Information Systems Student Research Journal

Research Paper DOI: ISSN:

Integrating Care Across Sectors: A Work System Perspective on Digital Home Care in Norway

Karina Fosså Hettervik
University of Oslo

Ida Kvale
University of Oslo

Abstract:

This study explores how the organization of cross-sectoral collaboration in digital home care (DHC) can facilitate a holistic patient care pathway. We examined two Norwegian municipalities implementing DHC services using a comparative case study approach. Data was collected through semi-structured interviews with 17 participants, including healthcare professionals, patients, and representatives from the Norwegian Directorate of Health. Observations and document analysis supplemented the interview data. The Work System Framework was employed to analyze the complex contexts of DHC services. Our findings reveal that effective cross-sectoral collaboration within DHC requires clearly defined roles, robust communication channels, and the utilization of tools that support shared decision-making processes in patient follow-up. The integration of specialized knowledge from both primary and secondary healthcare sectors significantly enhances the quality of patient care. However, challenges persist, as healthcare personnel often view the service concept as something positive yet are hindered by constraints related to time, cost, and perceived benefits. This study contributes to understanding how telemedical services can be organized to promote holistic patient care pathways. It highlights the importance of adapting organizational structures and processes to support cross-sectoral collaboration in digital health initiatives. The insights gained can inform policy and practice in implementing similar telehealth services.

Keywords: Home care, Holistic patient pathway, Cross-sectoral collaboration, eHealth, Remote monitoring, Work System Theory.

This manuscript underwent peer review. Craig Van Slyke served as the managing editor.

1 Introduction

Digital home care (DHC) is emerging as a promising innovation within the broader landscape of digital health technologies aimed at transforming healthcare delivery. As healthcare systems face increasing pressure from aging populations and the rising prevalence of chronic diseases, there is a growing need for efficient and innovative methods to provide comprehensive care for patients with complex needs (Strand et al., 2023; Helsedirektoratet, 2022). DHC represents a shift towards more patient-centered and technology-enabled care models, aligning with the goals of national eHealth strategies to enhance digital competence and leverage technological innovations in healthcare (Helsedirektoratet, 2021a).

DHC involves the use of technological tools for closer monitoring of patients living at home, where healthcare professionals utilize electronically registered data from self-monitoring to assess patients' conditions (Helsedirektoratet, 2021b). This approach aims to connect primary and specialist healthcare services, necessitating effective cross-sectoral collaboration (Helse- og omsorgsdepartementet, 2020). The potential of telemedicine services like DHC to contribute to more holistic care pathways has been highlighted in previous research (De Batlle et al., 2021). Building on the Coordination Reform in Norway, DHC seeks to promote a more coherent, quality-assured, and person-centered patient pathway focusing on collaboration between services (Helse- og omsorgsdepartementet, 2012).

While the potential benefits of DHC are significant, its implementation and the organization of cross-sectoral collaboration around such services present complex challenges. This study aims to address these challenges by examining how the organization of cross-sectoral collaboration in DHC can facilitate holistic patient care pathways. Through a comparative case study of two DHC services in Norway, we explore the contextual factors influencing collaboration between healthcare services to achieve a continuous patient pathway.

The research question guiding this study is:

> **"How can the organization of cross-sectoral collaboration in digital home care facilitate a holistic patient care pathway?"**

Our findings provide insights into the opportunities and challenges associated with cross-sectoral collaboration in telemedicine services, exploring the potential of such services to create more holistic patient pathways. The study offers an understanding of how digital technologies can be leveraged to transform healthcare delivery, highlighting the importance of organizational factors in realizing the benefits of these technologies.

The implications of this research are significant for both theory and practice. Our study contributes to researchers' understanding of how telemedicine services can be organized to promote holistic patient care pathways, offering a framework for analyzing the complex interplay between technology, organization, and healthcare delivery (Kamp & Hansen, 2019). For practitioners, our findings provide valuable insights into the factors that facilitate or hinder effective cross-sectoral collaboration in DHC, informing the design and implementation of similar services.

The paper is structured as follows: First, we review the relevant literature on digital health, holistic patient pathways, and cross-sectoral collaboration in healthcare. We then describe the theoretical framework used in our analysis, drawing on the Work System Framework to provide a comprehensive lens for examining the organizational aspects of DHC. The research method section outlines our comparative case study approach, elaborating on our data collection and analysis methods. We present our findings organized according to the elements of the Work System Framework, followed by a discussion that interprets these findings in light of existing literature and explores their implications. Finally, we conclude with a summary of our key contributions and suggestions for future research.

2 Literature Background

The emergence of digital health technologies has opened new opportunities for realizing the vision of holistic patient care pathways. Digital health encompasses a wide range of technological solutions aimed at transforming healthcare delivery, including telemedicine, remote monitoring, and digital communication tools (WHO, 2018). These technologies have the potential to bridge gaps between different healthcare sectors, facilitate information sharing, and enable more continuous and personalized patient care.

2.1 A Holistic Patient Pathway

A holistic patient pathway involves continuous, comprehensive care from the first contact with the healthcare system to the end of treatment, which is especially important for chronic and complex cases (Helsedirektoratet, 2018; Grimsmo et al., 2016). The Coordination Reform in Norway aims to improve collaboration in healthcare services, emphasizing the importance of patient-centered follow-up and multidisciplinary teams (Helse- og omsorgsdepartementet, 2012, s. 3; Harts et al., 2019; Kodner & Spreeuwenberg, 2002; Helsedirektoratet, 2018). Information Communication Technology solutions are essential for effective collaboration and information exchange. This study explores how telemedicine services can be organized to support a holistic patient pathway characterized by five main features:

1. Continuity in healthcare requires integration across various segments of the healthcare system. Effective collaboration is essential to achieve a comprehensive healthcare service (Helsedirektoratet, 2018; Helse- og omsorgsdepartementet, 2012).

The public healthcare system in Norway is divided into primary and specialist healthcare services. Primary healthcare often deals with patients with chronic illnesses and complex needs, necessitating a holistic approach. Specialist healthcare manages acute and chronic conditions and is structured around various organ systems, leading to highly specialized care (Braut, 2023; Helsedirektoratet, 2018). This structural division can pose challenges in providing integrated care for patients with multiple chronic conditions, known as multimorbidity (Johnsgaard, 2023).

Creating continuity in healthcare is challenging due to fragmented services and siloed work structures, which hinder cooperation among healthcare professionals (Grimsmo et al., 2015; Kamp & Hansen, 2019). The recent focus on improving collaboration aims to address this by breaking down silos and fostering better interaction between sectors (Ministry of Health and Care Services, 2020). Digital solutions are being developed to support the follow-up of patients with complex and chronic conditions by enhancing cooperation between general practitioners and specialist services (Helse- og omsorgsdepartementet, 2020). Successful implementation of digital innovations requires adaptation to the specific healthcare context, which is constantly evolving and complex, making it particularly challenging (Peyroteo et al., 2021; Nielsen & Sahay, 2022).

The efficiency of resource utilization through telemedicine is mixed in the literature, with some studies showing reduced hospital admissions for chronic patients (Gaikwad & Warren, 2009; Kessler et al., 2018; Mudiyanselage et al., 2019). However, evidence of cost-effectiveness is limited (Harts et al., 2020; Løyland et al., 2023). While intangible benefits such as security, understanding, and disease management are significant, the major cost involves healthcare personnel, indicating a need for more efficient resource use (Løyland et al., 2023). In contrast, De Batlle et al. (2021) argue that telemedicine can enhance the efficient use of healthcare personnel by facilitating better collaboration between primary and specialist services.

2. Cross-sectoral collaboration brings together healthcare professionals from different sectors and specialties to provide patient follow-up (Helsedirektoratet, 2018; Helse- og omsorgsdepartementet, 2012).

A key factor in achieving integrated patient care is the organization of work that facilitates effective cross-sectoral collaboration. At the same time, there is skepticism about replacing face-to-face interactions with digital solutions (Duplaga & Zieliński, 2006). Despite initial resistance, experience with telemedicine and sufficient training impact attitudes and collaboration, with those familiar with the service being more positive (MacNeill et al., 2014; Aas, 2001; Nilsen et al., 2016). Proper training enhances digital competency, which is crucial for successful implementation (Kickbusch et al., 2021).

While telemedicine can facilitate better collaboration, it alters workflows, raising concerns about increased workload (Granja et al., 2018). General practitioners particularly struggle to dedicate time and resources to these services, making collaboration more challenging (MacNeill et al., 2014). However, telemedicine allows task delegation, relieving pressure on healthcare professionals (Nicolini, 2006; Helse- og omsorgsdepartementet, 2020). Ensuring clear responsibility is essential, especially as roles evolve and healthcare professionals and patients take on new responsibilities (Granja et al., 2018; Meskó et al., 2017; Nilsen et al., 2016).

