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Facing Challenges in Virtual Healthcare Teams: A Scoping Review

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Health is an indispensable human right as declared in the World Health Organization constitution in 1946. This right was endangered by the outbreak of COVID-19 which induced strict quarantine measures to prevent the spread of disease, overloaded the healthcare networks, and caused the shortage of personnel. The interest in virtual care steadily rose even before the COVID-19 virus outbreak, but pandemics turned the growing interest into a need. While the demand for virtual care provision is high, the segment of virtual care is quite weighty, and both providers and patients agree that virtual care is inevitable at least for some part of care and some medical conditions.

The purpose of this study is to provide the basis for the further improvement of the delivery of virtual healthcare with the future expansion of healthcare technologies. The aim of the study is to explore qualitatively the challenges that members of virtual healthcare teams face while working with adult patients. The expected outcome is to synthesise the evidence of revealed data concerning the challenges and problems of virtual healthcare teams working with adults in the period 2018-2023. The research question is formulated as “What are the challenges faced by the members of healthcare teams in virtual settings while caring for adult patients?”

This master’s thesis was accomplished as a scoping review according to Joanna Briggs Institute with a predefined protocol. The search was performed in six related databases (PubMed, ScienceDirect, CINAHL-EBSCOhost, ProQuest, Wiley Online Library, and BASE (Bielefeld Academic Search Engine). A complementary manual search was also utilized. Critical appraisal tools were applied to the selected studies. Subsequently, the three-step screening process was used (screening by title, abstract, and full-text) with the application of predetermined inclusion criteria (studies in English in 2018-2023, participants are members of healthcare teams working in virtual settings) and exclusion criteria (reviews, editorials, commentaries, opinions, conference reports, blogs were excluded).

Overall, 1991 studies were found, and 25 articles (n=25) were selected for this scoping review after screening. The details of the search process are presented according to the PRISMA Extension for Scoping reviews guidelines in the PRISMA-ScR flow diagram. With the utilization of thematic analysis, six themes of reported challenges were revealed. These are challenges in the implementation of virtual care, technology- and patient-related challenges, challenges in virtual team dynamics, challenges impacting virtual teams’ members, and organization-related challenges.

Recognizing the challenges reported by members of the virtual healthcare teams can help organizations in developing working strategies for the provision of high-quality care and avoid costly problems. The findings of the thesis support the conclusions of previous research that the numerous challenges in virtual care delivery may obstruct the realization of the basic human right to health and should be addressed. The review may serve as a precursor for further studies in the complex and emerging field of virtual healthcare. With the synthesised evidence presented in this scoping review, policymakers and providers of virtual health care can formulate detailed questions that can be answered in further studies.

Keywords	Challenges, virtual care, virtual teams, healthcare, telehealth, telemedicine, digital health, scoping review

List of abbreviations

ScR	Scoping Review
EMR	Electronic Medical Records
GDPR	General Data Protection Regulation
HER	Electronic Health Records
HIT	Health information technology
IoT	Internet-of-Things
JBI	The Joanna Briggs Institute
MDT	Multidisciplinary teams
PCC	Population, Concept, and Context
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-analysis
PRISMA-ScR	PRISMA Extension for Scoping Reviews

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Appendices

1 Unresolved challenges in virtual care endanger the human right to health

Health is an indispensable human right (Ghebreyesus, 2017), and initially declared in the World Health Organization (WHO) constitution in 1946 (World Health Organization 2022), proposing that access to rights should be available without restrictions or discrimination for everyone. This right was endangered by the outbreak of COVID-19, a pandemic caused by Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV-2 pathogen). Initially started as a localized disease in China in December 2019, it was soon announced as a pandemic by WHO on March 11, 2020. A global outbreak of COVID-19, with millions of infected people, induced strict quarantine measures to prevent the spread of disease (CDC 2022), overloaded the healthcare networks, and caused a shortage of personnel (Habas et al. 2020; Ochani et al. 2021:20,33).

The interest in virtual care steadily rose even before the COVID-19 virus outbreak, but pandemics turned the growing interest into a need. Thus, virtual healthcare turned out to be almost a standard for healthcare provision at this time (Reeves, Ayers, and Longhurst 2021:3; Rodin, Lovas, and Berlin 2020:1) and was used widely as a viable alternative to physical visits to all populations, including vulnerable one (Bhatia et al. 2021: E113). Telehealth took its niche and hardly healthcare will be stepped away from the virtual environment due to the benefits it provides to all stakeholders. Koivunen and Saranto (2017:25) predicted the use of telehealth services would even rise in the future.

While the demand for virtual care provision is high, the segment of virtual care is quite weighty, and both providers and patients agree that virtual care is inevitable at least for some parts of care and specific medical conditions, yet no doubt that certain challenges exist in virtual care provision (Kichloo et al. 2020:5-7; Scott Kruse et al. 2018:5-10). These challenges and barriers are the reason for the occasionally conflicting views on the benefits and application of virtual healthcare (Doraiswamy, Abraham, Mamtani, and Cheema 2020:2; Manocchia, 2020:9).

The main issue is that virtual healthcare teams face certain challenges, which if left unresolved, prevent utilizing the full potential of such teams, thus limiting the quality of healthcare services. By being aware of them, virtual team members can handle them at the right time to prevent limitless problems and boost productivity. The ignorance of the

need to improve virtual care services may lead to pandemic unpreparedness in the future (Kichloo et al. 2020:1).

This study is undertaken to map the available literature and identify current challenges reported, which members of healthcare teams are facing while working with adult patients in virtual settings. The research question is formulated as What are the challenges faced by the members of healthcare teams in virtual settings while caring for adult patients?

Based on the range of revealed literature, it would serve as a precursor for future systematic reviews to ask explicit questions to avoid arising problems in the provision of virtual care. According to the purpose of this study, the format of the scoping review is chosen with the scoping review protocol of Joanna Briggs Institute (JBI).

Scoping reviews are utilized to map the available literature, report the published evidence in areas of interest, and serve as a foundation for further systematic review (Lockwood, dos Santos, and Pap, 2019:289). The results can help the policymakers and the providers of virtual health care to formulate detailed questions that can be answered in the systematic review. Consequently, effective solutions and programs can be initiated to avoid challenges if possible or, at least, to be prepared to overcome such challenges in the future.

The significance of this review is that it embraces the viewpoints of virtual team members working in all levels of health care, in primary, secondary, and tertiary care units with the combination of viewpoints presented by healthcare professionals working in virtual platforms.

2 Healthcare in virtual settings

2.1 Antecedents of digitalization

The technologies made a rapid leap from data processing to centralised computing in the 1980s. Soon, network computing started to develop in the 1990s. (Arms 2012:2-6.) Subsequently, the next step was Cloud computing, which allows storing big amounts of data and operating the computer systems without being limited to one physical storage device, which further facilitated the endless opportunities for further development of digital products. (Gopal, Suter-Crazzolara, Toldo, and Eberhardt, 2019:331; Paul, Maglaras, Ferrag, and Almomani, 2023:585.)

As an illustration, the achievement of combined related technologies, the Internet of Things (IoT) allows the connection of single devices into the collaborative network, where the devices can transmit and record data and link to each other, facilitating healthcare providers to able to access the health status of patients remotely (Hermes, Riasanow, Clemons, Böhm, and Krcmar, 2020:1046-1053).

The digital revolution affected many areas of life, but healthcare was impacted to a lesser extent than other areas (Gopal et al. 2019:329) and progressed at a slower pace (Fang et al. 2022:279; Hermes et al. 2020:1034-1035). Some researchers were concerned with the slower progression of digitalization in healthcare. Iyanna, Kaur, Ractham, Talwar, and Najmul Islam (2022:151-156) discussed the reasons causing end-users and organizations to resist the enablement of digitalization in the healthcare area. They named factors related to technology, laws, education, human factors, and organizational issues. Likewise, Stoumpos, Kitsios, and Talias (2023: 29-31) in their study devoted to acceptance of healthcare technologies examined the aspects of slower intake of digitalization in healthcare. They found the reasons for impediment lay in certain features such as lack of certain education of digitalization for users, the adverse effects, or to be more exact, shortcomings or flaws of digitalization products such as security issues, and ambiguous legal aspects (such as liability when digital solution fails) and suboptimal guidelines which needs to be developed in line with healthcare digitalization development. Regrettably, numerous regulations, laws, and policies still constrain the entrance of digitalization into the world of healthcare (Fang et al.

2022:282-283; Jonasdottir, Thordardottir, and Jonsdottir 2022:2; Mahoney 2020:442; Shaver 2022:518).

Nevertheless, many inventions bring benefits to the stakeholders in healthcare (Hermes et al. 2020:1052-1055; Paul et al.2023:575-585).

2.2 Virtual care as an evolutionary concept

Technology advancement is transforming virtual care (Jonasdottir, Thordardottir, and Jonsdottir, 2022:1; Jagarapu and Savani, 2021:6). Subsequently the terminology in this field is changing. Such terms as telehealth, telemedicine, telecare, Mhealth, and eHealth were developed to stay in line with the expansion of available benefits brought by technology. With the development of technology new concepts are entered into the domain of healthcare. The meaning of terms can also be different depending on which time it refers to. For example, the telemedicine concept in 1990 and 2000 differs significantly due to the latest innovations in communication and wireless technologies.

Nowadays many concepts starting with -tele-, such as telemedicine and telehealth, are still often used conversely (WHO. 2010:6; Gajarawala and Pelkowski, 2021:218; Mahoney, 2020:439). However, even though concepts are indeed close to each other, they have slightly different meanings.

Telemedicine as a term describing distant treatment originally was used in the 1970s (Doraiswamy et al, 2020:2; WHO. 2010:8). Since then, the term was reconsidered and now telemedicine is seen as the provision of medical services to patients by a healthcare professional remotely (Neddersen, 2020; Dubin, Fantus and Halpern, 2021:663). Telemedicine was thought to be used to eliminate geographical barriers. (WHO 2010:6).

The definitions of telemedicine vary greatly depending on the context and the current advancement of technology. Thus, Sood (et al. 2007) presented in the extensive concept analysis review the collection of 104 definitions which were scholarly peer-reviewed. The findings of Kruse et al. (2017:1) supplemented the results of Sood, as with the development of the concept, it is difficult, if not impossible to compare earlier and the latest studies operating with the concept because the meaning of the concept varied with time.

Telehealth, in comparison to telemedicine, is a novel topic in medicine that came into use in the 1990s (Kruse 2017:1). Telehealth is a significantly broader concept than telemedicine. It is a wider term since it embraces also non-clinical and other services related to health care distantly (Bitar and Alismail, 2021; Federal Communications Commission 2014; Gajarawala and Pelkowski 2021:218; Mahoney 2020:439; Roy, Levy, and Senathirajah, 2022:2.)

Telecare refers to the usage of equipment that can enable the possibility of care depending on people to live autonomously. Telecare devices may include such equipment as integrated sensors or alarm systems, or even devices used for remote round-the-clock care (Korkmaz Yaylagul et al. 2022).

Health information technology, abbreviated as HIT, is considered as all systems, that allow the operations with health-related data (such as storing, processing, transmission, and use), physical equipment and devices, related computer programs, and health-related applications, virtual platforms, and recent technologies to name a few (Jen, Kerndt, and Korvek, 2022).

Virtual care is the care provided in virtual settings. Such care is provided in teams, which can be either purely virtual, or hybrid ones.

Virtual teams are teams working in virtual settings and using remote communication channels (Mitzel et al. 2021:639). Before COVID-19 the accent was made that virtual teams were geographically dispersed (Efimov, Harth, and Mache 2020:2).

During COVID-19 and after coronavirus acute periods members of virtual teams can work in the same city or even organization but unite in virtual teams while caring for the same patient. Thus, the main idea was to continue the provision of health services without exposing personnel to the risk of infection and burnout, as well as to allocate the sparse resources of personal protective equipment for emergency cases and situations when patient treatment cannot be virtual (Becker et al. 2021).

Hybrid teams are healthcare teams working partly in virtual settings and partly in face-to-face services, as a hybrid type of both settings. (Ghanem, Rosso, and Rangel 2018:2-3; Oleksa-Marewska, and Tokar 2022:1). Some organizations may have certain teams for working in virtual environments (Khurshid, De Brún, Moore, and McAuliffe, 2020:3), while others compile the teams based on the current needs in respect to flexibility (Schwamm, Estrada, Erskine, and Licurse 2020: E282-283).

Healthcare delivered virtually is the working method to satisfy the needs of an ever-increasing aging population and allocate scarce resources. It also helps avoid time waste, costs, and efforts spent on transportation and facilitates the accession of healthcare services even in the case of strict lockdown situations or quarantines. (Haleem, Javaid, Singh, and Suman 2021:1-2,5; Naruka et al. 2022:1.)

2.3 Digitalization as an enabler of virtual care

The swift development of telehealth started in 2000. The main benefit of it is the access to care in sparsely populated or far-located regions, better outcomes for certain medical conditions, in addition to savings in allocated healthcare costs. (Barbosa, Zhou, Waddell, Myers, and Dorsey, 2021:463-476.)

The main purpose of telehealth is the ensure greater accessibility of care than traditional delivery of healthcare services. It was addressed via three main elements, access to the healthcare system, timeliness, and availability of required services. The access to healthcare system includes the removal of geographical barriers (factors preventing the transportation of patients, transportation time, and cost). Availability here indicates the obtainability of educated personnel (Barbosa et al. 2021:465). Timeliness deals with the possibility in time provide the required services, i.e. shorter waiting queues (AHRQ, 2018). Telehealth allows the provision of the expertise of multi-professional healthcare providers to be used for the benefit of the patient, ignoring time and geographic constraints.

There is growing interest in virtual healthcare teams (Barbosa et al. 2021:474; Li et al. 2019:1) Wherefore, the expansion of healthcare in virtual settings requires further attention because of some barriers which impede its advancement and application (Barbosa et al. 2021:475).

2.4 Impact of COVID-19 pandemic on healthcare

The imposed restrictions of lockdown caused by the COVID-19 pandemic decreased drastically the amount of healthcare services provided via traditional way (Corrao et al. 2022:46) Simultaneously, the demand for telehealth services escalated. For instance, in the US the need for telehealth skyrocketed from a fraction of a percent in April 2019 to an enormous eighty percent at its highest point during the pandemic (Karimi et al. 2020:1). In general, the healthcare systems in the world were not prepared to handle

the COVID-19 pandemics (Keesara, Jonas and Schulman, 2020). The possibilities of virtual healthcare were not exploited and even were not investigated to a full extent before COVID-19. (Shaver, 2020:518; Weigel and Ramaswamy, 2020). In reality, the implementation of new inventions of healthcare technology into the practice may initiate new challenges (Jen et al. 2022).

The enormous pressure on healthcare systems and the inability of old traditional healthcare delivery to satisfy the growing need for healthcare caused the sudden preference for telemedicine and telehealth with their unprecedented and unparalleled potential. The fast transformation of healthcare delivery was required to handle with vast amount of infected population in COVID-19 (Keesara, Jonas, and Schulman, 2020). Subsequently, the pandemics trigger the exploration and testing of new possibilities.

2.5 Specifics of teamwork and virtual care communication

Healthcare as a rule acts in teams. Indeed, almost no single therapeutic action is possible to care for the patient without the help of a dedicated team, where healthcare providers unite to provide holistic services for the patient and the patient's family. Teamwork in healthcare is the application of collective efforts in performing the task devoted to the provision of healthcare in the best way possible concerning the safety of patients (Anderson, Lavelle, and Reedy 2020:209).

Teamwork in healthcare is known to be complicated with the high rate of turnover and the high variability of experience and education of healthcare team members. Besides, the hierarchy in healthcare organizations causes difficulties in collaboration issues. (Anderson et al. 2020:209).

The coordination in virtual care is ensured by communication between healthcare providers. The communication in virtual settings is the interaction via asynchronous or synchronous communication tools. Both types of tools are practical with their benefits and constraints. The synchronous tools, i.e. taking place at the same time, are presented by mainly audio-based (phone calls, telephone conferencing), video-based instruments (video conferencing), or text-based (instant chat). The last type can be also semi-synchronous when the person is not online all the time or available. (Lowenthal 2022:1-10).

Asynchronous communication tools include emails, voice recordings, discussion or message boards or shared documents, and messengers, where communication happens with some delay or time lag. The border between synchronous and asynchronous communication tools sometimes is vague (Lowenthal 2022:9; Thomas et al. 2021:2).

The patient information systems are developed autonomously by medical institutions and organizations causing their inconsistency and the lack of possible integration. Therefore, the problem of inconsistent data appeared. The continuity of care became at risk of interruption with the diminishing level of safety and human error. The patient information systems and electronic health records databases should be interoperable to minimize such risks and ensure quality healthcare (Davis et al. 2016:4).

2.6 Previous research and gaps in literature

The utmost interest in related studies is the perception of patients receiving care from members of the virtual medical teams, the performance of such teams, and the evaluation of whether such virtual teams have a future in the field of healthcare, but little is known about how virtual environment affects healthcare team dynamics and what challenges do member of virtual healthcare teams face. Without acknowledging these challenges, the team dynamics would not be understood in full, moreover, the tacit problems and challenges are rarely solved and considered openly.

Indeed, the foremost attention in the latest studies is devoted to patients' perceptions (Koivunen and Saranto 2017:25). Viewpoints of the healthcare personnel were not the main point of interest. There is a gap in the understanding of how teamwork in healthcare can be enhanced (Anderson et al. 2020:208), challenges in access to virtual care, and other related challenges (Choxi, VanDerSchaaf, and Morgan, 2022:57; Mahoney 2020:442; Shaver 2020:527).

3 Purpose, aims, and research objectives

The purpose of this study is to provide the basis for the further improvement of the delivery of virtual healthcare with the future expansion of healthcare technologies.

The aim of the study is to assess the challenges faced by members of virtual healthcare teams and to explore qualitatively the challenges that members of virtual healthcare teams face while working with adult patients.

The objective of this study is to map the available literature in English in the period 2018-2023 based on predefined inclusion and exclusion criteria

The expected outcome is to synthesize the evidence of revealed data concerning the challenges and problems of virtual healthcare teams working with adults. As a result, the review would serve as a precursor for further studies. Afterwards, the policymakers and practitioners can use them as a working base in their policies to overcome the spotted challenges, improve the outcomes, and provide quality healthcare in virtual settings.

4 Materials and Methods

This chapter describes the methods used in the implementation of this thesis. The description of the search strategy and the methods of collecting, charting, analysing, and synthesising compiled data is given in detail.

4.1 Scoping review as a method

Qualitative research makes it possible to explore the complex phenomenon through the opinions of people who encounter this given phenomenon (Castleberry and Nolen, 2018:807-808; Vaismoradi, Turunen, and Bondas, 2013:398). The nature of qualitative research means that the researcher handles a big set of open-ended data, which is more complicated to handle in comparison to quantitative research, as the ideas and experiences are harder to analyse than numbers (Castleberry and Nolen, 2018:808). The thematic analysis is a suitable strategy to examine and condense the breadth of qualitative data as it enables to find conjoint themes throughout the full set of data (Vaismoradi et al. 2013:400).

