

The Acceptance Of Telehomecare System Amongst The Elderly With Chronic Diseases

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Abstract: Telehomecare system is a technology that enables patients to be monitored at home by health workers. The system involved data collection, knowledge transfer and communication between patients and health workers. Patients, especially the elderly who are suffering from chronic disease such as diabetic, hypertension or heart disease, are the best target users to use the systems. Chronic diseases are the major cause of death and disability in Malaysia, accounted for 71% of all deaths and 69% of the total burden of disease. A semi-structured interview was conducted amongst thirty elderly patients suffering from any one of the chronic diseases. This paper shall propose a framework for integrating medical record between Telehomecare system and health system called the 1THSystem. Patients do not need to go to the hospital for regular treatment. The regular checkup can be monitored at home to enable the elderly health monitoring and management and to ease their daily routine. This can reduce the number of hospital admissions, facilitate more efficient clinical visits, and may replace a hospital stay by living at home.

Keywords: Chronic diseases, data, patients, system

1 Introduction

Once there are more chronic diseases than at any time in the past, the number of individuals who need steady help expanded a considerable measure. Likewise, patients are constantly released from hospitals early and regularly require extra health awareness and observations of their health status [1].

In any case, the current view reflects in long period of patient and operation holding up records, shortages in hospital beds, community care and inadequate medical facilities in intensive care and emergency units [2]. Furthermore, the high expenses, including the expected confinement and the continuous issues in transporting patient, call for an alternative method in giving good medical care. Hence, Telehomecare is getting more important in the past few years.

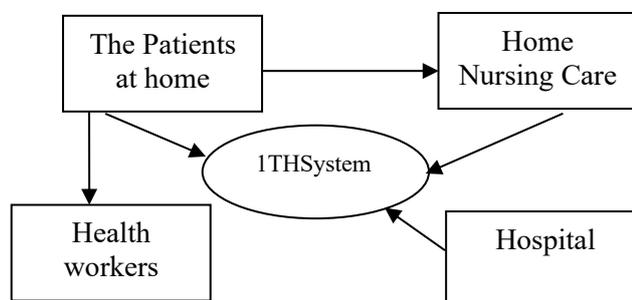


Figure 1: Conceptual design of Telehomecare Systems



This paper seeks to obtain information from patients about the existence of Telehomecare. This study can also provide more information about Telehomecare and its benefits to patients. The conceptual design in Figure 1 shows that Telehomecare system involves the delivery of healthcare services to patients at home using telecommunication technologies by the interaction of voice, video, and health-related data. The patient care is done from an external site by health workers.

Telehomecare is not strictly patient monitoring because it incorporates a range of health workers delivery through education, health information, self-care helps and suggestions. The implementation of Telehomecare helps to better manage elderly patients with chronic disease such as heart disease, diabetes, stroke, hypertension, and others. Telehomecare can also help create networks of services between hospitals and health workers, thereby allowing patients better access to services.

Telehealth and Telehomecare are related. Telehomecare is distinct from telehealth in that it refers to services offered to clients in their homes. Devices and instruction are given to clients so that they can monitor their own vital signs at home. These vital indicators are transmitted over a phone line or the internet to a healthcare professional. In order to inform the doctor or health practitioners that further testing is necessary, healthcare professionals keep an eye out for trends in the data. The fundamental advantage of Telehomecare is that it gives patients and caregivers more support, which promotes greater independence, fewer trips to the emergency room, and fewer flare-ups.