3. Seamless information sharing facilitates smooth internal and external dissemination of information within the healthcare system (Helsedirektoratet, 2018; Helse- og omsorgsdepartementet, 2012; Harts et al., 2020).

Facilitating shared access to information technology among involved stakeholders is crucial for realizing the benefits of telemedicine services (Harts et al., 2020). Access to necessary information can save time in patient follow-up (Smaradottir et al., 2020; Kamp & Hansen, 2019). Sharing data from telemedicine services with established healthcare information systems is also valuable. This can increase efficiency by eliminating the need for duplicate data entry and enhance patient safety by reducing human errors in data transfer (Harts et al., 2020). Achieving sufficient integration, however, is challenging due to the diverse information systems acquired from different providers in healthcare, complicating data sharing across established silos at various levels (Øvrelid & Sanner, 2020).

4. Patient-centered follow-up is crucial for achieving a holistic patient pathway, requiring attention to individual patient needs and tailored care plans (Helsedirektoratet, 2018; Helse- og omsorgsdepartementet, 2012; Harts et al., 2020; Kodner & Spreeuwenberg, 2002).

Previous literature argues that patient involvement is essential for cohesive follow-up (Kodner & Spreeuwenberg, 2002; Harts et al., 2020; Peyroteo et al., 2021; Radhakrishnan et al., 2015). Telemedicine facilitates greater patient involvement in their own care, impacting self-management. However, studies show mixed results regarding the effectiveness of self-management (Kessler et al., 2018). Some research indicates that telemedicine increases awareness of disease management (Mudiyanselage et al., 2019; Gaikwad & Warren, 2009), while others, such as Stamenova (2020), found no significant difference compared to traditional follow-ups. Positive outcomes are linked to tools like questionnaires and self-treatment plans (Mudiyanselage et al., 2019), whereas lack thereof may result in inconclusive effects (Stamenova, 2020).

5. Information-driven follow-up also plays an important role, relying on detailed patient information and multidisciplinary collaboration for more comprehensive patient care (Helsedirektoratet, 2018; Harts et al., 2020).

Information-driven follow-up is centered on using patient data to inform care. In telemedicine, patients can transmit measurements to healthcare professionals, facilitating early detection of deteriorating health conditions (Kessler et al., 2018; Harts et al., 2020). Telemedicine also facilitates knowledge sharing among healthcare professionals, leading to broader expertise in patient follow-up (Nicolini, 2006; Kamp & Hansen, 2019). Studies show that collaboration between primary and specialist care nurses leads to the integration of specialized skills, positively impacting primary care services (Kamp & Hansen, 2019). This interdisciplinary approach enhances service quality regardless of location and promotes a higher competency level in healthcare (Rohde et al., 2022; Helse- og omsorgsdepartementet, 2020).

However, sharing expertise through digital tools can be challenged by the lack of contextual information. Understanding data requires contextual interpretation, and healthcare providers may struggle to give informed advice without this context (Berg, 2004; Kamp & Hansen, 2019). Finally, it is crucial to determine the appropriate amount of health data to share. Overloading healthcare providers with unnecessary information can impact their ability to make timely decisions (MacNeill et al., 2014). Ensuring that shared data is essential and actionable helps streamline decision-making processes.

3 Theoretical Framework

3.1 Work System Theory

Work System Theory (WST) was employed as the theoretical framework for our analysis. WST, developed by Alter (2013), describes the work system in an organization. A work system is “a system in which human participants and/or machines perform work (processes and activities) using information, technology, and other resources to produce specific products/services for specific internal and/or external customers” (Alter, 2013, p. 75). The various elements must be balanced and aligned with each other to achieve an optimal work system (Alter, 2013).

The theory draws inspiration from a sociotechnical approach to technology implementation, striving for a balance between social and technical aspects (Mumford, 2006). However, differences can be identified between a sociotechnical perspective and Work System Theory (WST). The sociotechnical perspective focuses on how social and technological factors influence each other, whereas WST more broadly considers the various aspects as part of the same system (Alter, 2013).

Alter’s theory consists of three parts. The Work System Framework (WSF) and the Work System Life Cycle together form the foundation for the Work System Method (Alter, 2013). The WSF is the static component of the WST. It is a framework comprising nine elements that provide a fundamental understanding of a work system. Due to the scope of the study, we will only use the WSF as our theoretical framework. The reason for choosing the WSF as our theoretical framework is that the various elements of the work system are considered equally important. Consequently, technology is not the sole focus, allowing for a more holistic approach to the service (Alter, 2013). WSF is a comprehensive framework, yet it helps to establish clear boundaries within a complex context. The work system under analysis spans across different sectors, integrating various professional practices, guidelines, and infrastructure. To achieve the positive effects of telemedicine tools, optimal organization is essential (Duplaga & Zielinski, 2006, p. 5). Organization in this context involves the effective utilization of technology through collaborative structures, coordination, communication, and information sharing in cross-sectoral cooperation. WSF addresses both internal and external components of a work system, ensuring the inclusion of relevant factors to assess their impact on the holistic patient care pathway.

3.2 The Nine Elements of Work System Theory

Work System Theory is primarily tailored for work systems in a business context. Therefore, the theory is not widely used in digital health research. Although previous studies have demonstrated that the framework works in a complex healthcare setting, the need to adapt the theory to the specific context in which it will be applied is evident, which we have also done in this study (Jewer, 2022; Johnsen et al., 2016):

Processes and activities refer to the actions performed within a work system to achieve the desired product and service (Alter, 2013). In a healthcare context, this encompasses activities and processes aimed at promoting health, treatment, and quality of life within a patient care pathway. Activities include communication, interdisciplinary collaboration, and coordination, while processes refer to established procedures, such as the development and use of self-treatment plans in patient follow-up. The distinction between activities and processes is context-dependent and can sometimes be unclear.

Participants include all internal roles involved in the processes and activities of a work system (Alter, 2013). In the context of healthcare, participants primarily consist of healthcare personnel. Patients can also be seen as participants in certain activities, such as when they perform self-monitoring and engage in their own care.

Information includes all data used or produced within a work system through digital and analog channels (Alter, 2013). In healthcare, information is personalized to specific diagnoses and incorporates expertise from various professional groups. This includes using self-treatment plans and health data from electronic patient records, as well as submitted measurements and questionnaire responses from patients.

Technologies serve as aids within a work system to achieve desired outcomes from a product or service. Evaluation focuses on the interaction between participants and processes rather than the technology itself (Alter, 2013). In DHC, the central technology includes an information system for data visualization and interpretation by health professionals and tools like tablets and measurement instruments.

The product or service results from the activities and processes within a work system and should benefit the customers (Alter, 2013). In our study, we refer to patient follow-up, treatment, and overall health as the service. DHC differs from standard patient follow-up by enabling a more integrated and comprehensive approach through the use of technology and expertise from both primary and specialist healthcare services.

Customers are according to Alter (2013) the recipients of services within the work system. Internal customers, such as patients and healthcare professionals, are directly affected, while external customers, like municipalities or the state, are indirectly impacted. Our study focuses solely on internal customers.

The environment includes cultural, organizational, demographic, and regulatory factors influencing the work system (Alter, 2013). These factors affect the system’s implementation and efficiency. The work system is shaped by the division between primary and specialist healthcare services, each with its own guidelines, regulations, and financial constraints. The Directorate of Health significantly impacts the work system by mandating collaboration between these sectors.

Infrastructure comprises existing external resources that influence the work system, including technical, informational, and human resources shared with other systems (Alter, 2013). In our study, this includes electronic patient records in specialist and municipal healthcare services and the use of care and treatment messages for cross-sectoral information sharing. Human resources, such as coordinators and home healthcare staff from collaborating municipalities, also impact the system.

Strategies relevant to a work system are divided into work system strategy, departmental strategy, and organizational strategy. These strategies need to align. In our study, it is essential to distinguish between national and local strategies.

The framework ensures that relevant factors are considered and addressed. The various elements influence each other, resulting in the absence of a clear distinction between them. It is important to view the elements in interaction with one another, as this contributes to a holistic perspective to assess what is needed to achieve integrated patient care.

