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AN OVERVIEW OF HOSPITAL INFORMATION SYSTEM (HIS) IMPLEMENTATION IN MALAYSIA

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ABSTRACT

Information system plays an important role in various sectors, including healthcare sector such as hospitals. Hence, the implementation of Hospital Information System (HIS) in Malaysian Public Hospitals is aimed to improve the quality of public healthcare services especially in terms of enhancing patients' satisfactions and patient record management. However, not all public hospitals in Malaysia have embraced the use of the system. Thus, this paper discusses an overview of HIS implementation at Malaysian hospitals based on previous studies done in this area. Prior to the discussion, several components and types of HIS are explained in general. Furthermore, benefits on HIS implementation are also being described to emphasise the importance of HIS implementation in Malaysian Public Hospitals which is recognising the reasons to implement the system in Malaysian Hospitals.

Field of Research: Hospital information system, information system, hospitals.

1. Introduction

Information System (IS) refers to a computer system which is designed to manage all the hospital's medical and administrative information in hospitals (Biomedical Informatics Ltd., 2006). Shasha and Vossen (2011) defines the IS as software and hardware systems that support data-intensive applications. It is also known as an integrated set of components for collecting, storing, processing, and communicating information and the main components of it is

computer hardware and software, databases, telecommunications systems, human resources, and procedures (Brittanica, 2010).

According to the past reviews in IS terms, the understanding of IS refers to a computer system which includes software, hardware and database to collect, store and display data and information in electronic format. It has various advantages to improve the filing system in an organisation, including the healthcare sector such as hospitals. According to Yamauchi *et al.* (1994), IS may lower the health cost by coordinating services, reduce errors and speed of care, as well as increasing speed of care and accuracy to improve quality of care. Moreover, the IS enables the health sector, especially the hospitals in managing their tasks more systematically. Today, the IS is being used in all over Malaysia as part of the government's initiative to upgrade the public hospitals in Malaysia.

2. Hospital Information System (HIS)

Hospital Information System (HIS) is defined as a system focusing on the integration of clinical application collectively with financial and administrative applications to enhance service efficiency (Hyung *et al.*, 2004). Biomedical Informatics Ltd. (2006) reported that HIS consists of two or more of these components, such as Clinical Information System (CIS), Financial Information System (FIS), Laboratory Information System (LIS), Nursing Information Systems (NIS), Pharmacy Information System (PIS), Picture Archiving Communication System (PACS) and Radiology Information System (RIS) as shown in Figure 1.

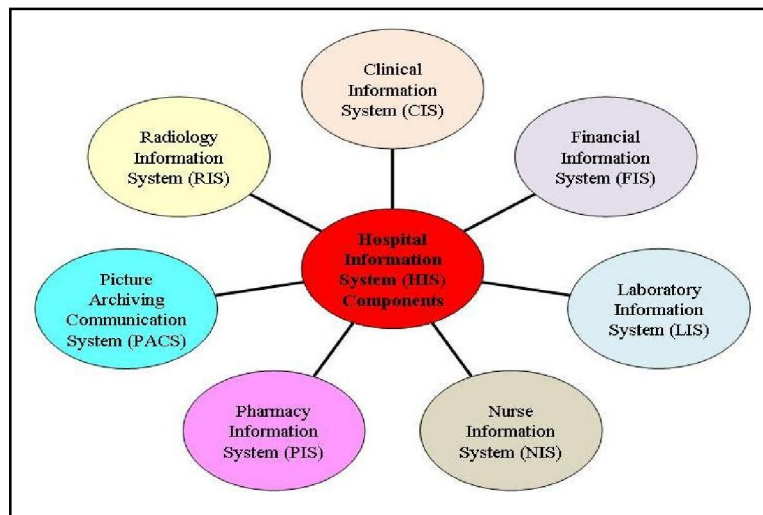


Figure 1: Components in Hospital Information System (HIS) (adapted by Biomedical Informatics Ltd., 2006)

