



Future Direction of Health Informatics in Sri Lanka

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ABSTRACT

Purpose: To propose suggestions for future direction of health informatics in Sri Lanka with the understanding of existing situation in Sri Lanka and world.

Methodology: Online literature search from journal articles and other documents

Findings: Application of Health Information System (HIS) in health informatics has been implemented on project basis at district level by facing various barriers. Experience of efficiency and effectiveness have been motivated to expand the application up to national level.

Conclusion: Applications of health informatics in Sri Lanka is limited when comparing with other countries in the world due to various barriers.

Key words: health informatics, health information system, health information & technology, electronic health record

Introduction

The Internet has revolutionized communication, access to information, and knowledge around the globe (Gee, *et al.*, 2012).

In the same way, information technology is quickly changing in all areas worldwide, creating new challenges and opportunities for different industries every day, including healthcare (Cassano, 2014). Thus, the Internet of everything, wearable devices, and consumerism, technology will soon become a common and integrated

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part of our lives in the digital age of mobile health (Matthew, 2015).

Technological development in clinical applications is the current trend in healthcare and it will continue to play a major role for years to come (Cassano, 2014). Healthcare systems are assimilating technology into daily practice at a quick pace (Lee, 2014). The purposeful use of digital tools is one of the key strategies to meet foreseen health care challenges locally and globally (Moen, *et. al.*, 2013). Technology is an element of informatics and assists in the exchange of information and in clinical decision-making (Swenty, 2014).

In today's healthcare system, information technology is the foundation of the future (Cassano, 2014). In fact, patient care has become a primary focus in the development of new concepts and knowledge in healthcare technology (Cassano, 2014). Consequently, telehealth is attracting growing interest due to the increasingly available communication technology (Houwelingen, *et. al.*, 2016). Using technology to provide healthcare remotely is seen as a major strategy to address the continuous increase in the demand for care (Houwelingen, *et. al.*, 2016).

The e-patient phenomenon has grown rapidly since the advent of the Internet in the mid-1990s, altering the balance of health information between clinicians and patients (Gee, 2012). Mobile health (mHealth) is a rapidly growing field. It provides the potential to advance research, prevent disease, enhance diagnostics, improve treatment, enhance education, reduce disparities, increase access to health services and lower healthcare cost in ways previously unimaginable (Dowell, 2013). Ultimately, the effective use of health information technology (IT) can help to deliver high quality care and improve patient outcomes (Higgins, 2015).

Ministry of Health is the main healthcare provider in Sri Lanka. Sri Lanka has achieved high standards in healthcare when compared to countries with the same level of economic development (Ministry of Health, 2016). Sri Lanka needs to be in the forefront delivering quality health care to its citizens as a model developing country (Dharmawardhana, 2012). The country is embarking on a new wave of development in the health sector through adaptation of information and communication technology (Ministry of Health, 2016). Quality health information is the key to effective evidence-based management of the health system (Abusayeed, 2010).

The objectives of this study;

- 1) To identify the trend of health informatics in the world
- 2) To describe the current status of health information system in Sri Lanka
- 3) To propose suggestions for future direction of health informatics in Sri Lanka

Methodology

This study is a simple review conducted during the month of November, 2016. In this study, we performed an online literature search from national and international journal articles published in 2010 or after by using the keywords; health informatics, health information system, health information & technology, electronic health record in Google search.

Findings

1. Trend of Health Informatics in the World

Public health care sector in developing countries faces many challenges including weak health care systems & under-resourced facilities that deliver poor outcomes of healthcare expenditure (Cline & Luiz, 2013). Although, m-Health (practice of telemedicine using mobile devices) was initially developed in industrialized countries, it has latterly gained attention in less industrialized countries. This development was mainly facilitated by the rapid rise of mobile phone penetration in developing or low-income countries. However, for a sustainable system, integration of technology by itself is not enough. Instead, there should be a wider contribution for its management including identification of telehealth policies and practices. Whereas the Telemedicine developments tend to focus more on technological aspect, a wider participation is mandatory as the stakeholder agreement is an essential element especially among the late adopters (Marasinghe, 2011).