This study was implemented as a scoping review with the utilization of The Joanna Briggs Institute (JBI) scoping review framework. The main purpose of the scoping reviews is to provide extensive and detailed descriptions of knowledge in the given topic instead of the report of the analysed evidence (Lockwood, dos Santos & Pap, 2019:287). A scoping review is a versatile tool when used for depicting the main principles as well as defining fundamental definitions in the given topic, discovering the existing evidence, and pointing out knowledge gaps (Munn, Stern, Aromataris, Lockwood, and Jordan 2018:408).

The nature of the scoping review enables the researcher to inspect broader areas and ask wider questions. The research protocol of scoping review grants the opportunity to embrace the evidence generated from the use of diverse research methodologies, including primary research, reports, reviews, and grey literature, to name the main sources of the available literature. A scoping review is better than other types of research in working with a broad layer of evidence. (Peters et al. 2021:263-265.)

According to the first methodologists of scoping studies, Arksey and O'Malley (2005:21-22), the main goals of scoping reviews are to explore the scope of available literature, to discover the gaps, to serve as a precursor to a systematic review and spread the findings to the policymakers and specialists. Another benefit of scoping reviews is the possibility to define broad research questions (Pollock et al. 2021:2016). The scoping review framework was upgraded to better suit to evolving methodological developments of scoping review guidelines (Peters et al. 2020:412). The transparency of the review and its consistency are the positive signs of the quality of the study (Peters et al. 2021:2-4).

The Joanna Briggs Institute (JBI), as a recognized international organization whose aim is to define and formulate procedures, provides high-standard guidelines for the synthesis of evidence-based knowledge in healthcare and distributes the empirically proved knowledge by decreasing the gap between scientific knowledge and its implementation in healthcare practices (Jordan et al. 2022:191; Püschel, 2022:1-2). All of this is possible through the collaborative system of several networks, including Evidence Synthesis Evidence Appraisal, and Evidence Utilization networks. (Vardell & Malloy 2013:435). The usage of JBI guidelines is recommended for scoping reviews as proven to be the most scrupulous so far (Pollock et al 2021:2105).

Because of the recommendation of Pollock (et al. 2023:521) to carry out the scoping review as a team, to keep conformity of recommendations, the librarian's help was used to define the search strategy and search terms to plan the search for this scoping review.

The JBI methodology was used to implement this review following the PRISMA-ScR approach, with the acronym stands for **P**referred **R**eporting **I**tems for **S**ystematic **R**eviews and Meta-**A**nalyses—Extension for **Sc**oping **R**eviews. PRISMA-ScR provides the instructions for comprehensive and visible implementation of all review stages, including search, synthesis, and reporting. (Sarkis-Onofre, Catalo-López, Aromataris & Lockwood, 2021:117-118). Additionally, JBI guidelines recommend presenting results in a tabular or graphic form as well as utilizing the basic frequency analysis to illustrate the scope of available data (Pollock et al. 2023:521).

4.2 PCC framework for research question formulation

An effective investigation requires effective research questions, and formulating the question is the first step for the quality review. (Bradley 2023; Ratan, Anand, and Ratan, 2019). The purpose of the investigation influences the choice of suitable clinical questions format (Munn et al. 2018) Joanna Briggs Institute recommends the **PCC** (**P**opulation, **C**oncept, and **C**ontext) framework for defining the precise and significant objectives, exclusion, and inclusion criteria and for assessing specified trends or issues. (Aromataris, and Munn, 2020:415; Pollock et al. 2021:2107).

Table 1 . PCC framework for identification of main concepts.

Population (P)	Concept (C)	Context (C)
Members of healthcare teams, adult patients	Challenges	Virtual settings

With the PCC framework, the research question is formulated as

What are the challenges faced by the members of healthcare teams in virtual settings while caring for adult patients?

4.3 Protocol

The protocol for this review is based on the methodological framework of the Joanna Briggs Institute (JBI) (Peters et al. 2015:142). The protocol should be obtainable for other researchers and can be published on either Figshare or OSF platforms designed for researchers in conformity with the JBI manual (Aromataris and Munn, 2020). For the easiness of accessing related records, the predefined protocol for this scoping review is presented in Appendix 1.

4.4 Inclusion and exclusion criteria

Criteria should be clearly defined before the search as is s directly indicates the level of validity of the study. Also, the reasons for the exclusions of the studies should be stated, explained, and documented thoroughly to avoid the risk of bias (Peters et al. 2021:2-3; Pollock et al. 2020).

The inclusion criteria were identified before the search based on the research question. The period for searching the literature was defined as years 2018 to year 2023, as the initial idea was to cover the timespan before the COVID-19 pandemic outbreak as well as the short time after it. The rationale for this is that during pandemics the care was shifted intensely to virtual settings, so the review was performed to find out whether the challenges faced were different before, during, and after the pandemics, to see how the virtual settings modified the provision of virtual care and to describe the challenges arisen in dynamics of members in healthcare teams in virtual settings.

The articles were chosen to be written in English and related to health care. As the dynamics of the virtual team working with mainly adults was the focus of interest, the pediatric and obstetric care teams were excluded from the search. Also, articles focused

on challenges faced by students or articles related mainly or partly to education or simulation of healthcare virtual teams were excluded from the search as irrelevant to the research question.

Inclusion and exclusion criteria are presented in Table 2.

Table 2. Inclusion and exclusion criteria.

Type of criteria	Included	Excluded
Types of participants	Members of healthcare teams	Medical students, patients, caregivers
Study design	Qualitative, quantitative, and mixed studies	Reviews
Settings	Virtual settings	Offline settings
Type of publications	Published articles and master and Ph.D. theses as grey literature	Editorials, commentaries, opinions, conference reports, blogs
Date of publication	2018-2023	Timespan excluding 2018-2023
Language of publication	English	Non-English

Reviews were excluded from consideration as secondary sources may have limitations in reliability. Secondary sources, even systematic ones, may be biased for several reasons. i.e., evidence selection, publication, and reporting bias to name a few (Baldwin et al. 2022:1; Drucker, Fleming, and Chan, 2016: E109-112). Scoping reviews have no limitations to use only peer-reviewed sources (Mak and Thomas, 2022:565; Pollock et al. 2021:521), which allows encompassing heterogeneous sources (Peters et al. 2021:3). Herewith grey literature as a source of valuable data was considered.

Tricco et al. (2016) stated that following the reporting guideline for scoping review is a must for amplifying transparency of applied practices, as later the validity and reliability of the performed study can be assessed by transparency. The checklist for scoping reviews adapted from Tricco et al. (2018:1, 4-5) recommendations were used as the basis for this master thesis and followed to ensure that this work is made according to PRISMA-ScR guidelines. The maximum checklist score of twenty-two was achieved,

meaning all related items were reported. The full checklist with reported items is presented in Appendix 2.

The objective of this scoping review is to map related concepts and define the key factors related to the concepts of interest, and to serve as a precursor to further studies.

4.5 Search strategy

The search was conducted according to the PRISMA guidelines for scoping reviews. The accuracy of reporting all steps of performing a scoping review directly contributes to the level of quality and practicality (Lockwood, dos Santos, and Pap, 2019:290).

The help of a search expert, i.e., of librarian, was used to be able to implement the precise search strategies in different databases as advised by proficiency in search strategies based on specifics of each database (Hanneke et al. 2017:7; Morris, Boruff and Gore, 2016).

The next databases were searched for the material Pubmed, ScienceDirect, CINAHL-EBSCOhost, ProQuest, Wiley Online Library, and BASE (Bielefeld Academic Search Engine). The last database was chosen as the extensive source of grey literature (Vähäkangas, 2023). The preliminary readings and assistance of the librarian aided in the definition of the search terms. It is important to find the appropriate equilibrium between high recall or broad coverage and high precision or narrow coverage searches (Nekolaichuk, 2023). A high recall search would bring more results, which ensures that the biggest share of related studies is identified. In practice, it is also increasing the amount of time to go over them as the number of unrelated studies is also higher (Hanneke et al. 2017:9).

According to the JBI's guidance, a three-step search approach was implemented (Peters et al. 2020). First, the trial search was initiated in the two suitable (i.e., related to healthcare) databases such as the CINAHL Complete (Ebsco) and PUBMED. Second, after a trial search the words in titles and abstracts of located articles as well as subject headings were investigated to perform the search in all databases. Third, the references of found articles were examined for additional related studies.

Hand search or manual search as a complementary search technique was used for this review from the reference lists of identified sources. This method is recommended to reduce the search bias or overcome the imperfections of indexing in databases (such

as “selective” indexing) (Peters 2020:418; Vassar, Atakpo, and Kash, 2016; Cochrane.org. 2019; Dreker, 2022). It also overcomes the limit of the search engine capability of the given database (Chapman, Morgan and Gartlehner, 2010:23). Also, this method allows to locate the studies with relevant information in a table or figure but without mentioning in the abstract (Cooper et al. 2020), otherwise such studies are usually missed in using merely search in databases. The combination of manual search used jointly with database search enables the extensive search of related literature (Hopewell et al. 2007).

Table 3. Key terms used in database search.

Database	Key terms
PUBMED	virtual teams AND healthcare OR telemedicine OR telehealth AND (challenges OR barriers) NOT students Filters used: Article type all, except reviews and systematic reviews, free full-text
CINAHL/EBSCO	("virtual teams" AND healthcare) OR (telemedicine team OR telehealth team) AND (barriers or challenges) NOT students
SCIENCEDIRECT	("virtual teams" AND healthcare OR “telemedicine team” OR “telehealth team”) AND (challenges OR barriers) NOT students
ProQuest	("virtual teams" AND healthcare OR “telemedicine team” OR “telehealth team”) AND (challenges OR barriers) NOT students Filters: excluded wire feeds
WILEY ONLINE LIBRARY	"(virtual teams AND healthcare OR telemedicine team OR telehealth team) AND (challenges OR barriers) NOT students"
BASE Bielefeld Academic Search Engine	("virtual teams" AND healthcare OR telemedicine team OR telehealth team) AND (challenges OR barriers) NOT students

4.5.1 Studies selection

The process of study selection was initiated at the same time as the search process. The confirmation of the suitability of the articles was made based on the triple system, i.e. title screening, abstract screening, and content screening against pre-selected inclusion and exclusion criteria.

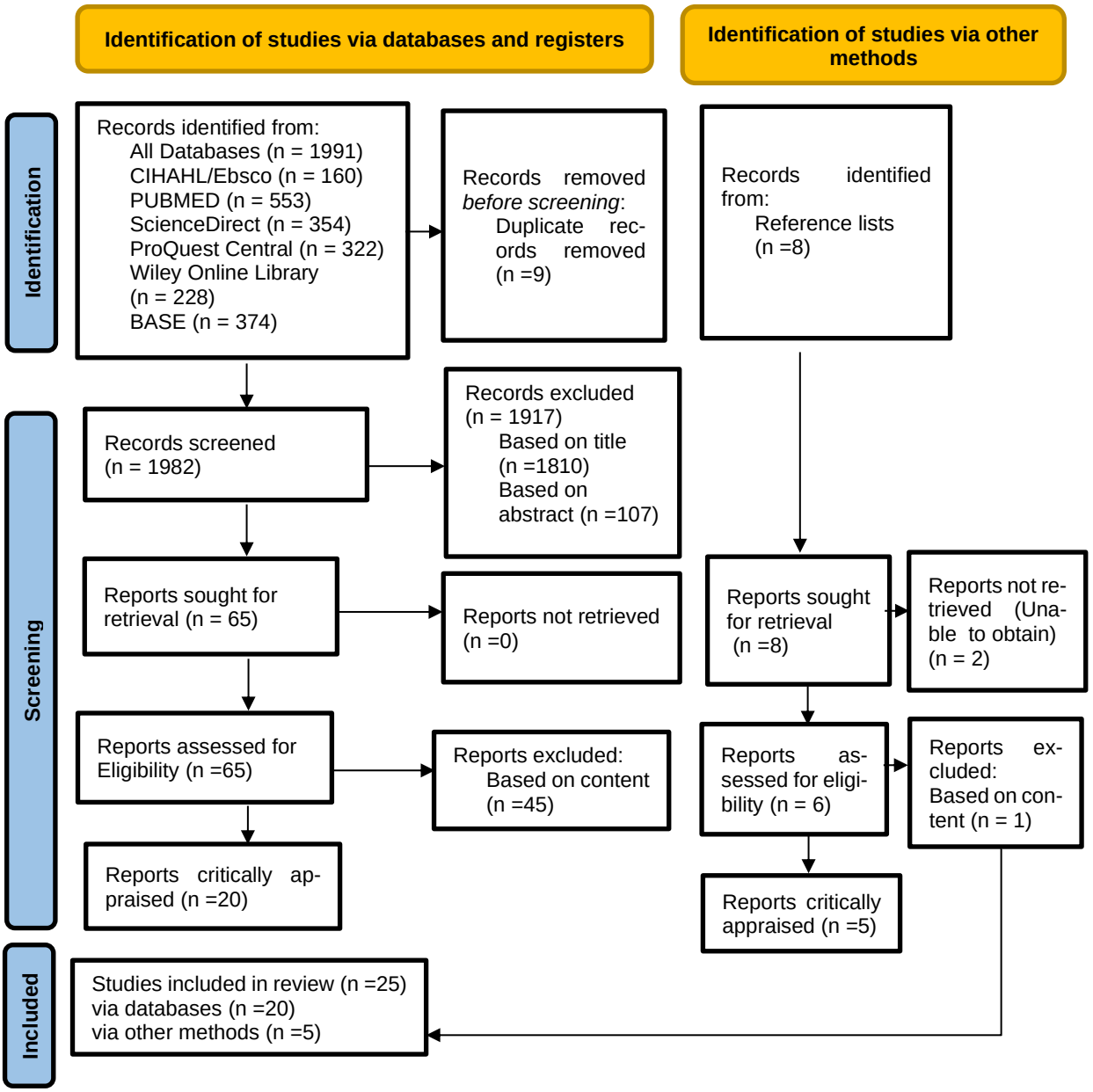

Figure 1. PRISMA-ScR flow diagram.

The search was performed in several sessions, whereas the last search session was made on July 30, 2023. Overall, 1991 studies were found. Nine duplicates (n=9) were removed, precisely two studies from PUBMED, one study from ScienceDirect, three studies from ProQuest Central, and three studies from BASE. Out of the available data, 177 studies were selected by title.

Overall, 1917 articles were removed as incompatible with research question-based and abstract, leaving sixty-five studies (n=65) at the centre of researcher attention. Subsequently, based on content screening, 25 articles (n=25) were selected for this scoping review. The details of the search process are shown in Fig.1 PRISMA-ScR flow diagram, which follows the PRISMA guidelines (Page et al. 2021).

4.5.2 Critical Appraisal

Routinely the critical appraisal of the studies selected for scoping review is not implemented. Appraisal of selected articles in scoping review is not usually performed because such reviews' aim is to generate a wide-ranging summary of the collected data (Peters et al. 2021:2). The requirement for critical appraisal is usually omitted as the aim of such review is to make the overview of the available evidence on studied phenomena or report the answer concerning the breadth and scope of the obtainable material (Peters et al. 2020:408).

However, to compensate for the bias of one researcher the studies selected were critically appraised with JBI’s critical appraisal tools, and the checklists for corresponding research were used. Indeed, the results based on studies whose quality assessment is not performed can be misleading and deceptive (Pollock et al. 2023:524-525).

Among the selected studies the studies were critically assessed according to the type of study. For example, two studies were appraised according to cross-sectional critical appraisal (Moola et al. 2020), and the rest, twenty-three studies were critically assessed by qualitative research studies appraisal tool (Lockwood, Munn, and Porritt 2015:183) The chart represented critically appraised selected studies and their scoring is presented in Appendix 3.

4.5.3 Data extraction, thematic analysis, and data synthesis

The way of data collection and analysis is contingent on the purpose of the scoping review. First, the outline of the extraction table should be done and tested. Second, the emergence of unexpected, yet useful data in the selected studies may require adjusting the headers of charting forms to include all the data related to the research question. The template for the extraction form for this review was created in conjunction with the JBI recommendations (Aromataris and Munn 2020:420-421). The extraction chart was created in Excel Spreadsheet, as it allows to easily tailor the extraction fields if required. On the other hand, this tool has the limitation of the manual entry of data and review, and, consequently, may show less accuracy in operating the data (Nachmann, 2023).

Initially, the data on studies' characteristics (such as country, year, and research design), context components (settings, population, and specialty), and key findings (such as challenges faced) were extracted. Then the data is analysed with thematic analysis and presented in narrative form.

Thematic analysis was chosen as the analysis method for this scoping review. The reason for this selection was the certain advantages provided by this method based on the large amount of complex qualitative data related to healthcare teams acting in virtual settings.

Thematic analysis is named as an explicit method in the analysis of qualitative data of any size, as it is flexible, allows an inductive approach, and is unrestricted (Herzog, Handke, and Hitters, 2019:2-4). Its flexibility is seen as an advantage because the researcher actively decides about the practice of analysis (Braun and Clarke, 2006:78). However, in the case of a novice researcher the same can be a threat as such researcher may feel unconfident while aiming to get scrupulous analysis, feeling, "potentially paralysing" in tough decision what characteristics of data to concentrate on an extensive pool of evidence (Braun and Clarke, 2006:97) and the variability i.e. inconsistency of developed themes (Nowell, Norris, White, and Moules, 2017:2; Purssell and Gould, 2021:3). The other benefits of such analysis that it can lead to the revelation of unexpected findings, providing a synopsis of central aspects of a large set of data (Braun and Clarke, 2006:97).

The inductive approach for thematic analysis is used, i.e., the themes are not predefined, but determined by the data itself (Braun and Clarke, 2006:83). The thematic analysis is not a straight line, but a “recursive” process (Braun and Clarke, 2006:86; Vaismoradi et al. 2013:402)

Braun and Clarke consider the thematic content method fundamental for the analysis of qualitative material (2006:78) and noted its high adaptability. They suggested six stages in the process of such analysis, from

- acquainting with the data, examining, and studying the information carefully,
- generating codes as they emerge from the texts,
- then arranging the coded data into clusters according to their meaning, and then assessing again based on the initial level (the coded samples of information) and on the higher level (overall set of available data from studies).
- Clarifying and amending the themes' names according to the details arising from the themes,
- Writing the final analysis based on the revealed themes (2006:86-87).

Braun and Clarke (2006:86-87) underlined the significance of performing the steps in a repetitive manner as well as seeing writing as an inherent attribute of the method, so the analysis is performed on a whole set of data and writing is performed on each step, from recording initial concepts in the first phase to final analytic report in the last phase.

The process starts with the primary level grasp of meaning, where every single subject or matter mentioned in the data is assigned a code if the researcher defined it as significant or relevant to the research (King, 2004:257; Purssell and Gould, 2021:5; Roberts, Dowell and Nie, 2019). A theme emerges when at least two codes are joined together by a meaningful pattern (Sandelowski & Leeman 2012; Vaismoradi et al. 2013:402).

Thematic analysis and content analysis have common traits and are often used in qualitative studies. The content analysis can derive the meaning from the basic frequency report, defining the importance of the theme depending on how often it appears in the data. On the contrary, the thematic analysis seeks to find information related to the research question where even the less mentioned theme is of the same importance as other, more often mentioned ones. (Vaismoradi et al. 2013:402-403). Another distinction of thematic analysis is the visual presentation of the results, the so-called thematic map (Vaismoradi et al. 2013: 403), which helps to see the interrelationships of discovered themes.

