



How do digital healthcare meetings impact the quality of healthcare?

A case study at Sahlgrenska University Hospital to explore digital healthcare meetings' impact on quality within healthcare

Master's thesis in Production engineering and Quality and operations management

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Cover: An illustration of a digital healthcare meeting with a physician conducted through a computer.

Gothenburg, Sweden 2022

Assessment of digital healthcare meetings impact on the quality of healthcare

A case study with the purpose of increasing knowledge about digital healthcare meetings' impact on quality within healthcare

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Abstract

Digitalization and covid-19 have changed routines for providing healthcare and drastically increased the usage of digital healthcare meetings. But the rapid implementation has left a gap in knowledge regarding its impact on quality within healthcare. The purpose of this study was therefore to investigate how the quality of healthcare has been affected by digital healthcare meetings. The research was carried out at two psychiatric units at Sahlgrenska University Hospital. The objective was to explore the impact of using digital healthcare meetings and increase the knowledge within the area. The study used a case study strategy and collected data from 11 semi-structured interviews. Thematic analysis was used to find patterns in the data and create main themes as well as subthemes. The main themes' impact was analysed based on the six quality dimensions within healthcare: *safe, effective, patient-centered, timely, efficient,* and *equitable*. Six main themes were found including *usage, effect, increased accessibility, at home, digital interaction,* and *technology*.

The result showed that the usage of digital healthcare meetings had mainly a positive influence on the dimensions *patient-centered, timely, efficient,* and *equitable.* Reasons for this were the improved flexibility of receiving healthcare, fewer cancellations, saved time and more equal access with less dependence on patients' geographic location. While it had mainly a negative influence on the dimensions *safe, and effective.* Reasons for this were the decreased secrecy between patient and personnel, reduced effect on certain treatments conducted and personnels' limited ability to interact with patients directly.

Keywords: Telemedicine, digital healthcare meetings, quality in healthcare, digitalisation of healthcare

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1. Introduction

Quality within healthcare has throughout history focused on the outcomes generated by treatments and the experience according to patients. Even small changes within healthcare can influence the perceived outcome when treating patients. Covid-19 has drastically changed perceived routines for providing healthcare by using telemedicine such as digital healthcare meetings. But the rapid implementation's impact on the quality within healthcare remains unclear. The purpose of the study is to investigate how digital healthcare meetings affect the quality of healthcare according to personnel. The conclusions in the study aim at increasing the knowledge of how practical implementations towards digitalizing the healthcare within hospitals affect the provided healthcare.

1.1 Background

Healthcare quality is an aspect that influences the outcomes of healthcare when treating patients. Quality within healthcare has been strongly connected with how healthcare is conducted. Early studies have shown how different practices lead to a drastically decreased mortality rate for diseases (Sheingold, 2014) and more safe treatments for future patients (Donabedian, 1989; Reverby, 1981). The quality of healthcare is not perfect meaning adverse events within healthcare are still happening today and can lead to injuries or deceased patients (Institute of Medicine 2000; Soop et al., 2009). The concept of quality within healthcare is defined by the institute of medicine in the United States as six dimensions: safe, effective, patient-centered, timely, efficient, and equitable. Changes and new implementations influence these dimensions (Institute of medicine, 2001).

One current implementation within healthcare in Sweden is "Vision for eHealth 2025". "Vision for eHealth 2025" is a strategy for future healthcare and can be summarized by this statement:

"In 2025, Sweden will be best in the world at using the opportunities offered by digitisation and eHealth to make it easier for people to achieve good and equal health and welfare, and to develop and strengthen their own resources for increased independence and participation in the life of society." (Ministry of Health and Social Affairs, 2016).

This is also a response to the demographic change in Sweden that expects a growing population of elders and a decreased population of younger people (Statistikmyndigheten SCB, 2022). This will also increase the demand and costs for providing care while having a more limited population of working healthcare personnel than currently (Vård- och omsorgsanalys, 2014; Abrahamsson, 2012). "Vision for eHealth 2025" focuses on developing healthcare through digitalization and eHealth to manage these demographic challenges (Ministry of Health and Social Affairs, 2016; Ehälsomyndigheten, 2021). Telemedicine is currently one implemented solution. Telemedicine can be described as healthcare meeting where a psychologist talks to a patient using video and audio (Darkins & Cary, 2000).

The Covid-19 pandemic worked as a catalysator for implementing telemedicine faster, resulting in a booming usage of telemedicine (Fix & Serper, 2020). The pandemic drastically limited access and provision of healthcare due to high risks of spreading the disease and

lockdowns. The result of this became a growing need for healthcare from citizens with limited resources for doing so in the form of available medical staff and healthcare equipment (Garfan et al., 2021). But the rushed implementation of telemedicine for solving these issues has now left a gap in knowledge on how the usage of telemedicine affects the quality of healthcare and the outcome of healthcare in Sweden (Ramaswamy et al., 2020). This can be seen based on the recommendations from other research studies suggestions for future research within the area of telemedicine. Therefore, the interest of this study is to contribute to research on how digital healthcare meetings affect the quality of healthcare.

1.2 Aim

The study investigates how digital healthcare meetings affect healthcare quality. The answer to this question aims at increasing the knowledge of how practical implementations towards digitalizing the healthcare within hospitals affect the provided healthcare according to personnel.

1.3 Limitations

The research is limited to evaluating how the usage of digital healthcare meetings affects the quality of healthcare based on personnel. Conducting interviews with patients is not possible due to the requirement of an ethical trial and the timeframe of this study. Digital healthcare meetings in this study refer to healthcare personnel using audio and video for conducting one of the following activities with a patient digitally: treatment, physical activity, planning, or follow-up on health status. The study excludes the medical knowledge for evaluating best practices when it comes to treating patients. Not all personnel at the units are interviewed because interviewees freely participate and due to limited time.

1.4 Research question

The following research question is defined for answering the research aim and guiding the research.

How has the quality of healthcare been affected by digital healthcare meetings according to personnel?

1.5 The case

The case study is performed at two psychiatric units at Sahlgrenska University Hospital, located in Gothenburg Sweden. The units are chosen because a high percentage of the healthcare meetings are conducted digitally. Sahlgrenska University Hospital is one of the biggest hospitals in northern Europe (Sahlgrenska, 2021a). The hospital has about 17 000 personnel and is located in different places in Gothenburg city. The hospital has patients from the entire Region of Västra Götaland and for certain operations nationally across Sweden. The hospital offers advanced surgery, treatments, and has 25 different areas of speciality care (Sahlgrenska, 2021b).

Because of confidentiality, the names of the units are not stated, and the name of unit P and unit A is used instead. Both unit A and unit P use digital healthcare meetings for conducting physical activities, treatments or meetings between patients and personnel. Both units are

influenced by "Vision for eHealth 2025" and the covid-19 pandemic for providing healthcare using telemedicine. Sahlgrenska University Hospital implemented digital healthcare meetings in 2019 and the number of digital healthcare meetings has from 2019 to 2021 going from 38 to 60 000, with the department of psychiatry being among the top users. Stakeholders from Sahlgrenska University Hospital's centre for digital healthcare are therefore curious in knowing how the usage of digital healthcare meetings affects the healthcare conducted. The interviews include different types of personnel at the units such as psychiatrists, occupational therapists, physiotherapists, unit manager, rehabilitation coordinators, curator, and psychiatric nurse.

2 Theory

In this chapter, the theoretical concepts used in this study are presented, for creating an understanding of the concepts that are important to answer the research questions.

2.1 Telemedicine

The word "tele" came from the Greek which meant "at a distance". The direct translation of the word telemedicine was therefore medicine at distance. Telecare or telehealth were also terms related to telemedicine but had different meanings. Telecare referred to providing nursing or community support from a distance for patients at home. Telehealth was a broader term than telemedicine which related to all types of public health services provided at a distance (Wootton et al., 2006). While telemedicine referred to the delivery of clinical healthcare services by using technology (American telemedicine association, 2012). The common thread across these terms was how health-related information was transferred between sites to improve the health of individuals or communities (Wootton et al., 2006), see figure 1.



Figure 1. Schematic picture exemplifying the exchange of information between practitioners and patients (Darkins & Cary, 2000)

For this study, the term telemedicine was used because it fitted the study best. Telemedicine could be further specified by this statement: "*Telemedicine involves the use of modern information technology, especially two-way interactive audio/video communications, computers, and telemetry, to deliver health services to remote patients and to facilitate information exchange between primary care physicians and specialists at some distances from each other.*" (Darkins & Cary, 2000). It should also be mentioned telemedicine was not purely technology but rather another way of providing care (Darkins & Cary, 2000). Telemedicine has been conducted using different types of information systems for communication such as videos, the internet or the telephone, see figure 2.



Figure 2. Different communication systems when conducting telemedicine (Darkins & Cary, 2000)

Telemedicine has been applied in a wide variety of medical activities such as diagnosis, treatment, prevention of diseases, and healthcare education for users. More specific examples of usage were scheduling healthcare activities, providing remote healthcare advice, or monitoring the condition of patients remotely. A very early example was when a physician in the late 1890s used the telephone for diagnosing a child with croup (Darkins & Cary, 2000).

Telemedicine has also proved to improve access to both common and specialised healthcare services for citizens in other geographic areas, improved the quality of healthcare services, and reduced costs of delivering healthcare in some cases (Darkins & Cary, 2000; Wootton et al., 2006). Telemedicine made it possible to monitor patients' health at home which could be valuable for the chronically ill. The chronically ill could then avoid receiving common diseases when visiting hospitals that would be lethal for them and instead be treated at home. Patients saw it as positive when telemedicine made it easy to coordinate consultations and establish contacts with healthcare. Patients could also feel more psychologically safe due to the distance between them and the healthcare professional when receiving care which made some more open or forthcoming (Darkins & Cary, 2000; Wootton et al., 2006). Visiting hospitals could be a time-consuming process for patients and a substantial inference in a person's day-to-day schedule (Hjelm, 2005). From the patient's perspective, this statement described some issues that came with receiving care at hospitals: "*With work, homes, and families it is just so inconvenient to get to the hospital, with the travel, parking, waiting, and uncertainty about what is going to happen."* (Darkins & Cary, 2000).

