

An Interactive Mobile Messaging System for Patients and Health Workers

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Abstract

In the recent past, health issues in developing countries has become a serious problem as different diseases attack and infect people making the public health sector overwhelmed. With a limited number of healthy workers and healthy facilities in developing countries, this problem has made it difficult for doctors to accurately study the trend of different diseases, thus failing to analyse the way patients behave after being diagnosed. This problem is also aggravated by the fact that many of the diagnosed patients live in faraway places from healthy facilities. One way to address this problem is by introducing the use of an interactive messaging system for patients who wish to access health services such as doctor appointments and consultations or need monitoring but are faced by challenges like; time needed for appointments and consultations as well as having to travel for long distances to reach healthy facilities. With such a system, health workers can monitor the progress of patients, while new patients have the advantage of sending their preliminary symptoms to the health workers via SMS. Patients may also be able to effectively collaborate with the health workers without necessarily having to travel long distances to visit the health facilities. In this paper, therefore, the authors discuss a mobile interactive messaging system that would enable patients to send preliminary symptoms to the health workers in public hospitals via SMS. The information gathered is stored in database residing at the health facility, which will serve as a reference point to the health workers whenever responding to the messages received from patients. The number of people who possess mobile phones is daily increasing, thus, can help facilitate communication in different geographical locations with easy. Health workers can then respond to many patients without necessarily having to travel long distances. An interactive messaging system for patients' collaboration with health workers is a novel approach to enabling communication between patients and health workers and constitutes the main contribution of this paper.

Keywords

Interactive Messaging System, Health Workers, Patient Monitoring, SMS, Communication

I. Introduction

In today's competitive business world people are always demanding for better and faster delivery of services. However, for patients who live in remote areas, health services become a challenge especially when they have to travel long distances so as to have appointments with healthy workers. Besides, many diseases today need daily monitoring by health workers, thus the need for health workers to stay in touch with the patients. This demand, therefore, dictates that health organizations must put in place systems that increase the speed and efficiency of service delivery to help them react faster to changing patients' conditions.

Mobile technology gadgets such as mobile phones can, thus, be used effectively by patients to facilitate communication in different geographical locations that may hinder movement of the health workers. The number of people who possess mobile phones is increasing by day. Thus, through mobile messaging technology, monitoring of patients can be simplified along with data collection, making it easier to analyse and evaluate patient information [1]. Due to the fact that there are limited health facilities in developing countries, this situation also results in congestion in hospitals let alone the long distances to be travelled by many patients. This situation also contributes to poor service delivery in health facilities. The patients, further, do not receive the required services to satisfactory. Mobile interactive messaging system for patients' in collaboration with health workers has the potential to solve the aforementioned problems especially when seeking doctor appointments.

Due to the wide use of short messaging services by many individuals, the interactive messaging system for patients and health workers is highly anticipated to be of great help to the public hospitals in developing countries which can serve patients from any part of the country. Implementing such a system in

health facilities, the collaboration of patients with health workers would be made easy and faster regardless of the physical distance from the hospital. This system is also cost effective and time saving because one does not have to travel long distances to reach the health workers services. Finally, the system is anticipated to reduce the congestion in many public the hospitals in developing countries. The next section will present related work

II. Related Work

According to a research by Wanda [2] many health care services are now delivered in outpatient settings where patients receive care then return home. In such a case, patients assume significant responsibility for monitoring their own health status, managing recovery and communicating with clinicians from home. Further, patient regularly coordinate with multiple providers and interact with the health information system. Instant messaging has proved itself as an effective tool for not only streamlining corporate communication needs but also as a popular social tool [3].

While it is relatively difficult to enter text in a mobile phone than it is on a computer, mobile text messages are being used in many different areas. Sharing information and technical exchange can reduce on the amount of time it takes to launch a solution and reduce the associated costs [4].

In another paper by Oladosu [5], they present a research in the design and implementation of a framework for cost cutting electronic healthcare delivery services for rural/sub-urban communities. This is achieved through the development of a semantic web services framework that would be deployed to provide wireless mobile healthcare delivery services and health management services for rural African communities.

Another effort by Pai [6] describes the use of automated voice calls to promote adherence to iron supplements among pregnant

women in urban India. They then conclude that automated calls deserve further consideration for reducing maternal anaemia. More efforts by Xavier [7] propose the use of mobile messaging technologies facilitated through a health management system (HMS) to enhance health monitoring and patient data analysis. In a paper by Marcus [8], they also present a generalizable system using NFC-enabled mobile phones which has been designed to address the needs of a project that tracks and cares for patients in a low-resource setting in Karachi, Pakistan.

There are many other related research works, but none of those nor the cited references in this paper presents an interactive messaging system for both patients and health workers in the way that is discussed in this paper. The next section will discuss the proposed interactive mobile messaging system.

III. Proposed Interactive Mobile Messaging System

This The coming of the wireless application technology (WAP) and 3G mobile communications network, including the Wi-Fi, has increased the use of mobile communications, thus increasing the need for mobile information technologies. The use of mobile messaging technology to monitor patients and analyse their data is the key to managing patient health data. In this proposed system the researcher assumes that all the patients have access to cell phones that can facilitate them with the much needed communication with the health workers. Mobile wireless phones are the most popular mobile wireless technology used mainly as personal communication tool [9].