The evolution of medical informatics shows a strong and traditional concentration on medical library and bibliographic information rather than medical (hospital information or patient information) information. Misdirected-concentration, a lack of formal medical informatics trained teaching staff and mistakenly positioning medical informatics as an undergraduate discipline are some of the problems inhibiting the development of medical informatics in China (Lei, *et. al.*, 2016).

District Health Information System 2 (DHIS2) has been adopted by WHO as a part of their Public Health Information tool kit. This framework is recognised in many developing countries in Asia and Africa as a sustainable and user friendly system for managing aggregated health information. DHIS2 based Maternal and Child

Health (MCH) Management and Information System has proven its ability for modernising the MCH information system in a resource limited environment (Manoj, 2012).

2. Health Information System in Sri Lanka

The paper-based state hospital management information system in Sri Lanka was instituted at the beginning of the last century and has since then evolved and expanded in scope (World Bank, 2014). Health information system (HIS) in any country, is one of the fundamental parts of health system, which provides required information for decision makers working in health sector at the national or local level (Ahmadi, 2014). Application of Information and Communication Technology (ICT) is considered important in improving all aspects of health information management, including collection, transmission and analysis of data at the most fundamental level. It is also vital for improving the storage, retrieval and optimum utilization of health information (Ranasinghe, *et al.*, 2012). Study of Ranasinghe, *et al.* (2012) reveals that national and regional HIS of Sri Lanka has poorly organized due to various reasons such as poor computer literacy among the staff, administrative bureaucracies, high initial cost, and lack of a well-structured HIS in place. They reasonably argue that HIS failure is, in all likelihood, an adversely contributing factor to the management of healthcare services in the studied health region (central province) and possibly the entire Sri Lankan health system (Ranasinghe, *et al.*, 2012).

There are few successful projects of implementing HIS in hospitals and public health sector in Sri Lanka. The Epidemiology Unit in Sri Lanka with the collaboration of WHO initiated computer based electronic information system in November 2005 at Base Hospital Ampara and Base Hospital Hambanthota. Then the system was expanded to six other selected hospitals in six districts. The computerized HIS is successfully functioning at District General Hospital (DGH), Trincomalee (Jayawardena, 2012). Study of Electronic Health Information System (EHIS) at the Out Patient Department (OPD) has contributed to a better understanding of the EHIS system at the DGH Trincomalee. It was observed that the MDS software used in this hospital was very much user friendly and easy to learn. The wireless network system was also successful with less error (Jayawardena, 2014).

There have been several initiatives aimed at District Health Information System 2 (DHIS2) implementation in Sri Lanka. DHIS2 was used in several projects under the central and provincial Ministries of Health. These projects showed that large scale DHIS2 implementation was practicable in Sri Lanka. These however, have had to be stopped or are progressing slowly due to various reasons

(Manoj, *et al.*, 2012). The “eHospital - Dompe” project was focused on making a District Hospital in Sri Lanka more efficient through adaptation of ICT solutions and appropriate change management (Kulathilaka, 2013). Author and his team developed a new system [Hospital Health Information Management System (HHIMS) Version 1.2] under the “e Hospital - Dompe” project with the support of Information and Communication Technology Agency of Sri Lanka (ICTA). The system was inaugurated on 27 December 2011. He concludes that appropriate use of ICT can absolutely contribute for improving the quality of care provided in the Sri Lankan healthcare sector. Dompe General Hospital has observed many advantages and opportunities with the implementation of health informatics (Liyanage & Ranasinghe, 2014).