These components of HIS are differentiated by their core functions, departments that used them and type of users. Thus, Table 1 examines the differences of those components by their departments and users. A Clinical Information System (CIS) is a computer-based system that is designed for collecting, storing, manipulating and making available clinical information important to the healthcare delivery process. Usually, it has been used in clinical department, especially by doctors and nurses. Moreover, a Financial Information Systems (FIS) is referred as computer systems that manages the business aspects of a hospital and used in financial department by accountants. Furthermore, a Laboratory Information System (LIS) is a computer information system that manages laboratory information for all the laboratory disciplines such as clinical chemistry, haematology and microbiology which are used in laboratory by laboratory officers. Besides that, Nursing Information Systems (NIS) is a computer system that manages clinical data from a variety of healthcare environments, and made available in a timely and orderly fashion to aid nurses in improving patient care which is used in wards by doctors and nurses. A Pharmacy Information System (PIS) is a complex computer system that has been designed to meet the needs of a pharmacy department which is used in pharmacy department by pharmacists. Otherwise, a Picture Archiving Communication System (PACS) is a loose term to describe a set of systems that facilitate the archiving, processing and viewing of digital radiological images and their related information and used in x-ray and imaging department by Imaging Officers. Lastly, a radiology information system (RIS) is a computer system that assists radiology services in the storing, manipulation and retrieving of information. In addition, it is also used to manage and store radiology information also used in x-ray and imaging department by imaging officers.

HIS components	Differences	
	Departments	Type of Users
CIS	Clinical	Doctors, Nurses,
FIS	Financial	Accountant
LIS	Laboratory	Lab officers
NIS	Ward	Nurses, Doctors
PIS	Pharmacy	Pharmacists
PACS	Imaging	Imaging Officer
RIS	Imaging	Imaging Officer

Table 1: Differences between HIS Components

However, not all of these components in HIS are the Information Systems used by hospitals. On the other hand, different hospitals might use different combinations of the components. For example in Malaysia, most public hospitals used the CIS.

3. Implementation Of Hospital Information System (HIS) In Malaysia

In Malaysia, the implementation of HIS is broadening in both of private and public hospitals. There are 49 private hospitals known as good quality hospitals which accredited by Joint Commission International (JCI), the Malaysian Society for Quality of Health (MSQH) and International Organisational of Standardisation (ISO) as the government

introduced “health tourism” in this country (Bernama, 2011). Thus, it has been proved to benefit the hospitals in terms of service quality. Hence, the country acquired up to RM380 millions from the previous year and the total is expected to increase to RM431 millions this year because of the low medical costs for the foreigners, as well as excellent and modern infrastructures (Bernama, 2011). This includes the IS usage as their electronic filing system to increase the efficiency and productivity of the hospitals. However, the public hospitals in Malaysia are accredited only by the ISO. According to Md. Zan (2007), the public hospitals provided slow services and are inefficient. It might be that the public hospitals have limited facilities especially limited medical facilities and limited electronic filing systems where patients need to wait a long time for treatment. Moreover, the public hospitals which used the IS tools are less than 10%. It is divided into three categories which are Total Hospital Information System (THIS), Intermediate Hospital Information System (IHIS) and Basic Hospital Information System (BHIS) (Aniza *et al.*, 2010). Thus, according to Nor Bizura (2010), eight (8) hospitals known as THIS, two (2) hospitals known as IHIS and six (6) hospitals known as BHIS as appeared on Table 2.

THIS	IHIS	BHIS
Hospital Putrajaya, Hospital Selayang, Hospital Serdang, Hospital Pandan, Hospital Ampang, Hospital Sg. Buloh, Hospital Alor Setar, and Hospital Sungai Petani	Hospital Keningau, Hospital Lahad Datu	Hospital Kuala Batas, Hospital Setiu, Hospital Pekan, Hospital Pitas, Hospital Kuala Penyu, Hospital Kunak.

Table 2: Categories of Hospital Information System (HIS) (adapted by Nor Bizura, 2010).

Accordingly, the level of implementation of HIS is still low in Malaysia. Hence, various issues may need to identify to discover the problem, for example the benefits of the HIS may need to be clearly analysed. It enabled the hospitals to implement the HIS. This is because the information about the system’s benefits will influence them to adopt HIS.