But there were also barriers and drawbacks to telemedicine. When conducting consultations at a distance meant that physical examinations were impossible and that physicians had

limited sensory cues as part of diagnosing patients (Miller, 2003). This limited the effectiveness of using telemedicine in different situations when patients sought care for example increased risks of misdiagnosis because telemedicine limited the information a health professional received during the teleconsultation (Miller, 2003; Wootton et al., 2006). Health professionals also referred to face-to-face consultations as the "golden standard" for treating patients and whereas teleconsultation could be seen as inferior (Darkins & Cary, 2000). Some health professionals had confidence in using video links for providing care while some could be sceptical and even openly hostile towards using telemedicine. The lack of evidence in the form of proper clinical trials was one potential reason why (Wootton et al., 2006). Other reasons were the fear of change as physicians felt telemedicine threatened the traditional relationships with patients or concerned with the delivery of care due to clinical and technical concerns (Darkins & Cary, 2000).

There were uncertainties regarding the usage of telemedicine as there have been few attempts demonstrating how it improved patients' health and limited guidelines for telemedicine. This included hospital-based trials looking at clinical outcomes. There were also a limited number of clinical trials of telemedicine done which had good evidence of favourable outcomes. One favourable trial was for patients with chronic diseases (Wootton et al., 2006). The theory highlighted the importance of collecting data and evaluating the impact of implementing telemedicine for example if telemedicine improved the quality of healthcare, improved health status for patients and cost-effectiveness (Wootton et al., 2006). Darkins & Cary (2000) described the importance of including patients' opinions when evaluating as there were very little data about patient reactions towards telemedicine. But there was no best way of evaluating telemedicine which makes it difficult to transform data into useful and relevant information for stakeholders (Haleem et al, 2014).

There were concerns about how the usage of telemedicine affected the relationship between health professionals and patients. One study showed how professionals experienced difficulties in establishing emotional connections with the patients when using telemedicine (Wootton et al., 2006). Telemedicine could be perceived as removing the human part of healthcare which influenced the relationship (Miller, 2003). Another difference was the communication between face-to-face consultation and teleconsultation. Teleconsultation could tend to be more focused on the issue at hand and less formal as part of establishing a relationship between patients and professionals (Darkins & Cary, 2000). Other concerns with telemedicine were the management, financing of telemedicine, and handling the confidentiality of patient information. These were concerns the healthcare organisations needed to consider and develop routines around for ensuring patients' trust (Darkins & Cary, 2000).

2.2 Quality in healthcare

Quality in healthcare was a phenomenon with many definitions that could be described by this statement: "Quality of care is the degree to which the treatment dispensed increases the patient's chances of achieving the desired results and diminishes the chances of undesirable results, having regard to the current state of knowledge." (The Council of Europe, 1997). The quality of healthcare was in the early days assessed by documenting how different practices affected the outcome of care. The result of developing and evaluating different practices was a decreased mortality rate for diseases going from 42.7% to 2.2% (Sheingold, 2014). This proved this showcased the impact different healthcare practices had on the outcome of a patient's treatment. Later studies believed similarly when hospitals evaluated

the outcomes of a patient's treatment by monitoring their conditions. This helped determine causes for healthcare injuries and potential improvements that influenced the treatment of future patients (Donabedian, 1989; Reverby, 1981). For example, the publication "*A Study in Hospital Efficiency*" found that 123 errors were made when treating 337 patients. The quality of healthcare was therefore argued to be connected with the process of treating the patient (Codman, 1918; Donabedian, 1989). The development of quality in healthcare was also considered a continuous process that remained important even today for minimising waste of resources, generating trust against modern medicine, and lastly better healthcare for citizens in society (World Health Organization, 2018a; World Health Organization, 2018b).

Actors within industrial management saw other aspects influencing the quality of healthcare. Aspects like variation in the processes used when treating patients (Berwick, 1991), leadership among management in hospitals for developing the healthcare or following routines (Lynn, 1991), and the organizational structure of healthcare systems when using the resources (Best, 2006). From this, the concept of quality in healthcare was refined by the institute of medicine in the US as six dimensions. The core dimensions were *safe, effective, patient-centered, timely, efficient,* and *equitable.* (Institute of medicine, 2001). These six dimensions have since then influenced the healthcare systems seen today for example in Europe (Legido-Quigley et al, 2008) and Australia (Australian Commission on Safety and Quality in Health Care, 2011).

Safe care referred to how neither patient nor personnel in healthcare shall be harmed when providing care, also called "freedom from accidental injury" (Institute of Medicine, 2000). Harmed in the previous sentence could be diagnostic errors, medical errors, and preventable injuries to a patient seeking care. The causes of accidental injuries could be summarised by this statement from the Institute of Medicine, (2001): "...(1) the failure of a planned action to be completed as intended or (2) use of a wrong plan to achieve an aim." When evaluating the safety, the best way would be through the patient's perspective (Institute of Medicine, 2001). One way of assessing *safe* according to Gardner et al. (2013) could be through the Donabedian structure, process and outcome model. Here the safety of a nurse practitioner service was assessed through data collected from a survey, interviews and health data collected with Donabedian's structure, process and outcome model (Gardner et al. 2013).

Effective care focused on matching the best practices for providing care with the patient to reach the desired outcome of treatments (Institute of Medicine, 2001). Different patients could respond differently to different treatments. The chosen practices for providing care should therefore be based on medical research evidence, clinical expertise, and previous patients treated for the treatment to be as *effective* as possible (Institute of Medicine, 2001). When evaluating *effective* included assessing both the provision of care and the outcome generated by the intervention or treatment also called Comparative Effectiveness Research (Price-Haywood, 2015). A common method used for doing this was clinical trials (Stegenga, 2015). A clinical trial compared the parameters of a group of patients receiving one type of treatment with another group of patients receiving another type of treatment for solving the same conditions. This then showcased the benefits and trade-offs with different treatments when determining the most *effective* care for treating this specific condition (University of North Carolina, 2021).

Patient-centered care was being respectful of and responsive to individual patient preferences, needs, and values. It also included actively involving the patient in the care management plan and adapting healthcare around the patient (Institute of Medicine, 2001).

Patient-centeredness could be further specified by these six aspects (Institute of Medicine, 2001):

- 1. Respect for the patient's values, preferences, and expressed needs
- 2. Coordination and integration of care
- 3. Information, communication, and education
- 4. Physical comfort
- 5. Emotional support
- 6. Involvement of family and friends

When measuring *patient-centered* Lewin et al. (2001) concluded that there was no "golden standard" for measuring patient-centered care. Meaning that it can be assessed in different ways. A possible reason for this was because *patient-centered* was such a wide definition (Groene, 2011). Docteur and Coulter (2012) thought it was beneficial to solve this issue by measuring *patient-centered* within healthcare in different ways. This was done by analysing previous answers from patient surveys assessing the care, interviewing experts within the field and analysing current research results and evaluations on the topic *patient-centered* care (Docteur & Coulter, 2012).

Timely care was about creating smooth process flows for patients seeking and personnel in healthcare providing care. A timely healthcare system was also adaptive towards urgent interventions and scheduled or modified contacts with patients expecting treatments. Waiting time and delays for patients and personnel should also be minimised as much as possible (Institute of Medicine, 2001). *Timely* could therefore be measured in different ways depending on the purpose and interest to measure. Examples of measurements which could be used to assess *timely* in Sweden time it took for a patient to receive care and experienced waiting time based on patients (Socialstyrelsen, 2018).

Efficient care focused on generating high value for the patient with the resources used for doing so for example money, energy or time. Effective care generated minimal waste in for of unnecessary complexity of healthcare, administration, supplies, and unnecessary processes. Efficient care also considered the personnel's strength with the task at hand when helping the patient (Institute of Medicine, 2001). *Efficient* then could be evaluated by comparing the resources used when providing care in two different ways. Sherwood et al. (2018) did this when evaluating the efficiency of using telemedicine in a male prison. The study measured the number of patients who could be managed using mainly telemedicine visits than in-person visits and the potential resources saved for doing so. The study estimated how 80% of patients required at least one fewer in-person visit and how it could decrease costs for guards when requiring fewer transports of prisoners for in-person visits (Sherwood et al. 2018).

Equitable care ensured the quality of healthcare did not vary because of characteristics like gender, race, geographical location, ethnicity, and socioeconomic status (Wyatt et al., 2016). *Equitable* could be further specified to two levels. Equity at a population level where the aim of health care systems was to reduce health disparities for subgroups. Equity on an individual level was focused on providing the same quality of healthcare regardless of patient characteristics (Wyatt et al., 2016). *Equitable* care could be assessed in very different ways depending on what type of socioeconomic factors of interest. There were for example frameworks describing how healthcare organisations could assess health equity in order to improve it. The framework did this by providing personnel with statements to assess from 1

to 5 regarding how well the organisation worked with the statement (Wyatt et al., 2016). Another way of assessing was by comparing socioeconomic factors such as education or region with the patient's health to find patterns of inequalities within healthcare (Socialstyrelsen, 2018). A brief description of the six quality dimensions within healthcare can be seen in table 1.

Dimension	Description
Safe	Avoiding injuries to patients from the care that is intended to help them.
Effective	Providing services based on scientific knowledge to all who could benefit and refraining from providing services to those not likely to benefit (avoiding underuse and overuse, respectively).
Patient-centered	Providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions.
Timely	Reducing waits and sometimes harmful delays for both those who receive and those who give care.
Efficient	Avoiding waste, including waste of equipment, supplies, ideas, and energy.
Equitable	Providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status.

Table 1. The six dimensions of quality within healthcare (Institute of medicine, 2001).

3 Method

The following chapter describes how the research was conducted. This includes the used research method for conducting the study, how the data was collected and analysed, and lastly considerations of ethics and trustworthiness of the study are described.

3.1 Research method

The study used a qualitative research strategy with a single case study research design. Qualitative research was selected due to its exploratory nature, focus on words, the social world, and the function of understanding a phenomenon. Due to the complexity that comes with evaluating healthcare quality, a single case study design was selected for obtaining deeper knowledge and understanding (Bell et al., 2019).