2 Telehomecare and the importance of Telehomecare System

Telehomecare is briefly outlined as “the use of audio, video, and other telecommunications and electronic information processing technologies to monitor patient’s status at a distance [1]. Telehomecare systems allow the capture of patients' clinical parameters (e.g. heart rate, blood pressure, blood oxygen saturation, blood glucose, electrocardiograph, and respiratory rate) by appropriate devices in a continuous or intermittent pace. Although the process of data measurement and collection can be totally automated, the patients themselves are often in charge of transferring self-measured clinical data. Such information can then be transmitted either to primary care professionals or to a specialized care center where the received parameters can be integrated with other relevant information related to the state of the patient. [2] When the measurements fall outside the established limits, the Telehomecare system can react automatically, triggering alerts to the responsible healthcare professional and allowing a timely response. [2] Telehomecare systems can be utilized in various contexts, such as the patient's home, at the scene of the medical emergencies, ambulance services, and hospitals [2].

A systematic review shows that data transmitted through Telehomecare systems demonstrated a high level of accuracy and reliability [3]. Furthermore, the process of data transfer of various Telehomecare systems have proven to be effective, and limited technical problems and errors were detected. With respect to patients' attitudes and behaviors, these novel management approaches have generally been well received and accepted. From an economic viewpoint, studies have reported that the use of home Telehomecare with high-risk pregnant women [4] and patients suffering from heart failure [5] or chronic obstructive pulmonary disease (COPD) [6] yielded significant healthcare cost reductions.

Home Telehomecare of patients with diabetes was associated with a significant improvement in glycemic control [7,8]. Studies conducted among patients with hypertension have proven the importance of this approach for the control of the disease [9,10]. With respect to home Telehomecare of patients suffering from asthma, significant improvements in patients' peak expiratory flows, considerable reductions in symptoms related to the disease, and improvements in perceived quality of life were observed [7]. According to recent systematic reviews, Telehomecare interventions for patients with heart failure have been shown to be efficient in reducing the risk of all-cause mortality, heart failure-related hospitalizations, emergency department visits, and improving patient self-care, perceived better quality of life, and evidence-based prescribing [11, 14]. Finally, home Telehomecare has also been found to reduce rates of hospitalization and emergency department visits for COPD patients [11,15,16].

A To reduce the amount of admissions to hospital

The number of admissions to hospitals continues to rise every year. In 2021, there were 2,139,392 patient admissions to government hospitals in Malaysia and there were only 38,394 total of beds. For private hospitals there were 904,816 patient admissions and the total number of beds was only 13,568. [17]. The total number of patients increases day by day and this led to having not enough beds in hospitals. With Telehomecare system, it can reduce the number of admissions to hospitals and can ensure that patients stay no longer than is necessary and keeping them healthy and at home [18].

B Health Workers can better monitor patients

Telehomecare system could save hospital costs by avoiding admissions and improving outcomes through early intervention. It allows health workers to focus on prevention and ability to control the rate of disease progression. This should reduce emergency visits and hospitalizations. It is difficult for health workers to monitor a large amount of patients at the hospital. Health Facts shows that the ratio of the population of doctors to patients in 2021 was 1:441 and nurses to patients was 1:297 [17].

C Self-management of patient's health

Telehomecare system helps patients learn and to manage their daily health routines for their medication. It will help patients to remember the needs that are specific to them. In an era of ubiquitous personal devices, increasing chronic diseases, the need to reduce contagion exposure and the demand for more effective care from a distance, telehealth is more relevant than ever [22–24]. Telehealth is the delivery of healthcare from a distance using information communication technology, which enables the provision of synchronous and asynchronous consultations between patients and clinicians [25].

3 Non-Communicable Diseases (NCDs) And Cost Limitations

According to the World Health Organisation (WHO), problems such as diabetes, heart disease, and hypertension are referred to as diet-related chronic diseases and are termed Non-Communicable Diseases (NCDs). The list goes on, and includes cancer, chronic kidney disease, osteoporosis, gallbladder disease, and many more.

The WHO Global Status Report 2021 on NCDs recorded a staggering 36.1 million deaths from the four main NCDs such as heart diseases, chronic lung diseases, cancers, and diabetes, in 2021. Nearly 80% of these deaths occurred in low- and middle-income countries. NCD deaths are projected to increase by 15% globally between 2019 and 2021, reaching 44 million deaths a year. Unfortunately, Malaysia has not been left behind when it comes to NCDs. Alarmingly, diet-related chronic diseases are prevalent amongst Malaysian children and adults, and have been on the rise over the past few decades.

