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A Systematic Review of Patient Satisfaction on Health Information Exchange in Malaysian Public Healthcare Organizations

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Abstract. Patient satisfaction is imperative in every healthcare organization. Service quality is the utmost important aspect that yields patient satisfaction in hospitals. Since Information Technology (IT) is widely used in hospitals, its applications can give rise to different issues related to patient satisfaction. This is because patient satisfaction derived from utilizing health information exchange systems (HIEs) depends on the service quality of the systems. This paper presents a systematic review of the impacts of service quality of Health Information Exchanges (HIEs) on patient satisfaction. Five databases, namely Scopus, IEEE, Proquest, Emerald and Science Direct were accessed to search for relevant studies. In total, 714 studies met the inclusion criteria. The result shows that five factors at the healthcare organizations that adopted HIEs have impacts on patient satisfaction: Tangibility, Reliability, Assistance, Safety and Empathy.

1. Introduction

Healthcare organizations are of paramount importance in providing welfare to the public. The services of healthcare organizations are expected to improve over time. In Malaysia, the majority of the public depend on the public healthcare organizations for treatments managed by the Malaysian government [1]. This is because, medical treatments and consultations at the public healthcare organizations are inexpensive compared with those of the private healthcare organizations.

The statistics show that 2,465,727 patients were admitted to the public hospitals, compared with 1,064,718 patients admitted to the private hospitals [2]. Besides that, 20,260,479 outpatients were given medical treatments and consultations at the public hospitals, compared with 3,932,361 outpatients at the private hospitals [2].

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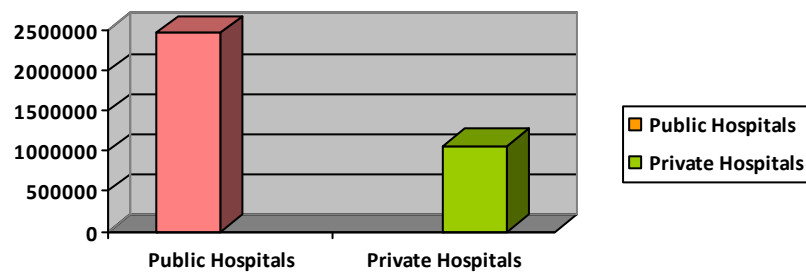


Figure 1. Numbers of public hospitals and private hospitals

Figure 1 shows the statistics of inpatients and outpatients at both the public and private hospitals. These statistics show that the public healthcare organizations play a vital role in Malaysia in providing medical treatments and consultations for the large majority of the population.

The public healthcare organizations are established by the government in every state and in almost every town of the country. In the year 2017, there were 139 public hospitals compared with 95 private hospitals located all over Malaysia [3]. Besides that, there are 2,839 public clinics compared with 1,064 private clinics in this country [4]. Figure 2 shows the statistics of both the public hospitals and public clinics in Malaysia, side by side with those operated by the private sector. It is obvious that there are a large number of public healthcare organizations in Malaysia.

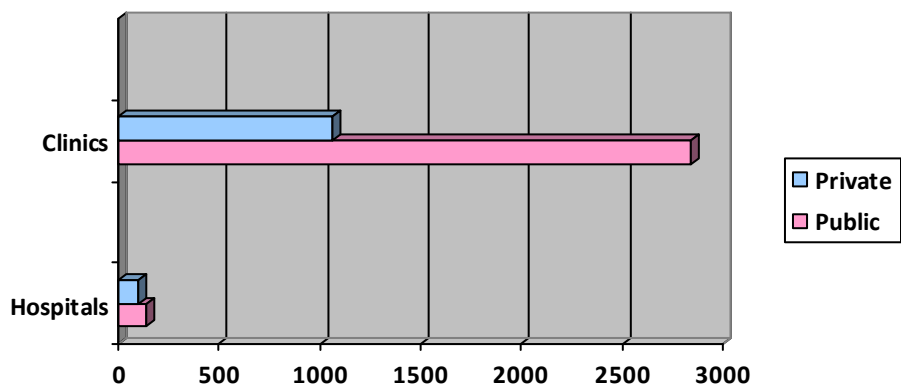


Figure 2. Numbers of public hospitals and private hospitals

Since the number of public healthcare organizations and number of patients are large, there are several issues and challenges encountered in this sector. For example, the services are inefficient in the public organizations; the patients need to wait for a longer time to obtain their medical treatments and consultations [5]. Besides that, there are several cases of professional negligence in the public healthcare system [6]. This might be caused by the manpower shortage in the public healthcare organizations [7]. These situations may affect the patient satisfaction with the public healthcare organization services.