Moreover, Haslina and Sharifah Mastura (2005) claimed that THIS, IHIS and BHIS are classified according to budgets, specialties and number of beds in the hospitals. However, the number of beds is highlighted in this classification. Hence, the hospitals with more than 400 beds are classified with THIS, more than 200 beds but less than 400 beds are classified as IHIS and less than 200 beds are classified as BHIS (Nor Bizura, 2010; Aniza *et al.*, 2010). This is because, the implementation of HIS may overcome usual problems such as inefficiency and slow services provided in bigger public hospitals.

In Malaysia, the implementation of HIS is developed by the different components of HIS either the THIS, IHIS or BHIS. In addition Abu Bakar (2008) explained the IS components that involved in THIS, IHIS and BHIS as shown in Table 3. According to the table, THIS has maintained complete HIS, while IHIS and BHIS have maintained a midway and essential components of HIS.

Basic Hospital Information System (BHIS)	Intermediate Hospital Information System (IHIS)	Total Hospital Information System (THIS)
Patient Management System + Clinical Information System	Integration of BHIS + Laboratory + Pharmacy Information System	IHIS + Radiology + PACS + administration + Financial + Inventory + Personnel Information System

Table 3: The IS components in THIS, HIS and BHIS (adapted by Abu Bakar, 2008).

4. Discussion

The Information System (IS) is important in healthcare sector, especially in hospitals. In Malaysia, the implementation of IS in healthcare sector is significant to our country's improvement of healthcare quality services in most Malaysian public hospitals. Therefore, Hospital Information System (HIS) is implemented by the government to provide the public hospitals with a good automated filing system. It has several components such as CIS, FIS, LIS, NIS, PIS, PACS and RIS. The major differences between those components are based on the departments and the personnel in those departments that use the system. In addition, different hospitals may have different Information Systems which is used by different personnel. In Malaysia, the implementation of HIS are divided into 3 categories which are THIS, HIS and BHIS. Moreover, the HIS have allowed the information from different sources and nature such as documents, images and signals that can be integrated within the hospital (Tachinardi, 2007). However, the level of HIS application is still low which is less than 10% hospitals that are classified as HIS out of 137 public hospitals in Malaysia. Thus, the benefits of the overall HIS implementation is necessary to be known in details.

According to the past studies, the researchers found that there are various benefits by using HIS in the hospitals. There are some positive issues relating to HIS implementation by them. The examples of HIS benefits are sharing data and information, as well as automation of transaction or work processes (Abdollah Salleh, 2006), easy access to patients' data and structured information (Indian Centre for Development of Advanced Computing, 2005; Biomedical Informatics Ltd), reduces transcription errors and reduces duplication of information entries (Harrison, 2007) and improved monitoring of drug usage, and study of effectiveness (Indian Centre for Development of Advanced Computing, 2005; Biomedical Informatics Ltd). Thus, a good understanding of the HIS is needed. Moreover, the information of benefits in HIS may influence the hospitals to apply it.

5. Conclusion And Future Research

In a nutshell, the implementation of the HIS is necessary as it gives many positive impacts by many reviewers. In addition, the implementation of such IS tools in healthcare sector especially in hospitals has encourage Malaysia to achieve the 2020 Vision as a developed country. Although today's medical tourism in Malaysia has been growing in many private hospitals, the importance of public hospitals in this country are also of needed to be concern especially to serve unaffordable nations. However, the critical issue found in the study is low adoption of the electronic system in Malaysian Public Hospitals where only less than 10% public hospitals have adopted the HIS. Thus, a more detailed investigation is necessary to reveal the real issues or problems occurring in implementing the system, especially in Malaysian Public Hospitals and good understanding on overall HIS implementation according to the past reviews is necessary to develop a framework prior to test and revise the issues in HIS implementation as a future research. Therefore, in this technological era, the HIS is needed to be applied in many other hospitals as it is beneficial in improving and enhancing the filing system in hospitals. Consequently, the HIS may increase the quality and services. Thus, the HIS implementation is necessary to be improved in all Malaysian Public Hospitals in the future.

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