Patients must have themselves registered using their phone numbers by the nearest health centres from which they can send symptoms on how they feel when they are sick or how they are feeling after diagnosis. The initial data of the patients is taken and they are given a health access key or number by the health workers to use for all communications to the hospitals. Figure 1 below shows a logical diagram for the feasibility of the mobile messaging system.

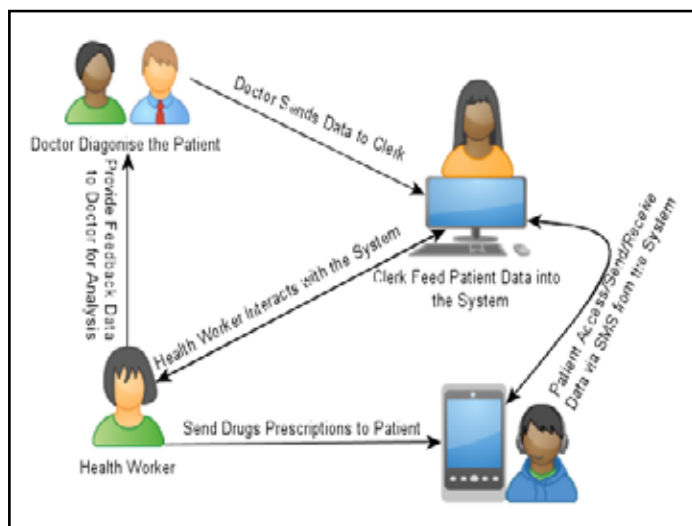


Fig. 1: Interactive Mobile Messaging System

The interactive mobile messaging system collects patient information from the communication made so that they can be analysed to evaluate the performance of each patient group. The analysis relies much on the data collected and the evaluation made through the communication with the patients. Patients can then be given the actual days to visit the health facility for further check-up [2].

Infer from Figure 1 that the patient initiates the communication and the data is captured by the clerk in the health center. The health worker then interacts with the system to see all the patients data gathered. The health worker then communicates with the designated doctor to analyse the patient data before sending any prescriptions to the patient. However, not also that, the feedback from the doctor is again sent to the clerk so that it can be merged with any existing data for future reference and further diagnosis of the patient.

IV. Discussion

Due to the ease and wide use of short messaging services, the proposed system is highly anticipated to be of great help to the public hospitals in developing countries which serves patients from various part of the country. As a result of establishment of such a system, collaboration of patients with health workers would be made easy and faster regardless of the physical distance from the health centres.

This is regarded as cost effective and time saving, bearing in mind that one does not have to travel to the hospital and at the same time, the system is anticipated to reduce the congestion in different hospitals.

The researchers focused on the mobile messaging technology to enhance monitoring and analysing of patient data in different health centres. Patients are allowed to send their information to the health workers via the mobile messaging system to be diagnosed by the doctors. Patient information is shared between health workers to get better drug prescriptions. The patient data is finally given to the data clerk to manage it using the health management system available in health centres.

Since patients are the ones to send their details and symptoms via the messaging system, the doctors in charge are responsible for examining the data through the health management system powered by wireless application protocol (WAP). Once the patients data is analysed the health workers sends SMS to the patients who have sent their information in the system with the doctors' feedback. The system groups patients depending on the ailments registered at the health facility, making it easy to make follow-ups on the patients. Each patient uses their personal phone numbers to access personal health data via SMS.

Health workers interact with the messaging system often to retrieve patient information, in order to find out their complaints and reactions. Further, the specialists who are doctors in this case, also access patient information, analyse them and give feedback to the concerned. Patients also get drug prescriptions from the health workers which they may purchase at the nearest drug shop in case there is need. Since WAP supports web-based applications, computers can also be used to access the same information.

V. Conclusion and Future Work

The researchers have, in this paper, discussed about enhancing patient monitoring through mobile messaging technologies. The use of mobile messaging technology by public hospitals to monitor patients irrespective of their geographical location can help save many lives. The mobile interactive messaging system can be used to manage patient data, facilitate faster communication which helps the patients' faster access, and reply to information that is requested by the health workers in different public hospitals. The health workers can use groups to monitor different patients at the same time.

To make a first step in this direction a simulated messaging system prototype was designed for collaboration between patients and health workers. Both the patients and health workers in the hospitals had limited time available for this research study, yet the researcher was able to validate that computer mediated messaging can be useful in supporting health collaboration. The researchers, therefore, concluded that this system of communication using wireless mobile technology makes monitoring and evaluation of patients' health performance much easier and efficient. The feedback of the test persons suggests a more effective, convenient and reliable information distribution improving their collaboration.

In future the researchers intend to implement this system into an application for mobile information technology services for the health sector. Also the researchers will extend the scope of observations and develop a general support system to realize a non-intrusive, situation-aware, context-enabled plan manager through SMS. The researchers also tend to put in place the legal issues that might occur in regards to the system.

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