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Care by video consultations: why or why not?

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Abstract

The practice of using video conferencing systems for health care provider-patient meetings is becoming increasingly more important. Here, we reviewed literature on the subject, with the aim to provide a set of factors and perspective on what has been noted as important for the success/failure of the use of video in consultation meetings. Mostly, previous studies have focused on the outcomes, how well video works for the patient-care professional meeting, when it comes to affecting expected outcomes of the consultation. However, we focus on the contextual factors that have been noted in research on the topic and aim to gather these from a wide range of studies on video used in a home environment. We discuss the results of the study in the broader context of the implementation situation of video consultations systems, providing factors, barriers, and perspectives as well as a general context to use or non-use of the systems. Hence, we provide knowledge that can be taken into account by the designers and developers of such systems.

Keywords: Telehealth; Video consultation; ehealth; literature review

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1. Introduction

The practice of using video conferencing (VC) systems for health care provider-patient meetings is becoming increasingly more important, not the least after the experiences during 2020 with the "Covid-19" situation. This practice is still under research [1], and needs more attention. Here, we reviewed literature on the subject, with the aim to provide a set of factors and a perspective of what has been noted as important for the success/failure of using of video in consultation meetings. Mostly, previous studies have focused on the outcomes, how well video works for the patient-care professional meeting, when it comes to affecting expected outcomes of the consultation. However, we focus on the contextual factors that have been noted in research on the topic and aim to gather these from a wide range of studies. We discuss the results of the study in the broader design situation of video consultations, providing factors, barriers, and perspectives as well as a general context to the use or non-use of the systems. Hence, we provide knowledge that can be taken into account by the designers and developers of such systems.

The main sources of experiences of VC come from the medical or care fields, where studies are undertaken to evaluate and consider the outcomes. The key questions answered here are concentrated on the outcome, specifically is the system effective, do users accept it, and how does it compare with traditional, in person "Face-to-Face" meetings. Many of these studies also record more contextual factors as reasons for the successes or failures. This study focuses on different empirical studies on patient-care professional interactions over video communication systems, that is, studies contain some input from the patients. Further, the consultation should be between the care-professionals, work at the workstations at their care centers, and the patients living in their own home environment.

Currently, reviewing such kinds of studies is an active topic as well as a fruitful research approach. A comprehensive example of this is Ignatowicz et al. [2], presenting a "review of reviews," providing an overall assessment of the effects of video consultations, a concept that the authors point as being the key to capture the phenomenon. This review is focused on the field of long-term conditions. Thirty-five review articles were included, and the general conclusion was a mixed result, that is, some showed satisfied patients (6). However, there were not any clear indications in terms of health outcomes. The articles results were augmented by a literature review of guidelines for video consultations. The review article does not focus on gathering a maximum of important aspects; rather, it is on giving a focused assessment of some key ones. However, a close reading of the results reveals a set of concepts (perspectives, dimensions, activities, etc.) that are important for understanding video consultations. The example from Ignatowic et al. [2] (Table 1) can be viewed as important when investigating VC.

Table 1.Aspects on VC, based on Ignatowic et al. [1]

- Patient satisfaction - Health outcomes - Healthcare professional satisfaction - Health service cost - Ethics - Patient safety - National policy and political push - Software in use - Security - Economics: savings from avoided travel - Comparing with F2F meeting - Comparing with other technologies, (mail, telephone, chat, etc.)	- Privacy, confidentiality, and informed consent - Information governance and compliance - technological infrastructure - technical support - Quality of the video conferencing, interruptions, etc. - Disruption of routines in clinic - Implementation of videoconferencing services, at clinic - Training and support for clinicians - Physical space for the video interaction, (home, clinic)

As evident from this list, there is a wide array of items to be considered when developing and implementing video conferencing system for the eHealth area. The current study wishes to go further in this direction, intending to get a better understanding of the usefulness of video consultations for designers and developers of such systems. Looking at the available information, as mentioned, a broad spectrum of concepts and perspectives has been found to be important. This paper aims to add with a broader, and more current, search.

2. Background: Digitalization of care meetings

This form of consultation, as a replacement of a traditional meeting, presents a challenge for the design of such systems. Currently, there is an increase of use, driven both by the demand of the services and the technological advancement, as video communication becomes readily available in even the simpler smartphones, often with no cost. The special focus on the clinician in the "patient-at-home" scenario has not been targeted clearly enough in previous reviews. The knowledge gained here comes from studies conducted in these areas of research, which are published in journals specializing in the areas. The aim of such studies is to increase the body of knowledge for research and practitioners in medicine and care. Such information can help designers widen their knowledge and allow for more creativity.