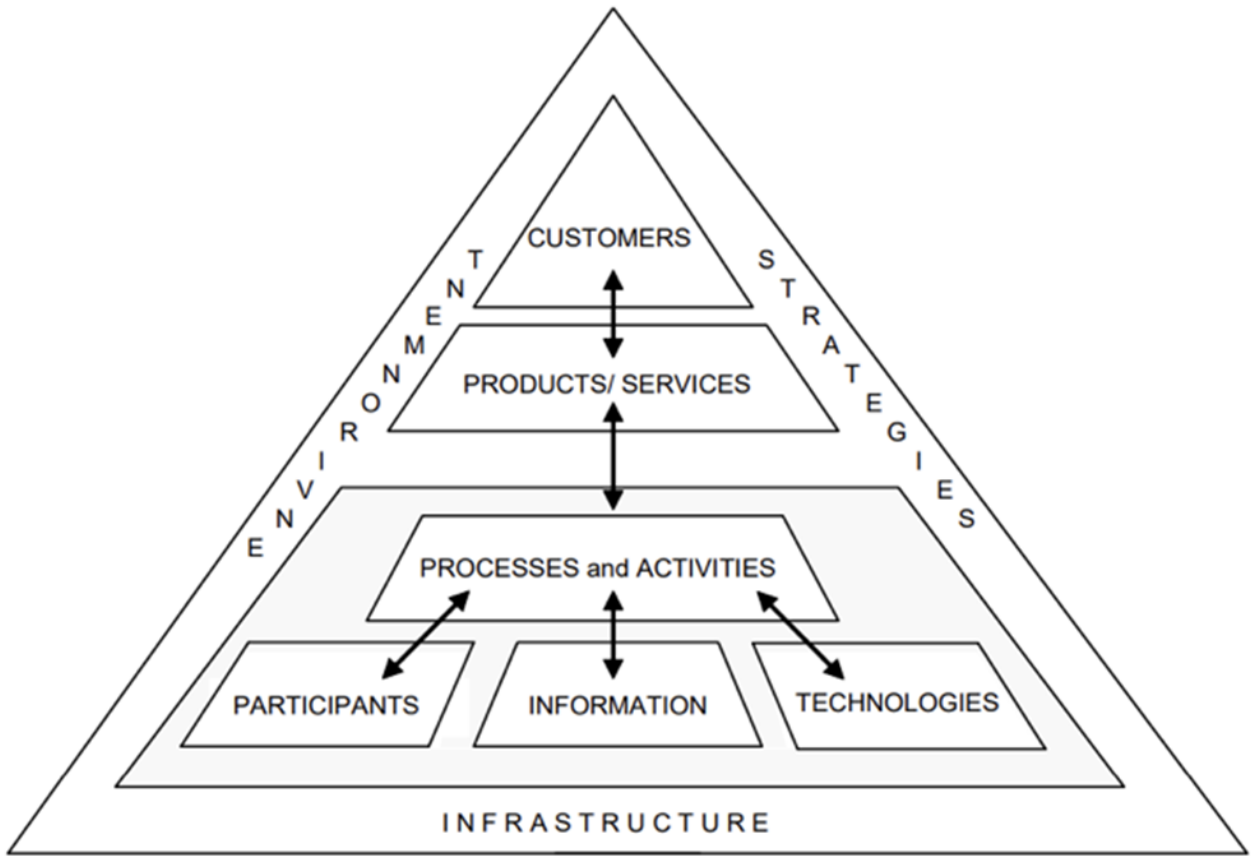

Figure 1. The Nine Elements in WSF (Alter, 2013, p. 78)

4 Research Ethics

Throughout the research process, we adhered to strict ethical standards to ensure the integrity of our study and protect participants' rights and well-being. Informed consent was obtained after participants received detailed information about the study's purpose and methods. We ensured confidentiality and anonymity by anonymizing informants and securely storing codes separately to prevent data breaches. Data was protected using Services for Sensitive Data (TSD) to safeguard sensitive health information (University of Oslo, n.d.c).

In presenting our case and research findings, we maintained anonymity by not specifying the locations of professional groups. We present professions in some contexts to highlight crucial differences in perceptions, using general job titles to ensure individuals are not identifiable. Participation was voluntary, allowing informants to withdraw at any time without consequences. Ethical approval was secured from Sikt. Sikt is a public entity that provides research data and digital services to Norwegian research and education institutions and ensures that personal data processing aligns with data protection regulations (Sikt, n.d.). The study adheres to established guidelines for conducting research, ensuring compliance with the "do no harm" principle (Dearden & Kleine, 2018).

5 Research Method

5.1 Methodology

To investigate the contextual factors affecting cross-sectoral collaboration within Digital Home Care (DHC), we conducted a comparative case study of two municipalities using the service, spanning from October 2022 to May 2024. Each case was analyzed individually before conducting a cross-case analysis.

To capture the complexity of the setting, we used a qualitative participatory approach involving field visits and participant engagement in identifying the research problem to ensure relevance (Van de Ven, 2018; Mathiassen, 2017). Adopting an interpretive approach, we analyzed informants' perspectives through social constructs. This process involves a double interpretation, as we interpret informants' descriptions through our own lens (Walsham, 2006).

5.2 Case Description

5.2.1 What is Digital Home Care?

Digital Home Care (DHC) involves the use of technological tools for closer monitoring of patients who reside at home. Healthcare professionals use electronically recorded data from self-monitoring to assess the patient's condition (Helsedirektoratet, 2021b, p. 8). The entirety or parts of patient follow-up is conducted digitally. DHC facilitates the accessibility of information related to the patient's illness and emphasizes self-care (Helsedirektoratet, 2021c, p. 1-3). In addition to measurements, a self-treatment plan is used as a tool for the follow-up and guidance of patients based on the results of self-monitoring. This includes tailored guidance and instruction based on individual needs and goals. The plan encompasses both medical and non-medical measures to promote self-care and predictability for the patient (Helsedirektoratet, 2021b, p. 31).

Table 1. Description of Key Actors

Key Actors	Responsibilities in the Healthcare System and in Digital Home Care
The follow-up service	A central hub for monitoring patients and is staffed by qualified healthcare professionals. These professionals play a coordinating role, facilitating collaboration with the municipality and various services across healthcare sectors.
General practitioners	Key collaborators with the follow-up service. Under the current healthcare system structure in Norway, GPs have a coordinating role across different healthcare levels, overseeing the patient's medication list, referrals to specialist care, and the overall continuity of care.
Specialized healthcare	A specialized entity within this collaboration, actively involved in patient follow-up based on the stage of the patient's illness. This service is responsible for specialized medical follow-up and interventions. Additionally, healthcare professionals from the municipality with specialized expertise may also be involved in providing services.
External actors	Actors that are linked to existing healthcare services in primary or specialized healthcare. They include service allocation administration, home nursing care, and various institutional offerings.
The Directorate of Health	Oversees and regulates health and care services in Norway. From 2022 to 2024, they are conducting a project to disseminate Digital Home Care (DHC) to municipalities, aiming to establish it as a permanent service for chronically ill patients. Participating municipalities must meet specific requirements to qualify for funding, including inter-municipal and cross-sectoral collaboration. Both specialist healthcare services and general practitioners must be involved (Helsedirektoratet, 2021c, p. 1-4).

5.2.2 Our Study Examines Two Municipalities Implementing DHC Services: Municipality A and B

Both municipalities use DHC for patient follow-up. Municipality A's service is fully operational, while Municipality B's is still in the project phase. Despite these stages, we focus on the current organization of cross-sectoral collaboration.

COPD is the most prevalent patient condition in both municipalities, with other chronic conditions varying. Both municipalities employ the same information system, but Municipality A has implemented a welfare technology hub to facilitate information transfer within the healthcare system.

In Municipality B, patient self-monitoring and self-treatment plans are mandatory. In Municipality A, the usage of such plans varies, with nurses having access to a quality handbook for guidance on different disease groups. Both municipalities collaborate with nurses from partner municipalities to address technical issues related to patient equipment. Additionally, Municipality A had also established contact with healthcare personnel with specialized expertise within the municipality, in addition to their connection with the hospital specialists. In this municipality, only the general practitioners (GPs) have sole medical responsibility, whereas in Municipality B, this responsibility is shared between GPs and hospital specialists. In the specialized health service of municipality B, a demand-driven outpatient clinic has been established, where patients are scheduled for consultations based on the measurements they submit to the follow-up service. This type of clinic is an alternative to regular outpatient follow-up and is guided by the patient's current condition rather than predetermined intervals for follow-up.