Data synthesis

Wide-ranging unprejudiced synthesis of pertinent studies is the main objective of scoping reviews. The extracted data may be presented graphically or in figures (Lockwood, dos Santos, and Pap, 2019:287) for ease of perception.

5 Results

5.1 Overview of included studies

In total 25 studies were selected. Two studies (n=2) were conducted before the COVID-19 pandemic, whereas the rest. i.e., twenty-three (n=23) were written in the years 2020-2023. The interest in challenges brought by virtual care was quite steady, yet low before COVID-19. Worthy of note that among articles selected for this scoping review in the timespan 2018 -2023, none of them was dated 2019 (n=0).

Following by COVID-19 outbreak, the interest was rising from two articles (n=2) in 2020 to its' peak, exposing eleven studies (n=11) in 2021 and eight studies (n=8) in 2022. The last year, 2023, brought four articles (n=4) (the search was made in July 2023, thus only articles published by this time were discovered).

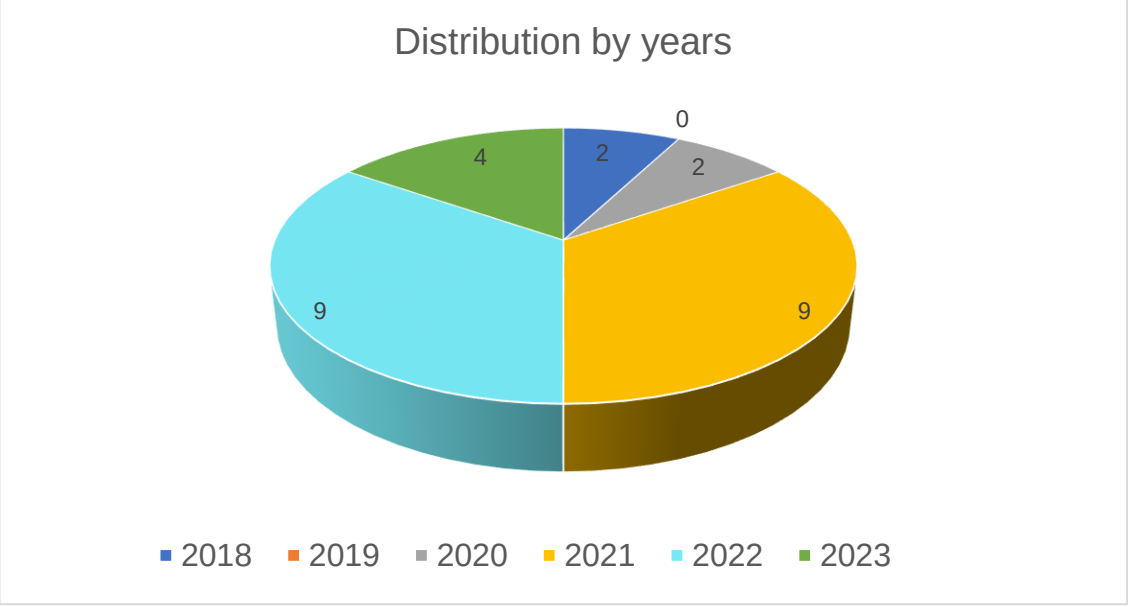

Figure 2. Overview of included studies.

Nonetheless, this does not mean that there was no interest in virtual care studies. As seen, it is rather an indication that the challenges were not of primary interest.

The leading country in investigations of challenges faced by members of virtual healthcare teams is the US with eight and a half studies (n=8,5), where one study was implemented jointly with Canada.

In its turn, Canada generated seven and a half studies (n=7,5), while UK researchers conducted six studies (n=6). Finland and Sweden conducted one joint study (n=1). Other countries conducted one study per country (Australia, Jordan, and the Netherlands). In total, eight countries analysed challenges in the virtual healthcare area.

Out of all articles selected for the purpose of scoping review, eight studies (n=8) were focused on challenges in tertiary care, six studies (n=6) examined the challenges in primary care, and six studies (n=6) were concentrated on secondary care teams. In addition, two studies (n=2) examined multiple practices, and the attention of the rest three studies (n=3) was pointed at virtual practice.

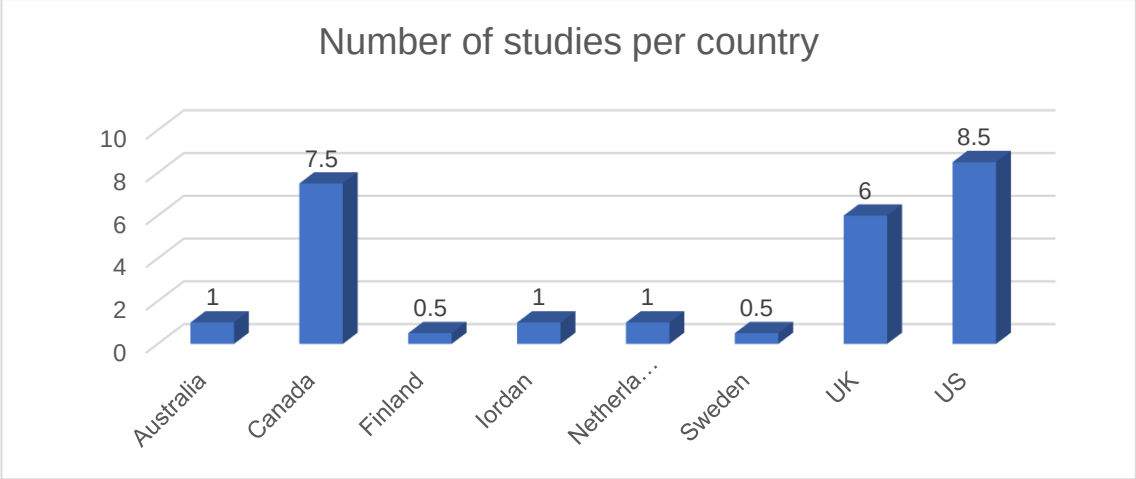

Figure 3. Number of studies per country.

Out of all articles selected for the purpose of scoping review, eight studies (n=8) were focused on challenges in tertiary care, six studies (n=6) examined the challenges in pri-

mary care, and six studies (n=6) were concentrated on secondary care teams. In addition, two studies (n=2) examined multiple practices, and the attention of the rest three studies (n=3) was pointed at virtual practices such as platforms, hubs, or virtual team rounding programs.

The distribution of interest paid by researchers to different levels of care (primary, secondary, or tertiary) is disproportionate. As a matter of fact, the interest in challenges in virtual primary care settings was shown exclusively by researchers from Canada and the US.

Attention to virtual teams' challenges at the secondary care level was paid by researchers from Canada, the UK, the US, the Netherlands, and Jordan. In contrast, the concern for challenges for virtual healthcare team members working at the tertiary level was expressed by researchers from Canada, the UK, the US, Australia, Sweden, and Finland. The challenges faced by virtual healthcare members in a virtual setting (more than one level) were of interest to UK and US researchers.

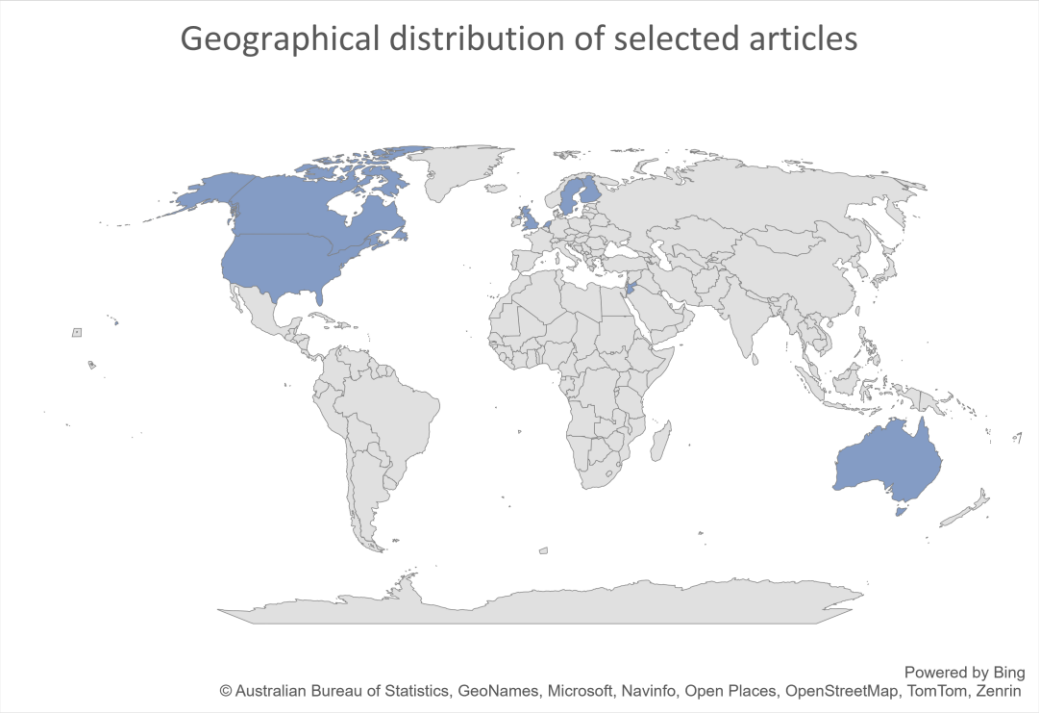

Figure 4. Geographical distribution of selected articles.

Similarly, virtual settings such as hubs, platforms, or virtual rounding programs and related challenges were of interest to researchers from the UK and the US. The geographical distribution of selected articles, participants distribution, and percentage are seen in Figure 4.

Country of study	Articles	%	Participants	%
Australia	1	4%	21	2%
Canada	7	27%	220	19%
Canada/US	1	4%	20+22	4%
Jordan	1	4%	24	2%
Netherland	1	4%	51	5%
Sweden/Finland	1	4%	5+15	2%
UK	6	23%	595	53%
US	8	31%	159	14%
Total	**26**	**100%**	**1132**	**100%**

Table 4. Percentage distribution of selected articles by country and the number of participants.

Concerning discipline or profession, the members of virtual healthcare teams consisted of oncologists, palliative care physicians, histopathologists, nurses, surgeons, radiologists, palliative specialists, psycho-oncology clinicians, and other healthcare and administrative workers. To conclude, the overall examined population was 1132 members of healthcare teams working in virtual settings.

5.2 Overview of revealed themes

Altogether six themes were revealed. The themes are closely related to each other. Every theme consisted of several subthemes.

Challenges associated with the general implementation of virtual care, specific challenges related to technology, the ones which were patients related, also challenges for virtual team members, and team dynamics were revealed. The organizational and reimbursement challenges were connected in one theme as often mentioned together in the studies.

The thematic map is presented to see the interrelations between the themes and sub-themes.

Figure 5. Thematic map of revealed themes and sub-themes.

5.2.1 Theme 1. Challenges in the implementation of virtual care

Virtual communication and collaboration are difficult

Virtuality made communication more complex and, as noted during the coronavirus pandemic, according to 31 percent of respondents, had a destructive effect on inside team communication (Soukup et al. 2023:5; Hargreaves et al. 2022:86). Team collaboration suffered from it and became a demanding process (Ashcroft et al. 2023:7).

Communication in a virtual setting was more complicated for introverts, who finally refrained from input into team meetings, leaving the team with valuable comments and staying demotivated team members (Hargreaves et al. 2022:91-92)

Virtual communication is different from "face-to-face"

Members of healthcare teams noticed that communication in remote settings differed from traditional communication. Some remarked that problems with supporting their viewpoint unlike during traditional person-to-person meetings and were pitiful of losing such positive aspects of communication (Rajasekaran, Whitwell, Cosker, Gibbons, and Carr, 2021:5.)

Lack of non-verbal cues

The lack of non-verbal cues influences had a negative effect on the assessment capacities and opportunities of healthcare providers (Ashcroft et al. 2021:6; Budhwani et al. 2021:7; Taylor et al. 2020:7) and turned it into a burdensome process (Donnelly, Mills, Gill, Mehta, and Ashcroft 2022:4).

This happened because some important information was not received such as feelings on the faces were not seen, and other non-verbal behaviour implications, like gestures, smell, agitation, or stress could not be used as the basis for assessment (Ashcroft et al. 2021:6; Budhwani et al. 2021:7; Feijt et al. 2020:3: Taylor et al. 2020:6).

This lack of nonverbal cues led to challenges in establishing rapport with the patients and limited the possibility to unambiguously deliver the anticipated message to the other side and to read patients responses (Butt et al. 2022:1370; Feijt et al. 2020:3; Hargreaves et al. 2022:4; Jarva et al. 2022:1387). It also initiated mistrust in own competencies and suspicion whether the “patients’ needs are understood and met” (Rosa, Lynch, Hadler, Mahoney, and Parker 2022:818).

In these circumstances, natural empathic “nonverbal support” was impossible to demonstrate, which in some cases negatively influenced job satisfaction (Hargreaves et al. 2022:4; Rosa et al. 2022:819-821).

Lack of face-to-face contact

Some healthcare providers supposed that the benefits of face-to-face interaction cannot be replaced (Alarabyat et al. 2023:5; Ray 2022:38;) as the virtual environment significantly limited the possibilities for obtaining the whole picture based on the subjective patient information and based on this, the provision of holistic care (Butt et al. 2022:1368; Rosa et al. 2022:818-821; Westley, Mistry, and Dheansa 2022:96).

Online counselling was perceived as challenging in the absence of personal contact (Jarva et al. 2022:1384-1386). Furthermore, the deficit of face-to-face interaction had a negative impact on establishing and developing therapeutic bonds (Breton et al. 2021:8). This concerned mainly the patients who required help with social interactions and emotional assistance as well as new patients without yet established therapeutic relationships (Breton et al. 2021:8; Hargreaves et al. 2022:4).

Some members of virtual teams felt lack of face-to-face contact caused distrust in their relationship-building skills (Rosa et al. 2022:818; or was distressing (Hargreaves et al. 2022:2).

Communication became more distant

The absence of touch in virtual settings might cause the communication to become emotionally detached. As a result, it might ruin the reliability of healthcare professional practice (Rosa et al. 2022:821; Taylor et al. 2020:6).

Limit of virtual communication channels

Virtual communication imposed its limits when the need arose to explain the complicated “clinical updates and rapid changes in clinical status that required difficult decision-making by families” (Rosa et al. 2022:819). Asynchronous virtual communication channels (email, for instance) could not be an appropriate channel for exchanging time-critical messages (Patel et al. 2021; 4; Voruganti, Husain, Grunfeld, and Webster 2018:2788).

The **risk of miscommunication** was associated with multidisciplinary teams or in the case when a considerable number of medical professionals in numerous medical centers care for a patient (Voruganti et al. 2018:2787).

Inadequate information flow was reported as a challenge as the indispensable information is either duplicated or not presented for consideration. At the same time, healthcare providers described the necessity to reiterate the same information for the different family members every time a new family member accompanies the patient. (Voruganti et al. 2018:2787).

Privacy challenge was the major sub-theme. This concern was expressed by health care providers both for themselves as well as for patients.

The patients had inconveniencies to ensure that they have possibilities to find a safe room or area to discuss sensitive issues to ensure their privacy during virtual appointments or virtual care sessions (Borg Debono et al. 2023: 5; Budhwani et al. 2021:7; Butt et al. 2022:1370; Feijt et al.2020: 4; Goldberg et al. 2021: 3040; Jarva et al. 2022:1387; Soukup et al. 2023:8). Likewise, the health care providers noted their privacy could be breached as with the use of asynchronous digital communication channels. As reported, some patients expected the day-and-night reach of their caring team members. (Alarabyat et al. 2023: 6; Breton et al. 2021:9; Voruganti et al. 2018:2789) Such overwork, if not restricted, caused healthcare providers' burnout (Alarabyat et al. 2023:5).

Virtual care fatigue

Healthcare team workers noted fatigue linked to the provision of virtual care (Breton et al. 2021:7; Butt et al. 2020:1369; Donnelly et al 2020:4).

Budhwani et al. (2021:6) reported the appearance of the term "Zoom fatigue". The sessions of virtual care were exhaustive, more stressful, and demanding (Budhwani et al. 2021:6; Breton et al. 2021:11; Feijt et al. 2020:4)

Healthcare providers named reasons for fatigue. They experienced it because of intensified efforts as because of overall lessened interaction and exchange of information with team members, more consideration and concentration were required in virtual settings. They also perceived virtual sessions as a new stress factor during the transformation of modern healthcare provision requirements (Ashcroft et al. 2023:7). Virtual team members also named among the reasons for the utmost efforts to understand the patient reactions during virtual communication without or with limited nonverbal cues, for instance, "read silences", handle interruptions and develop therapeutic relationships

in such environment. To adequately handle virtual sessions, health providers either needed to restrict the number of virtual patients per day or take pauses for restoration (Butt et al. 2022:1369). Members of virtual healthcare teams put more effort than usually expected for quality care provision in dealing with groups or those patients whose skills to make well-thought-out decisions are compromised (Feijt et al. 2020:4).

(Un)suitability of virtual care

The challenge with (un)suitability of virtual care was raised. The members of virtual care teams asserted that not all conditions, diseases, treatments, required assessments or examinations, patients, and related groups (caregivers, family members) were suitable for providing virtual care or treatment sessions (Alarabyat et al. 2023:6; Ashcroft et al. 2021:5; Donnelly et al. 2022:5-8; Feijt et al. 2020:3; Westley et al. 2022:96). Some healthcare providers found unacceptable to deliver virtually regrettable information about patient condition or disclose diagnosis (Hargreaves et al. 2022:4). The suitability of the certain patient and situation should have been taken into consideration (Ashcroft et al. 2021:9) as was noted in Jarva et al. study findings that "Everything cannot be in a digitized form" (2022:1384).

Additional efforts were required to arrange virtual care

Members of healthcare teams observed that they require additional efforts to arrange and coordinate virtual care. Even booking a virtual appointment or informing about arrival to the virtual session caused problems (Budhwani et al. 2021:5).

Additionally, healthcare providers realised that organisational duties took more time than performing in face-to-face sessions such as asking for additional related information (for example, vital signs, and body parameters) or delivering materials after the appointment (medical receipts, relevant learning material). Some new tasks appeared in the list as to ensure whether the patient could organize a private place for the virtual appointment and to remind about forbiddance to record virtual appointments if such restriction was in force in healthcare units. (Budhwani et al. 2021:5-6.)

Healthcare providers needed to remember or keep the lists of passwords needed to log in and use EHR (Electronic Health Records), EMR (Electronic Medical Records), or other computer programs related to patient care, and overall realised that the browsing the computer systems was interminable (Hoonakker and Carayon, 2018:14). Planning

and arrangements for multidisciplinary teams (MDT) online-conferences entailed additional time (Soukup et al. 2023:8). To sum up, obstacles were arisen because of complicated virtual collaboration (Ashcroft et al. 2023:5).