Heart attacks and strokes are among the top five causes of death. The 2021 report of the National Health and Morbidity Survey (NHMS) shows that one in five Malaysians are diabetic, and the total number of diabetic patients has increased two-fold from 1.5 million in 2019 to 3 million in 2021.

Malaysian Dietitians' Association (MDA) president Indra Balaratnam describes these NCDs as a significant blow to an individual's health and finances and is an impending disaster to society [19]. Not only are diet-related chronic diseases incurable, the long-term medical costs of treating these long-term diseases and the complications associated with them can strangle your purse strings. This is because many patients and families still make direct out-of-pocket payments.

Treatment for diseases, like cancer, can range from between RM40,000 and RM300,000 yearly, and for diabetes (outpatient care), between RM800 to RM1,000 a year. Treatment for the complications of these diseases may incur further costs [19]. The tremendous cost of medical treatments for diet-related chronic diseases can lead to patients and family members maxing out their credit cards and incurring debts. The families may also resort to liquidating their family assets or selling off personal belongings to pay for the treatments. In addition, if the main income earners in the family die or are disabled because of an NCD, there may be a drastic cut in spending on food and education, and a possible loss of care and investment for their children. Apart from the financial burden on individuals and households, the national healthcare costs of setting up and maintaining treatment facilities to treat these patients can hinder the country's economic development.

A WHO report estimates that such treatment facilities can cause billions of dollars in losses of national income. The threat and impact of NCDs can cause large-scale loss of productivity because of absenteeism and inability to work, and, ultimately, a decrease in national income. In addition, 30% of people dying from these diseases in the low- and middle-income countries are under the age of 60 and are in their most productive period of life. These premature deaths are more tragic because they are largely preventable [19].

4 Materials and Methods

To investigate the use of Telehomecare in managing chronic patients at home, a qualitative study was employed by the researcher and the questionnaire was administered to a group of elderly individuals who suffered from chronic diseases and sought treatment in a private hospital.

The final version of the instrument used for this study was divided into four (4) sections. The first section will describe patients' general information. The second section will give patients' family background, the third section is the patients' general medical information, and the fourth section is about Telehomecare system technology acceptance.

This survey was conducted from October 2021 to November 2021 and was conducted by a structured interview. The 30 selected patients were seeking treatments for a chronic disease at a private hospital. The closed-ended questions and a few open-ended questions have been chosen for this survey. The questionnaire took around 20-30 minutes, depending on the patient's health. In the present study, the elderly was defined as males and females aged 60 years and above. Diabetes mellitus, heart disease, stroke, and hypertension were selected to represent chronic diseases. Data was managed and analysed using statistical analysis add-in for MS Excel.

5 Results

Table 1 presents the percentage of patients who are males or females aged 60 years and above. Approximately 46% of female patients' age ranged from 65-69 and 29% of male patients aged from 60-69 were involved in this survey. In Table 2, approximately 50% of the patients answered that they have a computer and 43% of them use Internet facilities. The statistics gave a good indication that most patients are IT savvy and easy for them to accept new technologies such as Telehomecare system in the future. 37% of patients answered that they had never heard about Telehomecare. This finding is important to develop more awareness about Telehomecare and the use of it.

Statistics from United States Department of Commerce, Economics and Statistics Administration, US Census Bureau 78.4% aged from 45-64, and 53.1% aged 65 and above, are Internet users [20]. In Malaysia, household use of the Internet from age 45-49 are 5.2% and 6.6% are from age 50 and above [21].

