

Use of Smartphones in Hospitals

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1. Introduction and Literature Review

Current communication tools, among them smartphones, have led to the use of more technology throughout the world. By having faster processors, larger memory, small batteries, efficient operating systems, among others, they are capable of performing advanced functions (Bert et al., 2014). Technology has greatly affected both personal and work environments. According to Mobasher et al. (2014), in hospitals, the use of smartphones has had a great impact since this technology (and the development of applications) promote better decision-making, the reduction of the number of medical errors, the improvement of communication between hospital medical staff and they have contributed to the development of a new type of virtual medicine and telemedicine.

It is estimated that currently, more than 1 billion people in the world have downloaded health-related IT applications in their smartphones (Bhuyan et al., 2016). With more than 350,000 health-related mobile applications on Google Play and the Apple Store and about four to five million downloads daily, the popularity of medical apps keeps increasing (Sezgin, 2018). Various studies conducted in different parts of the world show that the number of people who use smartphones, and other devices with health-related applications, is increasing significantly every day (Bert et al., 2014). Some mHealth solutions aim at long-term goals (fitness and diet), while others deal with hospital administrative features, such as scheduling medical appointments and exams.

In developed countries, these apps are the most used by almost all residents and teaching doctors, for their care practice and teaching (Muller et al., 2016). This coupled with the fact that IT allows users to install, configure and run specialised applications, is why more and more professionals are making use of applications in the workplace. Sezgin (2018) agreed with Bert et al. (2014) that health professionals generally use smartphones and other devices to access information via the Internet, communicate with colleagues, and download

applications related to their profession and speciality to improve the performance of their work.

A Zebra survey on the use of technology in hospitals shows that, by 2022, 97% of nurses, 98% of doctors, and 96% of pharmacists must use smartphones (Bryant, 2018). Following this trend, hospitals are increasing their investment in mobile devices that collect and display valuable data, minimizing human error cases and making their processes much faster, which is imperative in times of crisis such as the current COVID-19 crisis. The study also highlighted that the main benefit of using smartphones by health professionals in hospitals is the reduction of errors in areas such as medication administration (61%) and sample collection labelling (52%) (Bryant, 2018). Mobile technologies allow clinical staff to spend more time with the patient. This is because, by 2022, 91% of nurses are expected to access electronic health records, medical and medication databases (92%), and laboratory diagnostic results (88%) using smartphones (Zebra Healthcare, 2018). Smartphones will also help communication between doctors and nurses, patient care quality, and provide real-time location information to streamline workflows.

Although the use of smartphones in hospitals has many benefits, Jin et al. (2020) argued that it has several disadvantages. One of the disadvantages is that a cell phone is a potential risk, a vector of infections and diseases for which any disinfection or sterilisation technique is ruled out (Jin et al., 2020). Downs et al. (2019) agreed with Jin et al. (2020), adding that doctors can be distracted from treating their patients while using smartphones, thus harming the patient's quick recovery. Kirk et al. (2014) added another perspective of the dangers of using smartphones in hospitals, is that of patient privacy. According to Kirk et al. (2014), although mobile applications and smartphones are highly beneficial, it is important to ensure that the patient's privacy is maintained.

2. Rationale

The digitisation of hospitals began many years ago. Indeed, the various technological adoptions in this sector have been successful. Hence, this is one of the reasons why the use of smartphones in hospitals has been adopted by users, as well as healthcare providers (Bert et al., 2014). The use of smartphones, tablets, and other mobile devices is now widespread. Many people are increasingly accustomed to using mobile devices to do most of their activities. As such, hospitals cannot stand on the sidelines of this revolution (Mobasheri et al., 2015). Since people can more easily access information, learn new things, interact, and even transact through their mobile devices, it is only natural that this trend could include the delivering health care.

3. Objectives

The current research's main objective is to conduct secondary research on the use of smartphones in hospitals. The research also highlights the relevant legal, ethical, and security issues involved in adopting smartphones in hospitals.

4. Methodology

The current research will use a literature review research methodology. A literature review or research highlight is a review of works that have been done by others. A literature review is an essential part of scientific work. It contextualises the current research scenario, points out conceptual inconsistencies and encourages new studies, all based on the summary and synthesis of existing works (Snyder, 2019). Articles will be searched in digital libraries such as Google Scholar, PubMed, and Science Direct. Articles will be selected after analysing their titles and abstracts. Regarding the inclusion and exclusion criteria, only articles written in English and published within the last ten years will be selected.

A literature review has several advantages. All data is already available, and there is no need to collect data from scratch. Moreover, the research is not dependent on the other

peoplecooperation, as is the case in surveys and interviews (Snyder, 2019). Using a literature review, the researcher can plan the workload more easily because nothing unforeseen will happen, such as in an experiment. However, a literature review has several disadvantages. First, extensive literature research is necessary. Secondly, the researcher cannot conduct or perform his operationalisation and, therefore, has little practical relevance.