Lack of physical assessment

The lack of physical assessment brought certain difficulties that members of virtual healthcare teams had to overcome. Not only checkups and condition evaluation became more complicated with the absence of physical examination (Borg Debono et al. 2023:5; Jarva et al. 2022:1389; Rosa et al. 2022:818), but also diagnosing based on such deficient data was prone to error (Breton et al. 2021:5-10). Especially telephone remote appointments were complicated because only verbal information was presented depending on the patient's and healthcare provider's abilities to express, understand, and participate in verbal communication (including linguistic and listening skills of both sides) (Breton et al. 2021:5). Some named the lack of physical assessment as the major challenge of virtual health provision (Ray 2022:36).

Limits of virtual care

Some saw clear limits of virtual care because the full usual examination of patients was not possible remotely (Howland et al. 2021:784). Due to the nature of healthcare tasks some remote specialists relied on those colleagues who were physically in hospitals to perform their tasks which required the presence in hospitals, so the first felt about themselves burdensome for coworkers (Rosa et al. 2022:819).

In the case of telephone appointments, the healthcare providers could not evaluate the patients' environment and interaction between patients and caregivers (Hargreaves et al. 2022:7).

The virtual settings could bring the perception of formality and indifferent care (Ray 2022:36). As such, it prevented fostering virtual healthcare team collaboration and communication (Rajasekaran et al. 2021:5).

Virtual care is less efficient

In some cases, virtual healthcare team members felt that virtual care was less efficient than care provided personally face-to-face. Some noted that less input in face-to-face

contacts produced the same results in therapeutic relations, so thus elicited a question of efficiency (Budhwani et al. 2021:6; Donnelly et al. 2022:8; Ray 2022:40).

Virtual appointment delay

Sometimes healthcare providers experienced challenges with virtual appointment delays. To exemplify, for the most part, there was no optimal way to convey the message to waiting patient in a virtual environment that the virtual appointment was late and postponed for some time (Breton et al. 2021:6; Budhwani et al. 2021:5).

Interruptions

Some reported the interruptions as challenges in virtual care. Such interruptions required time to solve an urgent problem to the detriment of the current virtual session or search to whom healthcare provider could delegate this urgent task. (Hoonakker and Carayon, 2018:14.)

Duplication of appointment

When limitations of remote appointments turned out to be critical (for instance, the need for physical examination), the patients ended up with face-to-face visits to receive the necessary care or diagnosis. This issue, in fact, occasionally doubled the number of appointments, which turned out to be suboptimal in terms of resource usage (Breton et al. 2021:5).

5.2.2 Theme 2. Technology-related challenges

The abrupt shift to care in a virtual setting imposed numerous challenges, particularly technological difficulties.

The major set of problems with technology occurred during video appointments or sessions (Butt et al. 2022: 1370; Westley et al. 2022:96-97). One of the problems was seen with a problem with Internet technology framework with the current limitation of bandwidth and steadiness of signal (Feijt et al. 2020:3), i.e. capacity of the Internet

due to its direct relations to quality and speed of Internet connection. For some areas such as rural or distant, it was a key concern (Donnelly et al. 2022:3).

Especially when the several video appointments or sessions took place from one clinic at the same time. This caused insufficient connection speed, causing pauses, delays or drop in quality in sound settings and the abovementioned addition to suboptimal pixelated images for video settings, which interrupted the sessions and incurred a decrease in curative outcomes of such sessions. (Ashcroft et al. 2021: 6; Becker et al. 2021:1720; Breton et al. 2021:8; Budhwani et al. 2021:5; Westley et al. 2022:97.)

Butt et al. (2022:1370) and Soukup et al. (2023:9) reported such constantly split sessions as the source of frustration for both sides. Taylor et al. (2022:6) supported the presence of such emotions and explained the risk of not receiving information and as a result, the risk of miscommunication because of technical failures.

The limits of technology and acknowledgment that it was not perfectly infallible (Breton et al. 2021:5-8), unstable and unpredictable work of equipment and network (Alarabyat et al. 2023:5: Soukup et al. 2023:8); quality of network connection (Ashcroft et al. 2021: 6; Jarva et al. 2022:1387; Rajasekaran et al. 2021:5), all of these were in the list of technological difficulties. The respondents of Hoonakker and Carayon (2018:13) also reported typical telecommunication challenges.

The other challenges listed were an abundance of various software applications which brings insecurity and a lack of confidence, to a certain extent because of keeping a register of needed passwords to all programs needed for virtual care sessions (Patel et al. 2021:5-6). Remote access was also listed as challenging (Soukup et al. 2021:5), as respondents encountered problems with the entrance or instability of the virtual platforms.

Lack of needed equipment for organizing the distant appointment (Breton et al. 2021:8) as well as maintaining the equipment in working condition (i.e. charging, tracking, etc) (Becker et al. 2021:1720) were also mentioned.

Members of virtual healthcare teams felt that they need either the capability to fix arising issues with technology or understand when it is time to ask for IT assistance (Jarva et al. 2022:13) Breton et al. (2021:11) warned that the technological challenges should

be seriously considered, as they hindered the provision of quality care and arise barriers for patient to use health care services in virtual settings.

Devices

A certain number of patients did not have access to essential devices (Ashcroft et al. 2021:6; Breton et al. 2021:4-8; Feijt et al. 2020:3; Ray 2022:37). Borg Debono et al. (2023:5) stated that the about 15 percent of patients experienced lack of devices or availability of the Internet. Some members of the virtual health care teams depended on the use of the help of caregivers of friends as such patients without necessary devices were unable to participate in remote appointments (Goldberg et al. 2021:3040).

Not only that, but members of the virtual healthcare teams suffered from an inadequate supply of devices (Feijt et al. 2020:3). Besides, devices were reported to break down and stop working (Alarabyat et al. 2023:5).

Health technology literacy

Health technology literacy was an actual challenge for some healthcare providers. The member of healthcare teams confronted numerous problems while working in virtual setting with platforms or accessing information from electronic health records (EHR) because of insufficient computer competences (Becker et al. 2021:1720; Taylor et al. 2020:6). Otherwise, they were facing problems in running remote appointments, browsing the needed information in digital medical records, consequentially being lost during and after the remote session to make all the needed routines (Breton et al. 2021:5). Health care professionals indeed necessitated the ability and knowledge in resolving arising technical and technological challenges (Jarva et al. 2022:1384).

Disintegration of EHR databases

The abundance and disintegration of numerous EHR databases was a known challenge. Healthcare providers frequently used several such databases with unmatching interfaces or inconsistent integration which meant limited possibilities for sharing patient information with other health providers (Burton et al. 2021:5; Howland et al. 2021:783).

The lack of integration caused feelings of disappointment and irritation since delays in sharing information among health providers negatively affect the in-time realization of the latest recommendations (Burton et al. 2021:5). Some members face challenges in becoming proficient in managing their duties in medical databases and electronic health records (Howland et al. 2021:784).

Technological distraction and wish for helpdesk

The concentration on technology instead of meeting subject was not uncommon (Taylor et al. 2020:6). It was also challenging to choose the proper and suitable virtual care platform in a short time (Donnelly et al. 2022:8). Some respondents wished for an easily accessible IT helpdesk (Feijt et al. 2020:4).

5.2.3 Theme 3. Patient-related challenges

The patient's access to technology was the major sub-theme in patient-related challenges. The challenges with access were seen in two aspects: the lack or low digital skills of patients, and the absence of the needed tools or equipment to assess health technology.

Members of health care virtual teams were alarmed that some patients have no access to technology, staying thus out of the telehealth sphere (Ashcroft et al. 2021:6; Borg Deboho et al. 2023:4; Breton et al. 2021:4).

Certain patients were computer illiterate (Breton et al. 2021:4; Feijt et al. 2020:4) or felt distress while using technology (Donnelly et al. 2022:4; Ray 2022: 37-38), being deficient in high-speed Internet, lacked needed devices such as laptops, cameras, microphone, causing them using phone appointments instead of video sessions (Borg Debono et al. 2023:5; Breton et al. 2021; Ray 2022:37; Westley et al. 2022:96).

Access to technology was especially problematical for vulnerable patients, people who are elderly, non-native English speaking, with previous trauma background (Ashcroft et al. 2021:6; Budhwani et al. 2021:7) had low computer skills, mental or sensory disabilities, or economically disadvantaged or from low social class (Breton et al. 2021:4; Goldberg et al. 2021:3040).

Respondents noted that the language and socioeconomic status of might have served as an obstacle to technology access (Butt et al. 2022:1369; Donnelly et al. 2022:4; Westley et al. 2022:97). Obstacles also could include the lack of private area to organize the appointment confidentially and securely (Borg Debono et al. 2023:4).

These people might have been obstructed in any step of virtual care, starting from lacking computer skills or devices, Internet connection to problems, downloading and installing needed software, with registration in virtual platforms or applications to challenges in participating video appointment (Breton et al. 2021:8; Budhwani et al. 2021:7; Ray 2022:37). Patients needed assistance in these steps, particularly those owning the older version of required devices (Budhwani et al. 2021:5).

Healthcare providers often required to employ the help of caregivers to help with organizing remote appointments (Goldberg et al. 2021:3040;), but sometimes patients did not have people around to help them with these issues (Breton et al. 2021:4). Some providers noted misunderstandings in using virtual platforms. As Alarabyat et al. reported technology was used incongruously and a few patients knew how to use technology appropriately (2023:4).

Patient attitudes toward virtual care

A whole range of patients' attitudes was observed by members of virtual care teams, among these security challenges, expectations, and concerns.

Healthcare professionals sometimes encountered dual patient attitudes when caring for them virtually. Typically, patients felt relaxed while being treated online, but at the same time the feeling of "personalized interaction" was missing (Ray 2022:36). Some healthcare providers dealt with the resistance of patients to be treated virtually, to take time to a long discussion and eliminate expressed fear toward "using technology", which was especially true when patients face severe illness (Alarabyat et al. 2023:4).

Patients have varied attitudes toward virtual care. Some reorganize their expectations with the use of new technologies, assuming healthcare providers were to be constantly available for discussion with new communication channels (Breton et al. 2021:8) Some patients directly articulate their objection against virtual settings (Ray 2022:38) So it is essential to figure whether the patients have predispositions toward telehealth (Hargreaves et al. 2022:4).

Security challenges were disclosed by members of virtual healthcare teams, such as cybersecurity combined with health networks and platform's reliability and security settings, sensitive information leaks threats, and virus susceptibility (Donnelly et al. 2022:4).

Healthcare providers also noted the low or limited patient commitment. It was seen in such situations when patients did not accept calls coming from unfamiliar phone numbers or do not arrange their everyday chores. In this way when the virtual appointment call was scheduled and made, the patient was easily interrupted, or the privacy of the patient was suffering, for example, virtual sessions were arranged during driving or while a patient was in public places (Breton et al. 2021:8).

Healthcare providers also observed that the communication of patients, who spoke another language, or when the appointment communication flow was mostly arranged via an interpreter, was more challenging for both sides. Such situations were more prone to incomprehension as well as mutual understanding was difficult to achieve (Butt et al. 2022:1369). Furthermore, the providers received the concerns of patients concerning the quality of virtual care (Goldberg et al. 2021:3040) and certain requirements because of cultural differences (for instance, personnel of the same gender as the patient (Alarabyat et al. 2023:5).

5.2.4 Theme 4. Challenges in team dynamics

The team dynamics theme comprised many sub-themes. As can be seen, the blurred coordination and workflow processes, challenges in team collaboration and interaction, specifics of virtual communication, exchange of information, and knowledge sharing become complicated. Finally, the groupthink threat was rising. Roughly the third of the sub-themes revealed the unclear coordination of virtual team workflow.

The discoordination was seen in the first line in conflicting schedules for team meetings or calls and patient appointments (Becker et al. 2021:1720; (Budhwani et al. 2021: 5; Patel et al. 2021:4; Soukup et al. 2023:8). Skipped team meetings later accumulated to the lowered sensation of team existence (Patel et al. 2021:4). The uncertainty in team role distribution led to only to vagueness who was in responsible of the care coordination in each step of patient care and treatment but also the composition of the virtual

team, i.e., “circle of care” and precise function of each member (Voruganti et al. 2018:2787-2788).

Discoordination brought confusion, doubt, and insecurity in further actions to be performed. (Hoonakker and Carayon, 2018:14). Even the simple task of who was responsible for placing the order for the needed laboratory test required pondering and took time (Howland et al. 2020:783).

The lack or reduction of team collaboration was mentioned less than twenty percent of sub-themes in team dynamics. The reduction in collaboration caused a decrease in the need to exchange information (including discussion concerning ambiguous medical cases), i.e. reduction of communication, which in turn, negatively affects team bonding processes (Breton et al. 2021:8). Member of virtual health care teams noted the deficiency of interpersonal bonds in teams (Hargreaves, Clarke, and Lester:2022:90).

Restoration of team cooperation in virtual settings demanded efforts from team members to implement innovative approaches. (Ashcroft et al. 2023:5; Donnelly et al. 2022:4) The reduction in collaboration caused a decrease in the necessity to exchange information (including discussion concerning ambiguous medical cases), i.e. reduction of communication, which in turn, negatively affects team bonding processes (Breton et al. 2021:8).

Challenges in virtual team communication, with some examples, but not limited to the reduction of communication or difficulties in the discussion of sensitive or complicated topics, were noted by members of virtual healthcare teams (Rosa et al. 2022:818; Soukup et al. 2023:4; Howland et al. 2021:785).

Interactions in virtual teams were regarded as demanding. The reason for it that it happened via “digital channels” (Jarva et al. 2022:1386-1387) and the combination of synchronic and allochronic channels although brought new opportunities, but concurrently presented challenges, since flawless working routines were not yet developed (Ashcroft et al. 2023:7). Although the virtual settings might have helped team members who were influenced by steady hierarchical infrastructure of the organization to express more freely than in face-to-face settings, but strict hierarchy still dictated it rules in virtual interactions (Taylor et al. 2020:7).

Knowledge sharing was more complicated in virtual interactions since there were less chances to initiate spontaneously “incidental learning” sessions virtually, but rather knowledge sharing sessions were needed in fact to plan to happen, as no “corridor conversation” were possible in virtual settings (Hargreaves, Clarke, and Lester, 2022:91-92). The diminishing amount of social interaction resulted in a reduction of favourable moments or appropriate time to knowledge sharing, which it the long run hindered team building process (Breton et al. 2021:8).

Lack of in-person debriefing was perceived as a challenge as interaction via digital channels not quite facilitate in-person support which was especially desired after “difficult encounters with patients” (Ashcroft et al. 2023: 5-6).

Groupthink threat might have been a concrete challenge for the teams where possibility to share opinions freely was restricted in some way or viewpoints of introvert team members were not taken into consideration. Such shy members might have found themselves avoiding even slight confrontations during team meetings for the sake of harmony in the team. Correspondingly, not only did such members consider themselves as not members of the team, but they also avoided contributions to the team and, for that reason, “potentially better, solutions are neglected”. (Hargreaves, Clarke, and Lester, 2022:88-91.)

5.2.5 Theme 5. Challenges of virtual team members

Members of care healthcare teams described the lack of training in virtual care provision as well as insufficiency in acquiring skills in using virtual platforms or programs which were used for telehealth.

The health providers who were mostly unfamiliar with the virtual care before, either got an insufficient education or training in providing care or counselling in virtual settings usings devices and the modern technologies or no training at all (Ashcroft et al. 2021:5; Breton et al. 2021:8; Donnelly et al. 2020:8; Goldberg et al. 2021:3039; Hoonakker and Carayon, 2018:12; Howland et al. 2021:785; Taylor et al. 2020:6). As a consequence, the learning while doing, or during virtual sessions, took time from time allocated to patient work (Donnelly et al. 2022:4; Soukup et al. 2023:6; Taylor et al. 2020:6).

The mistakes and misunderstandings in handling the multifaceted little-known virtual platforms for them might have led to not paying attention to supplementary information given by the platform or making the decisions based on initial information (Alarabyat et al. 2023:5). The health care providers required the detailed and precise guidance concerning practices accompanied by the possibility to share the practical and working methods among them (Feijt et al. 2020:4).

Extra workload or overload

Health care providers noticed the input in telehealth was substantially bigger than traditional healthcare, i.e., face-to-face. They named, for instance, the effort put into setting the remote care session, including configuration settings, and tuning the virtual session, fixing technical problems, and amending the settings distantly for patients and for themselves. (Budhwani et al. 2021:5.)

In case for treating hard of hearing people healthcare teams members were having to switch to chat alternative to overcome risk of misunderstanding, to speak slower and utilise Bluetooth-based earphones (Goldberg et al. 2021:3040). Virtual care teams stated the virtual care was more arduous (Donnelly et al. 2022:4-8; Hoonakker and Carayon, 2018:14).

For instance, health care providers in order to ensure that patients would receive the appropriate and high-quality care even remotely, needed to increase their interaction with patients by calling more often, and investigated more critically and more attentively the details of patients' medical history. The reason for such attentive behaviour was explained by the notion that the collection of patients symptoms virtually was more time consuming and more complicated for health care workers (Hargreaves et al. 2022:4) In some clinics the care managers were overburdened with conflicting assignments (Howland et al. 2021:785).

The establishment and maintenance of the therapeutic relationship remotely was challenging. This was especially true in case with new patients but maintenance of working relationships for previous patients was also complex (Breton et al. 2021:8; Budhwani et al. 2021:7; Ray 2022:36; Rosa et al. 2022:821). The same applied for cases with remote appointments or sessions restricted to be over the phone (Butt et al. 2022:1370).

Healthcare providers' fears

With the implementation of remote health care services, providers faced many fears: fear of not receiving the whole picture, overall picture might be lost, the right virtual solution was difficult to achieve, and the fear of missing something important that directly related to patient's condition and might have had severe consequences in the long run.

Attributable to the drawbacks and specifics of virtual communication providers admitted the appearance of fears of not getting all details or omitting them from the patients and thus not recognizing the real problems during the remote visits, thus fears of losing the whole picture and missing something crucial (Burton et al. 2021:5;) Health care providers slightly felt the feeling of "holistic" care provision is lost (Voruganti et al. 2018:2788).

Working from home was a challenge for some healthcare providers as clear boundaries between work and home were fading, also providers had to find resources to organize quiet working places in their homes, and, additionally, their privacy might have been disturbed (Burton et al. 2021:5; Donnelly et al. 2022:4).

5.2.6 Theme 6. Organizational and reimbursement challenges

The theme that was the least expressed by healthcare providers working in virtual teams was about challenges and obstacles in organization support and compensation practices.

As seen from the studies, the reimbursement system was not well thought out. For instance, the distant appointments were priced, but asynchronous messaging was not (Breton et al. 2021:9). The latter related to messages connected to sessions or to patients' questions and inquiries, which might have happened long after the virtual appointment took place, and as such, stayed outside of paid patient contacts.

The challenge with problems in financial support of care programs, in this case, virtual care programs were often insufficient. Respectively, insufficient funding and the deficit of health care personnel was observed, thus making so much needed growth and development of the health care unit impossible (Borg Debono et al. 2023:5).