To capture the phenomenon of video consultations, we look at some of the general concepts of ICT/IS/IT (/information and communication technology, information systems, information technology) in the area of care and medicine. There are several concepts coined for discussing IT/ICT in the health care area: ehealth, telemedicine, telehealth, mhealth (if wireless), just to mention some. These are constantly changing meaning as the technology is getting more advanced and the application of IT becomes more and more ubiquitous in health care. In the context of this research, these generic concepts are used to capture the phenomena of connecting patients and health care professionals in the literature searches.

A WHO report [3] sees the concepts of telemedicine and telehealth as interchangeable, with the main characteristics being: using IT/ICT to overcome geographical barriers, connecting users who are not in the same physical location, for clinical purposes. This understanding of the concepts can also be seen in a 2016 WHO report [4], where Telehealth is defined as "the use of telecommunications and virtual technology to deliver health care outside of traditional health care facilities." As an example of special case telehealth, video consultation is an important and emerging concept for understanding the distance meeting between patient and health care provider. The subject has been studied in a number of literature reviews and meta studies, often confined to a certain field. In a literature survey, [5] in the area of palliative care, VC is not seen as being able to fully replace F2F meetings, but it could drastically reduce the need for F2F meetings if there is a high level of acceptance from patients and relatives. A further study in the palliative care showed six factors as influential on the outcomes of video consultations, including: (1) Redesign of care, (2) Communication, (3) User perceptions, (4) Technology, (5) Privacy issues, and (6) Economic implications [6].

Rollo et al. [7] present a literature base checklist in the field of nutrition, structured according to the standard issued by the American Telemedicine Association issued in 2014. This provides practical advice using a set of requirements for general privacy and security standards, administration, technical, and clinical factors. The American Telemedicine Association provides a long list of guidelines, including an overview of the various terminologies for different fields of telemedicine, for example, including: Telepathology, Telemental Health, Teleburn Care, Telerehabilitation, just to mention some areas, (https://www.americantelemed.org/resource_categories/practice-guidelines/, 2020-10-29).

Although many studies (for example, [8], [9], [10], (many more can be cited)) have been conducted where the video consultation is investigated, the communication has often been between two care units. The patient goes to a care unit close to their home, where the communication facility is available and connects to the expert. The local facility, often smaller, lacks a needed expertise, but with the help of technology can provide the opportunity for the patient to meet with an expert. This remedies the travel costs and time, and makes it possible to actually come into contact with the right care giver. This approach limits the problems in terms of technology use, while mitigating problems that arise regarding time and travel costs. Trabjerg et al. [11] report that even though the consultation took place at a clinic, there were problems; specifically, 11% of the meetings were cancelled due to video equipment failures, 20% of the performed consultations had technical difficulties, and in general scheduling was time-consuming. Furthermore, Trabjerg et al. [11] highlight the advantages of involving more care givers in the consultation (tri-part meeting in this case), thus facilitating the coordination of care. This shows the clinic-to-clinic case as an important special case of video usage for consultations. Another aspect of the clinic-to-clinic application of VC is the connection of clinicians to each other, creating conferences around patients, with or without the patients present in the meeting. This connection of competences improves quality of care and is seen as important for the patient (see, for example, [12], [13], [14].

The attitudes toward VC among professional have been studied, including both active users (clinic and home-based systems) and those with no experience. Perry et al. [15] conducted a study in the mental health area comprising 142

professionals (47 users, 95 non-users) and found barriers to VC, including: "supervisor support needed," "to be an administrative burden," "lead to increased workload," "prefer in-person appointments." The differences between users and non-users were most apparent in their views on changes in administrative burdens, as it increased from 34% to 64%, who viewed it as a barrier. The barrier relating to preference for in-person appointments was seen as the greatest barrier among non-users (44%), but this was viewed as a problem by 39% of the active users.

However, in this research we focus on the patient, communicating from home, often without the support of set ups and technology, and generally being in a care facility, who deals with the technology. The pure home consultation approach has been measured in larger studies regarding the outcome and seems to be favored by many patients. In a study of 759 outpatients [16], 91.6% were satisfied with the consultation and thought the quality of the virtual visit was on par with a F2F (face to face) visit. Using VC also provided other benefits, making care more accessible (86.0%) and saving travel time. Another larger study is reported in [17], with 5,981 users, where 763 users took part in a pre-survey and a post-survey. In that study, about two-thirds of the users thought the use of a VC solution was equal to or better than a normal in-person visit. The context of the study was users with known barriers to visiting in person, mainly because of long travel distances.

