# ONLINE MEDICAL INFORMATION SYSTEM (OMIS): USER ACCEPTANCE IN SOUTH-WEST REGION OF MALAYSIA

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## ABSTRACT

This survey aims to identify the users' acceptance and their major concerns on having an Internet based medical history database, Online Medical Information System (OMIS). The survey was conducted in the southwest region of Malaysia known as Melaka. The survey covers three

districts; Alor Gajah, Jasin, and Melaka Tengah. A total of 957 respondents were interviewed, and 953 participated in the OMIS survey. 50% of the total respondents are from Alor Gajah and Jasin, where each district contributed 25% of the respondents, and the other 50% are from Melaka Tengah. The analysis of this survey is evidence of the users' acceptance when about 64.5% of 957 respondents provided positive responses about the proposed system. However, several concerns arose from the respondents, particularly in terms of the levels of security and privacy in the system that need to be focused on in a later study.

**Keywords:** Acceptance, Medical Information, OMIS, Storage

# 1. INTRODUCTION

## 1.1 Online Medical Information System (OMIS)

In 1995, the Malaysian Multimedia Super Corridor (MSC) was launched. Its aim is to accelerate Malaysia to become a fully developed nation and a knowledge rich society by the year 2020[1]. To accelerate the development of MSC, seven Flagship Applications were initiated. One of these is Telehealth. It is expected to make the Malaysian healthcare system more integrated, equitable, and accessible. This will help to realize the healthcare vision of the nation focused on lifelong wellness, where individuals, families and communities are empowered to play a major role in managing their health. Part of the Telehealth Flagship Application is the MyHEALTH Portal and Lifetime Health Record (LHR)[2]. The MyHEALTH Portal is a pure informational website. No medical records are stored in the website.

OMIS represents a central data repository system where all medical records will be kept. The system will provide faster access to medical records by registered practitioners. The system will allow users to access the system 24/7. It will support reducing redundant medical examinations on patients. Besides that, the proposed system plays the role in secure access to information for those involved in care regardless of time or place, together with increased citizen access to high quality health information. Also, the project hopes to promote the greater use of information and communications technologies (ICT) in health-care systems by improving cost-efficiency, reducing waiting times and waste, and increasing access to and accountability of health care services.
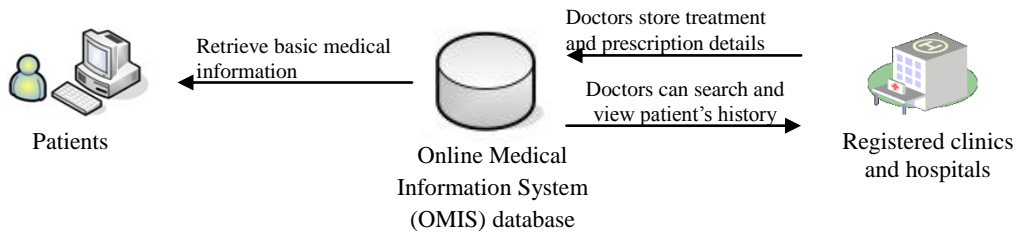
**Figure 1.** OMIS mechanism

There have been many research studies done to discuss the benefits of Internet based activities, such as Alba et al.[3] and Peterson et al.[4]. OMIS is a proposed database system where all medical records are kept online. Traditionally, when patients need medical treatment from a clinic or hospital, their records will be only in that particular clinic or hospital, typically in the form of a paper based file or in a standalone computerized system accessible only in that medical institution. In case patients are referred to another clinic or hospital for further treatment, they have to request their medical files to be transferred to the chosen medical institution.

OMIS is not meant to be a fully integrated hospital system. OMIS does not include the management and inventory functions of the clinic or hospital business processes. It is purely for medical record storage. OMIS works in such a way that treatment information will be keyed in by the doctor into the system. Only doctors from registered clinics and hospitals are allowed to use this system. This is to avoid the misuse of information. Each registered clinic and hospital will be given a username and password so that they can log into OMIS. Doctors can key in treatment information as well as search for the patient's previous medical history. Patients can also view their records online at home at their own convenience.