The applications of Information Communication Technology (ICT) help to overcome the issues and challenges faced by the public healthcare organizations [8]. Thus, the Malaysian government emphasizes the importance of implementing ICT in the Malaysian healthcare organizations [9]. In Malaysia, many electronic health systems are implemented or adopted in the public healthcare organizations; for example, Hospital Information System (HIS), Malaysia Health Information

Exchange (MyHiX), Tele-Primary Care and Oral Health Clinical Information System (TPC-OHCIS), and Malaysian Health Data Warehouse (MyHDW) [10-13]. These applications may help resolve the issues and overcome the challenges faced by the public healthcare organizations, which in turn will increase the patient satisfaction level [14]. Service quality is seen as an important indicator of patient satisfaction, and hence warrants a detailed study.

2. Health Information Exchange (HIE) in Malaysia

A Health Information Exchange (HIE) may be roughly defined as a system that allows the exchange of patients' medical records between public hospitals or clinics via online network in a smooth and secure manner [15]. In Malaysia, the HIE is known as Malaysia Health Information Exchange (MyHiX). At present, there are eight public healthcare organizations utilizing the MyHiX: Hospital Putrajaya, Putrajaya, Hospital Tuanku Jaafar, Negeri Sembilan, Hospital Port Dickson, Negeri Sembilan, Hospital Bentong, Hospital Sultanah Nur Zahirah, Hospital Raja Perempuan Zainab II, Institut Kanser Negara, and Klinik Kesihatan Presint 9 Putrajaya [16]. Hence, patients' medical records can be exchanged between these public organizations.

The MyHiX toolkit, which contains the overall depiction of MyHiX was developed by MOH [17]. In addition, the characteristics and benefits of the MyHiX were studied by Hisan [18] in his research work. Furthermore, in a study of the Malaysian e-health, Shaik Allaudin [19] found that MyHiX was a new system to be implemented in Malaysia. A distributed framework for the nationwide health information exchange using the smartphone technologies was proposed by Abdunabi et al. [20], while a security framework for HIE was proposed by Zaidan et al. [21].

3. Methods

This research employs the systematic literature review to study patient satisfaction associated with the use of MyHiX by the healthcare organizations; the findings of all related studies are identified, critically assessed and integrated. The strategic literature review covers five important activities, which are scoping, planning, identification, screening and eligibility [22].

In this paper, the systematic literature review was done to identify factors affecting MyHiX implementation. Therefore, all relevant terms related conceptually to MyHiX were also reviewed as shown in Table 1. These are the inclusion criteria:

Table 1. The inclusion criteria and description in this study

Criteria	Description
The articles were published between 2010 and 2017	This is crucial to ensure the findings are current, updated and accurate. Findings earlier than 2010 are considered outdated.
All types of studies related to the subject	This study focuses on the terms "Patient Satisfaction" and "Service Quality". In addition, the term "Health Information Exchange" is also included.
Articles published in five major databases	IEEE Explore Digital Library, Proquest, Emerald, Science Direct and Scopus.

The study gaps were scrutinized based on the above inclusion criteria. The data and information were obtained by focusing on the full text of the articles to ensure the review is comprehensive. Therefore, patient satisfaction of services provided by the hospitals using MyHiX could be identified and discussed.

4. Results and discussion

The five major databases, namely IEEE, Proquest, Emerald, Science Direct and Scopus were used in searching for articles of the relevant field of study.

Table 2. Number of studies based on databases

Database	HIE	Service Quality	Patient Satisfaction
IEEE	639	56	2
Proquest	885	1966	3821
Emerald	6789	4753	688
Science Direct	56,091	54,360	2937
Scopus	286	19	29
Total	64,690	61,154	7,477

Table 2 shows various studies focusing on the usage of HIE in healthcare organizations around the globe. The searching term “Health Information Exchange” brought in 64,690 articles. These articles discuss and explain the applications of HIE in various countries.