The lack of organizational support was noticed as badly organized acquaintance with clinic operational mechanisms and routines, both physical and immaterial. It could be represented as lack of information or lack of access to required software, equipment, and current, related regulations, for instance recently introduced General Data Protection Regulation (GDPR). Subsequently health care providers were struggling with arrangement of patients' appointments, trying to get pass to different electronic health records systems) (Feijt et al. 2020:3; Howland et al. 2021:783).

The interrelated challenge of employee turnover and "variable orientation" of newcomers were among reported challenges too. (Becker et al. 2021: 1720; Howland et al. 2021:785). In some area the community-level restrictions of virtual care aspects added the challenges (Howland et al. 2021:785).

Cost of acquiring virtual platforms and service fees might have represented challenges for some organizations with limited budgets (Donnelly et al. 2022:8). Apart from that, subsequent education and training costs could be equally too high for some organizations.

6 Discussion

6.1 Summary of evidence

In this scoping review the challenges of healthcare team members in virtual settings have been ascertained. Finally, six themes of challenges were identified.

Theme 1. Challenges in implementation of virtual care

The communication in virtual settings is difficult and different from "face-to-face" interaction. The absence of non-verbal cues which ease the communication in real life bring the risk of miscommunication. The need to rely on scarce hint to get the true message from the patients make healthcare personnel to invest considerably more efforts daily, which causes the tiredness and fatigue. Also, the communication channels are not always properly working or not appropriately used. Such obstacles requires more time to overcome, as the missed or late receive information may significantly complicated the

coordination of care, with the worse health outcome. Moreover, such channels have its' limits, constraining the flow of information. The received information about the same patient can be overgenerous in some cases and insufficient in others. All of these disrupt the seemingly ascertained working processes. For this reason, many efforts are required to structure and develop meaningful data to provide care safely. Correspondingly, personnel experienced information overload. Under these circumstances, the fatigue, which was very often associated with virtual interaction, was, to a certain extent, familiar to many healthcare professionals. The high turnover, frequent sick leaves, and burnout, which are often seen in healthcare providers lately, can be explained by this factor. Trivial problems, such as interruption during virtual appointments, or the lack of suitable information channels to inform about virtual appointment delays additionally burden mentally the virtual healthcare community.

The questions of (un)suitability of virtual care, with the lack of physical assessment, privacy, and tactile communication or touch, which are the pillars of healthcare are the questions that constantly concern the members of the virtual healthcare teams.

Davis et al. (2016:4) stated in the Guidelines for TeleICU Operations that the questions of privacy and confidentiality should be worked out in conjunction with local and related international laws. At the same time, careful attention to technological possibilities and perseverance of dignity and human rights should be given.

Theme 2. Technology related challenges

Most challenges related to technology originated from insufficient levels of literacy, i.e. computer, technology, and health technology literacy. The lack of devices and, therefore, the access to virtual services contributes to inequality in health care. This finding correlates with warnings about the appearance of a disparity problem (Lew et al. 2021:145-146; Shaver 2022:521), which limits access to healthcare. The advancement of the digital world on the other hand accelerates the development of virtual healthcare services, but on the other hand causes the constant necessity of updating the software and safety patches, which require more and more powerful devices. The vulnerable population cannot be allowed to enter the race to acquire the latest devices and easily can stay outside of the virtual healthcare sphere. The integration of multiple identification, financial, and healthcare platforms may be complicated to assess by more aged users. Not all applications and platforms are constructed with the consideration of the

ease of usage, especially if the person is physically, visually, or hear-impaired. Telemedicine platforms are not user-friendly seeing that designers of platforms are rarely considering the level of computer skills, age, or English language skills of their users as Lew et al. observed (2021:145).

Theme 3. Challenges related to patients

The countless obstacles of patients prevent them from getting high-quality healthcare. In short, the access to technology, and the lack or low digital skills of patients block the patients to benefit from the latest virtual expertise. As Reeves et al. (2021:3) noted the computer literacy or technological competency of patients in using the technology should never be disregarded. Among the factors to consider are the patients' attitudes and concerns towards virtual security and virtual care efficiency as well as quality. In virtual settings, the cultural differences and the proficiency of common communication languages are of great significance. Such differences may bring the risk of misunderstanding when the different cultures assign non-identical meanings to the same words. The findings are consistent with the previous research that virtual care in current implementation paradoxically created the disparity between population segments (Choxi et al. 2022:58; Haimi 2023:9-10).

Healthcare providers suggested involving the patient in design of healthcare virtual services and shaping patients' positive experiences with virtual care to avoid such negative attitudes (Lew et al. 2021:145). As noted from the healthcare providers' reports, many strategies, services, and programs are designed without patients or end-user involvement, where the amenities are not thought out from the point of view of the convenience of use by patients and their accompanying persons or families. The intuitively understandable and user-friendly applications, platforms, and software programs are still rare to find.

Theme 4. Challenges in team dynamics

The ambiguous coordination of virtual team workflow brings instability in understanding own roles and tasks for members of virtual teams, causing either doubling the workload or overlooking duties. The disregarded tasks threaten patient safety while doubling the workload is an additional source of fatigue. In the long run, the overload was a serious risk factor contributing to human error.

The specifics of virtual interactions, such as insufficient communication channels trigger the lack of team collaboration. Without solid team collaboration, knowledge sharing and debriefing are diminishing. The threat of groupthink is rising in such circumstances. As a result, the team is not acting with a collective effort. Subsequently, team sustainability is impaired, the trust in the team is lessening and the team efficiency is decreasing. Coordination problems cover all aspects of team processes and routines (Lew et al. 2021:145).

Theme 5. Challenges of virtual team members

The individual members of the virtual team expressed their lack of education or training in health technologies used in their workplaces. Jonasdottir, Thordardottir, and Jonsdottir (2022:5) confirmed in their study that concerning the rising amount of telehealth services, the need for health technology training is critical, and the scope of training should be adapted to the task and role of the healthcare provider.

The necessity to learn new demanding programs and platforms without delay, to solve the technological problems of the patients and colleagues, and to provide quality care on the same working day is exhausting. It is not surprising the members reported the extra workload in virtual settings. As remote healthcare services are often provided from home facilities over the clock, the boundaries between work and home have faded for some virtual healthcare providers. Additionally, new fears of missing important aspects and not receiving the whole picture of the patient's situation, and hence, misdiagnosing and mistreating are obviously distressing.

Theme 6. Organizational and reimbursement challenges

The organization of virtual health care provision is not flawless. The support of employing the organization of virtual team members is not sufficient. The compensation issues are not solved, causing the virtual team members to provide their services free of charge. For instance, the virtual appointment is a paid service. However, rarely do the virtual care policies specify the reimbursement question of how long the patients may ask questions via communications channels related to the same disease days and

weeks later after the initial appointment. The indistinct compensation for working tasks may lead to overburdening and high staff turnover.

Overall, the strategies for the provision of healthcare in virtual settings should be enhanced to ensure the quality of care and safety of the patients. However, these enhancements are impossible without an understanding of restrictions and challenges virtual care imposes (Reeves et al. 2021:3). Despite the fact, that some challenges in telehealth were noticed before 2000 (for instance, the lack of telehealth education of health care providers) (Darkins and Cary 2000:19-24), the same barriers are actual today as well. As in the chapter of the results presentation, the majority of included articles for this scoping review were conducted when COVID-19 showed the sudden need for virtual care. Correspondingly, the findings of other research showed that most studies devoted to virtual care were initiated during the time COVID-19 pandemics (Doraiswamy et al. 2020:10).

6.2 Critical assessment of validity and reliability

The risk of bias was managed by defining and implementing the search protocol according to recommendations of the JBI institute (Peters et al. 2020; O'Dwyer and Wafford 2021:645) Moreover, the critical assessment of selected articles was made with the assistance of appraisal tools recommended by JBI Institute. The scoring of critical assessments performed for each selected study is given in Appendix 3.

6.3 Trustworthiness

The quality and reliability of the qualitative research is based on the trustworthiness. Therefore, this concept should be addressed with the utmost accuracy.

Nowell et al. (2017:3) noted that the concept of trustworthiness which was enhanced by Lincoln and Guba in 1985 embraces confirmability, credibility, dependability, and transferability. These attributes are used concurrently with reliability and validity to assess the acceptability and quality of the implemented research.

Transferability is determined through the depiction of geographical, time period, and other context characteristics of the selected studies. The broad description of such features supports the credibility. Confirmability is seen in reporting measures taken to lower the risk of bias or describing the researcher's bias. The triangulation of data when several different sources of data are utilized to prevent errors and enhance the precision in data collection and extraction. Dependability is seen when each step of the research process is documented so the other researchers can repeat the whole process of research and receive the same results. Credibility refers to the correlation of presented results with what was analysed. (Johnson, Adkins, and Chauvin 2020:141-145.)

To establish trustworthiness, specified actions were made during each step of the thematic analysis. During familiarising with data, the researcher used prolonged engagement with the collected data and triangulated the diverse data collection method. In the phase of generating codes, the coding framework was used. In the next steps of defining and refining the patterns and themes, a thematic map or diagram was constructed to understand the interrelations and scope of the revealed themes. In the final step of reporting the data synthesis the description of context was given as well as a justification of preferences made in theoretical, methodological, and analytical parts of this master's thesis. (Nowell et al. 2017:4-11.)

The constant orientation of the research question to the data collected and charted additionally supported the trustworthiness. The reflexivity concept implies that the researcher may be prone to researcher bias. It is a confirmed fact that the background, knowledge, and experience may influence each step of research, starting with framing the context of the study, formulating the research question to collecting, extracting, and presenting the data. Such selectivity should be taken into consideration. (Johnson et al. 2020:139.)

The researcher of this master's thesis has a bachelor's degree in International Business and a degree in Nursing, with subsequent working experience in both field. The personal interest initiated the choice of this topic as the focus area for my master's thesis. No funding was received for conducting this scoping review.

6.4 Ethical considerations

Students, scientists, and scholars should adhere to the research ethical principles, which guide the researchers' decisions during all phases while working on the project. Good scientific practice contributes not only to the integrity of completed research work but also to the community and all its members.

This Master's thesis was written with respect and compliance with research guidelines and principles of research integrity. Responsible Conduct of Research guideline was followed with the usage of a checklist for the researcher. This checklist was used as a reminder to monitor that all required acts and performances are according to good research practice. For instance, the researcher was acquainted with the latest guidelines, documented the process of research accurately, and performed the study in an organised approach (Arene, 8-9, 15, 19; TENK, 2023).

The attentiveness to intellectual property was applied, with the credit given to used materials during the working process on this scoping review. The data was collected, extracted, and synthesised in an honest manner. The efforts to minimise bias were made with the acknowledgment of the researcher's bias and sticking to objectivity, caution, and answerability. (Resnik, 2020.)

Ethical approval

The approval from the ethics committee is not obligatory in case the research is made based on the published data or the information taken from public sources (Kohonen, Kuula-Luumi, and Spoof 2019:19).

No financial support was received for conducting this study.

6.5 Limitations of the study

The major limitation is that this scoping review is performed on a broad set of data, on all main levels of health care (primary, secondary, tertiary), which may give insight into basic requirements for all levels. However, the results yielded from the extensive data are also broad which necessitated the further downsizing of conclusions (Hanneke et al. 2017:6).

As only studies in English were reviewed, such language restriction is also seen as reducing the potentially significant studies in other languages which were excluded from examining according to the pre-defined protocol.

The patients' points of view were not considered in this scoping review. Even supposing the viewpoints of members of virtual healthcare teams members should be thoughtfully examined, the perspectives of patients, their families, and caregivers should be taken into consideration as well to have a balanced representation of the current situation.

6.6 Implications for policy and further research

The findings of scoping reviews cannot be used for direct implications for practice. Nonetheless, while scoping reviews serve as a precursor to a systematic review, further research can be undertaken to promote further steps in revealing and preparing strategies for overcoming challenges in virtual care provision. The findings of this scoping review may serve as the base for formulating the new meticulous research questions for systematic reviews and using such new studies be able to prepare data-driven strategies and guidelines valuable for the policy makers and specialists in that multifaceted field.

7 Conclusion

The core motivation of this research was to map the available literature in the complex field of virtual healthcare services, namely what kind of challenges were reported by virtual healthcare teams members. With the exceptionally rapid technological development nowadays the current situation in virtual healthcare is complex. The advancement of digitalization greatly expands the potential of virtual healthcare services. The pandemics of COVID-19 necessitated the acute replacement of traditional healthcare services by the provision of healthcare in virtual settings. However, with the development of the field of digital healthcare, the challenges modify according to the next context

and are burdensome for all stakeholders. Subsequently, the efficiency of virtual healthcare is substantially declining.

Using data from 25 articles selected in accordance with PRISMA Extension for scoping reviews checklist requirements, the next findings were obtained. This scoping review identified six interrelated categories of challenges. These are challenges in the implementation of virtual care, technology-related, patient-related, organization-related, and challenges within the team and personal challenges that are impeding the daily work of single members of virtual healthcare teams.

Challenges in the implementation of virtual care are denoted by a bundle of obstacles and complicated contexts. For instance, virtual communication and collaboration are difficult, as virtual communication is different from "face-to-face" because of the lack of face-to-face contact and physical assessment. With the lack of non-verbal cues, communication became more distant, and the limits of virtual communication channels are seen with the risk of miscommunication, inadequate information flow, and privacy challenges.

(Un)suitability of virtual care for certain conditions and specific groups of patients and the limits of virtual care led to the perception that virtual care is less efficient. Even the arrangement and coordination of virtual care provision are laborious. Resultantly, virtual care fatigue is becoming common in personnel working in virtual settings.

Technology-related challenges are seen as technological difficulties, lack of modern devices for patients and healthcare providers, low levels of health technology literacy, the disintegration of electronic health records (EHR), technological distractions, and the lack of easily approachable help-desk service.

In patient-related challenges, the focus is set on the patient's access to technology and their expectations and attitudes toward virtual care. Some patients with the development of communication channels expected their providers to be available twenty-four hours a day, while others required the help of their relatives or family in access to virtual healthcare services. Certain patients even showed some kind of resistance to the use of innovations in healthcare practice.

Team dynamics challenges are the lack or reduction of team collaboration and interaction, including the lack of in-person debriefing, specifics of virtual communication, exchange of information, and knowledge sharing, blurred coordination, unclear virtual team workflow, as well as groupthink threat.

The members of virtual teams must struggle with a lack of training in virtual care provision together with insufficiency in acquiring skills in using virtual platforms, or programs, constant extra workload, and dealing with their own healthcare providers' fears typically alone, because as mentioned before, the reduced team collaboration and interaction did not facilitate debriefing and defusing in virtual teams.

Organizational and reimbursement challenges are concerned mainly with the lack of organizational support, unrefined compensation practices, and financial obstacles. The financial matters influenced the highly inconsistent orientation, internal education, and, consecutively, the high employee turnover.

Recognising the challenges reported by members of the virtual healthcare teams can help organisations in developing working strategies for the provision of high-quality care and avoiding costly problems.

Some challenges revealed in this scoping review were also faced earlier. Their existence for many years either indicates that measures for overcoming them are not implemented enough, or such challenges are not taken seriously into account by policymakers. The third variant, that challenges are evolving with time and go conjointly with technology development, is probably the most accurate. Therefore, it requires the use of more modern measures to handle them successfully. Over time, the proactive identification and overcoming of challenges in the healthcare field saves money, and resources, lowers the risk of human errors, establishes a safe environment for healthcare providers, patients, and their families, and, finally, improves the quality of care provided. Thus, the human right to health would not be violated.

List of reviewed studies

1. Alarabyat, I.A., Al-Nsair, N., Alrimawi, I., Al-Yateem, N., Shudifat, R.M. and Saifan, A.R. 2023. Perceived barriers to effective use of telehealth in managing the care of patients with cardiovascular diseases: a qualitative study exploring healthcare professionals' views in Jordan. BMC Health Services Research, 23(1). doi:https://doi.org/10.1186/s12913-023-09368-w.

2. Ashcroft, R., Donnelly, C., Dancey, M., Gill, S., Lam, S., Kourgiantakis, T., Adamson, K., Verrilli, D., Dolovich, L., Kirvan, A., Mehta, K., Sur, D. and Brown, J.B. 2021. Primary care teams' experiences of delivering mental health care during the COVID-19 pandemic: a qualitative study. BMC Family Practice, 22. doi:https://doi.org/10.1186/s12875-021-01496-8.

3. Ashcroft, R., Donnelly, C., Lam, S., Kourgiantakis, T., Adamson, K., Verilli, D., Dolovich, L., Sheffield, P., Kirvan, A., Dancey, M., Gill, S., Mehta, K., Sur, D. and Brown, J.B. 2023. Qualitative examination of collaboration in team-based primary care during the COVID-19 pandemic. BMJ Open, 13(2), p.e067208. doi:https://doi.org/10.1136/bmjopen-2022-067208.

4. Becker, N.V., Bakshi, S., Martin, K.L., Bougrine, A., Andrade, J., Massey, P.R., Hirner, J.P., Eccleston, J., Choudhry, N.K., Britton, K.A., Landman, A.B., Licurse, A.M., Carlile, N. and Mendu, M.L. 2021. Virtual Team Rounding: A Cross-Specialty Inpatient Care Staffing Program to Manage COVID-19 Surges. Academic Medicine, 96(12), pp.1717–1721. doi:https://doi.org/10.1097/acm.0000000000004208.

5. Borg Debono, V., Neumark, S., Buckley, N., Zacharias, R., Hapidou, E.G., Anthonypillai, J., Faria, S., Meyer, C.-L., Carter, T., Parker, N., Lau, B., Abreu, E., Scott, D.W., Bisson, E.J., Pierre, J., Visca, R. and Poulin, P.A. 2023. Transition to Virtual Care Services during COVID-19 at Canadian Pain Clinics: Survey and Future Recommendations. Pain Research & Management, [online] 2023, pp.1–9. doi:https://doi.org/10.1155/2023/6603625.

6. Breton, M., Sullivan, E.E., Deville-Stoetzel, N., McKinstry, D., DePuccio, M., Sriharan, A., Deslauriers, V., Dong, A. and McAlearney, A.S. 2021. Telehealth challenges during COVID-19 as reported by primary healthcare physicians in Quebec and Massachusetts. BMC Family Practice, [online] 22(1). doi:https://doi.org/10.1186/s12875-021-01543-4.

7. Budhwani, S., Fujioka, J.K., Chu, C., Baranek, H., Pus, L., Wasserman, L., Vigod, S., Martin, D., Agarwal, P. and Mukerji, G. 2021. Delivering Mental Health Care Virtually During the COVID-19 Pandemic: Qualitative Evaluation of Provider Experiences in a Scaled Context. JMIR Formative Research, 5(9), p.e30280. doi:https://doi.org/10.2196/30280.

8. Burton, L., Rush, K.L., Smith, M.A., Davis, S., Rodriguez, P., Suazo Hidalgo, L. and Görges, M. 2021. Empowering patients through virtual care delivery: A qualitative study with micro practice clinic patients and health care providers (preprint). JMIR Formative Research(The Journal of Medical Internet Research), 6(4). doi:https://doi.org/10.2196/32528.

9. Butt, Z., Kirsten, L., Beatty, L., Kelly, B., Dhillon, H., and Shaw, J.M.2022. Barriers and enablers to implementing telehealth consultations in psycho-oncology. Psycho-Oncology. doi:https://doi.org/10.1002/pon.5939.