5. Secondary Data Analysis

The research was conducted based on printed materials, for example, journals, books, and theses, and it adopted a bibliographic. Bibliographic research is based on the analysis of the literature already published in the form of books, articles, and Gray literature (theses, dissertations, papers presented at congresses, and reports). It is important to identify and capture the information from the selected studies. The approach to be used is to answer each of the research questions with the information contained in these studies (Snyder, 2019). Once the data has been extracted, it will be synthesized to answer the research questions.

6. Discussion

The use of smartphones in hospitals has had many effects, the most important of which will be discussed here. First, it has resulted in the establishment of new operating models. Technology is disruptive, and this is evident in the effect of smartphones in hospitals (Bert et al., 2014). Thus, many traditional methods have become obsolete. As a result, doctors, as well as other health professionals, are adopting new techniques. Practices such as using referral tools or reference books are now a thing of the past because of medical applications such as RefferalMD (a HIPAA compliant application in the United States). Smartphones have Google cloud and this cloud-based patient referral management system can help physicians write referral letters quickly and easily.

The problem of access to healthcare has been greatly reduced by the evolution of smartphones (Young, 2016). Now, no more patients come to the doctor's to make a simple

appointment. Some mobile applications in smartphones help patients find health care providers nearby and make an appointment (Doctena, 2018). The Doctena (Europe) mobile application, for example, helps both doctors and patients to solve problems related to scheduling and making appointments (Doctena, 2018). The platform makes it easy to make an appointment but is also practical and flexible. With just a few clicks, formalities that used to take hours are now completed in less than a minute.

A very important factor for the use of smartphones as tools for medical use in hospitals is the educational/informative part. Through them, it is possible (even in the middle of surgery) to establish a professional dialogue with other specialists. This can be a very useful resource not only for the surgeon but also for those observing the surgery from outside (students or doctors) and the patient (Jin et al., 2020). Smartphones have also created an instant connection between doctors and patients. Various mobile applications have made it possible to facilitate communication between patients and their doctors and make it more flexible. They made it possible to eliminate the barrier represented by distance. Applications such as PingMD (a medical messaging application) allow patients to communicate with their practitioners through a secure platform, available on their mobile devices (Doctena, 2018). Medical information and medical reports can thus be shared. The use of mobile applications also helps to remove the language barrier between doctors and patients. Omnifluent Health is a mobile application from the American company SAIC. The app can translate what a patient or a doctor has said.

Smartphone apps can also reduce incidences of medical errors. Agfa HealthCare launched the CheckMed application to mitigate errors. The app reduces the manual process and ensures greater security in the administration of medications at the bedside. For example, using a mobile's device camera or even using RFID approach reading technologies, it is possible to read the patient's bracelet and make his identification (Sezgin, 2018). The nurse has access to the medical record data and the patient's prescription. Likewise, using the camera, the medication can be "beeped" by the application, which validates whether the

drug was prescribed by the doctor, whether it is at the right time, and, mainly, for the correct patient. This procedure avoids incorrect dosages, medication changes, and possible drug alterations.

Smartphones, through video conferencing, enhances medical support anywhere and anytime. The 2016 annual report, conducted by the PWC Health Research Institute, showed that 60% of American patients interviewed have medical consultations by videoconference, and 81% of participating physicians say that using applications to access medical information is crucial; and helps in the treatment of the patient (Heath, 2020). The use of smartphones and mobile applications improves the patient's life. The process of admitting a patient to an emergency unit is very tedious. Long lines and the process for authorization of the agreement can take a long time (Muller et al., 2016). With an application, the patient can confirm his data, plan, health insurance, and medical speciality before arriving at the hospital. This "pre-admission" of the patient will speed up the process of receiving the emergency unit.

7. Conclusion and Recommendations

Smartphones have revolutionised the hospital industry. They have solved most of the problems that led to reduced efficiency and productivity in this sector. However, there are still many improvements that can be made. The results of this research provide strong evidence that hospitals need to develop policies to support the safe use of digital technologies such as smartphones in the workplace and that strategies are needed to ensure further innovations in digital health. It is important to ensure that patients' data is protected and secured. Many applications in smartphones lack binary code protection and could be modified by reverse logic. Many applications also have poor transport layer protection and could be used to steal data or identity. Health applications should have appropriate security guarantees so that their behaviour is as expected, the measurement of the data does not negatively affect the health of the patient and that the information provided

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to the doctor or patient is accurate. Considering all these issues, this will be the only way to guarantee sustainable, safe, and integrated mobile health in the health system. In summary, it can be affirmed that smartphones are technological tools that contribute to inform and support citizens in self-management of their health and well-being, and help in enhancing communication between doctors and patients, and doctors and other hospital staff.

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