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# Health Professional's Decision-Making Based on Multichannel Interaction Services

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## Abstract

The COVID-19 pandemic has reinforced the importance and impact of telemedicine and multichannel interactions in healthcare services provided to patients. Health professionals are in turn increasingly dependent on patient data collected through multichannel interactions to make their clinical decisions. This article intends to present a brief analysis from the viewpoint of health professionals regarding the use of technologies in telemedicine and multichannel interactions to support decision making, basing on the analysis of clinical data of patients collected in a telemedicine environment. These technologies have numerous advantages for healthcare professionals and patients, but there are also some obstacles and gaps inherent that need to be overcome. Furthermore, health professionals can perform a more detailed analysis of patient data before taking any decision, as this practice promotes data collection to facilitate the decision-making process of health professionals.

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## 1. Introduction

The world is continuously evolving, and technology as well. The COVID-19 pandemic has demonstrated the importance of digital transformation across all sectors, especially in the healthcare sector. Healthcare has taken advantages of this trend by adopting new technologies in an era of digital transformation. To maintain this pace of evolution health professionals must adapt their activities and make decisions regarding the patient's health condition

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basing on remote care data. The evolution of information technologies in health services has demonstrated the importance of telemedicine for both health professionals and patients. Health professionals are one of the main users of these technologies and end up playing a fundamental role in their success and adoption on a large scale. This article seeks to analyze multichannel interaction technologies in telemedicine to support health professionals decision making [1]. Many authors focus only on health services provided to patients and on patients themselves, often leaving out health professionals, as they play a fundamental role in interacting with patients and in providing services to patients through interaction channels.

Thus, it is intended to analyze the role of health professionals in a multichannel interaction environment, and how they can develop their activities. It is intended to study, analyze, perceive and draw conclusions about the impact of multichannel interaction that health professionals have. The conceptual model proposed for multichannel interaction in health services will be used to carry out this analysis [2].

This article will focus on how health professionals use information and communication technologies (ICT) to interact with patients in a multichannel interaction environment. In the multichannel interaction model, health professionals take advantage of ICT to interact with patients through interaction channels to follow and monitor the patient health through interaction channels. The COVID-19 pandemic further reinforced the idea of telemedicine, as during this period there was an enormous number of patients who were followed up by health professionals through telemedicine services [3]. Telemedicine can thus be proposed as one of the practices that health professionals use to interact with patients without the need for a physical consultation [4–6]. This is a practice that can be seen as the starting point for multichannel interaction in health services made available to patients.

## **2. Background**

Lately, many authors have been publishing papers related to multichannel interaction services. But few or little had been published related to multichannel interaction services in healthcare. This paper aims to give a contribution regarding multichannel interaction services in healthcare, based on insights gathered from other areas such as marketing and e-commerce. Recently, there have been developments in these subjects, whose objective is to apply the concept of multichannel interactions, that exist in the areas of marketing and e-commerce, in health services available to patients through multiple channels of interaction [4]. Multichannel Interaction Services in Healthcare (MISH) is a practice in which patients interact with health professionals through the use of several channels of interaction [2]. In the areas of marketing and e-commerce, there are several multichannel interaction models between organizations and consumers, which served as an analysis and study guide for the development of a multichannel interaction model for health services made available to patients. This paper will use a conceptual model proposed in health care services for multichannel interactions [2]. This model is a model focused on patients, the channels of interaction they use to interact with health professionals, the health professionals that interact with patients through multiple channels of interaction, and in services provided to patients.

## **3. Healthcare Services in a Multichannel Environment**

Telemedicine is the delivery of healthcare services using information or communication technologies [7], i.e., is the practice where health professional deliver healthcare services to patients through multiple channels of interaction. In an environment of multichannel interactions, health professionals need to adapt to new circumstances to practice their activities. The way this adaptation is carried out is essential to prepare health professionals to make decisions based only on the analysis and interpretation of patient data collected in telemedicine.

According to health professionals, telemedicine represents an ideal environment for shared decision making with different health professionals who accompany patients, as this approach allows specialists from different areas to interact with others, as well as patients who are participating in the process, to analyze the collected data [3,8]. Studies carried out on interactions between patients and health professionals concluded that patients who were more involved in the telemedicine process and the decision-making process had better health results, as they felt more reliable and

safer knowing that they were not being excluded, but they are also aware of all the decisions that concern their health [9]. This fact greatly facilitates the work of health professionals, as they feel that patients are more collaborative and at ease with the service provided.