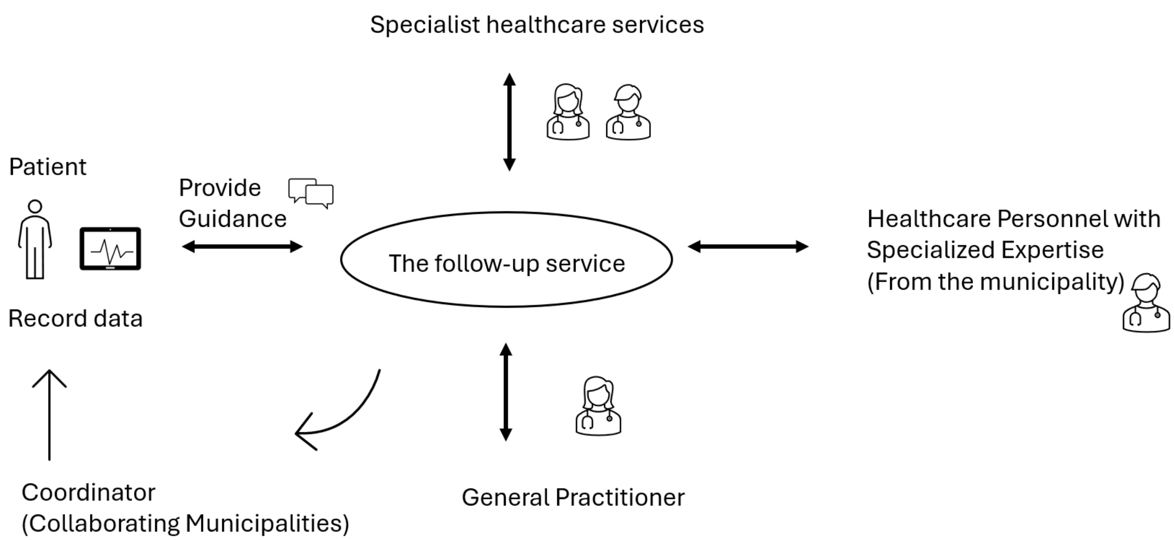

Figure 2. Overall Illustration of the Participants in the Collaboration and Workflow in Municipality A

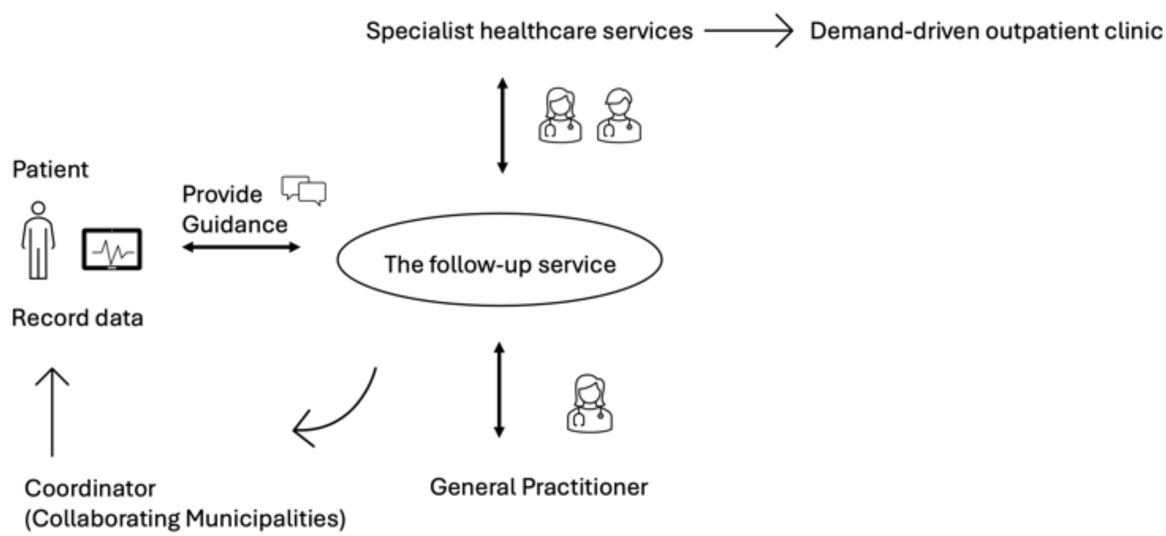

Figure 3. Overall illustration of the Participants in the Collaboration and Workflow in Municipality B

Both selected municipalities participate in the Norwegian Directorate of Health's project, which was a crucial selection criterion due to our focus on organizational aspects. They utilize the same information system in their follow-up processes, allowing for a meaningful comparison of technology use and organization across different settings. Additionally, both municipalities have implemented DHC for an extended period, ensuring that the service is well-established for evaluating organizational structures. By focusing on only two municipalities, we were able to conduct an in-depth analysis, as the study's time constraints did not permit the inclusion of more municipalities without compromising the depth of the analysis.

6 Data Collection

We conducted semi-structured interviews as our primary method of data collection. This approach allowed us to gain in-depth insights into the participants' experiences within the DHC service while maintaining flexibility to explore emerging themes (Tjora, 2021).

In total, 17 informants participated in the study. The selection of interview informants aimed to reflect participants in the cross-sector collaboration, which is crucial for achieving a comprehensive patient care pathway. Informal discussions and insights from service documentation helped identify the necessary healthcare personnel to include. Understanding the impact of a cohesive patient care pathway also required considering patients' perspectives to inform us about service outcomes. Additionally, it was evident that representatives from the Directorate of Health needed to be included, as their guidelines partly determined the participants involved in DHC and could influence the organization of the service. Of the 17 informants who participated, 16 were interviewed. The informant who was not interviewed contributed valuable insight through informal conversation during the observation. Seven informants represented municipality A, eight were from municipality B, and two were included from the Directorate of Health. Table 2 presents the number of participants from the different professional groups in the study. Some of the administrative informants were also healthcare professionals, and the interviews drew upon both their healthcare background and their administrative roles.

Table 2. Number of Participants

Job title	Number of Informants
Registered nurses	10
General practitioners	2
Specialized doctor	1
Administrative Roles	5
Patients	3

Table 3. Inclusion Criteria

Inclusion criteria for informants included:
Age over 18 years
Experience with Digital home care, includes patients
Involvement in the cross-sectoral collaboration within DHC

Our goal was to achieve a balance in the number of informants from different professional groups to avoid skewed input, but contacting general practitioners proved challenging. Despite this, we believe the included general practitioners offer valuable insights. Walsham (2006) asserts that the absence of certain informant groups does not significantly impact the study's transferability to research and practice (p. 322).

Based on the backgrounds of the informants involved in the DHC, three interview guides were developed: one targeted healthcare workers, one for patients, and one for the Directorate of Health. The questions represent different aspects of collaboration, including technology and holistic patient pathways. These topics outlined the parameters to be addressed during the interviews, while the open-ended questions allowed the informants to provide insights on these subjects. The questions did not initially draw upon the elements of the WSF, as the framework was included after the interviews were conducted. However, we identified a clear alignment between the interpretations obtained from the interview questions and the elements of the WSF, which led us to use WSF in the analysis of the data to address the complex contexts. The interviews were primarily conducted face-to-face in the respective fields, with one exception conducted via Zoom. Patient interviews were conducted over the phone to accommodate their health conditions. Each interview lasted approximately 15-60 minutes. After conducting the interviews, we felt we had reached a saturation point, as the last participants did not provide new information. This suggests that additional interviews would likely not have yielded significant new insights, although this cannot be determined with absolute certainty (Tjora, 2021, p. 158).

In addition to interviews, we conducted observations in the services in both municipalities to gain insight into workflow in the patient care and cross-sectoral collaboration through the use of DHC technology. We also observed a meeting where the two municipalities shared experiences about the service.

7 Data Analysis

Our data analysis process involved a combination of inductive and deductive approaches, using coding to structure the qualitative data collected. The analysis was conducted in two cycles.

7.1 First Cycle

We initiated the process with an inductive approach, deriving open codes from the data. These codes, which formed our sub-codes, consisted of concise descriptions based on the informants' own words, utilizing the comment function in a Word document. This allowed us to capture their actual experience of the work system they are a part of (Miles et al., 2014). Our theoretical understanding helped link findings to existing theory, preventing purely descriptive codes (Johannesen, 2022).

We then categorized the codes into the nine elements of the Work System Framework (WSF) which served as our main codes, using color-coding to clarify each code's element. Although some of the sub-codes fit multiple main codes, the framework effectively structured the identified codes.

With two of us performing the coding, it was essential to assess the agreement regarding both the main and sub-codes. In order to ensure the quality of the codes, we cross-validated our codes against each other to promote intercoder reliability (Delve & Limpaecher, 2023). To ensure consistency, we jointly coded the first interview to agree on the structure and then independently coded the rest. We transferred the codes into NVivo for better organization and navigation, indicating the number of informants supporting each code. We carried out this process together, providing us with the opportunity to discuss the codes with each other as we progressed. Initially, we coded in Word due to access limitations with NVivo. Despite variations in the wording of our codes, we observed several commonalities among the independently developed codes. When disagreements arose in relation to the open codes, we collaborated to reach a consensus on the sub-codes, which were then recorded in NVivo. According to Miles et al. (2014), this process helps avoid ambiguous codes and fosters a shared understanding of their meaning (p. 89). This results in both clarity in the definitions and reliability in the codes.

7.2 Second Cycle

In the second coding cycle, our goal was to review the content and relationships between the codes (Miles et al., 2014). Using NVivo, we consolidated main and sub-codes, providing clear visibility of which quotes fell under each code. The codes we had after the first cycle were relatively open, and therefore, we spent time formulating more explanatory and concrete codes. As a result, we ended up with a larger number of codes. The amount of data material we were left with necessitated the need to narrow down the research question, enabling us to align the codes with the new focus and remove redundant codes.

We created a schema grouping sub-codes under more descriptive names, adding detailed descriptions and relevant quotes, forming the structural foundation for our findings.