This system will be beneficial for both patients, doctors, and perhaps in the future, pharmaceutical corporations and researchers in the medical line.

**Patients:** This system allows patients to view their medical records at any time. They can get information like their next appointment dates, medical prescriptions, what medicines they are allergic to, etc. They are able to view and print out basic medical information for their perusal.

**Doctors:** Medical histories of patients will be available for doctors to view during treatment. Access to patients' past consultations and prescription histories will be made available through OMIS. It is not necessary for patients to repeat basic medical examinations like blood tests and x-rays repeatedly, as all that information is stored in OMIS. This saves a considerable amount of time and money.

**Pharmaceutical companies:** In the future, this system can be integrated with pharmaceutical companies where patients looking at their medical prescriptions online will be able to know which pharmacies offer the related medications near their locations.

**Medical researchers:** OMIS will be a very good data source for medical researchers.

## 1.2 The Survey

The survey was conducted based on a quantitative method questionnaire designed with two main objectives; identifying users' acceptance of the proposed system, and analyzing users' main concerns regarding storing their medical information in an online system. Since there were two main objectives, this study is divided into two sections. A total of 957 respondents from Alor Gajah, Jasin, and Melaka Tengah were interviewed face-to-face and immediate responses and feedback were obtained from them.

# 2. METHODOLOGY

## 2.1 Questionnaire

The questionnaire is divided into two subsections. The first section is a set of questions with which to study users' acceptance levels. The second section is to similarly study users' concerns about the proposed online system.

## 2.2 Sample of Respondents

Respondents were selected from areas in the Alor Gajah (25%), Jasin (25%), and Melaka Tengah (50%) districts. Alor Gajah and Jasin can be considered rural areas, while Melaka Tengah is on the urban side. A total of 957 respondents were interviewed, and 953 participated in the OMIS survey. The distribution of respondents is tabulated in Table 1.

**Table 1.** Actual distribution of respondents for all districts

| District | No. of Respondents | % |
|----------|--------------------|------|
| Alor Gajah | 249 | 26.02 |
| Jasin | 208 | 21.73 |
| Melaka Tengah | 500 | 52.25 |
| **Total** | 957 | 100 |

## 2.3 Data Analysis

Data analysis was performed to determine the respondents' level of interest towards OMIS. Pearson Chi-square method was adopted to determine the cross tabulation relationship between respondents' demographics and the level of interest towards OMIS, using the Statistical Package for the Social Sciences (SPSS) software.

## 3. SURVEY FINDINGS AND DISCUSSION

## 3.1 Respondents' Level of Interest towards OMIS

The respondents' level of interest towards OMIS was determined by calculating the mean of the total responses to the first part of the questionnaire. Referring to Table 2, there are five statements (D1 − D5) to be scaled from 1 to 5; 1 = Strongly Disagree, 2 = Disagree, 3 = Neither, 4 = Agree, and 5 = Strongly Agree.

**Table 2.** Respondents' level of interest towards OMIS

| Statement | Mean |
|---|---|
| I feel it is useful to have an online medical system to retrieve my health information | 3.62 |
| It would be easy for me to obtain medical information on the internet | 3.59 |
| Having an online medical information system is a good idea | 3.59 |
| I intend to use an online medical information system whenever it is available | 3.46 |
| I prefer to keep my personal medical information in a manual filing method compared to an online system | 2.81 |

From the results, it can be concluded that the respondents agree that OMIS is a good idea, which is being useful for them to retrieve their medical information via the internet. However, there might be a slight concern on keeping personal medical information online (to be discussed in the later section).

## 3.2 Overall Response

From Table 3, the result of a Pearson Chi-Square test shows no significant relationship between districts and a preference to OMIS. However, it is clear that respondents from every district are interested in having an online system for personal medical information. Also, it is interesting to learn that respondents from Jasin district (rural area) are more

interested in having OMIS than those in Melaka Tengah district (urban area).