10. Donnelly, C., Mills, C., Gill, S., Mehta, K. and Ashcroft, R. 2022. The experience of primary care teams during the early phase of COVID-19: A qualitative study of primary care practice leaders in Ontario, Canada. BMC Primary Care, 23(1). doi:https://doi.org/10.1186/s12875-022-01907-4.

11. Feijt, M., de Kort, Y., Bongers, I., Bierbooms, J., Westerink, J. and IJsselsteijn, W. 2020. Mental Health Care Goes Online: Practitioners' Experiences of Providing Mental Health Care During the COVID-19 Pandemic. Cyberpsychology, Behavior, and Social Networking, 23(12). doi:https://doi.org/10.1089/cyber.2020.0370.

12. Goldberg, E.M., Jiménez, F.N., Chen, K., Davoodi, N.M., Li, M., Strauss, D.H., Zou, M., Guthrie, K. and Merchant, R.C. 2021. Telehealth was beneficial during COVID -19 for older Americans: A qualitative study with physicians. Journal of the American Geriatrics Society. doi:https://doi.org/10.1111/jgs.17370.

13. Hargreaves, S., Clayton, K., Creech, L., Darlison, L., Ejegi-Memeh, S., Fenemore, J., Gardiner, C., Taylor, B. and Tod, A. 2022. Impact of Covid-19 on lung cancer and mesothelioma specialist nurses: A survey of experiences and perceptions. European Journal of Oncology Nursing, 61, p.102207. doi:https://doi.org/10.1016/j.ejon.2022.102207.

14. Hargreaves. C., Clarke, A.P., Lester, K.R. 2022. Microsoft Teams and team performance in the COVID-19 pandemic within an NHS Trust Community Service in North-West England. Team Performance Management: An International Journal. Vol. 28 No. 1/2, pp. 79-94. https://doi.org/10.1108/TPM-11-2021-0082

15. Hoonakker, P.L.T. and Carayon, P. 2018. Work System Barriers and Strategies Reported by Tele-Intensive Care Unit Nurses. Critical Care Nursing Clinics of North America, 30(2), pp.259–271. doi:https://doi.org/10.1016/j.cnc.2018.02.008.

16. Howland, M., Tennant, M., Bowen, D.J., Bauer, A.M., Fortney, J.C., Pyne, J.M., Shore, J. and Cerimele, J.M. (2020). Psychiatrist and Psychologist Experiences with Telehealth and Remote Collaborative Care in Primary Care: A Qualitative Study. The Journal of Rural Health, 37(4). doi:https://doi.org/10.1111/jrh.12523.

17. Jarva, E., Oikarinen, A., Andersson, J., Tuomikoski, A., Kääriäinen, M., Meriläinen, M. and Mikkonen, K. 2022. Healthcare professionals' perceptions of digital health competence: A qualitative descriptive study. Nursing Open. doi:https://doi.org/10.1002/nop2.1184.

18. Patel, H., Damush, T.M., Miech, E.J., Rattray, N.A., Martin, H.A., Savoy, A., Plue, L., Anderson, J., Martini, S., Graham, G.D. and Williams, L.S. 2021. Building cohesion in distributed telemedicine teams: findings from the Department of Veterans Affairs National Telestroke Program. BMC Health Services Research, 21(1). doi:https://doi.org/10.1186/s12913-021-06123-x.

19. Rajasekaran, R.B., Whitwell, D., Cosker, T.D.A., Gibbons, C.L.M.H. and Carr, A. 2021. Will virtual multidisciplinary team meetings become the norm for musculoskeletal oncology care following the COVID-19 pandemic? - experience from a tertiary sarcoma centre. BMC Musculoskeletal Disorders, 22(1). doi:https://doi.org/10.1186/s12891-020-03925-8.

20. Ray, S. 2022. Healthcare Professional's Perspective on Telemedicine - Healthcare Professional's Perspective on Telemedicine - Individuals Living with HIV/AIDS Individuals Living with HIV/AIDS. [online] Available at: https://digitalcommons.ric.edu/cgi/viewcontent.cgi?article=1434&context=etd [Accessed 11 March 2023].

21. Rosa, W.E., Lynch, K.A., Hadler, R.A., Mahoney, C. and Parker, P.A. 2022. 'Doing palliative care with my hands tied behind my back': telepalliative care delivery for oncology inpatients during a COVID-19 surge. Translational Behavioral Medicine, 12(7), pp.816–824. doi:https://doi.org/10.1093/tbm/ibac044.

22. Soukup, T., Winters, D., Chua, K., Rowland, P., Moneke, J., Skolarus, T.A., Bharathan, R., Harling, L., Bali, A., Asher, V., Gandamihardja, T., Sevdalis, N., Green, J.S.A. and Lamb, B.W. 2023. Evaluation of changes to work patterns in multidisciplinary cancer team meetings due to the COVID -19 pandemic: A national mixed-method survey study. Cancer Medicine. doi:https://doi.org/10.1002/cam4.5608.

23. Taylor, M.J., Shikaislami, C., McNicholas, C., Taylor, D., Reed, J. and Vlaev, I. 2020. Using virtual worlds as a platform for collaborative meetings in healthcare: a feasibility study. BMC Health Services Research, 20(1).doi:https://doi.org/10.1186/s12913-020-05290-7.

24. Voruganti, T., Husain, A., Grunfeld, E. and Webster, F. 2018. Disruption or innovation? A qualitative descriptive study on the use of electronic patient-physician communication in patients with advanced cancer. Supportive Care in Cancer, 26(8), pp.2785–2792. doi:https://doi.org/10.1007/s00520-018-4103-7.

25. Westley, S., Mistry, R. and Dheansa, B. 2021. Accuracy of virtual assessment in hand trauma. JPRAS Open. doi:https://doi.org/10.1016/j.jpra.2021.10.008.

References

AHRQ (Agency for Healthcare Research and Quality). 2018. Elements of Access to Health Care: Timeliness. Agency for Healthcare Research and Quality, Rockville, MD. https://www.ahrq.gov/research/findings/nhqrdr/chartbooks/access/elements3.html Accessed 9 October 2023

Anderson, J.E., Lavelle, M., and Reedy, G. 2020. Understanding adaptive teamwork in health care: Progress and future directions. Journal of Health Services Research & Policy, [online] 26(3), p.135581962097843. doi:https://doi.org/10.1177/1355819620978436. Accessed 4 May 2023

Arksey, H. and O'Malley, L. 2005. Scoping studies: Towards a Methodological Framework. International Journal of Social Research Methodology, 8(1), pp.19–32. doi:https://doi.org/10.1080/1364557032000119616. Accessed 11 April 2023

Arene. 2018. Ethical recommendations for thesis writing at universities of applied sciences. The Rector's Conference of Finnish Universities of Applied Sciences Arene. Available at: https://www.arene.fi/wp-content/uploads/Raportit/2018/ETHICAL%20RECOMMENDATIONS%20FOR%20THESIS%20WRITING%20AT%20UNIVERSITIES%20OF%20APPLIED%20SCIENCES.pdf Accessed 19 March 2023

Arms, W.Y. 2012. The 1990s: the formative years of digital libraries. Library Hi Tech, 30(4), pp.579–591. doi:https://doi.org/10.1108/07378831211285068. Accessed 2 January 2023

Aromataris, E. and Munn, Z. (Editors). 2020. JBI Manual for Evidence Synthesis. JBI. Development of a scoping review protocol.Available from https://synthesismanual.jbi.global. https://doi.org/10.46658/JBIMES-20-01. Accessed 11 April 2023

Babiker, A., El Husseini, M., Al Nemri, A., Al Frayh, A., Al Juryyan, N., Faki, M.O., Assir,i A., Al Saadi, M., Shaikh, F., Al Zamil, F. 2019. Health care professional development: Working as a team to improve patient care. Sudanese Journal of Paediatrics, [online] 14(2), pp.9–16. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4949805/ Accessed 21 March 2023

Baldwin, J.R., Pingault, J.-B., Schoeler, T., Sallis, H.M., and Munafò, M.R. 2022. Protecting against researcher bias in secondary data analysis: challenges and potential solutions. European Journal of Epidemiology, [online] 37(1), pp.1–10. doi:https://doi.org/10.1007/s10654-021-00839-0. Accessed 26 March 2023

Barbosa, W., Zhou, K., Waddell, E., Myers, T., and Dorsey, E.R. 2021. Improving Access to Care: Telemedicine Across Medical Domains. Annual Review of Public Health, 42(1), pp.463–481. doi:https://doi.org/10.1146/annurev-publhealth-090519-093711. Accessed 12 December 2023

Becker, N.V., Bakshi, S., Martin, K.L., Bougrine, A., Andrade, J., Massey, P.R., Hirner, J.P., Eccleston, J., Choudhry, N.K., Britton, K.A., Landman, A.B., Licurse, A.M., Carlile, N. and Mendu, M.L. 2021. Virtual Team Rounding: A Cross-Specialty Inpatient Care Staffing Program to Manage COVID-19 Surges. Academic Medicine, 96(12), pp.1717–1721. doi:https://doi.org/10.1097/acm.0000000000004208. Accessed 12 March 2023

Bhatia, R.S., Chu, C., Pang, A., Tadrous, M., Stamenova, V., and Cram, P. 2021. Virtual care use before and during the COVID-19 pandemic: a repeated cross-sectional

study. CMAJ Open, 9(1), pp.E107–E114. doi:https://doi.org/10.9778/cmajo.20200311. Accessed 8 September 2023

Bitar, H. and Alismail, S. 2021. The role of eHealth, telehealth, and telemedicine for chronic disease patients during COVID-19 pandemic: A rapid systematic review. Digital Health, 7, p.205520762110093. doi:https://doi.org/10.1177/20552076211009396. Accessed 19 August 2023

Bradley, P. 2023. Library: Systematic reviews: Formulate your question. [online] library.bath.ac.uk. Available at: https://library.bath.ac.uk/systematic-reviews/formulate-question. Accessed January 25, 2023.

Braun, V. and Clarke, V. 2006. Using Thematic Analysis in Psychology. Qualitative Research in Psychology, 3(2), pp.77–101. https://www.tandfonline.com/doi/abs/10.1191/1478088706qp063oa. Accessed 4 March 2023.

Castleberry, A. and Nolen, A. 2018. Thematic analysis of qualitative research data: Is it as easy as it sounds? Currents in Pharmacy Teaching and Learning, [online] 10(6), pp.807–815. doi:https://doi.org/10.1016/j.cptl.2018.03.019. Accessed 21 March 2023

CDC 2022. Isolation. [online] Centers for Disease Control and Prevention. Available at: https://www.cdc.gov/coronavirus/2019-ncov/your-health/isolation.html. Accessed 15 April 2023.

Chapman, A.L., Morgan, L.C., and Gartlehner, G. 2010, Semi-automating the manual literature search for systematic reviews increases efficiency. Health Information & Libraries Journal, 27: 22-27. https://doi.org/10.1111/j.1471-1842.2009.00865.x Accessed 20 March 2023

Choxi, H., VanDerSchaaf, H., Li, Y., and Morgan, E. 2022. Telehealth and the Digital Divide: Identifying Potential Care Gaps in Video Visit Use. Journal of Medical Systems, 46(9). doi:https://doi.org/10.1007/s10916-022-01843-x. Accessed 8 April 2023

Cochrane.org. 2019. 5. Handsearching. [online] Available at: https://training.cochrane.org/resource/tsc-induction-mentoring-training-guide/5-handsearching. Accessed 10 April 2023.

Cooper, C., Snowsill, T., Worsley, C., Prowse, A., O'Mara-Eves, A., Greenwood, H., Boulton, E. and Strickson, A. 2020. Handsearching had best recall but poor efficiency when exporting to a bibliographic tool: case study. Journal of Clinical Epidemiology, 123, pp.39–48. doi:https://doi.org/10.1016/j.jclinepi.2020.03.013. Accessed 20 March 2023

Corrao, G., Cantarutti, A., Monzio Compagnoni, M., Franchi, M. and Rea, F. 2022. Change in healthcare during Covid-19 pandemic was assessed through observational designs. Journal of Clinical Epidemiology, 142, pp.45–53. doi:https://doi.org/10.1016/j.jclinepi.2021.10.015. Accessed 12 December 2023

Darkins, A.W. and Cary, M.A. 2000. Telemedicine and Telehealth: Principles, Policies, Performance and Pitfalls. New York: Springer Publishing Company. ISBN 0826113028

Davis, T.M., Barden, C., Dean, S., Gavish, A., Goliash, I., Goran, S., Graley, A., Herr, P., Jackson, W., Loo, E., Marcin, J.P., Morris, J.M., Morledge, D.E., Olff, C., Rincon, T.,

Rogers, S., Rogove, H., Rufo, R., Thomas, E., and Zubrow, M.T. 2016. American Telemedicine Association Guidelines for TeleICU Operations. Telemedicine and e-Health, 22(12), pp.971–980. doi:https://doi.org/10.1089/tmj.2016.0065. Accessed 7 September 2023

Doraiswamy, S., Abraham, A., Mamtani, R., and Cheema, S. 2020. Use of Telehealth during the COVID-19 pandemic: A scoping review. Journal of Medical Internet Research, 22(12). doi: https://doi.org/10.2196/24087. Accessed 20 August 2023

Dreker, P. 2022. Research Guides: Systematic Reviews in the Health Sciences: Handsearching. [online] libguides.rutgers.edu. Available at: https://libguides.rutgers.edu/c.php?g=337288&p=2269575. Accessed 10 March 2023

Drucker, A.M., Fleming, P., and Chan, A.-W. 2016. Research Techniques Made Simple: Assessing Risk of Bias in Systematic Reviews. Journal of Investigative Dermatology, 136(11), pp.e109–e114. doi:https://doi.org/10.1016/j.jid.2016.08.021. Accessed 11 April 2023

Dubin, J.M., Fantus, R.J. and Halpern, J.A. 2021. Testosterone replacement therapy in the era of telemedicine. International Journal of Impotence Research, [online] 34(7), pp.663–668. doi:https://doi.org/10.1038/s41443-021-00498-5. Accessed 30 September 2023

Efimov, I., Harth, V. & Mache, S. 2020. "Health-Oriented Self- and Employee Leadership in Virtual Teams: A Qualitative Study with Virtual Leaders", International Journal of Environmental Research and Public Health, vol. 17, no. 18, pp. 6519. Accessed 8 March 2023

Fang, M.L., Walker, M., Wong, K.L.Y., Sixsmith, J., Remend, L. and Sixsmith, A. 2022. Future of digital health and community care: Exploring intended positive impacts and unintended negative consequences of COVID-19. Healthcare Management Forum, p.084047042211073. doi:https://doi.org/10.1177/08404704221107362. Accessed 7 December 2023

Federal Communications Commission. 2014. Telehealth, Telemedicine and Telecare: What's What? [online] Federal Communications Commission. Available at: https://www.fcc.gov/general/telehealth-telemedicine-and-telecare-whats-what. Accessed September 15 2023. Accessed 19 March 2023

Gajarawala, S. and Pelkowski, J. 2021. Telehealth Benefits and Barriers. The Journal for Nurse Practitioners, [online] 17(2), pp.218–221. doi:https://doi.org/10.1016/j.nurpra.2020.09.013. Accessed27 August 2023

Ghebreyesus, T.A. 2017. Health Is a Fundamental Human Right. [online] World Health Organization. Available at: https://www.who.int/news-room/commentaries/detail/health-is-a-fundamental-human-right.Accesed 10 August 2023

Gopal, G., Suter-Crazzolara, C., Toldo, L. and Eberhardt, W. 2019. Digital transformation in healthcare – architectures of present and future information technologies. Clinical Chemistry and Laboratory Medicine (CCLM), 57(3), pp.328–335. doi:https://doi.org/10.1515/cclm-2018-0658. Accessed 2 January 2024

Habas, K., Nganwuchu, C., Shahzad, F., Gopalan, R., Haque, M., Rahman, S., Majumder, A.A., and Nasim, T. 2020. Resolution of coronavirus disease 2019 (COVID-19). Expert Review of Anti-infective Therapy, 18(12), pp.1201–1211. doi:https://doi.org/10.1080/14787210.2020.1797487. Accessed 15 September 2023

Haimi, M. 2023. The tragic paradoxical effect of telemedicine on healthcare disparities-a time for redemption: a narrative review. BMC Medical Informatics and Decision Making, [online] 23(1), p.95. doi:https://doi.org/10.1186/s12911-023-02194-4. Accessed 17 November 2023

Haleem, A., Javaid, M., Singh, R.P. and Suman, R. 2021. Telemedicine for healthcare: Capabilities, features, barriers, and applications. Sensors International, 2(2). doi:https://doi.org/10.1016/j.sintl.2021.100117. Accessed 9 August 2023

Hanneke, R., Asada, Y., Lieberman, L., Neubauer, L.C., and Fagen, M. 2017. The Scoping Review Method: Mapping the Literature in 'Structural Change' Public Health Interventions. The Scoping Review Method: Mapping the Literature in 'Structural Change' Public Health Interventions. doi:https://doi.org/10.4135/9781473999008. Accessed 25 March 2023

Hermes, S., Riasanow, T., Clemons, E.K., Böhm, M. and Krcmar, H. 2020. The digital transformation of the healthcare industry: exploring the rise of emerging platform ecosystems and their influence on the role of patients. Business Research, [online] 13(3), pp.1033–1069. doi:https://doi.org/10.1007/s40685-020-00125-x. Accessed 2 January 2024

Herzog, C., Handke, C., and Hitters, E. 2019. Analyzing Talk and Text II: Thematic Analysis. In: Van den Bulck, H., Puppis, M., Donders, K. & Van Audenhove, L. (Eds.) The Palgrave Handbook of Methods for Media Policy Research. Basingstoke: PalgraveMacmillan. Available from: https://www.researchgate.net/publication/321197933_Analyzing_Talk_and_Text_II_Thematic_Analysis#fullTextFileContent Accessed 4 April 2023

Hopewell, S., Clarke, M.J., Lefebvre, C., and Scherer, R.W.2007. Handsearching versus electronic searching to identify reports of randomized trials. Cochrane Database of Systematic Reviews 2007, Issue 2. Art. No.: MR000001. DOI: 10.1002/14651858.MR000001.pub2. Accessed 19 July 2023.