Although time-consuming, this process shaped new perspectives and insights. Developing precise code names at each step was crucial. The Work System Framework (WSF) provided a foundational structure, while sub-codes allowed us to explore core meanings from the interviews.

8 Findings

These findings are structured around the themes of the Work System Framework (WSF). The purpose of this structure is to illustrate how the different parts of the work system impact the organization of Digital Home Care (DHC) to answer the research question: “How can the organization of cross-sectoral collaboration in digital home care facilitate a holistic patient care pathway?” The application of the framework facilitates a multifaceted analysis of the cases from different perspectives within the work system, thereby enabling a comprehensive understanding.

8.1 Processes and Activities

The follow-up service’s communication with the patient is based on an assessment conversation, information submitted by the patient, and the self-treatment plan. The self-treatment plan requires a doctor to approve the actions in the plan and is an important tool in patient follow-up. Our findings reveal differences between the two municipalities regarding responsibility for the creation of the self-treatment plan. In Municipality A, the general practitioner holds the medical responsibility if the patient does not already have a plan. Conversely, in Municipality B, the responsible physician depends on where the patient is referred from: “If patients are recruited from the hospital, the specialist drafts and provides input on the plan” (9). Interviews further indicate that both municipalities recognize the benefits of incorporating specialized expertise in the development and updating of the plans. A nurse observes that general practitioners are somewhat constrained, possessing less latitude for action compared to specialists. While general practitioners offer broader expertise, “some GPs are reluctant because they are not specialists” (1).

Scheduled collaborative meetings are considered an effective forum for cooperation. Such meetings enable different healthcare personnel to meet to discuss the patient’s follow-up. The findings indicate that both follow-up services experience better collaboration with specialized healthcare than with general practitioners. This may be partly due to the regular meetings established with specialized healthcare. However, arranging consultations with general practitioners proves challenging in both municipalities due to their limited capacity. One informant expressed, “I think it varies from GP to GP, but I believe it is better to address issues as they arise rather than having a fixed meeting once a month” (16). Consequently, scheduling meetings on an as-needed basis is deemed more suitable.

8.2 Participants

As highlighted in the previous paragraph, it is important with collaboration between different healthcare personnel to ensure quality in the patient follow-up. However, the recruitment of relevant participants, both from the municipality and the hospital, is difficult. There are no distinct causes for this challenge. One informant state: “I don’t know what it is, whether it’s capacity or attitudes, or what it is exactly, but it’s difficult to say. It will probably vary greatly from GP to GP in terms of how positive they are towards this arrangement” (1).

However, it seems essential that the healthcare personnel see the useful value of the service. Our findings also reveal that experience with the service seems to affect the willingness to use it. One nurse emphasized the importance of clarifying the responsibilities between the participants to avoid uncertainty regarding their role in the service. There are no substantial differences between the municipalities, except that Municipality B benefits from ongoing collaboration with a specialist healthcare physician, reducing their dependency on cooperation with general practitioners.

The digital transformation is not highlighted as a primary reason why doctors are reluctant to participate in the service, although attitudes are perceived to vary from one general practitioner to another as it alters their current practice. At the same time, both the Directorate of Health and the two municipalities emphasize the positive feedback they have received regarding the opportunities it presents.

8.3 Information

Both municipalities emphasize the importance of interdisciplinary expertise in patient follow-up. This is due to both the professional quality of the follow-up and the patient’s perception of a more holistic healthcare system. While the measurements provide a crucial basis for collaboration, it is imperative to assess the extent of information sharing required among other participants in the work system. The findings also highlight the importance of considering the context in which the data is produced: “For the data gathered, it is crucial that it makes sense on both sides. [...] As a general practitioner with a sense of responsibility, we tend to think more in terms of worst-case scenarios” (6). There is some variability in how extensively GPs utilize this information. Nevertheless, both patients and healthcare personnel from both municipalities highlight the measurements as concrete data to reference in interdisciplinary collaboration. One informant state:

> “I also think it’s a bit more concrete when you measure pulse and blood pressure and everything. You see, and then you might have a bit more to bring to the table. Okay, but she had this and that, and she needs an appointment. Okay, ‘we see’ in a way that it becomes a bit more visible” (14).

Although there is a need for adaptation and assessment related to the measurements, they are considered a central part of the service.

8.4 Technology

The perspectives among participants regarding access to the DHC information system vary. The hospitals in both municipalities have some access to the system. However, the access is limited. The GPs do not have access to the system, and the nurses from DHC have to send updates regarding the patients in an external system. Some informants argue that the collaboration would be improved if they all had access to the same data, while others think the GPs would perceive it as “... another system they would need to log into” (9). There are no significant differences in terms of access across the different municipalities.

8.5 Product or Services

Findings from both municipalities emphasize the necessity of evaluating the specific contributions of DHC to the healthcare system, ensuring that the service alleviates burdens rather than duplicating existing services. The intended outcomes highlighted include a more holistic experience of the healthcare system, more appropriate use of GP visits, and early detection of deterioration to avoid hospitalizations. The role of the patient and their experiences with the service appear to be relatively consistent across both municipalities.

A patient expresses: “If there is anything, they get in touch, and I can reach out no matter if it’s something minor or major. So, it’s a very good sense of security to have in my backpack” (4).

Additionally, the patient is given a more active role in their care, which can foster a deeper understanding and greater awareness of their condition.

8.6 Customers

Both municipalities conduct assessments of patient suitability and perform initial evaluation conversations with all patients; “And then it varies, how sick the patient is and how much follow-up they need. At times, there are many conversations which are demanding and lengthy” (10). However, the requirements for measurements vary between the two municipalities. In the municipality without a fixed measurement requirement, it is emphasized that this flexibility facilitates better adaptation to individual patient needs. In Municipality B, individual adaptations are made by admitting patients to outpatient appointments in specialized healthcare based on information gathered via DHC. This approach is used instead of having fixed check-ups: “Instead, specialized healthcare can be used for those who have significant issues, like exacerbations” (11). These findings demonstrate that the service contributes to creating more continuity in the patient pathway for each patient based on individual needs.

8.7 Environment

The requirements set by the Directorate of Health have significantly shaped collaboration in the two municipalities. A representative noted that without mandated cross-sectoral collaboration, “it would certainly have impacted [the service], and many projects would likely have chosen to only have internal collaboration within the municipality because they see their needs there” (15). Our findings reveal varying participant involvement in the municipalities, potentially impacting service effectiveness.

Additionally, the relationship between benefits and costs may challenge cross-sectoral collaboration. Notably, the hospital in Municipality B invested in the project, which an informant believes positively influenced collaboration: "Because we have succeeded well with cooperation. I believe this is partly because we, from the hospital's side, have also chosen to invest in this project" (7). The organization of disease groups within municipal and specialized healthcare also affects the service. Municipality B's awareness of these challenges may help prevent follow-up discrepancies.

8.8 Infrastructure

The findings indicate that external factors, such as the allocation of sufficient time, are crucial for the willingness to utilize the service. In Municipality B, it is highlighted that being available outside of scheduled meetings is challenging. Conversely, Municipality A exhibits more flexibility in ongoing collaboration among participants. However, an informant noted a desire for more active participation in patient follow-up, hindered by the lack of allocated time for DHC in her role. This limitation is also evident in Municipality B. An informant remarked that DHC is a time-intensive service requiring thorough understanding for effective workflow: "It requires resources, allocated time, and dedicated consistent personnel. So, it can't just be something additional on top of everything else. There needs to be people who are involved in it, who want to do it, and who can focus solely on it. Because it is time-consuming" (11). Furthermore, it is essential for the service to integrate well with existing services, systems, and collaboration tools. Informants from both municipalities report that the lack of integration leads to duplicate entries, and better integration would be beneficial. "It would have helped if we could have a bit more integration on things, so we don't have to duplicate entries. That would clearly help us a lot" (9).

8.9 Strategies

National strategies significantly influence the priorities of municipalities in their service provision. In both municipalities, considerable attention has been directed toward the growth of the service. Our study shows that the national dissemination strategy contributes to a strong focus on expansion and recruitment at the local level in both municipalities. This is particularly evident among participants in the follow-up service and through tasks related to recruitment: "We don't have many with diabetes, but we could probably have more if we had contact with a diabetes nurse" (3). An underlying focus is also to ensure the sustainable utilization of healthcare personnel. The findings indicate that DHC can contribute positively to this, provided the service is organized appropriately and targets the right patient group.