In a multichannel interaction environment, we are witnessing a paradigm shift that was previously focused on the traditional healthcare institution for healthcare, centered on patients and their needs. With the change of this paradigm, health professionals will use information technologies in healthcare services to empower patients, by providing detailed information about their health in their hands.

According to the conceptual model of multichannel interactions proposed in health services [2], a brief analysis on how health professionals can take advantage of the model to offer a better telemedicine service in the different channels of interaction with patients will be taken. Starting from the conceptual model for multichannel interactions in health services, an analysis will be performed from the point of view of health professionals on how the workflow in the process of interaction with patients is, and with other health professionals, especially concerning patient data analysis collectively by different health professionals in the clinical decision-making process. All patient clinical data collected during the telemedicine process must be available to health professionals who interact with patients. With these data, together with the information described by the patients, health professionals can make a more detailed analysis of the patient's health condition. Telemedicine is very important, since it allows healthcare professionals to obtain information about the patient during the patient screening process. Because of this process, health professionals will depend a lot on symptoms that the patients describe, and on the analysis of the data to make future decisions. This fact requires that these health professionals are prepared to make decisions in such scenarios. Technologies play a fundamental role, as it is how health professionals interact and be in contact with patients.

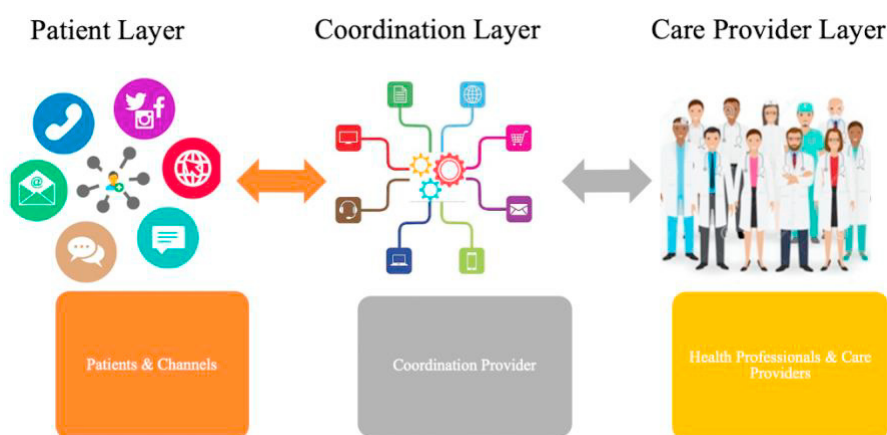


Figure 1 - Multichannel Interaction Services from [2]

According to the proposed multichannel interaction model, it can be identified that the existence of a single touchpoint for health professionals to interact with patients is essential to create a telemedicine environment to monitor patients, as well as to share information and clarify any doubts with other health professionals. By analyzing the proposed interaction model, it can be said that the point of view of the single touchpoint is in the coordination layer, as this layer is responsible for managing all interactions between health professionals and patients. In this layer, health professionals are provided with the means of interacting with patients, as well as interacting with other professionals. In the proposed model, the coordination layer plays an important role, as it is through this layer that all the interaction between health professionals and patients is processed, as well as the extraction and treatment of data collected from patients. From the analysis of these data, health professionals are able to make decisions.

In telemedicine health services, healthcare professionals not only want to make clinical decisions about patients but also want to involve patients in the process so that they feel more comfortable and are part of the process.

According to some professionals, the involvement of patients in the telemedicine process makes patients more comfortable and safer, as they feel that they are actively participating. This gives patients more confidence and makes them more collaborative during telemedicine.

### *3.1. Health Professional's Main Challenges in Decision-Making in Telemedicine*

The process of decision-making based on analysis of data gathered in telemedicine has some challenges that health professionals have to overcome such as [6,10,11]:

- Breakdown in the relationship among different health professionals.
- Breakdown in the relationship between health professionals and patients.
- Issues regarding the quality of clinical data.
- Organizational and legal issues.