Iyanna, S., Kaur, P., Ractham, P., Talwar, S. and Najmul Islam, A.K.M. 2022. Digital transformation of healthcare sector. What is impeding adoption and continued usage of technology-driven innovations by end-users? Journal of Business Research, 153, pp.150–161. doi:https://doi.org/10.1016/j.jbusres.2022.08.007. Accessed 2 January 2024

Jen, M.Y., Kernd, C.C., and Korvek, S.J. 2022. Health Information Technology. [online] PubMed. Available at: https://www.ncbi.nlm.nih.gov/books/NBK470186/. Accessed 12 December 2023

Johnson, J.L., Adkins, D. and Chauvin, S. (2020). A Review of the Quality Indicators of Rigor in Qualitative Research. American Journal of Pharmaceutical Education, 84(1), pp.138–146. https://www.ajpe.org/article/S0002-9459(23)01606-6/fulltext Accessed 2 December 2023

Jonasdottir, K.S., Thordardottir, I. and Jonsdottir, T. 2022. Health professionals' perspective towards challenges and opportunities of telehealth service provision: A scoping review. International Journal of Medical Informatics, 167, p.104862. doi:https://doi.org/10.1016/j.ijmedinf.2022.104862. Accessed 6 September 2023

Karimi, M., Lee, E., Couture, S., Gonzales, A., Grigorescu, V., Smith, S., De Lew, N. and Sommers, B. (2022). National Survey Trends in Telehealth Use in 2021: Disparities in Utilization and Audio vs. Video Services. [online] Available at: https://aspe.hhs.gov/sites/default/files/documents/4e1853c0b4885112b2994680a58af9ed/telehealth-hps-ib.pdf. Accessed 12 December 2023

Keesara, S., Jonas, A., and Schulman, K. 2020. Covid-19 and Health Care's Digital Revolution. New England Journal of Medicine, 382(23). doi:https://doi.org/10.1056/nejmp2005835. Accessed 9 October 2023

Khurshid, Z., De Brún, A., Moore, G. and McAuliffe, E. 2020. Virtual adaptation of traditional healthcare quality improvement training in response to COVID-19: a rapid narrative review. Human Resources for Health, 18(1). doi:https://doi.org/10.1186/s12960-020-00527-2. Accessed 2 January 2024

Kichloo, A., Albosta, M., Dettloff, K., Wani, F., El-Amir, Z., Singh, J., Aljadah, M., Chakinala, R.C., Kanugula, A.K., Solanki, S., and Chugh, S. 2020. Telemedicine, the current COVID-19 pandemic and the future: A narrative review and perspectives moving forward in the USA. Family Medicine and Community Health, [online] 8(3), pp.1–9. doi:https://doi.org/10.1136/fmch-2020-000530. Accessed 20 August 2023

King, N., 2004. Using templates in the thematic analysis of text. In Cassell, C. and Symon, G. Essential Guide to Qualitative Methods in Organizational Research. [online] Google Books. SAGE. Available at: https://books.google.fi/books?hl=en&lr=&id=Ghv9-mu5WQkC&oi=fnd&pg=PA256&ots=i0MRcS-xUW&sig=nAepv13d5DgP-SpuZ3NiX6O46nBY&redir_esc=y#v=onepage&q&f=false Accessed 19 March 2023.

Kohonen, I., Kuula-Luumi, A., & Spoof, S-A. (Editors.) 2019. The ethical principles of research with human participants and ethical review in the human sciences in Finland. Finnish National Board on Research Integrity TENK guidelines 2019 (2nd ed.). Publications of the Finnish National Board on Research Integrity 3/2019. https://tenk.f/sites/default/fles/2021-01/Ethical_review_in_human_sciences_2020.pdf Accessed 25 March 2023

Koivunen, M. and Saranto, K. 2017. 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, [online] 32(1), pp.24–44. doi:https://doi.org/10.1111/scs.12445. Accessed 8 April 2023.

Korkmaz Yaylagul, N., Kirisik, H., Bernardo, J., Dantas, C., van Staalduinen, W., Illario, M., De Luca, V., Apóstolo, J., and Silva, R. 2022. Trends in Telecare Use among Community-Dwelling Older Adults: A Scoping Review. International Journal of Environmental Research and Public Health, 19(24), 16672.doi:https://doi.org/10.3390/ijerph192416672. Accessed 18 November 2023

Kruse, C.S., Krowski, N., Rodriguez, B., Tran, L., Vela, J., and Brooks, M. 2017. Telehealth and Patient satisfaction: a Systematic Review and Narrative Analysis. BMJ Open, 7(8), p.e016242. doi:https://doi.org/10.1136/bmjopen-2017-016242. Accessed 12 November 2023

Leggat, S.G. 2007. Effective healthcare teams require effective team members: defining teamwork competencies. BMC Health Services Research, 7(1). doi:https://doi.org/10.1186/1472-6963-7-17. Accessed 26 November 2023

Lehne, M., Sass, J., Essenwanger, A., Schepers, J. and Thun, S. 2019. Why digital medicine depends on interoperability. npj Digital Medicine, 2(1). doi: https://doi.org/10.1038/s41746-019-0158-1. Accessed 26 November 2023

Li, J., Wu, H., Deng, Z., Lu, N., Evans, R. and Xia, C. (2019). How professional capital and team heterogeneity affect the demands of online team-based medical service. BMC Medical Informatics and Decision Making, 19(1). doi:https://doi.org/10.1186/s12911-019-0831-y. Accessed 9 October 2023

Lockwood, C., dos Santos, K.B. and Pap, R. 2019. Practical Guidance for Knowledge Synthesis: Scoping Review Methods. Asian Nursing Research, [online] 13(5), pp.287–294. doi:https://doi.org/10.1016/j.anr.2019.11.002. Accessed 12 August 2023.

Lockwood, C., Munn, Z., and Porritt, K. 2015. Qualitative research synthesis: methodological guidance for systematic reviewers utilizing meta-aggregation. International Journal of Evidence-Based Healthcare, [online] 13(3), pp.179–187. doi:https://doi.org/10.1097/xeb.0000000000000062. Accessed 20 March 2023

Lowenthal, Patrick R. 2022. "Synchronous Tools for Interaction and Collaboration". In O. Zawacki-Richter and I. Jung (Eds.), Handbook of Open, Distance and Digital Education. Springer. https://doi.org/10.1007/ 978-981-19-0351-9_55-1 Accessed 2 December 2023

Mahoney, M.F. 2020. Telehealth, Telemedicine, and Related Technologic Platforms. Journal of Wound, Ostomy & Continence Nursing, 47(5), pp.439–444. doi:https://doi.org/10.1097/won.0000000000000694. Accessed 9 October 2023

Mak, S. and Thomas, A. 2022. Steps for Conducting a Scoping Review. Journal of Graduate Medical Education, 14(5), pp.565–567. doi:https://doi.org/10.4300/jgme-d-22-00621.1. Accessed 1 April 2023

Manocchia, A. 2020. Telehealth: Enhancing Care through Technology. Rhode Island Medical Journal (2013), [online] 103(1), pp.18–20. Available at: https://pubmed.ncbi.nlm.nih.gov/32013298/. Accessed 25 March 2023

Mitchell, P.H., Wynia, M.K., Golden, R., McNellis, B., Okun, S., Webb, C.E., Rohrbach, V., and Von Kohorn, I. 2012. Core Principles & Values of Effective Team-Based Health Care. NAM Perspectives, [online] 2(10). doi:https://doi.org/10.31478/201210c. Accessed 4 May 2023

Mitzel, L.D., Funderburk, J.S., Buckheit, K.A., Gass, J.C., Shepardson, R.L. and Edelman, D. 2021. Virtual integrated primary care teams: Recommendations for team-based care. Families, Systems, & Health. doi:https://doi.org/10.1037/fsh0000655. Accessed 15 August 2023

Moola, S., Munn, Z., Tufanaru, C., Aromataris, E., Sears, K., Sfetcu, R., Currie, M., Qureshi, R., Mattis, P., Lisy, K., and Mu, P.-F. 2020. Chapter 7: Systematic reviews of etiology and risk . In: Aromataris E, Munn Z (Editors). JBI Manual for Evidence Synthesis. JBI. Available from https://synthesismanual.jbi.global Accessed 29 March 2023

Morris, M., Boruff, J.T. and Gore, G.C. 2016. Scoping reviews: establishing the role of the librarian. Journal of the Medical Library Association: JMLA, 104(4), pp.346–354. doi:https://doi.org/10.3163/1536-5050.104.4.020. Accessed 25 March 2023

Munn, Z., Stern, C., Aromataris, E., Lockwood, C. and Jordan, Z. 2018. What kind of systematic review should I conduct? A proposed typology and guidance for systematic reviewers in the medical and health sciences. BMC Medical Research Methodology,

[online] 18(1), pp.1–9. doi:https://doi.org/10.1186/s12874-017-0468-4. Accessed 20 March 2023

Nachman, S. M. 2023. LibGuides: Scoping Reviews: Step 7: Extract Data from Included Studies. [online] guides.lib.unc.edu. Available at: https://guides.lib.unc.edu/scoping-reviews/extract-data. Accessed 26 May 2023
Naruka, V., Zientara, A., Hussein, N. and Punjabi, P.P. 2022. Digital communication platforms in cardiothoracic surgery during COVID-19 pandemic: keeping us connected or isolated? Interactive CardioVascular and Thoracic Surgery. doi:https://doi.org/10.1093/icvts/ivac078. Accessed 9 August 2023

Neddersen, J. 2020. The Difference Between Telemedicine and Telehealth. Herzing University. [online] Available at: https://www.herzing.edu/blog/difference-between-telemedicine-and-telehealth. Accessed September 15 2023. Accessed 5 April 2023.

Nekolaichuk, E. 2023. Research guides: Searching the Literature: A Guide to Comprehensive Searching in the Health Sciences: Precision vs. Sensitivity. [online] guides.library.utoronto.ca. Available at: https://guides.library.utoronto.ca/c.php?g=577919&p=4304403. Accessed 2 August 2023

Nowell, L.S., Norris, J.M., White, D.E., and Moules, N.J. 2017. Thematic analysis: Striving to Meet the Trustworthiness Criteria. International Journal of Qualitative Methods, [online] 16(1), pp.1–13. doi:https://doi.org/10.1177/1609406917733847. Accessed 1 April 2023.

O'Dwyer, L.C. and Wafford, Q.E. 2021. Addressing challenges with systematic review teams through effective communication: a case report. Journal of the Medical Library Association, 109(4). doi:https://doi.org/10.5195/jmla.2021.1222. Accessed 19 April 2023.

Ochani, R., Asad, A., Yasmin, F., Shaikh, S., Khalid, H., Batra, S., Sohail, M.R., Mahmood, S.F., Ochani, R., Hussham Arshad, M., Kumar, A. and Surani, S. 2021. COVID-19 pandemic: from origins to outcomes. A comprehensive review of viral pathogenesis, clinical manifestations, diagnostic evaluation, and management. Le Infezioni in Medicina, [online] 29(1), pp.20–36. Available at: https://pubmed.ncbi.nlm.nih.gov/33664170/. Accessed 20 October 2023

Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., Mulrow, C.D., Shamseer, L., Tetzlaff, J.M., Akl, E.A., Brennan, S.E., Chou, R., Glanville, J., Grimshaw, J.M., Hróbjartsson, A., Lalu, M.M., Li, T., Loder, E.W., Mayo-Wilson, E., McDonald, S. and McGuinness, L.A. 2021.The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71/ https://www.bmj.com/content/372/bmj.n71 Accessed 26 March 2023

Paul, M., Maglaras, L., Ferrag, M.A. and Almomani, I. 2023. Digitization of Healthcare sector: A Study on Privacy and Security Concerns. ICT Express, [online] 9(4), pp.571–588. doi:https://doi.org/10.1016/j.icte.2023.02.007. Accessed 8 January 2024

Peters M.D.J., Godfrey C, McInerney P, Munn Z, Tricco AC, and Khalil, H. 2020. Chapter 11: Scoping Reviews (2020 version). In: Aromataris E, Munn Z (Editors). JBI Manual for Evidence Synthesis, JBI, 2020. Available from https://synthesismanual.jbi.global. https://doi.org/10.46658/JBIMES-20-12 Accessed 1 April 2023

Peters, M.D.J., Godfrey, C.M., Khalil, H., McInerney, P., Parker, D., and Soares, C.B. 2015. Guidance for Conducting Systematic Scoping Reviews. International Journal of

Evidence-Based Healthcare, [online] 13(3), pp.141–146.doi:https://doi.org/10.1097/xeb.0000000000000050. https://pubmed.ncbi.nlm.nih.gov/26134548/ Accessed 11 March 2023

Peters, M.D.J., Marnie, C., Colquhoun, H., Garritty, C.M., Hempel, S., Horsley, T., Langlois, E.V., Lillie, E., O'Brien, K.K., Tunçalp, Ö., Wilson, M.G., Zarin, W., and Tricco, A.C. 2021. Scoping reviews: reinforcing and advancing the methodology and application. Systematic Reviews, 10(1). doi:https://doi.org/10.1186/s13643-021-01821-3. Accessed 1 April 2023

Pollock, D., Davies, E.L., Peters, M.D.J., Tricco, A.C., Alexander, L., McInerney, P., Godfrey, C.M., Khalil, H. and Munn, Z. 2021. Undertaking a scoping review: A practical guide for nursing and midwifery students, clinicians, researchers, and academics. Journal of Advanced Nursing, 77(4), pp.2102–2113. doi:https://doi.org/10.1111/jan.14743. Accessed 25 March 2023

Pollock, D., Peters, M.D.J., Khalil, H., McInerney, P., Alexander, L., Tricco, A.C., Evans, C., de Moraes, É.B., Godfrey, C.M., Pieper, D., Saran, A., Stern, C. and Munn, Z. 2023. Recommendations for the extraction, analysis, and presentation of results in scoping reviews. JBI Evidence Synthesis. doi:https://doi.org/10.11124/jbies-22-00123. Accessed 1 April 2023

Purssell, E. and Gould, D. 2021. Undertaking Qualitative Reviews in Nursing and Education - a Method of Thematic Analysis for Students and Clinicians. International Journal of Nursing Studies Advances, 3, p.100036. doi:https://doi.org/10.1016/j.ijnsa.2021.100036. Accessed 1 April 2023

Ratan, S., Anand, T., and Ratan, J. 2019. Formulation of research question – Stepwise approach. Journal of Indian Association of Pediatric Surgeons, [online] 24(1), p.15. doi:https://doi.org/10.4103/jiaps.jiaps_76_18. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6322175/ Accessed 25 January 2023.

Reeves, J.J., Ayers, J.W. and Longhurst, C.A. (2021). Telehealth in the COVID-19 Era: A Balancing Act to Avoid Harm. Journal of Medical Internet Research, 23(2), p.e24785. doi:https://doi.org/10.2196/24785. Accessed 2 December 2023

Resnik, D. 2020. What Is Ethics in Research & Why Is It important? [online] National Institute of Environmental Health Sciences. Available at: https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm. Accessed 12 December 2023

Roberts, K., Dowell, A., and Nie, J.-B. 2019. Attempting rigour and replicability in thematic analysis of qualitative research data; a case study of codebook development. BMC Medical Research Methodology, [online] 19(1), pp.1–8. doi:https://doi.org/10.1186/s12874-019-0707-y. https://bmcmedresmethodol.biomedcentral.com/articles/10.1186/s12874-019-0707-y Accessed 8 April 2023

Rodin, D., Lovas, M., and Berlin, A. 2020. The reality of virtual care: Implications for cancer care beyond the pandemic. Healthcare, 8(4), p.100480. doi:https://doi.org/10.1016/j.hjdsi.2020.100480. Accessed 29 March 2023

Rosen, M.A., DiazGranados, D., Dietz, A.S., Benishek, L.E., Thompson, D., Pronovost, P.J., and Weaver, S.J. 2019. Teamwork in healthcare: Key Discoveries Enabling safer, high-quality care. American Psychologist, [online] 73(4), pp.433–450. doi:https://doi.org/10.1037/amp0000298. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6361117/ Accessed 9 August 2023

Roy, J., Levy, D.R. and Senathirajah, Y. 2022. Defining Telehealth for Research, Implementation, and Equity. Journal of Medical Internet Research, 24(4), p.e35037. doi:https://doi.org/10.2196/35037. Accessed 9 October 2023

Sandelowski, M. and Leeman, J. 2012. Writing Usable Qualitative Health Research Findings. Qualitative Health Research, 22(10), pp.1404–1413. doi:https://doi.org/10.1177/1049732312450368. Accessed 4 October 2023

Sarkis-Onofre, R., Catalá-López, F., Aromataris, E. and Lockwood, C. 2021. How to properly use the PRISMA Statement. Systematic Reviews, [online] 10(1). doi:https://doi.org/10.1186/s13643-021-01671-z. https://systematicreviewsjournal.biomedcentral.com/articles/10.1186/s13643-021-01671-z Accessed 25 March 2023

Schwamm, L.H., Estrada, J., Erskine, A. and Licurse, A. 2020. Virtual care: new models of caring for our patients and workforce. The Lancet Digital Health, 2(6). doi:https://doi.org/10.1016/s2589-7500(20)30104-7. Accessed 2 January 2024

Scott Kruse, C., Karem, P., Shifflett, K., Vegi, L., Ravi, K., and Brooks, M. 2018. Evaluating barriers to adopting telemedicine worldwide: A systematic review. Journal of Telemedicine and Telecare, [online] 24(1), pp.4–12. doi:https://doi.org/10.1177/1357633x16674087.https://pubmed.ncbi.nlm.nih.gov/29320966/ Accessed 29 March 2023

Shaver, J. 2022. The State of Telehealth Before and After the COVID-19 Pandemic. Primary Care: Clinics in Office Practice, [online] 49(4), pp.517–530. doi:https://doi.org/10.1016/j.pop.2022.04.002. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9035352/ Accessed 18 November 2023

Stoumpos, A.I., Kitsios, F. and Talias, M.A. 2023. Digital Transformation in Healthcare: Technology Acceptance and its Applications. International Journal of Environmental Research and Public Health, [online] 20(4), p.3407. doi:https://doi.org/10.3390/ijerph20043407. Accessed 2 January 2024

Sood, S., Mbarika, V., Jugoo, S., Dookhy, R., Doarn, C.R., Prakash, N., and Merrell, R.C. 2007. What Is Telemedicine? A Collection of 104 Peer-Reviewed Perspectives and Theoretical Underpinnings. Telemedicine and e-Health, 13(5), pp.573–590. doi:https://doi.org/10.1089/tmj.2006.0073. Accessed 20 October 2023

TENK. 2023. Implementation Checklist for 2023 RI Guidelines Available at: https://tenk.fi/sites/default/files/2023-09/Implementation%20checklist_RI%20Guidelines%202023.pdf Accessed 17 December 2023

Thomas, J., Kneale, D., McKenzie, J.E., Brennan, S.E., Bhaumik, S. 2022.Chapter 2: Determining the scope of the review and the questions it will address. In: Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). Cochrane Handbook for Systematic Reviews of Interventions version 6.3 (updated February 2022). Cochrane, 2022. Available from www.training.cochrane.org/handbook. Accessed 25 January 2023

Tricco, A.C., Lillie, E., Zarin, W., O'Brien, K., Colquhoun, H., Kastner, M., Levac, D., Ng, C., Sharpe, J.P., Wilson, K., Kenny, M., Warren, R., Wilson, C., Stelfox, H.T., and Straus, S.E. 2016. A scoping review on the conduct and reporting of scoping reviews. BMC Medical Research Methodology, [online] 16(1), pp.1–10. https://doi.org/10.1186/s12874-016-0116-4/**.** https://pubmed.ncbi.nlm.nih.gov/26857112/ Accessed 2 April 2023

Tricco, A.C., Lillie, E., Zarin, W., O'Brien, K.K., Colquhoun, H., Levac, D., Moher, D., Peters, M.D.J., Horsley, T., Weeks, L., Hempel, S., Akl, E.A., Chang, C., McGowan, J., Stewart, L., Hartling, L., Aldcroft, A., Wilson, M.G., Garritty, C. and Lewin, S. (2018). PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. Annals of Internal Medicine, 169(7), pp.467–473. doi:https://doi.org/10.7326/m18-0850. Accessed 2 April 2023

Vähäkangas, K. 2023. LibGuides: Systematic searching: Grey literature. [online] libguides.oulu.fi. Available at: https://libguides.oulu.fi/c.php?g=697494&p=5008496 Accessed 5 September 2023

Vaismoradi, M., Turunen, H., and Bondas, T. 2013. Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. Nursing & Health Sciences, 15(3), pp.398–405. doi:https://doi.org/10.1111/nhs.12048. Accessed 29 March 2023

Vassar, M., Atakpo, P., and Kash, M.J. 2016. Manual search approaches used by systematic reviewers in dermatology. Journal of the Medical Library Association : JMLA, [online] 104(4), pp.302–304. doi:https://doi.org/10.3163/1536-5050.104.4.009. Accessed 21 March 2023

Weigel, G. and Ramaswamy, A. 2020. Opportunities and barriers for telemedicine in the U.S. during the COVID-19 emergency and beyond. [online] Kaiser Family Foundation. Available at: https://www.kff.org/womens-health-policy/issue-brief/opportunities-and-barriers-for-telemedicine-in-the-u-s-during-the-covid-19-emergency-and-beyond/. Accessed 8 April 2023

WHO. 2010. Telemedicine: opportunities and developments in member states. Report on the second global survey on eHealth. Global Observatory for eHealth Series, V.2. Geneva, Switzerland: World Health Organization.https://iris.who.int/bitstream/handle/10665/44497/9789241564144_eng.pdf?sequence=1 Accessed 28 August 2023

Wootton, R., Bahaadinbeigy, K., and Hailey, D. 2011. Estimating travel reduction associated with the use of telemedicine by patients and healthcare professionals: proposal for quantitative synthesis in a systematic review. BMC Health Services Research, 11(1). doi:https://doi.org/10.1186/1472-6963-11-185. Accessed 1 May 2023

World Health Organization 2022. Human rights and health. [online] www.who.int. Available at: https://www.who.int/news-room/fact-sheets/detail/human-rights-and-health#:~:text=The%20WHO%20Constitution%20(1946)%20envisages. Accessed 15 September 2023

Facing Challenges in Virtual Healthcare Teams: A Scoping Review protocol

This is the protocol for a scoping review.