The video consultation, as a mode of care, is increasingly becoming a change factor on an institutional and societal level, underscoring the need for understanding the implications on several levels. Technology advances are used for video consultations in various ways, as a bespoken system for a particular situation, as a generic commercially available video conference system, or as smartphone apps developed by start-up care companies. This trend has impacted how care is consumed. A report from the U.K. [18] shows details on the impact of one GP mobile service and provides several dimensions to understand how patients, professionals, and society at large are affected. The effectiveness, economics, and impact of VC on the operations of health care organizations have been studied from a number of perspectives, including the shortening of waiting time for consultations, the length of the consultation, the number of patients serviced, and the re-admission rates. Salah et al. [19] showed that re-admission decreased due to the use of VC in the time frame of 12 months.

Video technology has been used for other purposes also, for example, as social support and education to patent groups, as part of helping them cope with their chronic health problems [20]. A similar application concerns education of parents to children with diabetes [21]. A larger group of parents were offered lectures on different topics about caring for children with diabetes.

3. Method: literature review

The aim of the review was to capture a great diversity of factors and dimensions, important for the development and use of video in the patient-doctor meeting. Searches were conducted using the "One Search" system (see https://lnu.se/en/library/search-and-evaluate/articles-and-databases/? for included databases). An initial search gave the overview of the subject and provided directions for the further study. The focused study on the home situation was conducted with the following rules in mind. General inclusion criteria were that the article should contain contextual information about the implementation of the video consultation in the home environment, not only the effectivity outcomes as a care technology. All selected papers had to be peer reviewed, full text, English, and journal articles. Cases that were teaching or training related, pre-implementation studies, study protocols, or just technical descriptions were excluded. The usage situation should be patient-care professional synchronic two-way encounter, where the patient resides at home managing the call on his or her own. Accordingly, cases where the patient went to a care center for the video consultation were discarded. Short texts like posters or abstract papers were also excluded, as these generally do not contain a broader understanding of the situation. Duplicates were also excluded, just as papers not accessible from the system in full text. Papers on pre-studies, study design, feasibility studies, etc., were excluded too as they do not contain empirical data. Studies are normally conducted and presented with certain core questions in mind; however, to get the bigger picture, not only are these gathered from the papers, but it is also necessary to look at the discussions and all the material provided by the authors.

The papers were reviewed in a series of steps. First, we made a quick scan of the search to establish whether it promised a workable set of paper. A quick scan of titles was made to ensure that the search was relevant and on topic. The abstracts of papers were then reviewed, and those that did not meet the criteria were removed. The remaining papers were then reviewed closely by reading the content, whereupon those that were not relevant were also discarded.

A first, rather broad, search of the words: "title," "video" and "consultation" session gave a large set of papers, with a total of 144 papers (2015–2021). A quick scan of the titles gave a positive result, and 40 articles were selected for closer inspection. The abstracts of these papers were reviewed, yielding 19 papers that were selected as relevant and included in the study.

A search of "Title: contains telehealth AND video" gave 70 articles, with the same rules as mentioned above. All articles were reviewed; however, it yielded only 34 articles. The high number of discarded papers was mostly due to the length restriction, typically papers in abstract format, together with some papers with technical (optimization/algorithms, etc.) or educational/staff training content. Among the selected papers, there were two key words that came up more often, "rural" and "veterans," making the search somewhat more limited than what we had hoped. In the end, seven articles were included in the study. More searches were also made combining several of the concepts related to telehealth in combination with the word "video." However, these did not yield any workable papers. In conclusion, 26 papers were included in the study. A table with key factors was constructed; this list can be obtained upon request. The analytic process was conducted in a three-step process. First, we checked the papers for key factors and created a list. Secondly, we established a set of general categories of analysis, as patterns with these factors. Five general categories were established in an interpretative and pattern seeking manner. The outcome of this process yielded the following: societal level, care professionals, care organizations, patients, and technologies. Within these categories of analysis, the established factors were then put under each of the headlines. The papers are cited in the order of when a factor was first discovered as relevant, which is important because many of the papers contain several relevant factors.

4. Results: Dimensions of VC in practice

Based on the study, a number of dimensions of the practical use of VC in daily operations can be proposed. Based on what was mentioned and discussions in the reviewed papers, a number of key concepts were abstracted, with a possibility of being more or less active, with some seen as more positive for the effectiveness of VC.