9 Discussion and Conclusions

9.1 Enhancing Workflow Efficiency through DHC

The findings from this study indicate that implementation of Digital Health Care (DHC) enhances workflow efficiency in cross-sector collaboration. In Norway, public healthcare is divided into primary and specialist healthcare. The Coordination Reform acknowledges the challenges posed by siloed work structures and highlights telemedicine as a tool for enhancing collaboration (Helse- og omsorgsdepartementet, 2020; 2012). Our findings confirm that telehealth facilitates healthcare integration, echoing studies by Kamp and Hansen (2019), who found improved cross-sectoral collaboration among nurses. It is emphasized that closer contact among healthcare personnel can contribute to a more cohesive healthcare experience for patients. This is corroborated by patient feedback, stating that the service feels secure and that the follow-up service reduces the distance to assistance. This is particularly evident in Municipality B, where it is easier to access the demand-driven outpatient clinic based on the measurements they submit.

Measurements and self-treatment plans are essential tools for ensuring continuity and an efficient workflow in patient follow-up. Our findings indicate that the use of these tools fosters consistent patient monitoring and facilitates decision-making across different sectors. By providing concrete data, measurements enable timely interventions, improving the overall coordination of care and preventing unnecessary hospitalizations (Kessler et al., 2018). The literature emphasizes involving patients in their care, and our findings show that assessment conversations and self-treatment plans help tailor follow-up to individual needs. These tools, especially the self-treatment plan, enhance patients' understanding of their health. Some of the patients report that self-treatment plans and the measurements they record make it easier to know when to seek help while also providing reassurance that the follow-up service will intervene if deviations are detected. This contributes to smoother, more personalized follow-up, as patients are equipped with clear guidelines on what to do when their health deviates from the reference range.

However, it is essential that the measurements are presented with relevant context to the collaborating healthcare personnel. Additionally, careful consideration of which data to share with collaboration participants is necessary to avoid information overload (MacNeill et al., 2014). Our findings emphasize the importance of determining which data is necessary and how it is shared to maintain both workflow efficiency and patient-centered care.

Effective cross-sectoral collaboration in patient follow-up requires a flexible meeting structure. Regular meetings between follow-up and specialist healthcare services are beneficial, fostering consistent relationships and making consultations easier. However, involving specialists only when necessary can improve resource efficiency, as suggested by Løyland et al. (2023). While fixed meetings with general practitioners (GPs) are lacking, GPs value ongoing collaboration. Tools like self-treatment plans and measurements are crucial, providing concrete data for both planned and ongoing collaboration. A balance between individualized and structured meetings is needed based on patient and team needs.

Our study provides several indications that the implementation of Digital Home Care (DHC) enhances workflow efficiency in cross-sector collaboration, particularly using the tools measurements and self-treatment plans, which establish common reference points. Our study indicates that integrating these tools into the workflow enhances the efficiency of cross-sectoral collaboration. Measurements streamline communication and ensure that all parties have access to the same information, thereby reducing delays and improving response times. When considering data from the WSF elements—activities, customer interactions, information, and external elements such as environment and infrastructure—collectively, the use of tools provides a common reference point in collaboration, thereby positively contributing to an efficient workflow. Nonetheless, some argue that these tools can make the service rigid, underscoring the need for individual assessment to determine when these tools are most beneficial in collaboratively creating holistic patient follow-up.

9.2 Reorganizing Self-Treatment Plan Development: A Necessity

This study states that there is a clear need for improved methods in the creation of self-treatment plans. Plans developed by specialists in the healthcare system appear to offer more flexibility for follow-up services, as specialists can tailor them to the specific diagnosis. This is highlighted by a nurse from Municipality B, who states that specialists contribute to providing greater flexibility in the plans. Additionally, nurses report that using the self-treatment plan as a tool creates an expectation for making sound individual assessments, a responsibility that is viewed positively in both municipalities. Thus, involving specialist healthcare services in the development of these plans seems beneficial. However, GPs also express a desire to be included in the process, with some suggesting better training for GPs to enhance their involvement. Additionally, the establishment of common guidelines could ensure consistent quality across patient care. Effective collaboration between specialists in the hospital setting is critical, particularly for multimorbid patients, to meet their diverse needs.

Current research suggests that telemedicine could facilitate better coordination, but challenges remain in creating self-treatment plans for patients with complex conditions that span multiple specialties. Prior studies highlight the importance of a structured approach across sectors to provide specialized and holistic care (Grimsmo et al., 2018). Interviews indicate that specialists recognize the need for more collaboration across departments to develop comprehensive self-treatment plans. A shift in how these plans are created could support a more integrated approach, promoting better outcomes, especially as more and more patients are connected to the service. A shared platform for self-treatment plans could mitigate these concerns, enabling real-time updates and collaborative work.

The Norwegian Directorate of Health mandates cross-sector collaboration in its project guidelines, requiring the involvement of both GPs and specialists. However, despite these efforts, there is a lack of clear guidelines regarding the number and roles of specialists needed in patient care collaboration. This lack of clarity can lead to an inconsistent understanding of the purpose and scope of such involvement across municipalities. Consequently, we observe varying levels of involvement, prioritization, and utilization of these participants in the two municipalities. Furthermore, although a unified information-sharing platform is seen as a positive step toward seamless collaboration, concerns remain about the increased workload for GPs due to greater system complexity.

When considering findings from all elements of the WSF collectively, there is a clear need to reorganize how self-treatment plans are developed to achieve a cohesive patient pathway through cross-sector collaboration. Ultimately, collaboration across sectors is essential, as it brings a broader range of expertise to patient follow-up (Kamp & Hansen, 2019; Nicolini, 2006; Rohde et al., 2022). The expertise of specialists is particularly valuable in crafting self-treatment plans, and integrating their input alongside that of GPs could enhance the quality of these plans. However, sustainable resource use among healthcare professionals must be considered. A shared workspace for plan development could support more efficient collaboration while minimizing resource strain.

9.3 Time and Financial Resources: Key Recruitment Challenges

A big challenge in recruiting for DHC is the difference in resources between primary and specialist healthcare, especially in terms of costs and benefits. Our study found that hospitals often get more financial benefits than municipalities, where the services are actually used and costs occur. While not all studies agree, some show that telemedicine can reduce hospital admissions and costs (Gaikwad & Warren, 2009; Kessler et al., 2018; Mudiyanselage et al., 2019). Although economic benefits are evident in the hospitals, the responsibility for treatment is assigned to the municipalities, which results in the hospitals not feeling equally involved. A finding that may confirm this is that the hospital in Municipality B has chosen to invest in the project. Although both municipalities perceive the collaboration with specialist healthcare as positive, more specialists regularly participate in the service through weekly meetings in Municipality B, suggesting that the investment makes a difference.

We found that the lack of financial benefits for primary care can discourage general practitioners (GPs) from joining. This matches other studies showing that telemedicine does not always make healthcare more efficient, with benefits often hard to measure (Harts et al., 2019; Løyland et al., 2023). Our research also shows that GPs' payment systems are not well-suited for digital services, which is also highlighted in the Norwegian Directorate of Health's pilot project report (Helsedirektoratet, 2021b).

While studies say digital skills are important for new solutions (Kickbusch et al., 2021), we found that digital skills are not a big barrier. Instead, it is the unfamiliarity and new ways of working that are challenging, stressing the need for good training (Nilsen et al., 2016). How much time is set aside for DHC is highlighted as a greater challenge, greatly affecting how people feel about using them in their work. Our study shows that a busy workload can make it hard to take on new digital solutions, as noted by MacNeill et al. (2014). By examining the elements of activities, participants, information, technology, infrastructure, and strategies in relation to one another, we found that insufficient time and lack of financial resources for digital services is a major issue, with people being positive about the idea but constrained by time, cost, and benefits.

9.4 A Need for a Shared Understanding of the Purpose and Goals of the Service

To ensure that Digital Home Care (DHC) effectively contributes to integrated patient care, it is essential to develop a shared understanding of the service's purpose. Our findings reveal that while DHC improves the flow between primary and specialist healthcare, there is a need for clarity on the specific needs it addresses. This understanding is crucial to prevent the service from overlapping with existing healthcare functions and to ensure sustainable resource use, as healthcare personnel represent the largest cost factor in DHC (Løyland et al., 2023).

The literature suggests that collaboration between healthcare sectors enhances resource utilization (DeBatlle et al., 2021), but our study indicates that without a common understanding of DHO's goals, this potential is not fully realized. Informants expressed that a clear focus on the needs DHC fulfills is necessary to optimize its placement and function within the healthcare system.

Our research shows that experiences with DHC significantly influence participant attitudes. Prior literature suggests that experiential knowledge can highlight the service's benefits (MacNeill et al., 2014; Monrad Aas, 2001). Informants noted that GPs who have tested DHC are generally more positive, supporting existing literature. However, some informants found DHC unsuitable for certain patient groups, reducing interest in using the service. This dual effect of experience confirms previous findings while also revealing potential drawbacks.

DHC alters the roles of involved healthcare personnel. MacNeill (2014) found that nurses had more positive attitudes towards role changes than GPs, viewing increased responsibility as beneficial. Our findings corroborate this, showing nurses appreciate making independent patient assessments and using self-treatment plans, which provide more autonomy before consulting a doctor. However, GPs exhibit varied attitudes towards task delegation, with some finding it positive and others challenging. This reflects literature indicating nurses generally embrace more responsibility, whereas GPs may be hesitant to delegate.