According to Yin (2018), a case study is especially beneficial when: "a "how" or "why" question is being asked about a contemporary set of events over which the researcher has little or no control". When conducting research where research questions focus on why and how, a case study strategy is often beneficial for answering how and why something is functioning (Yin, 2018). A case study strategy was therefore chosen for investigating how digital healthcare meetings have affected the quality of healthcare at these psychiatrist units.

But case studies are by some researchers valued less compared to other research strategies. One concern is that data should be described and interpreted fairly, but the same issue could as well happen in other research strategies such as historical research. Another concern when performing case study research is that it is not performed thoroughly or does not use a planned method, and researchers' own opinions influence the outcome of the study (Yin, 2018).

This research was divided into four phases: pre-study, data collection, data analysis and conclusions, see figure 3. The goal of the first phase, pre-study, was to understand the research topic and select the aim and research questions of the study. This was conducted through informal interviews with stakeholders at Sahlgrenska University Hospital, personnel from unit P, private companies within the healthcare, and guidance from supervisors at Chalmers University. For understanding the topic, a variety of scientific articles and books within the field were read as well as videos that were seen. In the pre-study phase, mind mapping was also used as a platform for exploring, collecting intel, discussing, and refining different research ideas with stakeholders. The mind map made it easy to show and structure research ideas and information from books and scientific articles.

In the second phase, a literature study and interviews with personnel were conducted to collect data. In the third phase, the collected data from interviews were transcribed, identified, and analysed. The potential findings were then used as guidance for identifying literature of relevance. The second and third step was then repeated until the interviews did not contribute to new findings. In the last phase findings were summarised and conclusions were generated by comparing empirical findings with the existing theories.



Figure 3. Illustration of research strategy's four phases

When evaluating theoretical and empirical data the researchers chose to use an abductive research process as seen in figure 4. The reason for this was because the process uses both current theories and empirical facts for generating conclusions and can be developed as the study explores the research area (Kovács & Spens, 2005). A pure deductive or inductive research approach was inappropriate for the study's nature. A deductive research process focuses on finding logical conclusions which do not fit well with an explorative approach to understanding a social phenomenon. An inductive research approach could work, but there was limited previous literature within the research area for guiding the research process (Bell et al., 2019).



Figure 4. Illustration of the abductive research process (Kovács & Spens, 2005)

3.2 Data collection

In this chapter, three different types of data used are described: literature study, hospital database and qualitative interviews.

3.2.1 Literature study

The foundation of this study relies on the literature study when forming the scope and research questions. The literature study was developed in parallel and iteratively along with the study's first three phases pre-study, data collection and data analysis. The literature could then be developed along the way to deepen the knowledge as new information of relevance was found in one of the study's phases.

In the pre-study phase, an explorative literature study was conducted that focused on exploring and understanding different research areas of relevance towards digitalization and healthcare. The data aimed at helping the authors understand the research area. The discovered literature was based on early interviews with contacts, sources in literature, recommendations from supervisors and keywords used such as healthcare, digitalization, digital healthcare meetings, and impact. The literature was found through the following databases: Google Scholar and Pubmed.

During the phases of data collection and data analysis, the authors acquired a deeper knowledge of the research area as guidance towards forming, conducting qualitative interviews, and analysing the answers. A more focused literature study was therefore conducted around the following concepts, "healthcare in Sweden", "The six dimensions of quality in healthcare", "Covid-19 impact" and "evaluation of quality in healthcare". Literature was included or excluded based on relevance and credibility that contributed to answering the research aim. The databases used in this literature study were mainly Chalmers library and Google Scholar. Keywords used included *quality in healthcare, evaluating quality of healthcare, telemedicine, telehealth, Covid-19 and telemedicine.*

3.2.2 Qualitative interviews

In the pre-study unstructured interviews used open-ended questions based on the interviewee and knowledge of interest. This was an efficient way of gathering initial intel while exploring the research area (Bell et al., 2019). The interview guide was shared ahead of time as it helped the interviewees prepare for a deeper discussion to take place during the interviews. Interviewees included in the pre-study were previous researchers within healthcare, private healthcare companies and stakeholders from Sahlgrenska University Hospital and Chalmers. The goal of these interviews was to gain knowledge, better understand the research scope and define the research aim.

During the data collection phase, semi-structured interviews were chosen for collecting empirical data. Semi-structured interviews were chosen allowing the study to explore and gain deeper knowledge within specific areas of interest. But the interviewees could still freely interpret different aspects of relevance within these areas when answering the questions for understanding the phenomena (Bryman, 2012). This type of interview was also a flexible method where the questions could be developed along with the study towards answering the research question while allowing follow-up questions during the interviews for better empirical data and avoiding misinterpretations.

When conducting the interviews, the study used an interview guide. The construction of the interview guide could be described in figure 5 (Bryman, 2012).



Figure 5. A schematic picture of the process for constructing the interview guide (Bryman, 2012)

The first two steps in figure 5 were done in the pre-study. The rest of the steps were done during the data collection phase. The description of the six dimensions for quality in healthcare was used as guidance and connected the interview questions with the study's aim. The definitions were reviewed iteratively along with the creation of interview questions. The interview questions were formulated to make health professionals reflect on how the usage of healthcare meetings affected each of the six dimensions. For example, to explore the perceived effectiveness of care through digital healthcare the following question was asked: What do you think about giving care digitally?

The questions were thoroughly reviewed and discussed internally by the authors by using the following guidelines for formulating an interview guide (Bryman, 2012):

- Create a good flow with the order of questions
- Formulate questions that contribute toward answering the research question
- Formulate comprehensible questions that the interviewees feel can be answered or reflected upon
- Keep the questions simple if possible
- Formulate open-ended questions

Furthermore, the authors took inspiration from the questions asked by Sweden's national patient survey (Nationell Patientenkät, 2018). The questions were then reviewed by stakeholders from Sahlgrenska University Hospital and the supervisors. Afterwards, the questions were tested and reviewed by the first two interviewees. Any potential issues related to the questions during this phase were reviewed and potentially acted upon depending on feedback received.

Sampling

A purposive sampling method was used to sample cases and participants, this is a commonly used sampling method in qualitative research. Purposive sampling means to find a case and participants who are relevant and suitable for answering the research questions (Bell et al., 2019). Another term for purposive sampling is judgement sampling hence researcher's judgement is used for choosing cases and participants (Etikan et al., 2016).

Since it would not be useful to conduct interviews where digital healthcare meetings were not used, the sampling process started with inspecting statistics on how much digital healthcare meetings were used in percentage at different units at Sahlgrenska University Hospital. This was done together with stakeholders from the digital health department at Sahlgrenska. A unit with already established contact with stakeholders and using digital healthcare meetings was selected, named unit P in this study. Stakeholders from the digital health department at Sahlgrenska University Hospital emailed the manager at unit P information about the study and asked for interviews.

After approval from unit P, a discussion with the unit manager took place and it became clear that it was desirable to interview personnel from different roles. Due to the role differences in treatments and usage of meetings digitally it was preferable to interview one or two personnel from each role at the unit. It was also seen as beneficial for answering the research question to gather a wider range of sampling and answers. The manager at unit P forwarded the information to its personnel with the expectation that at least one or two interviews from each role participated, and asked personnel interested in participating in an interview to contact researchers. The interviewees' roles and codenames can be seen in table 2. Interviews were conducted until saturation was achieved, which means that no new relevant data seems to be emerging. Therefore, the number of interviews are needed to achieve saturation (Bell et al., 2019). The interviews conducted at unit P were not enough to achieve saturation. Additional interviews were therefore performed at another psychiatric unit called unit A following the same principles as done for unit P. In total 11 interviews were conducted, seven at unit P and four at unit A.

Role	Interviewee	Type of interview	
Psychiatrist	P1	Physical	
Therapist	P2	Physical	
Physiotherapists	Р3	Physical	
Physiotherapists	Р4	Physical	
Rehabilitation Coordinator	Р5	Digital	
Rehabilitation Coordinator	Р6	Digital	
Unit Manager	Р7	Digital	
Curator	Р8	Physical	
Psychiatric nurse	Р9	Physical	
Psychiatrist	P10	Physical	
Physiotherapists	P11	Physical	

Table 2. All interviews were conducted including the interviewees' roles and how the interviews were conducted.

Interview process

Before each interview an information letter about the study was sent out to each participant, the information letter can be seen in appendix A. The information letter presented the focus of the study as well as informed the interviewees and the study's expectations during the interview. Each interview was recorded. The interviews were conducted physically or digitally. During the interview, one asked the questions while the other took notes of relevant aspects for further questions. Both researchers engaged in asking follow-up questions for extracting more data or understanding the interviewees' answers.

Every interview started by giving the interviewee a paper with the interview guide, the interview guide can be seen in appendix B. If the interview was digital the questions were sent to the interviewees' email. This was done to offer the ability to also read the questions and not only hear them. Thereafter the interviewers conducting the research presented themselves and asked the interviewee to present themselves. Moreover, introductory questions about the interviewees' work at the unit were asked to make the person more comfortable before starting to ask the question from the interview guide.

3.3 Data analysis

The data analysis used literature study and thematic analysis. The literature study represented the theoretical data for what is known and was used as guidance when forming the thematic analysis. The empirical data generated by the thematic analysis was then used for finding patterns but also developing the literature study to deepen the knowledge. The findings from both were then compared to draw conclusions. A schematic figure of the data analysis can be seen in figure 6.



Figure 6. Schematic picture of the data analysis process

A thematic analysis was used for identifying and analysing patterns also called themes within the data (Braun, 2006). The method suited well with the study's exploratory nature and abductive approach seeing how it is flexible and can be done iteratively along the research process. The thematic analysis was conducted using the six phases from Braun (2006):

- 1. Familiarizing yourself with your data.
- 2. Generating initial codes.
- 3. Searching for themes.
- 4. Reviewing themes.
- 5. Defining and naming themes.
- 6. Producing the report.

In phase 1, the thematic analysis started with transcribing the recorded interviews. This was done by one interviewer the same or the previous day after an interview. When the transcription was done the other interviewer read it to ensure the quality of the transcription.