Design Plan

Study design: Scoping review.
This review will be based on the Joanna Briggs Institute (JBI) methodology for scoping reviews and the PRISMA-ScR checklist. Health and social sciences databases would be used as the sources for searching academic and grey literature. The search would be tested in two related databases. The time span for searched literature in English language will be defined as 2018 the years just before the COVID-19 outbreak which led to acute shift of healthcare to virtual settings and up to the beginning of 2023, when the mainstream of pandemics was over, to perceive the dynamics of the studies produced in this time span. Titles and abstracts are screened first, and then the full text would undergone the examining whether the selected studies correspond to inclusion criteria. The viewpoints of patients and their families as well as healthcare students are not considered in this review, as main concentration is given to the challenges perceived by members of healthcare teams working in virtual settings. The scoping review is performed by one reviewer, so search strategy, inclusion and exclusion criteria are clearly stated as well as the data extraction, analysis and synthesis methods thus ensuring transparency of the study and reproducibility. The extracted data is put into predetermined extraction tables. Further the thematic analysis is used, and the results are presented in a narrative way.

Data collection procedures
First two main databases
Initially test searching would be performed in two databases to define keywords, in PUBMED and CINAHL/EBSCO. After that the keywords would be defined. Then the databases containing academic and grey literature healthcare studies (PUBMED, CINAHL/EBSCO, ScienceDirect, Emerald, BASE and Wiley Online Library) would be searched in accordance with defined keywords and Boolean operators to reveal relevant studies.

Analysis Plan

The pertinent information would be extracted and placed in predefined charts as recommended by charting process guidelines of JBI. The thematic analysis would be implemented to explore the data. The synthesis of the results would be made in tabular forms with narrative explanation. The summary of selected articles would be presented.

Description

The healthcare experienced the acute shift from face-to-face settings into virtual to stay in congruence with COVID-19 outbreak quarantine requirements. While the virtual care is considered as safe, functional, and effective as the “offline” care, undoubtedly members of virtual healthcare teams experience certain challenges in their work both in work with patients, as within the healthcare team.

The objective of this scoping review is to map the literature to define/identify the challenges faced by members of healthcare teams in virtual settings. Without acknowledgement of challenges their overcoming is not possible.

Subjects

Social and Behavioural Sciences

- Medicine and Health Sciences

Keywords

- virtual care
- healthcare
- challenges
- problems
- telehealth
- telemedicine
- virtual teams

Date created.

12.03.2023

Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Check-list (adapted from Tricco et al. 2018)

SECTION	ITEM	REPORTED ON PAGE #
TITLE		
Title	1	Title page
ABSTRACT		
Structured summary	2	Abstract
INTRODUCTION		
Rationale	3	2
Objectives	4	9
METHODS		
Protocol and registration	5	12, Appendix 1
Eligibility criteria	6	12-13
Information sources	7	14-17
Search	8	14-15
Selection of sources of evidence	9	16-17
Data charting process	10	18
Data items	11	12-13
Critical appraisal of individual sources of evidence	12	17
Synthesis of results	13	20
RESULTS		
Selection of sources of evidence	14	16
Characteristics of sources of evidence	15	Appendix 4
Critical appraisal within sources of evidence	16	Appendix 3
Results of individual sources of evidence	17	Appendix 4
Synthesis of results	18	20-40
DISCUSSION		
Summary of evidence	19	40-44
Limitations	20	46
Conclusions	21	47-19
FUNDING		
Funding	22	45

Applied Joanna Briggs Institute (JBI) checklists and Quality assessment scoring.

Lockwood, Munn, and Porritt. 2015. JBI Critical Appraisal Checklist for Qualitative Research	Moola et al. 2020. JBI Critical Appraisal Checklist for Analytical Cross-Sectional Studies
1. Is there congruity between the stated philosophical perspective and the research methodology?	1. Were the criteria for inclusion in the sample clearly defined?
2. Is there congruity between the research methodology and the research question or objectives?	2. Were the study subjects and the setting described in detail?
3. Is there congruity between the research methodology and the methods used to collect data?	3. Was the exposure measured in a valid and reliable way?
4. Is there congruity between the research methodology and the representation and analysis of data?	4. Were objective, standard criteria used for measurement of the condition?
5. Is there congruity between the research methodology and the interpretation of results?	5. Were confounding factors identified?
6. Is there a statement locating the researcher culturally or theoretically?	6. Were strategies to deal with confounding factors stated?
7. Is the influence of the researcher on the research, and vice- versa, addressed?	7. Were the outcomes measured in a valid and reliable way?
8. Are participants, and their voices, adequately represented?	8. Was appropriate statistical analysis used?
9. Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	
10. Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	

Score		**Quality assessment scoring**	
Y Assessment criteria are satisfied	2	**Selected**	n=25
U Unclear	1	**Excluded**	n=0
N Assessment criteria are not satisfied	0	**Seek further info**	n=0
X assessment criteria do not apply	-		

Summary of selected articles

Authors	Article title	Profession/ discipline	Country of study	Settings	Methodology/research design	Key Findings	JBI assessment score
Alarabyat et al 2023	Perceived barriers to effective use of telehealth in managing the care of patients with cardiovascular diseases: a qualitative study exploring healthcare professionals' views in Jordan	Cardiovascular specialists	Jordan	2 major hospitals, secondary care	Qualitative, exploratory study	The several obstacles were reported by the members. Among them patients-related, concerns of virtual team members, organizational drawbacks, and challenges in virtual health implementations.	20/20
Ashcroft et al. 2023	Qualitative examination of collaboration in team-based primary care during the COVID-19 pandemic	Multiprofessional	Canada	Primary care	Qualitative descriptive research	Such issues as virtual interaction and virtual team collaboration, virtual care fatigue, and virtual communication were seen as major challenges for the primary team working in virtual settings.	20/20
Ashcroft et al 2021	Primary care teams' experiences of delivering mental health care during the COVID-19 pandemic: a qualitative study	Social workers, therapists, nurses, physicians, administrators	Canada	Primary care mental health	Qualitative study	In delivery of virtual care, the barriers and health inequities are faced. The social and digital factors should be considered in planning care delivery in the future, to avoid disparities.	20/20
Becker et al 2021	Virtual Team Rounding: A Cross-Specialty Inpatient Care Staffing Program to Manage COVID-19 Surge	Multiprofessional	US	Virtual team rounding program/virtual platform	Qualitative study	Virtual practice saves the time of health providers. Administrative, technology-related, team engagement and training challenges were found during virtual round testing program, and the participants proposed solution to them	20/20
Borg Debono et al 2023	Transition to Virtual Care Services during COVID-19 at Canadian Pain Clinics: Survey and Future Recommendations	Pain clinics healthcare teams	Canada	Pain clinics Secondary care	Qualitative participatory action study	Team members reported the barriers faced in providing services in virtual settings (the major of them are technology-related barriers, organizational and reimbursement barriers)	20/20

Breton et al. 2021	Telehealth challenges during COVID-19 as reported by primary healthcare physicians in Quebec and Massachusetts	Physicians	Canada (n=20), US n=22	Primary care	Comparative qualitative study	The physicians reported faced challenges in four areas (technological access for patient, efficiency of provided care because of lack on non-verbal cues, team dynamics and patient-provider relations)	20/20
Budhwani et al 2021	Delivering Mental Health Care Virtually During the COVID-19 Pandemic: Qualitative Evaluation of Provider Experiences in a Scaled Context	Mental health professionals	Canada	Ambulatory hospital	Mixed method, qualitative descriptive analysis	Challenges related to adaptation to virtual care provision were listed. Among them, workflow, technological and reimbursement challenges were seen as the critical ones. "Zoom" fatigue and arduous remote appointments (with preliminary and post-appointment work) were discussed as well as lack of required resources and training to provide virtual care	20/20
Burton et al 2021	Empowering Patients Through Virtual Care Delivery: Qualitative Study With Micropractice Clinic Patients and Health Care Providers	Physician, clinic manager	Canada	Rural micro practice, primary care, hybrid	Qualitative descriptive study	Asynchronous communication channels were preferred. The challenges in coordination of care, computer and health technology literacy, fear of lost overall picture and lack of physical assessment were presented. The engagement of the patient is critical. The borders "work/home" may be blurred if 24/7 care is provided	20/20
Butt et al 2022	Barriers and enablers to implementing telehealth consultations in psycho-oncology	Psycho-oncology clinicians	Australia	Multiple practice settings (e g tertiary)	Qualitative semi-structured interview-based study	The clinicians providing the psycho-oncological services faced the set of barriers which need to be addressed to ensure efficiency of services. The barriers involved such themes as patient access, clinician practice, therapy engagement and administration of therapy	20/20
Donnelly et al 2022	The experience of primary care teams during the early phase of COVID-19: A qualitative study of primary care practice leaders in Ontario, Canada	Leaders of multidisciplinary teams	Canada	Primary care	Qualitative semi-structured interview-based study	Technology challenges, low understanding of health technology and lack of devices were the main challenges in primary multidisciplinary teams. The attention to vulnerable population should be given to avoid disparity in healthcare sphere	20/20
Feijt et al. 2020	Mental Health Care Goes Online: Practitioners' Experiences of Providing Mental Health Care During the COVID-19 Pandemic	Mental health professionals	Netherlands	Mental health online clinics	Qualitative descriptive study	The main challenges are reported as technology-related, organization-related and access to technology and the fostering the harmonious "patient-provider" relationships. Also (un)suitability of virtual care for some types of treatment were reported.	20/20

Goldberg et al. 2021	Telehealth was beneficial during COVID -19 for older Americans: A qualitative study with physicians	Geriatricians, primary care physicians, emergency physicians	US	Multiple practice settings	Qualitative study,	The healthcare providers reported the barriers in work with aged patients. Findings show that not the older age of the patient may warn about possible challenges, but rather the low computer literacy, impairments, low social and economic position or limited access to Internet	19/20
Hargreaves, Clarke, and Lester, 2022	Microsoft Teams and team performance in the COVID-19 pandemic within an NHS Trust Community Service in North-West England	Nursing, therapy, mental health & admin Staff	UK	Multidisciplinary	Qualitative study	Knowledge sharing does not take place virtual team naturally but requires certain sessions for exchange of new expertise. Introvert team members might hesitate to reveal their opinions, which may lead to "group think" and to demotivation of such team members	14/16
Hargreaves, et al 2022	Impact of Covid-19 on lung cancer and mesothelioma specialist nurses: A survey of experiences and perceptions	Nurses	UK	Lung cancer, mesothelioma, tertiary care	Online cross-sectional survey	Nurse faced the challenges in teamwork and barriers to claim support due to nursing ethos (patient' needs are above nurses' ones), so request stay unexpressed	20/20
Hoonakker and Carayon, 2018	Work System Barriers and Strategies Reported by Tele-Intensive Care Unit Nurses: A Case Study	Nurses	US	Tele-ICU units,	Qualitative semi-structured interview-based study	Nurses worked out strategies to numerous challenges (virtual collaboration, technological, coordination and information sharing) while working in virtual settings	18/20
Howland et al 2021	Psychiatrist and Psychologist Experiences with Telehealth and Remote Collaborative Care in Primary Care: A Qualitative Study	Telepsychologists, telepsychiatrists	US	Primary care mental health unit	Descriptive qualitative study	Access to care is increasing due to virtual care modality. Yet, challenges in workflow processes should be solved, especially communication with primary care, scheduling, EHR, to name a few	20/20
Jarva et al 2022	Healthcare professionals' perceptions of digital health competence: A qualitative descriptive study	Healthcare workers	Sweden, Finland	Multiple practice settings (e.g. Tertiary)	Descriptive qualitative study,	The health providers reported some barriers which arise while dealing with patients in virtual settings. Health technology incompetence shaped all aspect of patient care in virtual practice	20/20
Patel et al 2021	Building cohesion in distributed telemedicine teams: findings from the Department of Veterans Affairs National Telestroke Program	Stroke specialists	US	Virtual hub US	Qualitative, semi-structured interview-based study	Teamwork and team dynamics as well as technological challenges should be addressed by virtual healthcare teams to develop in-team cohesion	20/20

Raja-sekaran et al 2021	Will virtual multidisciplinary team meetings become the norm for musculoskeletal oncology care following the COVID-19 pandemic? - experience from a tertiary sarcoma centre	Multidisciplinary team members	UK	Tertiary care, cancer	Qualitative research	The noted challenges concern limits of virtual care, limits of virtual communication channels as well as technological difficulties for members of virtual multidisciplinary tertiary care team.	20/20
Ray, 2022	Healthcare Professional' Perspective on Telemedicine - Individuals Living with HIV/AIDS	Healthcare workers	US	HIV/AIDS agencies	Mixed method qualitative study	The healthcare providers expressed their concerns about limits of virtual care and the efficiency over traditional method of healthcare provision, also patient assess to technology was seen as challenging	20/20
Rosa et al 2022	'Doing palliative care with my hands tied behind my back': telepalliative care delivery for oncology inpatients during a COVID-19 surge	Palliative specialists	US	Urban comprehensive cancer centre, tertiary care	Qualitative semi-structured study	The solution to challenges should be developed for holistic virtual care provision. The challenges not known previously now burden the healthcare providers Technological, team relationship, coordination and communication challenges should be solved	20/20
Soukup et al 2023	Evaluation of changes to work patterns in multidisciplinary cancer team meetings due to the COVID-19 pandemic: A national mixed-method survey study	MDT (histopathologists, oncologists, nurses, surgeons, radiologists	UK	Tertiary care, cancer	Mixed method prospective cross-sectional study	Working IT infrastructure for healthcare organisation is needed to ensure quality care in virtual settings. Safety and efficiency should be considered while planning for virtual care. Coordination and IT challenges are mentioned as the main ones.	16/16
Taylor et al 2020	Using virtual worlds as a platform for collaborative meetings in healthcare: a feasibility study	Doctors, academics, technicians, nurses	UK	Virtual platform	Qualitative descriptive study	Virtual platforms enhance communication, but barriers as low computer skills and technical problems (reliability) should be addressed to be able use the full potential in virtual collaboration	18/20
Voruganti et al 2018	Disruption or innovation? A qualitative descriptive study on the use of electronic patient-physician communication in patients with advanced cancer	5 oncologists, 5 palliative care physicians	Canada	Virtual platform, tertiary care	Qualitative study	The novel communication channels may bring challenges to team structure, dynamics of relations and endanger the patient-provider bonds. integration of the team as a whole and patients' preferences are necessary to aim at more patient-cantered care	20/20
Westley, Mistry, and Dheansa, 2022	Accuracy of virtual assessment in hand trauma	Plastic surgery speciality and core trainees	UK	Hand trauma virtual clinic	Qualitative evaluation study	The personnel of virtual clinic faced challenges in providing the health care services/ The most of challenges are technological	20/20

Example of thematic analysis

Theme	Final subtheme	Formation of code →pattern→sub-theme	Quote from the study	Author(s) and year of the study
			Direction of the iterative process of thematic analysis	
Challenges in implementa-tion of virtual care	virtual care fatigue	Fatigue (prolonged impact)	"Many participants reflected on the high level of **fatigue** associated with telehealth." p. 1369	Butt et al. 2022
	virtual care fatigue	Fatigue (prolonged impact)	"However, **fatigue** due to how much more attention-taxing virtual meetings are versus face-to-face interactions poses a novel workplace stressor that was identified during the COVID-19 pandemic." p.7	Ashcroft et al. 2023
	virtual care fatigue	Exhaustion (short affect)	"televisits are "more **exhausting**" for some health providers" p.7	Breton et al. 2021
	virtual care fatigue	Exhaustion (short affect)	"…personal **impact** on telehealth "were negative, including isolation, worry, and exhaustion." p.11	Breton et al. 2021
	virtual care fatigue	Exhaustion ←tiredness	"Multiple participants also reported to find the videoconference sessions more demanding and **tiring** than face-to-face sessions" p.4	Feijt et al. 2020
	virtual care fatigue	Fatigue (prolonged impact)	"…there is a higher **fatigue** level that comes with virtual appointments. "p. 4	Donnelly et al. 2022
	virtual care fatigue	Tiredness →Fatigue (pro-longed impact)	"…**fatigue**...more **attention-taxing** virtual meetings" as a "novel workplace stressor" p.7	Ashcroft et al. 2023
	virtual care fatigue	Greater effort and focus→ tiredness→ exhaustion	"Reportedly, telehealth appointments required **greater concentration** and **effort** due to the limited non-verbal cues and trying to read silences, as well as **greater focus** on building rapport and managing patient distraction" p.1369	Butt et al. 2022
	virtual care fatigue	Emotionally and physically draining →exhaustion	"…found it **more emotionally and physically draining**…**having to try to figure out** what the other person, how the other person's reacting and re-sponding without those visual cues" p. 1369	Butt et al. 2022