Ensuring patient flow and safety in DHC requires clear role clarification. It is critical to consider role definitions when coordinating healthcare services across regions (Rohde et al., 2022; Nohr & Christiansen, 2010). Our study highlights uncertainty in role definitions, particularly for specialist nurses, leading to confusion about responsibilities. This issue mirrors challenges identified by Kamp and Hansen (2019), where unclear responsibilities between specialist and municipal nurses can result in gaps in patient care. Unclear roles not only threaten patient safety and flow but also hinder the full utilization of participants' expertise.

Overall, findings from the elements of activities, participants, information, product and service, customer, infrastructure, and strategy indicate that the study results suggest the need to work towards a shared understanding of the purpose and goals of the service among all participants in the cross-sector collaboration. Different objectives and focuses, such as those related to measurements mentioned earlier in the discussion and the delegation of tasks, also appear to impact uncertainty regarding responsibility clarification. Furthermore, this can affect the ability to achieve continuity in follow-up as well as the sustainable utilization of healthcare personnel resources.

10 Practical Implications

The Norwegian Directorate of Health aims to integrate DHC for patients needing long-term follow-up. Our study highlights the potential for cross-sectoral collaboration, emphasizing the benefit of regular meetings for sharing expertise. Key tools like measurements and self-treatment plans are essential for continuity but require better integration. Adequate time and financial resources are necessary for successful implementation. Our findings suggest involving general practitioners from the start to prevent the perception of DHC as an additional burden and ensure a unified understanding of service goals across sectors.

11 Theoretical Implications

This study contributes to the research on telemedicine by confirming both opportunities and challenges in its implementation. Findings reveal that the organization of telemedicine around measurements and personalized care plans enhances cross-sectoral collaboration and continuity. Specialized knowledge in developing care plans is crucial. Contrary to previous research, our findings suggest resistance stems more from resource allocation than individual attitudes. While DHC centralizes healthcare contacts, patients do not feel isolated from other providers. The study also highlights the utility of the Work System Framework (WSF) in healthcare despite the complexities and time-consuming nature of this approach.

12 Further Research

This study examines the organization of cross-sectoral collaboration for holistic patient pathways using the Work System Framework (WSF). While we have addressed some internal and external factors, areas requiring more research include patient and healthcare provider training, user interface evaluation, context adaptation, and integration with existing health information systems. Further studies on resource allocation, external factors, and the effects of personalized care plans on workflow are needed to enhance telemedicine services and sustainable cross-sector collaboration.

13 Summary

In this study, we have examined the key elements for organizing cross-sectoral collaboration in a telemedicine service to achieve an integrated patient pathway. To gain insight, we focused on perspectives from informants involved in the cross-sectoral collaboration. We included two different municipalities employing DHC in patient follow-up and explored how they organize cross-sectoral collaboration around this service. Using the WSF framework, we analyzed the various components of the work system to develop a comprehensive understanding of the interconnections. It is evident that the different components influence each other, highlighting the importance of considering the entire context.

To address the research question, "How can the organization of cross-sectoral collaboration in DHC facilitate an integrated patient pathway?", it is useful to identify the challenges and opportunities relative to the five characteristics of an integrated patient pathway. The framework reveals both internal and external factors affecting this. The current organization of the service partially contributes to an integrated patient pathway by considering patient needs in its design. However, challenges remain in facilitating effective collaboration among essential healthcare personnel, especially through the utilization of technology and tools, which is crucial for an integrated approach. Enhancing healthcare personnel involvement with specialized expertise in the service, establishing better cooperation with general practitioners, the need for a review of what the service aims to achieve, and clarifying responsibilities are areas for improvement in the municipalities.

This is essential to optimize the utilization of healthcare personnel expertise. Additionally, external factors like allocating sufficient time, better integration in the DHC information system, and more effective resource distribution in the healthcare system are critical for successful cross-sectoral collaboration around DHO. Awareness of these challenges is vital for developing digital services that contribute to more integrated patient pathways. The study indicates that addressing both internal and external factors will require changes at local and national levels.

Acknowledgments

First and foremost, we would like to express our sincere gratitude to all the participants who took part in the study. We are deeply thankful for their openness and willingness to share their experiences regarding the Digital home care service.

We would also like to thank our supervisor Sune Dueholm Müller for all the engaging discussions. Your commitment and interest in the project have been motivating, and we greatly appreciate all the insights and knowledge you have shared with us. Additionally, we would like to thank all the reviewers for valuable feedback during the process of creating this paper.

Declaration of AI

During the preparation of this work, the authors used AI to condense the content of our master's thesis and have drawn inspiration from the output to formulate the paragraphs of this paper. We have carefully reviewed all the sections to ensure that the paper retains the key elements of the original thesis. Additionally, AI was employed to assist with translation of the content.

References

Aas, I. H, M. (2001). Telemedical work and cooperation. Journal of Telemedicine and Telecare, 7(4), 212–218.

Alter, S. (2013). Work system theory: Overview of core concepts, extensions, and challenges for the future. Journal of the Association for Information Systems, 14(2), 72–121.

Berg, M. (2004). The contextual nature of information. In Berg et al.: Health information management integrating information technology in health care work (pp. 62-78). Routledge.

Braut, G. S. (2023, November 1). Helsevesenet. In Store medisinske leksikon. Retrieved from helsevesenet – Store medisinske leksikon

De Batlle, J., Massip, M., Vargiu, E., Nadal, N., Fuentes, A., Bravo, M. O., Miralles, F., Barbe, F., & Torres, G. (2021). Implementing mobile health-enabled integrated care for complex chronic patients: Intervention effectiveness and cost-effectiveness study. JMIR mHealth and uHealth, 9(1), 1-9.

Dearden, A. & Kleine, D. (2018). Minimum ethical standards for ICTD/ICT4D research. Sheffield Hallam University, 2, 1-13.

Delve, H. L. & Limpaecher, A. (2023). Inter-coder reliability. Delve. Retrieved from Intercoder Reliability in Qualitative Research — Delve

Duplaga, M. & Winnem, O. M. (2006). Model of Chronic Care Enabled with Information Technology. In K. Zielinski, M. Duplaga & D. Ingram (Ed.), Information Technology Solutions for Healthcare (pp. 248-270). Springer London: Imprint: Springer.

Duplaga, M. & Zieliński, K. (2006). Evolution of IT-Enhanced Healthcare: From Telemedicine to e-health. In K. Zielinski, M. Duplaga & D. Ingram (Ed.), Information Technology Solutions for Healthcare (pp. 1-21). Springer London: Imprint: Springer.

Gaikwad, R., & Warren, J. (2009). The role of home-based information and communications technology interventions in chronic disease management: a systematic literature review. Health Informatics Journal, 15(2), 122–146.

Granja, C., Janssen, W., & Johansen, M. A. (2018). Factors determining the success and failure of ehealth interventions: Systematic review of the literature. Journal of Medical Internet Research, 20(5), 1-21.

Grimsmo, A., Kirchhoff, R., & Aarseth, T. (2015). Samhandlingsreformen i Norge. 17 (3), 3-12. Retrieved from NTNU Open: Samhandlingsreformen i Norge

Grimsmo, A., Løhre, A., Røsstad, T., Gjerde, I., Heiberg, I., & Steinsbekk, A. (2016). Helhetlige pasientforløp – gjennomføring i primærhelsetjenesten. Tidsskrift for omsorgsforskning, 2(2), 78–87.

Harst, L., Timpel, P., Otto, L., Richter, P., Wollschlaeger, B., Winkler, K., & Schlieter, H. (2020). Identifying barriers in telemedicine-supported integrated care research: Scoping reviews and qualitative content analysis. Journal of Public Health, 28(5), 583–594.

Helse- og omsorgsdepartementet [Ministry of Health and Care Services] (2020). Handlingsplan for Allmennlegetjenesten (Publication code: I-1198 B). Retrieved from Handlingsplan for allmennlegetjenesten

Helse- og omsorgsdepartementet [Ministry of Health and Care Services]. (2012). Samhandlingsreformen Lovpålagte samarbeidsavtaler mellom kommuner og regionale helseforetak/helseforetak. Helse-og omsorgsdepartementet. Retrieved from https://www.regjeringen.no/globalassets/upload/hod/dokumenter-sam/nasjonal-veileder-samarbeidsavtaler-mellom-kommuner.pdf

Helsedirektoratet [Norwegian Directorate of Health] (2022, Mars 11) Folkehelse i et livsløpsperspektiv – Helsedirektoratets innspill til ny folkehelsemelding. Retrieved from Rammene for folkehelsearbeidet - Helsedirektoratet

Helsedirektoratet [Norwegian Directorate of Health]. (2021a). Gevinstrealiseringsrapport. Enkunnskapsoppsummering fra Nasjonalt velferdsteknologiprogram. Retrieved from Gevinstrealiseringsrapport - en kunnskapsoppsummering fra Nasjonalt Velferdsteknologiprogram

Helsedirektoratet [Norwegian Directorate of Health]. (2021b). Digital hjemmeoppfølging – sluttrapport fra nasjonal utprøving 2018-2021. Nasjonalt velferdsteknologiprogram. Helsedirektoratet.