In phase 2, statements in transcriptions that were seen as interesting for the research aim were highlighted and written on post-it notes in software named Miro. The post-it notes were grouped based on relevance or common features and given a suitable heading which created a code. The codes were discussed verbally between the authors.

In phase 3, the codes were reviewed and grouped for defining preliminary themes. The codes were read through, and codes related to each other were grouped based on the following guidelines from Bryman (2012):

- Repetitions: topics that recur again and again
- Metaphors and analogies: the ways in which participants represent their thoughts in terms of metaphors or analogies.
- Similarities and differences: exploring how interviewees might discuss a topic in different ways or differ from each other in certain ways or exploring whole texts like transcripts and asking how they differ.
- Theory-related material: using social scientific concepts as a springboard for themes.

From this, the grouped codes formed initial themes that described certain aspects of relevance toward the influence digital healthcare meetings had on the quality of care. A theme was generated based on that the codes seemed coherent and that four or more different interviewees mentioned the topic. But the limit of four mentions was decided at later stages in the process and tested based on how many subthemes would be created with the different number of requirements of mentions. There were no specific recommendations for this, so it was decided during the study.

In phase 4, here the themes and grouping of codes were reviewed at two different levels. Level one reviewed the coherency between the codes grouped together that formed the theme. This was done by reading the statements in each theme and evaluating if any codes deviated from each other. Some codes deviated which were then moved or discarded from the theme, while others were found to better fit another theme. If the code within the theme was coherent the review continued to level two.

Level two compared the individual themes with all the data collected to ensure that the themes gave an accurate representation of what the data said. This was done by comparing if the themes described the grouped codes well and if there were any additional codes that fitted with a theme which was missed in earlier coding stages.

In phase 5, the authors focused on capturing the essence of what each theme was described in relation to the research aim. Each author wrote a text of a theme, the description was then

reviewed by the other author to ensure it captured the essence of the theme and grouped codes. One test for doing this was to describe the scope and content of each theme in a few sentences.

In phase 6, the results were divided based on the main themes found in the thematic analysis. The main theme consisted of subthemes that described in detail certain aspects of the usage of digital healthcare meetings. Each subtheme was then connected with the impact it had on the six quality dimensions for quality within healthcare. Based on what each quality dimensions, positive influences on the quality dimensions or both positive and negative influences on different quality dimensions. For some themes, it was unclear how it influenced the quality dimensions and therefore had no influence on the quality dimensions at all.

3.4 Ethics

Four essential ethical areas stated by Bell et al. (2019) were considered in the research; harm to participants; lack of informed consent; invasion of privacy; and deception. To avoid harm and invasion of privacy of interviewees the transcribed and recorded interviews were handled carefully, anonymous, and not shared with others. Furthermore, a consent form was created to inform participants and avoid the invasion of privacy, interviewees had to read through the information letter before being interviewed. (Data from the hospital's database was already anonymized. The data was handled carefully and not shared with anyone else.) Furthermore, the specific psychiatry units where the research was conducted were not mentioned by name to avoid potential invasion of privacy and harm to participants.

3.5 Trustworthiness

Reliability and validity are two important criteria for quality in quantitative research, but it has been questioned how applicable these criteria are for qualitative research (Bell et al., 2019). Instead, the study's trustworthiness was based on the four criteria by Guba and Lincoln (1985), (1994): *credibility, transferability, dependability and confirmability,* which is also described by Bell et al. (2019).

Credibility reflects on the acceptability of findings by assessing how the authors conducted the research and seeking confirmation for findings through the members of the social world investigated (Bell et al., 2019). Triangulation has been used by comparing different sources of information against each other to increase credibility. For example, theories are compared with data from interviews and by conducting interviews at two different units at Sahlgrenska University Hospital. Another method for increasing credibility is by conducting respondent validation which means making sure researchers' perception is accurate by confirming with respondents (Bell et al., 2019). Respondent validation has unfortunately only been conducted with a few respondents due to time limitations.

Transferability refers to the ability to transfer findings which is more difficult in qualitative studies due to fewer samples and unique social settings. Transferability can be enhanced by using "thick descriptions" which provide detailed information about the settings and creates a database for estimating the transferability of the study (Bell et al., 2019). In this thesis "thick descriptions" have been written through thorough transparent descriptions of how the research was carried out, with exception of information which potentially could risk

confidentiality for interviewees and healthcare units. Furthermore, the findings of the research have been transparently and clearly stated.

Dependability refers to the possibility for which the study can be replicated which is more difficult in qualitative research due to its unique social settings. Furthermore, the dependability criteria also relate to how the authors internally agree on what is seen or heard (Bell et al., 2019). To ensure dependability it was important to save and have information available about the research process such as sample selection, formulation of the problem, transcription of interviews, field notes etcetera. Another approach to improve dependability is by having peers as auditors along the course of the research who read through all saved materials and investigate the procedures of the research. Since this method is very time-consuming for auditors it has not been used (Bell et al., 2019). But the opposition of the thesis by two peers has been carried out, and an examination by a supervisor and an examiner from Chalmers University. Furthermore, as earlier mentioned, the process of the research has been thoroughly explained and has been transparent as much as possible without risking the confidentiality of the units researched.

Confirmability recognizes that it is impossible for authors to be completely objective when conducting social research. The important aspect is how the study was conducted or that the results from the study are not overly influenced by either personal values or theories (Bryman, 2012). The study's confirmability can be seen based on the interview guides where most of the questions were formulated neutral and open with the intention of not guiding the interviewees' thinking. An audio recording was also used to ensure that the authors did not misinterpret interviewees' answers when collecting the data. Lastly, the authors have been transparent to increase the confirmability by describing in detail how the study was conducted.

4 Results

In this chapter, the results of the study are presented. Results present and summarise what the personnel stated during the interviews. The results consist of six main themes and 25 subthemes themes created during the thematic analysis. The chapter is structured by first presenting and describing the main themes, followed by presenting and describing its subthemes. At the end of this chapter, an overview of the results is presented, including all main themes, subthemes, and how many different interviewees have mentioned each subtheme.

The subthemes were created by first highlighting transcribed statements from the interviews that were relevant to the research question. These statements were then copied to post-it notes which were grouped together with other similar post-it notes. If the grouped statements were mentioned by at least four different interviewees, they became a subtheme and were given a fitting name. The subthemes with similar aspects and coherency were then grouped together and given a name describing the coherency of the subthemes, creating a main theme.

4.1 Usage

During the interviews, personnel mentioned to some extent how, when, or both, when they used digital healthcare meetings. Personnel mainly mentioned five types of topics related to how digital healthcare meetings were used which became subthemes during the thematic analysis, these were: *judgement call, unfitting, fitting, an alternative* and *body guidance*. Later in this analysis, these subthemes were grouped together because of their association and underlying connections, this new group created the main theme which was named *usage*. The main theme received the name *usage* as the word described it well. *Usage* described certain topics discussed during interviews of how and when digital healthcare meetings were used by the personnel.

4.1.1 Judgement call

The personnel described how the usage of digital healthcare meetings required a *judgement call* based on how it could affect the patient. Five respondents described this during the interviews in different ways. The decision was done by the personnel and their view regarding if it could be an advantage or disadvantage. There were none which mentioned how guidelines existed for making these judgement calls or suggestions. So, whether a patient received treatment digitally depended on the personnel it seemed. One respondent summarized the importance of these judgement calls: "*Who should have digital healthcare meetings and who should not have digital healthcare meetings? And I think that's a pretty important question as well.*" (P3).

4.1.2 Unfitting

During the interviews, it became clear that digital healthcare meetings were *unfitting* on certain occasions. One occasion when it was seen as unfitting to use digital healthcare meetings was if the patient's well-being varied or was regarded as unwell. One interviewee stated: "*Yes, so that's why patients who you already know are very swaying in their condition, you want to come here.*" (P8). In these situations, caregivers wanted to have the patient in a physical meeting in case they needed to make physical examinations, such as measuring the blood pressure or handing over the patient directly to a doctor. Another interviewee said:

"Yes, but when I meet and then I notice that, oh here an urgent assessment of a doctor is needed. Then it is also very good to have the patient here on-site to be able to go and knock at one of the doctor's doors. An assessment must be made here, like now and it is difficult if it is digital." (A1)

Moreover, personnel preferred to use physical healthcare meetings when conducting assessments of a patient's well-being or when it required a patient's physical presence. In these situations, personnel needed to be able to for example give injections. Personnel described how it was preferable to have the patient physically present before a decision regarding the patient's treatment or health. Another situation when digital healthcare meetings were seen as *unfitting* was when personnel wanted to see a patient in the room to be able to see the patient's whole body, and how it interacted and moved. Lastly, it was *unfitting* when the patients' Swedish language was not well since it was easier to read body language and gestures to understand the patient physically.

4.1.3 Fitting

But digital healthcare meetings were also considered *fitting* on different occasions. Personnel often described digital healthcare meetings as a "safe" way to give care. Follow-up meetings, check-ups, talking with a psychologist, and planning care with patients were mentioned as fitting occasions. These occasions were described as fitting because they did not require personnel to see the whole body and it was a form of conversation. One interviewee said: *"There are various elements that work better and worse. Follow-ups of care planning, of physical activity, when patients need contact, meetings with colleagues, we can be several who have the meeting with the patient, when it is very much based on us talking, I think it works well."* (P6). Furthermore, two respondents mentioned it was *fitting* to use digital healthcare meetings when there were about 3-4 patients in the meeting because otherwise, it would be hard to see all patients and for everyone to talk.

4.1.4 An alternative

While there were occasions when digital healthcare meetings fit or not, it was also considered *an alternative* for conducting physical healthcare. Personnel explained how digital healthcare meetings allowed the provision of healthcare during the pandemic when physical contact limited care, or when the patient could not be physically present. It was also seen as a better alternative to phone calls since it allowed the personnel expressed that: *"But the meetings themselves I think will be so good digitally. But it is different from a phone call as I cannot read and I did not get any eye contact. I cannot read the facial expressions, so then I think digital healthcare meetings are a very good alternative if they cannot be here on-site"* (P4).