Human barriers related to the beliefs, behaviors and attitudes as well as financial barriers related to money and funding are the two major categories of barriers and challenges in the way of successful implementation of Electronic Medical Records (EMRs) (Khalifa, 2013). Additionally, he identifies professional, technical, organizational and legal barriers. In fact, human resource is one of the essential factors for implementation of the health information system. The great resistance of physicians and other healthcare professionals to accept and use health information systems and electronic medical records (EMRs) is probably one of the major barriers that delayed the adoption and successful implementation of such systems (Ahmadi, *et al.*, 2014). The study of “Adoption of Health Information Systems in Sri Lanka” by Jeyakodi (2015) highlights that the most important disincentive to adopt HIS is due to the time taken to learn the system and the complexity of the system. Both factors combined with lower level of basic computing skills make the clinicians resistant to adopt the HIS in place. Another common complaint is the potential for interference with the patient-doctor encounter (Jeyakodi, 2015). Hence, immediate interventions are needed to improve the present state of HIS in Sri Lanka after identifying gaps in the HIS and factors that contribute to creation of such gaps through a meticulous in depth analysis (Abusayeed, 2010).

3. Solutions to overcome barriers of Health Information System in Sri Lanka

The HIS needs enhancement in the form of improving the software speed, responsiveness and increasing availability of computers, laptops and computers on wheels. Screen designs need to be enhanced with more focus on the sequence and logic of functions, tasks and buttons, some software features need to be more user friendly or user adjusted when possible, such as font size. Furthermore,

the conventional methods of data entry using keyboards are labor intensive and time consuming, which can be alleviated by using new innovative technologies such as automated voice recognition and dictation systems (Khalifa & Alswailem, 2015). Similarly, it is important to improve the organizational support of users through providing more training to new and old users, more dedicated and protected time during working hours for users to learn and practice on the system and providing better user manuals and materials for training and also as reference for users when they have problems (Khalifa & Alswailem, 2015). In addition, there is a need to improve computer literacy by increasing computer training in schools or by introducing computer training and support at the initial stage of undergraduate programs (Ranasingle, 2012).

Security and patient privacy must be upheld while achieving the goal of transforming data into useful knowledge (Lee, 2014). Security and privacy issues related to health data have become widely argued issues and it may be particularly serious in a country such as Sri Lanka where evolution of technology does not accord with the evolution of other associated fields such as the necessary legal frameworks (Ratnayake, 2013). Moreover, the present legal framework governing Electronic Medical Records (EMRs) in Sri Lanka can be viewed as weak in the context of rapid adaption of electronic means for patient records and its transmission. With the enactment of the Electronic Transactions Act No. 19 of 2006, the electronic records and communications received legal validity and therefore electronic medical records which are designed in an acceptable manner should receive the same legal status as their paper forms (Ratnayake, 2013). Conversely, the legal acceptance of an electronic patient record by the Sri Lankan judiciary/courts is still an issue which is not covered by Sri Lankan law. Hence, it is still a need to maintain a manual BHT (Bed Head Ticket) specifically in a case of legal interest (Jayawardena, 2014).

Conclusion and Suggestions

Although there are few successful projects of implementing Health Information System (HIS) in hospitals and community health service, applications of health informatics in Sri Lanka is limited when comparing with other countries due to various barriers including human, financial, professional, technical, organizational and legal barriers. Our following suggestions may be helpful to overcome both identified and unseen barriers for a better future. Although some barriers that exist may be challenging to overcome, other

barriers, such as the lack of skills in using technology are solvable. Efforts to overcome these barriers should start with a sincere intent.

- Recognizing a well-trained workforce to lead the implementation and evaluation of Health Information System and other health informatics applications.
- Providing health informatics training opportunities for health-care workforce through short-term and long-term specialized courses focusing on target groups on computer and internet literacy after need assessment.
- Establishing strong ethical and legal framework for electronic health data and information.
- Promoting collaborative efforts that allow sharing of experiences about health informatics among developed countries and emerging regions (regional integration).
- Expanding the health informatics applications such as telehealth by using mobile communication technology.
- Increasing infrastructure facilities of information and communication to hospitals and community health centers.
- Focusing attention to integrating informatics with evidence-based practice (EBP) to improve patient care.

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