4.1 Care on a societal level

A key component in understanding the VC strategy for restructuring the care process is the strategic motivation behind the change. One motivation could be a national strategy for using VC, with guidelines for the application, while providing extra resources for the effort. The strategy could be within a framework of digitalization of care based on political forces, with new legislations [22, 23]. A consequence of this strategy could be allowing net doctors to operate [18]. This would include new ways of how care founding's are allowed to be spent. A common driving force could be an economic logic of lowering cost and creating more effective operations. A different strategic direction to change could also be noted, either as top down or bottom-up approaches. The management of a care organization could push and promote the change or it could be a demand from the operational levels [24]. Both have different impacts on the effectiveness of the efforts. There is also an out-side and in strategic force, where competition is driving a care organization toward digitalization, and VC is one strategy to meet competitors. A growing and exponentially more important factor is the public demand, with the expectation of a higher degree of digitalization of how care is provided. This is underpinned by the expansion of technology for video interactions between people. This spills over to people's expectation of how care is provided. All these forces are at play today and will greatly form how the VC solution is decided on and implemented. Currently, the Covid-19 crisis point to impacts of sudden and unexpected phenomena can impact digitalization, forcing changes to be implemented [25]. Such forces will occur and will be a difficult planning dimension to handle; nonetheless, it is a powerful source of change.

4.2 The care professionals

The big picture reflected in most studies is that there is an interest in VC style solutions, which appear to be interesting for care professionals. Mostly care professionals seem to look favorable on VC. In the right circumstances, the VC solution could be a good replacement or complement to traditional care [26,27]. The selection and screening of patients to be included in the VC style of care are central for the VC solution to work properly [28]. Extra efforts

are required for the professional operation and must be integrated when the VC is implemented. This is a reoccurring theme in most of the papers we reviewed, where patients deemed unsuitable were excluded. The nature of the care discipline affects the application of VC greatly, and how it is implemented varies significantly [16]. The need for education and instruction is present in all the papers, and using VC without the right skills and knowledge is of course impossible [24,29]. Disinterest and lack of commitment from staff might follow [29], while promotion and fire spirits might be a large part of the successful VC implementation [24]. Increased workload [25] (or decreased [27]) and new work tasks such as technical support are cited as problems. The care professional might end up being the technical support, thus requiring other skills [30]. New ways of structuring the consultation are needed, including how to set up the conversation, create a trustworthy relation, and make the patient comfortable [28,31,32]. With these new skills, there comes a debate on how the new technology affects the profession at large and what this does to the core of the profession. To implement VC as a tool that is needed for care professionals is essential, making their work more efficient and effective. If the VC tool is not viewed as needed by the care professional, the efforts might fail [24].

4.3 The care organization

The introduction of VC will have a profound impact on how care is provided and how care is organized. A common theme in the paper is the issue of scheduling of the meetings, and in general cumbersome administration processes [25,27]. How patients are guided through is often novel, and new systems are needed. These functions need to be integrated into the VC solutions. This affects how the overall work operations are organized, with new roles and skill sets as necessary complements to the VC system itself. A steady and reliable work schedule is the core to a functional care organization. The work schedule is often an issue, and this is especially so when dual systems are in play, with patients going through the organization on different paths [27]. The physical environment is hence affected; a care center has a set of assets: the professionals' workroom, the examination room, the waiting room, the reception area, etc., which are ways of structuring the care. The VC technology changes the need for and use of these assets [33]. Instead of having large installations in special rooms, technology might be pushed out to the patient's home environments. All this affects how long-range planning is performed, beyond the VC systems. Procurement and interactions with supplies change, as well as how buildings are designed. The effectiveness aspect of VC is an important part of the VC technology. VC creates an opportunity to provide care to more people who might not be reached in other ways. This can include patients who are unreachable because of distance, but also patients who take part in care opportunities because it becomes more easily accessible [34]. Nonetheless, there is only so much you can do over a video link. However, the VC can inform the care provider if a physical meeting is necessary, saving time and effort for all involved [35], for example that fewer care meetings are needed [36]. Using VC can lead to fewer patients visiting the care center, and at the same decreasing the time spent for each meeting [37]. Another impact on the care delivery, which has been reported by the use of VC, is the increase in consultations, held in a more timely manner, with better and earlier effects, leading to improved care [38]. Solving simpler matters like changes in medications are time and money saving effects of VC, reported, for example, by [39]. The net effect of the VC could be as good as creating zero cost meetings when applied systematically [40]. Meetings have been noted to be shorter when conducted with VC, leading to savings in time and money [41][34].