One respondent got the impression that when the alternative of having annual check-ups through digital healthcare meetings more patients attended them. The respondent expressed: "Some patients may not have had as much contact as they have, I get in touch when I need it. This may have been a few years and they may have been a little unwilling to come to these annual visits because they see no point in it. But during the pandemic so when we offered these years' visits in a more remote way then I think an experience was that there were a few more who came to them" (A3).

4.1.5 Body guidance

The usage of digital healthcare meetings when conducting *body guidance* was frequently discussed during different interviews with therapists. *Body guidance* focused on training patients through simple physical exercises or movements for understanding their bodies. The personnel made it clear it was possible to conduct body guidance when using digital healthcare meetings. But it also came with certain drawbacks when doing so. Personnel thought practising already learned movements could be done digitally while learning new movements was not appropriate and uncertain. When doing so required more hands-on information such as touching for guiding the patient's movements or seeing the patient's reactions. So, the interaction was not on a satisfying level. The outcome from body guidance was affected negatively with descriptions like "harder to practise" and "not the same quality compared to physically". Here was one example: "*Otherwise, we are pretty much physical. You might put a hand on your back. Can you drop behind here or can you lift a little here? And I do not reach my hands through the digital, so it is the great difficulty that you cannot really give this real guidance."* (P3)

4.2 Effect

During the interviews, personnel mentioned how their digital healthcare meetings had influenced the healthcare they provide. The interviewed personnel mostly mentioned and discussed five different topics that had influenced digital healthcare which became subthemes during the thematic analysis, these were: *flexibility, cancellations, work area, financial incentive,* and *time-efficient*. Furthermore, these subthemes were grouped together during the thematic analysis because of their underlaying similarities and influence on digital healthcare. This new group created the main theme which was given the name *effect*, this name was chosen since it referred to what effects personnel or patients had experienced since starting to use digital healthcare meetings.

4.2.1 Flexibility

Using digital healthcare meetings influenced the *flexibility* of providing care among personnel and patients when seeking care. For the personnel, it became easier to find time slots with patients for conducting healthcare meetings. The care could also be conducted later at the unit but still within the opening hours. The patients could receive care at times which fitted them while not requiring their physical presence at the unit. This was commonly mentioned as the main reason for the increased *flexibility*. Seeing how the patient could have children or a reason for not being able to leave the job or the home. A statement illustrating this was: *"Yes, then it can also be positive in the other direction, so to speak, that you may have children at home and could not have had a meeting on that day. But if you have it digitally, you can have a meeting. Or there will be a craftsman or something like that, then they have not been able to go away, be able to get away to the unit, but you can do it if you have it digitally." (P5)*

4.2.2 Cancellations

The usage of digital healthcare meetings also seemed to result in fewer *cancellations*. Personnel experienced fewer cancelled meetings since the usage of digital meetings. When asked why there was one theory among the interviewees suggesting patients got more reminders from the application used for conducting digital healthcare meetings. Potential missed physical meetings could also be replaced with a digital healthcare meeting when the

patient felt a bit ill, did not have the strength to go to the unit or simply forgot the meeting. But a planned meeting either digitally or physically should preferably be conducted as planned and not be taken for granted. Here was one statement on this: "*But I would probably* say that they may be a little less likely to miss digital meetings because they also can, that is, they get like a reminder in the mobile, maybe a few minutes before and when it starts. And then even if they have forgotten the visit, they can often receive it. Even if it may happen under bad circumstances, you can perform the meeting." (P10).

4.2.3 Work area

During interviews at specifically unit P, the usage of *work area* connected with using digital healthcare meetings was mentioned by personnel. Interviewees explained that the unit had a limited amount of work area available for providing healthcare and meeting patients physically. Personnel then worked from home at least one day per week and used digital healthcare meetings instead of being physically at the unit. Personnel thought this helped save the *work area* and minimized the demand for booking rooms at the unit. One respondent said: "We are a bit overcrowded so for that reason, it will probably also be an advantage if we can keep some visits still digital of course." (P2). Another expressed: "Of course, I can also work from home and have digital healthcare meetings, which is good, and I relieve the room of the unit booking." (P5)

4.2.4 Financial incentive

Digital healthcare meetings received a higher *financial incentive* compared with telephone meetings. Therefore personnel felt imposed to use digital healthcare meetings rather than telephone meetings when choosing between both options. An illustration of this was: "*We are then imposed not to do so because we get different payment for a visit like this. Digitally counts as a regular meeting, but a telephone meeting gives a little less money*" (P6). One argued how the difference in *financial incentives* undermined best practices when choosing how to conduct healthcare.

4.2.5 Time-efficient

Digital healthcare meetings were among interviewees seen as *time-efficient*. When asking how digital healthcare meetings affected the usage of time interviewees mainly described it as having a positive influence. The question was open-ended meaning that the person could state either positive or negative answers but chose to refer to it as having a positive influence. Common words used were how the usage of time resulted in "more effective care", "effective work" or "more focused". When asked further questions as to why there were some theories for it but no definitive answers, less time was spent on everyday talk with the patient before starting the meeting, walking to pick up patients and more focused meetings.

One interviewee described it: "But I would say that it becomes a more efficient use of time. And maybe also because it takes some time to pick up the patient, the patient has to hang up his clothes and hello, hi yes, it's windy today. And yeah, it is especially before the meeting that it becomes more efficient." (P5).

4.3 Increased accessibility

During the interviews, personnel mentioned how digital healthcare meetings increased the accessibility for patients. Personnel mainly mentioned three different ways to increase access to care which became subthemes during the thematic analysis, these were: *less travelling, saved time and closer healthcare*. After the subthemes were grouped together during the thematic analysis due to their similarities, the main theme *increased accessibility* took form. The main theme referred to how digital healthcare meetings had *increased accessibility* for patients. This main theme contained the subtheme with the most amount of post-it notes, that was statements, from all the interviews which were the subtheme *less travelling*.

4.3.1 Less travelling

When digital healthcare meetings were used patients required *less travelling* for receiving care. Out of all subthemes, *less travelling* was the most mentioned subtheme and mentioned by 11 of 11 interviewees. Requiring the patient not to travel to the unit was seen as positive among the personnel. Seeing that digital healthcare meetings increased accessibility, saved time and led to fewer trips for patients. Several respondents mentioned it was beneficial to use digital healthcare meetings for short follow-up meetings since patients did not need to travel for short informative meetings. Personnel said this: "We have patients all the way up to Skövde and down, so it is pretty pleasant for them to have it digital to not have to travel 1,5 hours to get here for a 30-minute meeting" (P3).

4.3.2 Saved energy

Part of receiving a treatment physically required patients to travel to the unit, but when using digital healthcare meetings instead *saved energy* for patients. Respondents described how the process of travelling to the unit could be an energy-consuming process, from booking and planning the trip to meeting people at the unit. Personnel described this since patients could have little energy left for conducting a treatment when finally arriving at the unit. The patient could then save this energy with digital healthcare meetings allowing the patients to manage their energy more efficiently and use it either during the treatment or for activities after the treatment. The energy could be for simple physical activities such as taking a walk or something the patient wanted to do. One personnel expressed: "And for the patients, some come a long way, they do not need to travel and can put energy on other things." (P5).

4.3.3 Closer healthcare

For the patients when implementing digital healthcare meetings and increasing the accessibility of care resulted in *closer healthcare* as well. When asked about the impact digital healthcare meetings had on equal care it was positive toward patients living further away. Several respondents mentioned how increased accessibility led to more equal access since patients further away could gain the type of care required and a more equal amount of care. The care then became less dependent on where the patient physically was. One interviewee phrased: "*Equality can be from many aspects, but since we are a regional unit, I think directly about this with the distance that you should have access to us in the entire region. The same opportunity to be able to participate in things.*" (P6)

4.4 At home

After interviews were performed, it was clear that when digital healthcare meetings were performed patients were very often located *at home*. Personnel mentioned five different ways being *at home* affected healthcare. These five became subthemes during the thematic analysis, these were: *not alone, private spot, comfortable, strong emotions and challenging patients*. During this analysis, these five subthemes were grouped together due to their similarities and formed the main theme *at home*. The main theme *at home* referred to where digital healthcare meetings took place but also how patients receiving care *at home* affected healthcare. *At home* contained the subtheme with the second most statements from the thematic analysis, which was the subtheme *not alone*.

4.4.1 Not alone

Personnel often experienced how patients were *not alone* during digital healthcare meetings which affected the care. This topic was mentioned by 10 of 11 interviewees describing different situations where suddenly the patient was *not alone* or how other people around interfered in different ways while describing it as an issue. The statements included other people in the form of family members, a partner, children or even animals being close by. A condition for digital healthcare meetings was to fulfil the secrecy between personnel and patients. So, the secrecy was questioned by several respondents due to other people being close to the patient or suddenly interfering with the meeting and possibly being able to overhear the conversation. Another problem was when patients did not feel comfortable and willing to talk about a person affecting their life when the person was home at the same time as the patient. This then limited the treatment of the patient as explained here: *"Then also quite many patients have other family members at home. Which allows that someone could walk by, a partner or so. But I had a patient who wanted to tell a difficult thing about their child before the child came home. Which means that the child's absence or presence would control the conversation." (P5).*

4.4.2 Private spot

When conducting digital healthcare meetings, it was preferable for the personnel when the patient conducted the meeting in a so-called *private spot*. The personnel referred *private spot* in different ways such as "a small room", "not sitting so openly" or "a separate room and where it is quiet". The common pattern was how the care took place in a similar setting as if conducted at the unit. Most patients had a *private spot*, but some patients had for example limited possibilities based on their accommodation. One respondent expressed: "*And as I said in those cases where I feel that we both can like carry out the meeting in a way that is intended, where you sit separately, and they have time.*" (P10). This was not always the case as personnel made other statements where the patient thought it was okay for conducting a digital healthcare meeting at a café which was not an acceptable setting because of the secrecy between patient and personnel.

