Using Mobile Technology to Improve Healthcare Service Quality

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Abstract

Improving healthcare service quality for illness of treatment, illness prevention and patient service is difficult for most hospitals because the hospitals are lack adequate resources and labor. In order to provide better healthcare service quality for patients, mobile technology can be used to manage healthcare in a way that provides the optimal healthcare service for patients. Pursuing utilization of mobile technology for better patient service, Taipei Medical University Municipal W. F. Teaching Hospital has implemented a mobile healthcare service (m-HS) system to increase healthcare service quality. The m-HS system improves the quality of medical care as well as healthcare service. The m-HS is a multi-functional healthcare management agent, meets the mobile tendency of the present society. This study seeks to discuss the m-HS architecture and workflow processes. We believe the m-HS does have the potential to improve healthcare service quality. Finally, the conclusions and suggestions for the m-HS are given.

Keywords:
Mobile technology, mobile healthcare service, patient safety, health care

1. Introduction

Due to high cell phone usage, mobile devices have become necessary tools in our daily life, and it is time to make use of mobile for providing patient service. Based on the advantages of mobile technology, this study considers that it is sufficiently reliable and powerful to improve patient service and patient-physician relationships. In order to increase healthcare service quality, Taipei Medical University Municipal W. F. Teaching Hospital has implemented a mobile healthcare service (m-HS) system. The process of the m-HS is conducted by mobile technology, and its primary function is to help physicians and hospital administrators manage individual patients in a systematic fashion. Since cell phones are so popular in Taiwan, it is time to launch mobile healthcare service for patients, physicians and hospital administrators. Better service quality in medical care and health care can be fulfilled by mobile technology.

This paper is organized as follows:

1. To illustrate the features of healthcare and mobile healthcare service application for patient service.
2. To introduce the m-HS architectures.
3. To highlight the functions and workflow processes of the m-HS innovation new services for patient.
4. Two surveys have been conducted for this study. Survey 1 was before the implementation, survey 2 was preceded six months after the implementation of the system.
5. To conclude the mobile contribution ,discussions and implications.

2. Healthcare Literature

The Features of Healthcare

This study summarized the features in three categories: illness treatment, illness prevention and patient service. The detail contents are listed as follows:

1. Illness treatment
   Problems associated with illness of treatment include a number of issues as follows: (1)Long waiting time, extended waits are a waste of valuable time and restrict patients to only brief treatments or consultations with from physicians. (2)Behind schedule appointments by physicians, (3)Appointment reminders, (4)Physician shortage, hospitals need more physicians for some emergency cases to treat large volumes of critical patients. (5)Patient safety, notification of a negative side effect of a drug is possible via a patient and physician-directed alert message. (6)Inpatient ward availability, patients can be notified of pending ward availability as soon as possible.
2. Illness prevention
   Problems also exist from the perspective of illness prevention, three issues are given: (1)Abnormal ancillary test results notification, (2)Ancillary tests procedure reminder, (3)Periodic notifications, for examples, to follow routine check up procedures or schedule their child’s vaccinations.
3. Patient service
   Hospitals can foster loyalty in patients by improved relationship management between patients and physicians. Three patient’s services provide as follows: (1)Greeting, (2)Lectures for improving health, (3)Appropriate reminder for patients.

Mobile healthcare service

This study proposed to adopt mobile technology to provide better service quality for patients. According to the features of illness treatment, illness prevention and patient service, the solution of the problems or defects of the present health care may lie with the mobile technology of mobile healthcare service.

3. The M-HS-Architecture

The m-HS system proposes a variety of functions to deliver mobile service for dedicated medical processes and patients; hence, six subsystem layers comprise the system (see figure 1).