4.4 The patients

Overall, the patient response is positive, and patients are seeing many good sides and opportunities with VC. The most obvious one is getting care based on their conditions, or getting care at all, and the Covid situation has put this issue at an edge. However, the most common argument from the patient perspective is the question of travels, and not having to travel is cited by many studies as a key factor, including time, costs, and the practicalities of the travel [16,17,22,33,36,38,41,40,42]. There is also a big factor of convenience for the patient, taking care meetings at home makes it easier to fit care into everyday life, just by the fact of not having to visit the clinic [17,22,38,40,41,43]. This makes care more patient centered, and might put the patient more in control of the process. Care in home environment enables next of kin to take part [22,42], which is sometimes good, but some time creates privacy issues [28,40]. The VC can also put the patient more in control of the meeting itself, with a feeling of being able to steer the conversation [28]. The home environment, the setting of the meeting, varies a lot and can be a problem, from rooms to devices,

measuring instruments, security issues, down to bandwidth which can be hard to plan for and hurdles that are impossible to fix [17,30,42,42,45]. The explosive increase of hand-held devices and internet connections in homes is a major factor for VC at home and explains way it is viewed positively for many patients. This is illustrated with many examples of projects relying on patients' own devices [22,41]. At the same time, the digital divide (lack of technology or skills) created for those without is a continued problem; in practice, these persons are just excluded from the project or program [17,34,43,44,45]. Having the caregiver provide such devices is one way to mitigate these problems [17,28,29,33,41]. One aspect for the patient is the impact on non-compliance with care instructions and advice on self-care [35], and whether VC can provide more care contacts over time [34,38], and create more compliance along the way. In the end, the patient should be in the focus, specifically who is the patient and what is the nature of the health problem, which makes the patient unable (typically dementia) [33,41] or unwilling to participate in care using VC. The nature and content of the care meeting are also important, and the need for a physical examination is a key factor [37,40]. Nonetheless, it is better to receive some decisions or messages in a home environment [40,44], maybe in the presence of next of kin.

4.5 Technology

As noted and referenced in the previous section, the technology is still the number one problem with VC. Non function of any kind is cited in virtually all the papers. The big problem for patients is the technology itself, and the possibility of patients to handle it and indeed to have it available. When the right technology is present, easy to use [27,37,44], and the patient is comfortable with it, the view of VC is very positive. However, many papers have reported problems with the technology, making it a major obstacle to have a successful VC [25,28,29,30,36,39,43,45]. Education, pre-visits at home, instructions, and tech support are ways of dealing with technical issues [22,38,28,39,41,46]. VC works best when the patient goes from being a technology user to being immersed in the care conversation, where technology becomes invisible and is out of mind. The need to have instructions and education is always noted as key components in the VC system, together with support functions. There are two major approaches to the VC solution: the standard video conferencing system [17,23,27,29,30,33,34,45,] or the integrated platform solution [16,22,25,35,36,37,39,40,41,42,44]. Many examples of VC operations or projects just use a standard, for free solution (Zoom, Skype, Facetime) from any of the major tech companies. As these are part of the pre-installed functionality of devices or operating systems, users are often used to using them, making technology less of a problem from a knowledge angle and as a standard service has high reliability. Today, with smartphones where the video component comes as more or less a built-in option, it could become a natural extension of the traditional telephone call, with the same level of ease of use and reliability. The integrated platform solutions offer more functions, typically the large questions about scheduling, but still often come short in some areas in the particular situation. Integration with other care systems is a perennial problem, pointing toward the need to view the development of VC technologies from a broader point of view.

5. Conclusions

The overall pattern seen in this review is the interacting forces of functionality of technology, the utility seen by professionals, and the convenience seen by patients. However, the driving force to make it happen is the willingness of institutional forces on societal and organizational levels to put strategic purpose and money into the project. The transition from the general interests of digitalization onto the necessities of the pandemic situation is very clear and pressing. From being an interest among doctors and scientists, have been overtaken by operational needs. An important factor to understand the outcomes and experiences gathered is the high level of exclusion of patients, removing patients who are deemed unsuitable for participation. This points to a large sector of potential problems with VC for more general usage. However, in the large picture, a pattern involving meta factors provides a more general understanding of the VC phenomena. There is a balancing of both economic and quality factors. These are complex, resulting in various outcomes. VC brings combined improvements on both the care economics and quality, similar to cases where either economics or quality dominates. There are no clear disadvantages where both higher expenses and decreased quality have been noted. This could be because of non-reporting of such cases, where projects that faced these problems have been discontinued. The analysis of papers in this report provides a three-level analysis instrument. On

the core level, experiences of professionals, patients, and technology drive the interest for the VC solutions in practices, this process is embedded in social and institutional contexts, which is in turn function within a logic of economical and quality factors.

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