4.4.3 Strong emotions

When conducting healthcare either at the unit or at a distance the patients could sometimes experience *strong emotions*. Going through *strong emotions* had been described as part of the treatment for some patients. Personnel understood how this could be a critical situation and managing these *strong emotions* was a potential issue when using digital healthcare meetings. The reason for this was their limited options to help the patient manage these strong emotions

digitally, except for verbally talking about the emotions. It was more difficult to "catch the feelings" as personnel expressed which then created uncertainties about the patient's wellbeing when leaving the meeting. This then left the personnel worrying a bit about the patient. This statement described the issue well: "*Here I have felt a little uncomfortable because I think if the person would be home and practice, he or she is flooded with anxiety or sadness, and I cannot do anything then. I cannot reach, I cannot catch. I do not know what happens when the person turns off the camera. Because here you could ask them; can you stay in the waiting room for a while? Can you go for a walk? We may have another therapist, you can go and talk to this one so that you are a little calm when you leave here." (P3)*

4.4.4 Comfortable

When receiving care at home the patients felt more *comfortable*. Personnel described this in different ways suggesting how and why patients were more *comfortable*. A common suggestion for this was because the care took place in an environment in which the patient was familiar and felt safe. Furthermore, personnel mentioned how it could be more "emotionally charged" for patients to visit the unit as an explanation to why they felt more comfortable with a digital healthcare meeting at home. Here was one example of it: "Feel more relaxed at home than in a psychiatric clinic. For some, it feels emotionally charged to come to a reception where you have been when you have felt very bad so it can be a stress to come in, sit in the waiting room, maybe see someone else who feels bad" (P11). Other positive aspects for receiving care digitally included statements suggesting the patients could become "calmer", "made it easier for patients to express themselves" or "relaxed". An example proving this was: "Then we continued the conversation when she sat at home in her kitchen, and it was a completely different person I saw... For example, this patient that was so relaxed at home was also more relaxed and had more access to her cognitive abilities when she was calmer so there was an advantage with her being at home so we could have a calmer conversation" (P2).

4.4.5 Challenging patients

As part of treating a patient's condition, it could require *challenging patients*. The subtheme referred to how digital healthcare meetings made it possible for patients to avoid social problems instead of challenging them. Digital healthcare meetings made it easier for patients to avoid meeting other people and isolate themselves which could enhance social issues such as not daring to meet other people or social phobia. Personnel stated how patients trained social skills through meeting people when travelling to the unit and at the unit. But when patients had the opportunity to have digital healthcare meetings and stay at home, social problems were not challenged and sometimes, therefore, got worse. An example was: "*But there may also be those who do a disservice like I said that you want digital meetings to avoid going out, to avoid meeting people, to be able to perpetuate social insecurity or social phobia or something like that. That you have the anxiety to get out and then you avoid it as well and then you can hide a little behind that. And that's like a balancing act." (P6).*

4.5 Digital interaction

During the interviews, a common subject mentioned and discussed by personnel was the interaction between patients and personnel during digital healthcare meetings. Personnel mentioned three different subjects related to the interaction which became subthemes during the thematic analysis, these were: *missing signals, establishing relationships* and *limited*

vision. When conducting the thematic analysis, it became clear that these three subthemes were connected and had to some extent similarities and were therefore grouped together. This created the main theme *digital interaction* which described how digital healthcare meetings had affected the interaction between personnel and patients, and the provision of healthcare when it was used.

4.5.1 Missing signals

A clear difference between a digital and a physical healthcare meeting was how the interaction felt different because personnel were *missing signals*. It was difficult for personnel to specify what the difference was. It was more of a feeling but after asking further questions it came down to the small subtitle signals that the patient expressed and personnel received and used to draw conclusions. The signals could take the form of "reactions", "feelings", "breathing" or "sounds" which were either impossible or more difficult to receive digitally. This statement described this pretty well: "*Then there is something when you meet a person in the room. You feel, although I think one has still become quite good at reading digitally as well. But there is something there, something extra happens in the room and when you work with psychiatry as we do, it is also what happens in the room."* (P6).

4.5.2 Establishing relationships

Before using digital healthcare meetings saw it as important to *establish relationships* with the patients. The relationship was considered an important part of providing care as it made the interaction easier and understanding the patient physically and digitally. For establishing and maintaining the relationship between patient and personnel physical meetings were seen as necessary in the beginning or on a regular basis. Meeting only the patients digitally felt uncomfortable or uncertain for most personnel. Statements like this were commonly used: "*I do not think it is a good thing to meet a patient for the first time through a digital healthcare meeting…Have I already had one, if you say an alliance, or if you say that a relationship worked up with the patient, I think it goes better.*" (P2). Some mentioned how it worked well to establish the relationship digitally and had never met the patient physically, but it depended on the patient.

4.5.3 Limited vision

Looking through a screen when conducting a digital healthcare meeting left personnel with *limited vision*. Even though the personnel could see the patient it was only certain parts such as the upper body and not the whole body of the patient. Details of the patients were also harder to see or detect where "body language" was frequently mentioned as a specific detail. It then became more difficult to observe patients as part of the process of providing care. Digital meetings also gave patients the possibility to hide for example "tiredness" and "avoid activities" when comparing it with a physical meeting. One respondent expressed: "*At the same time, you feel that some can also hide a little behind it. I do not see exactly what they do, here I see someone walking away from the exercise and drinking water, I see what they do.*" (P3). The *limited vision* also caused a feeling of having less control over the situation.

4.6 Technology

During the interviews, a frequently mentioned and discussed topic was the technology of digital healthcare meetings. Personnel had brought up four different topics related to technology which formed subthemes when conducting the thematic analysis, these were: *booking system, issues, adaptation* and *stressful*. During this analysis these four subthemes were grouped together because of their underlying similarities and connections, this group created the main theme *technology*. *Technology* summarised aspects connected to the usage of technology when providing digital healthcare and the influence it had.

4.6.1 Booking system

When using the current *booking system* for digital healthcare meetings it was described as both time and energy-consuming. The problem was that one digital healthcare meeting needed to be booked in three to four different systems instead of one. Previously this administrative process was simpler when booking a physical meeting which was why personnel mentioned this difference. The booking process was also not considered straightforward or user-friendly when booking a digital meeting, statements like this were used: "*For me, yes a little more administrative time, because I need to book in another system*" (P11).

4.6.2 Issues

The technology used during digital healthcare meetings sometimes caused technical *issues* which affected the provision of healthcare. The issues were described in different ways and took different forms of "lagging", "thrown out of the digital meeting" or "bugs". These could happen either to the patient or personnel. Some of the personnel seemed to accept these *issues* as they only happened on occasion and could always replace the digital meeting by calling the patient instead. The technical issues were still a disturbance for the personnel and a cause for delaying the care when not functioning properly. An example of this was: "*But it bugs a lot. I had one yesterday when I worked remotely, which I do on Tuesdays, and then the connection lags. Then it's hard to know if it is from my side or from the patient's side.*" (A1).

4.6.3 Adaptation

The transition to digital healthcare meetings had not been straightforward for the units but possible while requiring *adaptation* from both patients and personnel. During the interviews, there were different statements describing how or what personnel or patients needed to learn about. For example, getting accustomed to the format, learning to use the technology or learning how to provide care digitally. A statement on this was: *"If you are not used to it, you can get caught up in the technology."* (P6). It has also required time and energy for making this *adaptation*. But the challenges patients and personnel had been overcome through practice as seen in statements like: *"It's probably an exercise thing, now I have done it so much that you still get a good contact through the computer screen. Yes, I think I get that or create this care room in some way."* (P9).

4.6.4 Stressful

The technology in digital healthcare meetings were not perfect which led to consequence in form of *stressful* moments for patients. Personnel described how digital healthcare meetings could stress the patients worried about the technology or experienced difficulties when using

it. One respondent described it like this: "Some sit ready long in advance because they are stressed that they will not get the technology to work." (P6). While some did not want to have it digitally to protect themselves from being exposed to stressful situations. A specific description of this said: "She gets such high anxiety when it is lagging" (P8).

4.7 Overview of results

Here the results were summarized in table 3 including the main themes, subthemes and the number of different interviewees mentioning the subthemes.

Table 3 Main themes, subthemes found from the thematic analysis and the number of different interviewees mentioning the subthemes.

Main themes	Subthemes	Number of mentions
	Judgement call	5
Usage	Unfitting	6
	Fitting	8
	An alternative	7
	Body guidance	5
	Flexibility	6
	Cancellations	6
Effect	Work area	5
	Financial incentive	4
	Time-efficient	7
Increased accessibility	Less travelling	11
	Saved energy	7
	Closer healthcare	6
	Not alone	10
	Private spot	7
At home	Strong emotions	5
	Comfortable	6
	Challenging patients	4
	Missing signals	10
Digital	Establishing relationships	6
interaction	Limited vision	6
Technology	Booking system	5
	Issues	7
	Adaptation	9
	Stressful	4

5 Analysis

In this chapter, the analysis of the study is presented. The analysis is divided based on the main themes found. The analysis presents and summarises the influence each main theme has on the six quality dimensions within healthcare. A summary of the influence each main theme and subtheme has on the quality dimensions can be found at the end of this chapter, see table 4.

In the analysis, the subthemes from the results were analysed based on how they influenced each of the six quality dimensions of *healthcare, safe, effective, patient-centered, timely, efficient* and *equitable*. A subtheme could have both a positive and a negative influence on the different dimensions as you will see. Each subtheme in the analysis highlighted important information as motivation for why and how it influenced a quality dimension. Some themes also did not influence any of the quality dimensions.

5.1 Usage

Judgement call highlighted the importance of judging when it was beneficial to use digital healthcare meetings or not. For making these *judgement calls* the personnel gave no statements that there was a lack of knowledge internally. Theory on telemedicine though described there was a limited number of guidelines for using telemedicine and few clinical trials proving how telemedicine resulted in more favourable outcomes (Wootton et al., 2006). But the collected data did not suggest there was a lack of guidelines or knowledge among the personnel regarding when or for whom to use digital healthcare meetings. The unit had therefore been able to develop this knowledge internally. *Judgement call, therefore*, had no clear influence on the quality dimensions within healthcare.

Unfitting, fitting and *an alternative* mainly described situations of digital healthcare meetings either being not preferable, preferable or an option when conducting healthcare. The statements within each theme were very coherent with each other making it clear that personnel understood when to use digital healthcare meetings. But the statements themselves did not suggest any positive or negative insights to analyse connected with potential influence on the quality dimensions. The statements were rather facts from the personnel regarding how digital healthcare meetings should be used based on experience and knowledge. *Unfitting, fitting* and *an alternative* had no clear influence on the quality dimensions within healthcare.