**Table 3.** Response by district – OMIS relationship

| Demographic Details | | In Favor to OMIS | | | Pearson Chi-Square | | |
|---|---|---|---|---|---|---|---|
| | | Yes | No | Total | Value | df | p |
| District | Melaka Tengah | 304 (61%) | 194 (39%) | 498 (52%) | 8.676 | 2 | 0.0131 |
| | Alor Gajah | 154 (62%) | 94 (38%) | 248 (26%) | | | |
| | Jasin | 150 (75%) | 57 (25%) | 207 (22%) | | | |
| | Total | 608 (64%) | 345 (36%) | 953 | | | |

In summary, the analysis shows that about 64.5% of 957 respondents provided positive responses on the proposed system. In terms of district, respondents from Jasin were the most to give positive feedback, with 72% from 207 total respondents. We specifically observed from the demographic cross table that most respondents from all three districts agreed on the importance of having a central medical storage regardless of their gender, marital status, age, income, and employment. However, 59% of respondents with a non-formal education level believe that the system would not be able to provide them a satisfactory service. This may due to their lack of awareness of medical system access effectiveness, as well as computer illiteracy. These results correspond to the recent research done on college students in China. It was concluded that the usage of Internet services will increase when the users have more knowledge[5]. Also, respondents with primary and secondary education levels have a similar percentage of 49% and 42% respectively believing the service would be unsatisfactory. This could also be due to the same reasons.

## 3.3 Concerns/Issues about OMIS

The main concerns are data security and privacy issues. Respondents may be worried that their medical information could be manipulated by any third party. There are two types of medical data that respondents are quite reluctant to store: drug allergies and chronic illnesses. Most of the respondents consider this information to be confidential only to themselves and the doctors who treat them. This suggests that OMIS should only keep

basic medical information, i.e., blood type, appointments, and medication history.

We analyzed the main concerns of the respondents about having their medical data kept in an online system. In a study done by Palmer[6] for the electronic market users, it was revealed that site users express a logical concern for privacy. According to the Eurostat[7], worries about revealing data over the Internet are the main online-related risk perceived. Other issues are about information security and privacy. The respondents doubt that such an online medical system can have high security features to prevent information leakage. A recent research study concluded that concern for privacy will be the same in the future, due to the independence of this variable with respect to the experience and ability of the users to manage the internet[8].

We would recommend that for respondents with a low level of education, exposure to the importance of having OMIS as a central medical storage for faster retrieval should be made if the system is going to be realized. This is to ensure that these people are not left behind the latest technology, which is essential since it is related to their health information.

Privacy is actually the ability to control the terms by which an individual's personal information is acquired and used[9]. Privacy affects aspects such as the obtaining, distribution. or the non-authorized use of personal information[10]. As new complex technologies have emerged and a growing amount of information is being processed, it has made privacy an increasingly important issue[11]. As a result, the Internet users are more distrustful regarding how their personal information is being collected and processed.

Lack of security is also another obstacle when it comes to online transactions. In an e-commerce context, security reflects perceptions regarding the reliability of the payment methods used and the mechanisms of data transmission and storage[12]. Users are concerned about their personal information and would like to believe that their information will not be manipulated by other parties. In other words, it should be impossible for the data to be modified or retrieved by unauthorized parties. Proper authentication processes should be put in place to guarantee that each transaction is done only by authorized individuals.

Since the respondents are anxious about the security and privacy issues, we need to guarantee that the system would have security features as efficient as the online banking system.

# 4. CONCLUSION

The study finds that most of the respondents agree on having a central medical record storage system. However, there are still some concerns regarding security and privacy issues.  Lack of awareness and computer illiteracy may be the main causes for concerns.

If OMIS is going to be realized, it is recommended that respondents with a low level of education are exposed to the importance of having OMIS as a central medical storage system for faster retrieval. This is to ensure that they are not left behind the latest technology, which is essential since it is related to their health information. Since the respondents are mainly concerned about the security and privacy issues, the system should incorporate efficient and effective security features and functions just like the ones provided by online banking systems.

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