There are further challenges that health professionals still need to overcome to offer a better-quality health service and make better decisions based on the analysis of the obtained data. The challenges identified above are just some of the most pertinent concerning telemedicine and clinical decision-making, based on the patient's clinical data collected.

### *3.2. Health Professionals Benefits in Decision-Making in Telemedicine*

The benefits of telemedicine-based decision-making are numerous. Some of the most notable benefits of this practice are [6,10,12]:

- Better and improved access to clinical information.
- Much provision of health care not previously deliverable.
- More access to care services and increasing health care delivery.
- Increased health professional's education.
- Health care organization cost reduction.
- Better quality control.

Health professionals recognize the benefits of this practice, as well as the new possibilities for interaction that this practice brings both to them and patients. Despite its benefits, professionals recognize and recommend face-to-face interaction at least once a year with patients in cases of patients who do not have more serious health problems and between three and five times a year for patients who have some health problems who require some kind of face-to-face medical assistance.

## **4. Discussion**

Patient's health care needs are changing continuously, and now patients want to be more involved in the management of their health through their mobile devices. This movement shows how important is multichannel interactions in health care services in this new paradigm. Multichannel interactions in healthcare service will enable health professionals to interact with patients across multiple channels, to get insights regarding a patient health condition. With the data gathered, health professionals can analyze these data to have a broader idea about patient health, and, based on patient data, they can make some decision regarding the patient's health. All of this can happen without health professionals and the patient being physically together [13]. With today's technologies available to health professionals, they can take advantages of such technologies to give more specific and personalized care services to their patients. Of course, current technologies don't dismiss patients to go to care facilities to get in-person care services. However, in a multichannel environment with telemedicine technologies, patients don't have to go frequently to the care facility in person to get care services [3].

To better understand and evaluate how effective health professionals can make decision-based on multichannel interaction services, a SWOT analysis was carried out. This analysis is intended to identify the main external and internal forces that can directly or indirectly impact the health professional's decision making on such an environment [6,7,14].

Strengths	Weakness
Health professionals can make better decision through in-depth patient data analyzes	Health professionals might have a poor interpretation of the patient's health condition
Health professionals can provide care service to patients through multiple channels of interaction	Poor patients' collaboration during interaction will make it harder for health professionals to make a good decision regarding the patient health condition
Improved health professional's education regarding new technologies to provide telemedicine care	Breakdown in the relationship between health professionals and patient
Improved access to care services, increasing care delivery and improved access to information	Poor quality of health information
Opportunities	Threats
Telemedicine could be expanded to more care services provided to patients	Poor connection services and technical issues will limit health professional's interaction with patients and consequently decision making
Reduce health care cost	
Improved equity of access to care between and within regions, previously denied because of such factors as socioeconomic constraints, especially in countries in the developing world, and the tendency for specialized services to be centralized in urban centres	Laws and regulations that aim to limit health professional decision making based only on an analysis of patient data through telemedicine without in-person care services

## 5. Conclusion

The COVID-19 pandemic had boosted the adoption of telemedicine, which ended up bringing numerous benefits for healthcare professionals, as well as patients. With this practice, patients do not need to travel to health institutions to receive medical follow-up and health professionals which, in turn, depends solely and exclusively on physical interaction with patients to make their clinical decisions. This practice is still in its initial phase, but it has already demonstrated its potential but still needs some improvements to make the process more effective and efficient. Telemedicine has proven to be incredibly useful, and it is here to stay [15]. Over time, supporting technology and systems will make virtual visits more efficient, better coordinated, and hopefully, more patient-friendly.

Although health professionals have an important role in the decision-making process, the contribution and involvement of patients proved to be an essential factor for data collection and the consequent analysis of these data and decision making by health professionals. Although health professionals recognize the importance of this practice, they still do not rule out healthcare in person with some frequency [3,15].

There is still a long road ahead that needs to be covered to assess different aspects of this practice, from the point of view of patients, as well as health professionals. Moreover, there are still several issues that still need elucidation, namely the issues of protection, privacy and security of patient data, among other issues related to this practice. This article, aimed to present an analysis from the point of view of health professionals, as it is a decision-making process in an environment of multichannel interaction through telemedicine, is an issue that many authors have not addressed in their publications. As the future work of this article, it would be useful to the scientific community to carry out more practical studies with health professionals who are providing telemedicine services to present more analysis about this practice.

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