Body guidance gave clear descriptions of how digital healthcare meetings limited personnels' ability to interact with the patient. It was specifically more difficult to guide and show the patient how to move without physical contact. Not being able to make these small adjustments was a bit frustrating for some personnel as well. The statements were coherent with the theory of telemedicine where physical examinations were either limited or impossible (Darkins & Cary, 2000; Wootton et al., 2006). Personnel also noticed negative differences in the outcome of patients treated when comparing the treatment done digitally versus physically at the unit. Personnel felt how those who had completed the treatment at the unit previously came further in the treatment and resulted in better results. The treatment could therefore be more effectively done at the unit compared with using digital healthcare meetings. *Body guidance*, therefore, had a negative influence on the quality dimension *effective*. Patients' time and energy spent on the treatment could also be more efficiently used

when conducted at the unit compared with digital healthcare meetings. *Body guidance* had a negative influence on the quality dimension *efficient*.

5.2 Effect

Flexibility described how the usage of digital healthcare meetings made it easier for both personnel and patients to find timeslots for providing care when the patients were available. Another interesting aspect was how personnel could provide healthcare later in the day when done digitally. Similarities to this were found in the literature as telemedicine made it easier for a private person's schedule to book a consultation (Hjelm, 2005) or how it could be inconvenient for patients to have a physical meeting when having family and work (Darkins & Cary, 2000). Because it improved possibilities for patients to receive care based on their preferences *flexibility* had a positive influence on the quality dimension *patient-centered*. Seeing how personnel experienced it was easier to find timeslots with patients for conducting healthcare meetings led to fewer delays for patients seeking care and *flexibility* had a positive influence on the quality dimension *timely*.

Cancellations indicated how personnel experienced fewer cancelled meetings since implementing digital healthcare meetings. A potential cancelled meeting would need to be rebooked and then lead to a delay of care, while also consuming time and energy for personnel who planned and prepared for the cancelled meeting. A potential theory for why it led to fewer cancelled meetings was the increased number of notifications a patient received before a digital healthcare meeting. With fewer cancelled meetings it led to fewer delays for personnel who gave care and for patients seeking care. *Cancellations* then had a positive influence on the quality dimension *timely*. Because of fewer cancelled meetings which sometimes could be cancelled. *Cancellations* had a positive influence on the quality dimension *timely*.

Work area described how digital healthcare meetings helped one of the units manage the lack of rooms available for meeting with patients. At one of the units' personnel worked from home one day in the week instead of at the unit by using digital healthcare meetings to provide care. If the meetings were done physically at the unit, the personnel saw it as a risk of limiting the possible number of meetings carried out and thereby limiting the provision of care. Digital healthcare meetings, therefore, made it possible to save *work area* in the unit. The manager also saw this as necessary based on their current situation with the facility. Because personnel experienced digital healthcare meetings saved work area compared with if everything was done physically at the unit *work area* had a positive influence on the quality dimension *efficient*.

Financial incentive, when providing healthcare, the unit received a higher economic gain by conducting a digital healthcare meeting compared with a phone call. Out of these two options it was therefore preferable to use a digital healthcare meeting as it generated more money. But two of four interviewees were critical of influencing the provision of care this way when they did not see how this would improve the care. Even though there were some negative comments it was not connected with a potential impact on the quality dimensions. *Financial incentive* had no clear influence on the quality dimensions.

Time-efficient, when it came to the usage of time personnel experienced how digital healthcare meetings increased the utilization of time. When asked about the usage of time

personnel described how more could be done during a day compared with previously. Some of the reasons for this mentioned by personnel were minimizing time spent walking for picking up a patient and less time spent on socializing with the patient before the meeting started. Because personnel experienced digital healthcare meetings saved time and increased efficiency *time-efficient* had a positive influence on the quality dimension *efficient*.

5.3 Increased accessibility

Less travelling, personnel described how the usage of digital healthcare meetings leads to *less travelling* for patients. The subtheme was consistent with the theory stating how digital healthcare meetings increased access to healthcare for patients in other geographic areas (Darkins & Cary, 2000; Wootton et al., 2006). Because patients could meet personnel digitally instead of physically it saved time for patients required to travel long distances. *Less travelling* had a positive influence on the quality dimension *efficient*. By also increasing the access to healthcare, some patients' preferences could be better fulfilled by not requiring them to travel to the unit for receiving care. *Less travelling* had a positive influence on the quality dimension *patient-centered*.

Saved energy, personnel described how patients' energy could be better used by having a digital healthcare meeting instead of a physical meeting at the unit. The planning and travelling to the unit were for some patients an energy-consuming process. This means that when the patients arrived, they had less energy conducting the treatment compared with a digital healthcare meeting. The personnel also thought the patient's *saved energy* could be used better for example to take a walk or perhaps do rehabilitation exercises. *Saved energy* had a positive influence on the quality dimension *efficient*.

Closer healthcare illustrated how personnel experienced digital healthcare meetings made healthcare come closer to the patients. The improved accessibility of care was seen as beneficial for people's possibility to receive the specific care the patient required when curing their illness. This then included patients from other regions seeing how regions specialised healthcare differ. Patients could receive the right type of healthcare while not as dependent on their geographic placement. *Closer healthcare* had a positive influence on the quality dimension *equitable*.

5.4 At home

Not alone, when conducting digital healthcare meetings it was possible for other people to influence or disturb the treatment. A concern mentioned by the personnel was outsiders who could break the confidentiality between personnel and patient by overhearing or actively listening to what was said. The personnel could for example not be certain there was no one else except the patient in the room. Darkins & Cary (2000) and Wootton (2006) mentioned similar aspects as well referring to how health organisations needed to consider the management of patients' information. Other people could disturb the treatment by suddenly appearing or interfering with the patient. Moreover, other people could limit the treatment for example by being close which made the patient unwilling to talk about that specific person. Digital healthcare meetings increased the risk of breaking secrecy or leaking information within healthcare. *Not alone* had a negative influence on the quality dimension *safe*. These disturbances in the form of other people influenced the treatment negatively. *Not alone* therefore had a negative influence on the quality dimension *effective*.

Private spot, for the purpose of providing care through digital healthcare meetings personnel saw it as beneficial if the patient were isolated for example by sitting in a room with a closed door. Whether patients had this possibility or not could be a concern for the purpose of secrecy within healthcare. But the analysis of the current data gave no such insights into how this subtheme could affect the quality dimensions of healthcare. *Private spot*, therefore, had no clear influence on the quality dimensions.

Strong emotions were something patients experienced on occasions and left personnel with limited options to manage compared with a physical meeting at the unit. At the unit, there were other options available such as letting the patient wait in another room until feelings settled down, or having another therapist talk with the patient. This situation was also experienced as troublesome for personnel who wanted to help the patient, and unpleasant for the patient experiencing these emotions based on the statements. Because of this, *strong emotions* had a negative influence on the quality dimension *safe*.

Comfortable, personnel described it as beneficial to use digital healthcare meetings for some patients because it made them calmer or increased the feeling of safety. One reason for this could be because the care took take place in an environment where the patient felt in control compared with being physically at the unit. The theory around the usage of telemedicine suggested similarities with this where some felt more psychologically safe because of the physical distance between the patient and the physician instead (Wootton et al., 2006). *Comfortable* therefore had a positive influence on the quality dimension *safe*. The usage of digital healthcare meetings resulted in more adapted care by giving patients the opportunity to choose the environment where care took place based on their preferences. *Comfortable* had a positive influence on the dimension *patient-centered*.

Challenging patients, digital healthcare meetings made it possible for patients to isolate themselves from interacting with other people and increased the risk of enhancing potential social issues such as a social phobia. The provision of care could then contribute to a patient's sickness that needed to be challenged as part of treating it. Based on this *challenging patients* had a negative influence on the quality dimension *effective*.

5.5 Digital interaction

Missing signals illustrated how having digital healthcare meetings led to missed signals which could otherwise be seen and experienced in a physical meeting. The theory was coherent describing how telemedicine minimized physicians' sensory cues as part of treating patients (Miller, 2003; Wootton et al., 2006). Similar in this case was how personnel used these signals for interpreting patients' health or confirming judgements. The signals were important for the personnel as part of treating patients and managing uncertainties of patients' health. Missed signals could lead to missed information, which increased the risk of mistakes when treating the patient. *Missing signals* had a negative influence on the quality dimension *safe*.

Establishing relationships described how having a relationship with the patient made the provision of care easier when using digital healthcare meetings. But for the purpose of establishing a relationship, the personnel preferred physical meetings at the beginning with new patients or on a regular basis when treating the patient. Theories described this similarly but formulated how it was difficult to establish emotional connections with patients when using telemedicine (Wootton et al., 2006). The actual influence of this subtheme remained

unclear with the current data since there was no clear indication of influence related to the quality dimensions. *Establishing relationships* had no clear influence on the quality dimensions.

Limited vision, personnel noticed how digital healthcare meetings limited their sight which was considered an important source of information when for example interpreting the patients' wellbeing. Having more limited sight then created uncertainties which could increase the risk of errors when treating patients. The theory supported this as telemedicine could limit health professionals' access to information and lead to potential mistakes such as misdiagnosis (Darkins & Cary, 2000). *Limited vision,* therefore, had a negative influence on the quality dimension *safe.* Similar to this was how it complicated the treatment of the patient. It was more difficult to observe the patient and more difficult to know what the best treatment would be for the patient based on the information available through sight. *Limited vision* had a negative influence on the quality dimension effective.

5.6 Technology

Booking system, when planning digital healthcare meetings personnel experienced the administration as a bit demanding since it consisted of and required different systems for booking a meeting. This had not been an issue previously, so personnel spend more time and energy on administration when using digital healthcare meetings. *Booking system,* therefore, had a negative influence on the quality dimension *efficient.*

Issues described how both personnel and patients could experience technical problems interfering with the provision of care. These disturbances delayed or interrupted patients' treatment when meeting digitally. Therefore, *issues* had a negative influence on the quality dimension *timely*. It also forced personnel and patients to spend unnecessary time and energy on solving these *technical issues* instead of focusing on the treatment. *Issues*, therefore, had a negative influence on the quality dimension *efficient*.