Besides that, the searching term “Service Quality” brought in 61,154 articles, whereas “Patient Satisfaction” brought in 7,477 articles. Only articles focusing on patient satisfaction and service quality of HIEs were selected. The various aspects covered by the articles are as follows: only five out of 714 articles focus on HIE and MyHiX, 909 studies focus on service quality, and 212 studies focus on patient satisfaction of services provided by the healthcare organizations in Malaysia. The figure indicates that there is a lack of studies in this area in Malaysia.

The full texts of these articles were reviewed as suggested by Khan et al. [22] based on the above inclusion criteria and the relevance of the articles to this study. The result shows that 714 articles are relevant and can be incorporated in this study. The findings are categorized into three areas: HIE, Service Quality and Patient Satisfaction.

4.1 Studies on Health Information Exchange

In 2014, 76% of the U.S. hospitals exchanged information among themselves; however, the number of people using the HIE was reportedly very low [23]. According to previous articles, HIE could provide connections among stakeholders, including laboratories, public health departments, hospitals, and service providers to exchange data and information [24]. The finding shows that there are various advantages of HIE; for example, Safety of Healthcare, Timeliness, Cost Reduction, Assessing Quality of Care, Research Resource, Organizational Benefits, Patient Perceptions, and Security and Privacy [21]. However, there are several issues resulting from the use of HIE; for example, usability [25-26], missing data [27-29], disruption of workflow [25; 28-29], startup costs [29; 30-31], privacy and security [29; 32], and lack of compelling business case for sustainability [29].

4.2 Studies on Service Quality in Healthcare Organizations

Service quality is defined as an assessment of how well a delivered service conforms to the customer's expectations. A high level of service quality will meet or exceed customer expectations on a consistent basis[33]. There are several studies on service quality of healthcare organizations. For example, a study by Borges et al. [34] found that the quality of services was satisfactory when the patients had high expectations of the medical and hospital service. Aliman [35] found that the strength of the perceived service quality-behavioral intentions relationship becomes weaker when the satisfaction is reflected. There are five variables to measure the quality of services in healthcare organizations: Tangibility, Reliability, Assistance, Safety and Empathy. These variables are explained as follows [36]:

Tangibility

This refers to an appearance of physical facilities, equipment, personnel and written materials.

Reliability

This refers to an ability to perform the promised service dependably and accurately.

Assistance

This refers to the willingness to help customers and provide prompt services.

Safety

This refers to the employees' knowledge and courtesy and their ability to inspire trust and confidence.

Empathy

This refers to caring, easy access, good communication, customer understanding and individualized attention given to customers.

4.3 Patient Satisfaction of Healthcare Organization Employed with HIE

Patient satisfaction has been recognized as the most important key success indicator in the healthcare industry [36-52]. It is linked to the concepts of perceptions and expectations [33]. The service will be considered excellent, if perceptions exceed expectations [53].

Table 3. Previous studies patient satisfaction in healthcare organizations

Variables	Tangibility	Reliability	Assistance	Safety	Empathy
Researchers					
[37]	✓	✓	✓	✓	✓
[38]	✓	✓	✓	✓	✓
[39]	✓	✓	✓	✓	✓
[40]	✓	✓	✓	✓	✓
[41]	✓	✓	✓	✓	✓
[42]	✓	✓	✓	✓	✓
[43]	✓	✓	✓	✓	✓
[44]	✓	✓	✓	✓	✓
[45]	✓	✓	✓	✓	✓
[46]	✓	✓	✓	✓	✓
[47]	✓	✓	✓	✓	✓
[48]	✓	✓	✓	✓	✓
[49]	✓	✓	✓	✓	✓
[50]	✓	✓	✓	✓	✓
[51]	✓	✓	✓	✓	✓
[52]	✓	✓	✓	✓	✓

According to Table 3, previous studies on patient satisfaction mostly adopted the multi-dimensional research instrument SERVQUAL [34], which is designed to capture consumer expectations and perceptions of a service along the five major variables of service quality: Tangibility, Reliability, Assistance, Safety and Empathy. This indicates that SERVQUAL could be adopted to measure the quality of services and patient satisfaction in the Malaysian healthcare organizations.

5. Conclusion

In a nutshell, based on the findings obtained from previous articles, the service quality of HIEs has an impact on patient satisfaction. An empirical study is required to test the findings, especially in

Malaysia where the electronic health systems are widely used in this country. In addition, comparative studies are recommended to be done in various developing countries. The empirical studies are significant, the findings of which can be utilized to improve the quality of services provided by the healthcare organizations that employed the HIE.

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