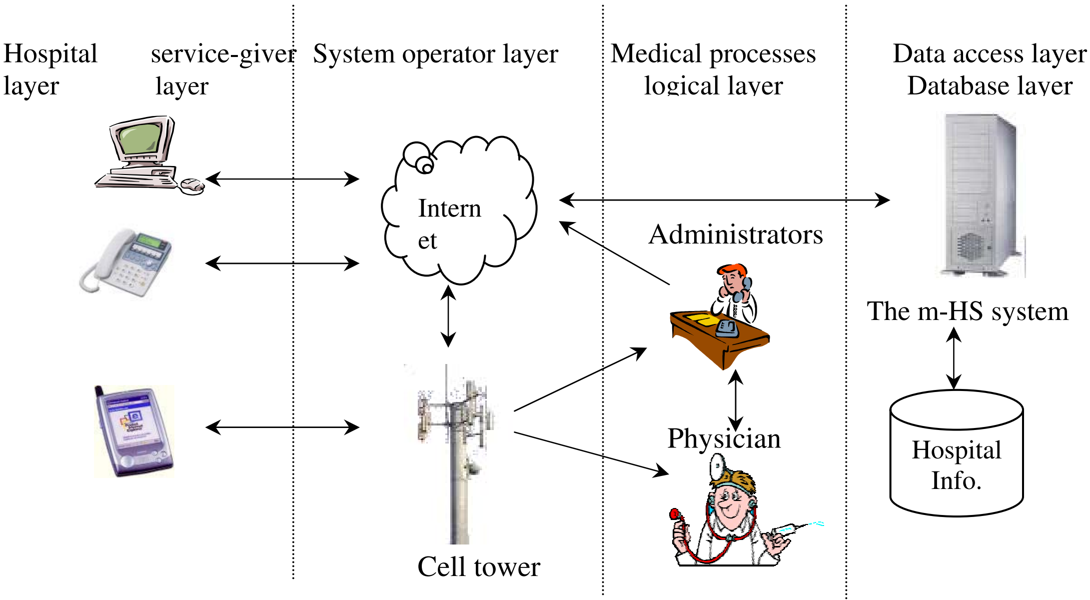

Figure 1 Diagram of the m-HS Architecture

4. Functions and Processes of the M-HS

The m-HS is designed to improve the service quality of illness treatment, illness prevention and patient relationship management. Patients, physicians and hospital administrators are all served.

The M-HS for Patients

The various services for patients are listed below.

1. Appointment number inquiry service, Patient appointment notice,
2. Pre-physical check ups / surgery precaution procedures notification,
3. Patient waiting / inpatient ward notification,
4. Service for patient safety notification,
5. Service for improving patient relationships

The M-HS for Physicians

1. The m-HS emergency physician group notification,
2. Treatment notification,3.Treatment time notification

The M-HS for Administrators

1. The management of physicians and clinics,
2. Performance evaluation

The Workflow Processes of the M-HS

1. 1. The patient session,
2. 2. The examination session,
3. 3 The administrator sessions

5. Survey and Results

Two surveys have been conducted for this study. Survey 1 was conducted by questionnaire before the implementation of the m-HS to survey patient's attitude for 18 functions (Fig 2 & Table 1) while survey 2 was preceded six months after the implementation of the system. Telephone survey was applies by Survey 2 to survey user's satisfaction, willing continuously to use and helpful of m-HS system to aid for service quality.

120 questionnaires were distributed for Survey 1 which 102 questionnaires were completed, reaching 85% high response rate. The reliability of the scales was assessed using Cronbach's alpha. The value of Cronbach's alpha gives an indication of the internal consistency of the items measuring the same construct. The reliability coefficient for the 18 items of our questionnaire was 0.88. As an acceptable range of reliability coefficients for most instruments is over 0.7 [24], the instrument we adopted in analyzing this survey was statistically reliable.Encouraged by the finding of survey 1, the m-HS system was then developed and designed based on user's needs. The m-HS pilot scheme has been implemented in the WanFang Hospital for six months from February to July in 2004. During this period, the mobile message system has delivered around 10,000 service messages to patients. Survey 2 was conducted by telephone survey for receiving feedback from 200 patients after received of the m-HS service. From the result of survey 2, Table 2 shows most patients who adopted m-HS were satisfied with its functions. Many patients expressed willingness to continue using m-HS and agreed that m-HS services enhanced the quality of healthcare. Therefore, it is evident that the finding of survey 2 not only strongly supported the feasibility of applying mobile service in healthcare but also shows such a service reached to the goal of enhancing the quality of service in hospitals. We thus assume that applying a mobile service to improve healthcare service in a hospital is no longer a rhetoric topic, but will be a growing reality in the future.

6. Conclusion

According to the result of survey 1, it shows that items with mean over 4.0 (or domain score over 73%) were related to medical or examination issues. In other words, items participants considered the most are "Medication safety notification", "Pre-surgical operation notification" and "Inpatient wards waiting notification", This indicates participants consider m-HS functions relevant to medical or examination issues are of greater importance. The above-mentioned findings imply that more emphasis should be placed for functions related to patient's personal health management in the future development of m-HS. Mobile healthcare service not only improves the quality of healthcare service, but also improves patient relationships for healthcare providers. If the m-HS enlarges its service domain, it has the potential to be a multi-functional health management agent in the future. We believe that the trend will integrate increasing wire bandwidth, the improvement of mobile technology and health monitor devices, and global positioning software. In short, the practitioners and researchers who want to successfully exploit mobile healthcare should pay attention to various pending issues that have to be addressed.

7. References

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