Adaptation, both patients and personnel have needed to change as part of using digital healthcare meetings for providing care. This has been a challenge for both the personnel and patients based on the collected data, but it was unclear how this had influenced the quality of healthcare. *Adaptation* had no clear influence on the quality dimension within healthcare.

Stressful, some patients found the usage of digital healthcare meetings stressful because of their inability to handle technical problems or technology. This was then a source of unnecessary stress for patients when seeking care and a reason why some not wanted digital healthcare meetings. For some patients, the stress was also a bit harmful. This unnecessary stress and potential harm to patients led to *stressful* having a negative influence on the quality dimension *safe*.

5.7 Summary of analysis

When summarizing the analysis of how each theme affected the different quality dimensions, it highlighted how digital healthcare meetings had a negative influence on the dimensions safe and effective while having a more positive influence on patient-centered, timely, efficient and equitable as seen in table 4.

Table 4. How each subtheme influenced the quality dimensions within healthcare. A "+" indicates a positive influence and a "-" indicate a negative influence.

		Quality dimensions					
Main themes	Sub themes	Safe	Effective	Patient - centered	Timely	Efficient	Equitable
	Judgement call						
	Unfitting						
Usage	Fitting						
	An alternative						
	Body guidance		-			-	
	Flexibility			+	+		
	Cancellations				+	+	
Effect	Work area					+	
Enter	Financial incentive						
	Time-efficient					+	
	Less travelling			+		+	
Increased	Saved energy					+	
	Closer healthcare						+
	Not alone	-	-				
	Private spot						
At home	Strong emotions	-					
	Comfortable	+		+			
Challenging patients	Challenging patients		-				
	Missing signals	-					
Digital interaction	Establishing relationship						
	Limited vision	-	-				
	Booking system					-	
Technology	Issues				-	-	
leennorogy	Adaptation						
	Stressful	-					

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6 Discussion

This chapter discusses the limitations of the study, the impact of the results, and recommendations for future research.

6.1 Limitations of the study

The study has not interviewed patients because it required an ethical trial which took time to receive. Their views and opinions on digital healthcare meetings were therefore based on the personnels' experiences and opinions. Interviews with patients can strengthen the results and the credibility by comparing their answers with the personnels'. Respondents from unit A were chosen by the manager which means the selected respondents might be affected by the manager's preferences and influenced the collected data from the interviews.

Since this was a case study carried out at two specific psychiatric which used digital healthcare meetings on a daily basis the outcome of the same study at other units probably results in new outcomes. The results of this study are therefore limited and mainly applicable in similar scenarios. Evaluating digital healthcare meetings in another setting can be done for testing the result's trustworthiness and reliability in other healthcare areas which are recommended.

6.2 Results

During the interviews, personnel expressed that digital healthcare meetings made healthcare more timely and more efficient since its implementation. As mentioned in the background the demand for care will increase while having a smaller population of working people available (Vård- och omsorgsanalys, 2014; Abrahamsson, 2012). The future healthcare systems will then require these types of solutions which help healthcare become more efficient and more timely. The efficiency of digital healthcare meetings though needs to be further evaluated why personnel experienced this. Finding the reasons why through for example a time study can lead to new opportunities for improvements within healthcare in other healthcare settings as well.

In this case, there are trades offs though where the care became less safe and effective. So, what can be done to minimize this negative influence? The causes for the negative influences relate to, consequences of treatments conducted digitally, developing routines for managing certain situations digitally and consequences caused by technical problems. The negative influence on conducting certain treatments highlighted the importance of knowing the limitations, the possibilities and evaluating the impact digital healthcare meetings had when providing care. Developing this knowledge within healthcare can be essential in the future for providing care digitally and lead to improved quality of healthcare digitally. As mentioned in the theory few guidelines existed describing specifically when, how or for whom to use telemedicine or its clinical effectiveness of it (Wootton et al., 2006). These were similarities seen in this study as well. Developing guidelines internally can in one way be difficult for the unit while requiring time and energy from personnel. But at the same time positive for spreading the knowledge and creating specific guidelines and routines fitting the unit seeing how each unit can work differently, resulting in different guidelines for each unit.

Connected with this was a lack of routines for managing patients digitally in certain situations. *Strong emotions* highlight this seeing how the same options during a physical meeting did not exist digitally. Talking to another therapist was one example which could be done digitally as well but there were no routines for this. Some personnel made suggestions during the interviews such as a shorter follow-up meeting with the patient briefly during the next day. So other options exist but they had not been implemented or developed when working digitally. By not openly talking about issues when using digital healthcare meetings hinder the improvement process and with it the development of using it. Darkins & Cary (2000) motivated the importance of having routines when using telemedicine as part of monitoring the quality of care, minimising clinical risks, and training. Based on this, these routines are important as part of developing the knowledge among personnel and controlling the process.

Moreover, there were theories regarding the impact of certain subthemes in the study which probably had an impact on the quality of healthcare, but the data made it difficult to draw reliable conclusions. For these themes which could have an impact, it would be interesting to ask further questions for generating more data and deeper knowledge. For example, the subtheme *establishing relationship*, suggests the importance of the relationship between patient and personnel which digital healthcare meetings limit (Wootton et al., 2006). While the theory suggests personnel could be concerned about this, it was not true in this case (Darkins & Cary, 2000; Miller, 2003). Most mentioned how it was preferable to establish a relationship in physical meetings, but some still had never met the patient physically while still creating the same level of relationship required. These concerns are therefore probably fears among personnel or reasons for not wanting to use telemedicine rather than the whole truth.

Some subthemes in the result were also mentioned more frequently by interviewees than others while some were not mentioned by more than three interviewees and were therefore excluded. From these excluded subthemes there were some interesting aspects worth mentioning. One interesting answer was how a patient could not receive digital healthcare because the phone broke which meant the patient could not sign in with bank identification. Another issue of concern was how one patient had a limited amount of data for conducting digital meetings. These statements are interesting because it highlights some pre-conditions and vulnerabilities that can be taken for granted when using digital healthcare meetings. For example, not everyone has bank identification or a good internet connection. Screen tiredness was a potential subtheme which did not make it to the results but describes how exhausting it was for some patients when interacting through a screen. According to the personnel, some patients became tired faster by interacting through digital healthcare meetings and therefore preferred phone calls instead.

6.3 Future research

Further research should focus on exploring the patients' perspectives regarding the usage of digital healthcare meetings and their impact on care. More specifically when and how the usage of digital healthcare meetings benefits patients' well-being and healthcare conducted. This will help develop the current knowledge within the area to further improve the quality of care for patients. Because at the end of the day the patients will be the consumers of healthcare and how healthcare is conducted will impact their well-being.

7 Conclusions

The purpose of this study was to explore and increase knowledge regarding how the usage of digital healthcare meetings impacted quality within healthcare. The aim was fulfilled through a case study at two different healthcare units including 11 interviews. The study identified how digital healthcare meetings had a positive influence on the quality dimensions *patient-centered, timely, efficient, equitable* and a negative influence on the quality dimensions *safe* and *effective*.

Digital healthcare meetings had a positive influence by increasing patients' flexibility for when and where healthcare was conducted based on the patients' preferences. It also gave patients living further away from the units more equal access to care as the provision of care became less dependent on the patients' geographical location. Personnel saw how the implementation increased efficiency as it saved time, energy, work area, and experienced fewer cancelled meetings.

Digital healthcare meetings had a negative influence by limiting personnels' senses such as vision for extracting information about the patient and decreased secrecy between personnel and patient. Managing certain situations related to the patient digitally was not beneficial while for some patients it felt more comfortable to receive care digitally. Conducting body guidance digitally was considered less effective because it limited personnel's ability to interact and decreased the effect of the treatment. When receiving care digitally other people could either disturb the treatment or limit it due to their nearby presence. Lastly, digital healthcare meetings made it possible for patients to isolate themselves more which risked enhancing potential social problems.

The study hopes to increase and spread more practical knowledge within healthcare about how digital healthcare meetings influence healthcare for the purpose of learning and developing the quality of care. It highlights the importance of discussing and managing potential implications actively when using digital healthcare meetings as part of developing healthcare. The study hopes to contribute to the future provision of healthcare and with it the well-being of patients who receive it.

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Appendices

In this section, the information letter sent to personnel before an interview and the interview guide used during interviews is presented.

Appendix A – Information letter

Hello!

We are very happy that you want to participate in our research on how digital healthcare meetings affect the quality of care.

Those conducting the study, Antonia and Mattias, will interview you with a focus on your experience regarding the use of digital healthcare meetings' impact on care. The interviews are estimated to take between 30-45 minutes, and the time for the interview can be adapted to your wishes. If you wish to see the interview questions before the interview, you are welcome to contact us.

During the interview, the sound will be recorded so important information is not lost. The recordings will only be available to Antonia and Mattias and will be deleted no later than June 6, 2022. You who participate in the interview will be completely anonymous and your participation in the survey is completely voluntary. You can cancel your participation at any time without further justification.

Do not hesitate to contact us if you have any questions or concerns before the interview.

Best regards, Antonia Millner and Mattias Forsberg.

Appendix B – Interview guide

- 1. Can you describe how a digital healthcare meeting is conducted?
- How do you think it works to provide care through digital care meetings?
 a. What makes you say so?
- 3. What do you experience works well and less well with providing care via digital healthcare meetings?
 - a. How so?
- 4. How do you think the usage of digital healthcare meetings affects the patient?
- 5. How do you experience that the care is adapted towards the patient by using digital healthcare meetings?
- 6. How do you experience the safety of patients when using digital healthcare meetings?
- 7. Do you feel that you can treat patients safely digitally and why do you think so?
- 8. How do you think digital healthcare meetings affect the use of your time?
- 9. How do you think waiting times, delays and missed appointments have been affected by digital care meetings?
- 10. Is there anything else you think about around time and digital care meetings?
- 11. Why do you think patients would like digital care?
- 12. Why do you think patients would not want digital care?
- 13. How would you describe equal care?
- 14. How do you think equal care is affected using digital care meetings?

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