Helsedirektoratet [Norwegian Directorate of Health]. (2021c). Regelverk for tilskuddsordning: Digital hjemmeoppfølging av kronisk syke. Retrieved from Digital hjemmeoppfølging av kronisk syke - utlysningsrunde for Finnmark - Helsedirektoratet

Helsedirektoratet [Norwegian Directorate of Health]. (2018, February 8). Helhetlige pasientforløp. Helsedirektoratet. Retrieved from Helhetlige pasientforløp - Helsedirektoratet

Jewer, J. (2022). Investigating a Work System Approach to Implement an Emergency Department Surge Management System: Case Study. Journal of Medical Internet Research, 24(8), 1-14.

Johannesen, L. E. F. (2022). Utenforakademia: mot en utvidet forståelse av «abduktiv analyse» og teoriutvikling. Norsk sosiologisk tidsskrift, 6(2), 1-16.

Johnsen, H. M., Fruhling, A., & Fossum, M. (2016). An analysis of the work system framework for examining information exchange in a healthcare setting. Communications of the Association for Information Systems, 39(1), 73–95.

Johnsgaard, N. (2023, December 25). Multimorbiditet. In Store norske leksikon. Retrieved from multimorbiditet – Store norske leksikon

Kamp, A. & Hansen, A. M. (2019). Negotiating Professional Knowledge and Responsibility in Cross-sectoral Telemedicine. Nordic journal of working life studies, 9(5), 13-32.

Kessler, R., Casan-Clara, P., Koehler, D., Tognella, S., Viejo, J. L., Dal Negro, R. W., Díaz-Lobato, S., Reissig, K., González-Moro, J. M. R., Devouassoux, G., Chavaillon, J. M., Botrus, P., Arnal, J. M., Ancochea, J., Bergeron-Lafaurie, A., De Abajo, C., Randerath, W. J., Bastian, A., Cornelissen, C. G., … Bourbeau, J. (2018). CoMET: A multicomponent home-based disease-management programme versus routine care in 109 severe COPD. The European Respiratory Journal, 51(1), 1-14.

Kickbusch, I., Piselli, D., Agrawal, A., Balicer, R., Banner, O., Adelhardt, M., Capobianco, E., Fabian, C., Singh Gill, A., Lupton, D., MeDHCra, R. P., Ndili, N., Ryś, A., Sambuli,N., Settle, D., Swaminathan, S., Morales, J. V., Wolpert, M., Wyckoff, A. W., …Wong, B. L. H. (2021). The Lancet and Financial Times Commission on governing health futures 2030: growing up in a digital world. The Lancet, 398(10312), 1727–1776.

Kodner, D. L., & Spreeuwenberg, C. (2002). Integrated care: meaning, logic, applications, and implications--a discussion paper. International Journal of Integrated Care, 2(4), 1-6.

Løyland, Kine, Sten Gahmberg, Gaarder Harsheim, Sæther, Iversen, Snilsberg, & Abelsen. (2023). Effekter, gevinster og kostnader ved digital hjemmeoppfølging – en samfunnsøkonomisk analyse basert på et pragmatisk randomisert forsøk. Magma, 26(5), 124-135.

MacNeill, V., Sanders, C., Fitzpatrick, R., Hendy, J., Barlow, J., Knapp, M., Rogers, A., Bardsley, M., & Newman, S. P. (2014). Experiences of front-line health professionals in the delivery of telehealth: A qualitative study. British Journal of General Practice, 64(624), 401–407.

Mathiassen, L. (2017). Designing Engaged Scholarship: From Real-World Problems to Research Publications. Engaged Management Review, 1(1), 17-28.

Meskó, B., Drobni, Z., Bényei, Éva, Gergely, B., & Győrffy, Z. (2017). Digital health is a cultural transformation of traditional healthcare. mHealth, 3, 1-8.

Miles, M. B., Huberman, A. M. & Saldana, J. (2014). Qualitative Data Analysis – A Method Sourcebook (3rd ed.). SAGE Publications.

Mudiyanselage, S, B., Stevens, J., Watts, J. J., Toscano, J., Kotowicz, M. A., Steinfort, C. L., Bell, J., Byrnes, J., Bruce, S., Carter, S., Hunter, C., Barrand, C., & Hayles, R. (2019). Personalised telehealth intervention for chronic disease management: A pilot randomised controlled trial. Journal of Telemedicine and Telecare, 25(6), 343–352.

Nicolini, D. (2006). The work to make telemedicine work: A social and articulative view. Social Science & Medicine (1982), 62(11), 2754–2767.

Nielsen, P., & Sahay, S. (2022). A critical review of the role of technology and context in digital health research. DIGITAL HEALTH, 8, 1-10.

Nilsen, E. R., Dugstad, J., Eide, H., Gullsle, R, M. K., & Eide, T. (2016). Exploring resistance to implementation of welfare technology in municipal healthcare services – a longitudinal case study. BMC Health Services Research, 16(1), 657–657.

Nohr, L. E., & Christiansen, E. K. (2010). Desentralisering ved bruk av telemedisin. Tidsskrift for den Norske Lægeforening, 130(13), 1372–1369.

Peyroteo, M., Ferreira, I. A., Elvas, L. B., Ferreira, J. C., & Lapão, L. V. (2021). Remote Monitoring Systems for Patients with Chronic Diseases in Primary Health Care: Systematic Review. JMIR mHealth and uHealth, 9(12), 1-11.

Radhakrishnan, K., Xie, B & Jacelon, C. S. (2015). Unsustainable Home Telehealth: A Texas Qualitative Study. Gerontologist, 56(5), 830–840.

Rohde, T., Grut. L., Lippestad, J. & Anthun, L. S. (2022). Samhandling mellom kommuner og sykehus (Report 102020752). KS. Retrieved from Samhandling-mellom-kommuner-og-sykehus.pdf

Sikt. (n.d.). About Sikt - The service provider for the knowledge sector. Retrieved from Sikt – Kunnskapssektorens tjenesteleverandør

Smaradottir, B. F., Berntsen, G. K. R. & Fensli, R. W. (2020). How to Enhance Digital Support for Cross-Organisational Health Care Teams? A User-Based Explorative Study. Journal of Healthcare Engineering, 1-8.

Stamenova, V., Liang, K., Yang, R., Engel, K., van Lieshout, F., Lalingo, E., Cheung, A., Erwood, A., Radina, M., Greenwald, A., Agarwal, P., Sidhu, A., Bhatia, R. S., Shaw, J., Shafai, R., & Bhattacharyya, O. (2020). Technology-Enabled Self-Management of Chronic Obstructive Pulmonary Disease With or Without Asynchronous Remote Monitoring: Randomized Controlled Trial. Journal of Medical Internet Research, 22(7), 1-14.

Strand, B. H., Berg, C. L., Syse, A., Nielsen, C. S., Skirbekk, V. F., Hansen, T., Vollrath, M. E. M. T., Blix, H. S., Husabø, K. J., Gjertsen, F., Meyer, H. E., Kvaavik, E., Nes, R. B, Reneflot, A., Ranhoff, A. H., Bye, E. K., Holvik, K., Hjellvik, V., Dalane, K. E. … Håberg, A. K. (2023). Helse hos eldre i Norge. Folkehelseinstituttet.

Tjora, A. H. (2021). Kvalitative forskningsmetoder i praksis (4th ed.). Gyldendal.

Universitetet i Oslo (n.d.). Tjenester for Sensitive Data (TSD). Retrieved from Tjenester for Sensitive Data (TSD) - Universitetet i Oslo

Van de Ven, A. H. (2018). Academic-practitioner engaged scholarship. Information and Organization, 28(1), 37-43.

Walsham, G. (2006). Doing interpretive research. European Journal of Information Systems, 15(3), 320–330.

Wilkinson M., Mair F., Bonnar S.A. & Angus R.M. (2002, May 17-23). Initial Experience with Telemedicine in the Home Care of Patients with Acute Exacerbations of COPD. Proc ATS 98th Int Conf, Atlanta, GA.

World Health Organization (2018) Classification of digital health interventions v1.0: A shared language to describe the uses of digital technology for health. World Health Organization. Retrieved from https://www.who.int/publications/i/item/WHO-RHR-18.06

Øvrelid, E., & Sanner, T. A. (2020). Sense-able process innovation in digital health infrastructures. Scandinavian Journal of Information Systems, 32(1), 81–116.