Table 1: The Percentage of Female and Male Patients by age

Count of Age	Female	Male	Grand Total
60-64	15%	29%	23%
65-69	46%	29%	37%
70-74	23%	18%	20%
75-79	8%	6%	7%
80-84	0%	12%	7%
90-95	8%	6%	7%
Grand Total	100%	100%	100%

Table 2: The Percentage of Patients on Their Technology Acceptance

Questions	Total	Yes	No	Total
Do you own a computer?	30	50%	50%	100%
Do you personally use a computer at your workplace or home?	30	47%	53%	100%
Do you use the Internet facilities?	30	43%	57%	100%
Do you know about Telehomecare?	30	63%	37%	100%

Based on the above findings, evidently, it is important to spread more information about Telehomecare so that patients will know the use of Telehomecare. 63% of patients answered that they had heard about Telehomecare so the patients can't proceed to the next questions as above. In the UK, the Data Protection Act 2018 and common law duty of confidentiality apply [26, 27]. To disclose confidential information, collected during healthcare delivery, for secondary use in research, requires a legal gateway such as consent, public interest, a legal obligation, or approval by the UK Secretary of State for Health [28] (Refer to Table 3).

Table 3: Analysis of the Technology Acceptance of Telehomecare System

Questions	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Q7	10%	43%	3%	7%	0%
Q8	17%	26%	13%	7%	0%
Q9	10%	7%	20%	23%	3%
Q10	50%	13%	0%	0%	0%
Q11	39%	17%	7%	0%	0%

Table legend:

- Q7 If the Telehomecare system were available, would patient be ready in using it?
- Q8 Do the Telehomecare system improve patient knowledge and education about health status management?
- Q9 Do the Telehomecare system affect health management by medical practitioner?)
- Q10 Are you concerned about the confidentiality of patients' medical report when using this Telehomecare system?
- Q11 Do you think Telehomecare system will save time and money?

6 Discussion

Telehomecare system information should be disseminated so that more elderly patients will accept and willing to use the system. From the survey done, the patients are still in doubt and worry if they cannot manage good healthcare by themselves using Telehomecare system. However, on average, they believe the presence of this technology will provide benefits and advantages to patients such as management of time and save money. Patients are also concerned about health record safety.

In the past, Telehomecare was exclusively utilised in rural or isolated areas, but it is currently being used more frequently to broaden the geographic reach of healthcare services and enhance patient access. Patients have named convenience, effectiveness, communication, privacy, and comfort as factors that are crucial for the usage of Telehomecare [29]. Numerous practises and specialties fall under the umbrella of telehealth, which encompasses contacts between patients and doctors over the phone, email, video calls or conferences, the Internet, and remote equipment. Patients can easily connect with medical professionals through telehealth programmes if they have smartphones, tablets, laptops, or desktop computers. These professionals may be able to diagnose, monitor, and treat a variety of acute and chronic diseases [30, 31]. As a result of these technical developments, telehealth is gaining acceptability and support.

The sample size for patient's groups in the study was not large. However, there was a statistical significance with 30 patients involved in this questionnaire. Therefore, the findings provide useful and valid information in spite of sample size limitations. Morse [26] posits that the more useable data are collected from each person, the fewer participants are needed. When using semi structured interviews, one obtains a small amount of data per interview question (i.e., relatively shallow data), then to obtain the richness of data required for qualitative analysis, one needs a large number of participants (at least 30 to 60). If, on the other hand, for grounded theory, with two to three unstructured interviews per person, may need 20 to 30 participants, adjusted according to the factors discussed above. The participants evaluated this experience as positive and beneficial for their health management as well as time saving for the patient's.

7 Conclusions

This paper has described the introduction of Telehomecare system and the importance of using it. The result from the analysis showed that there is a need to disseminate information about Telehomecare. The increasing number of elderly patients suffering from chronic diseases are worrying nowadays, and, at the same time the facilities provided by hospitals is very limited. Through Telehomecare system, it can help patients to be more comfortable in monitoring their own health. More research need to be undertaken by various parties so that the information and awareness of the system can be disseminated.

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Conflict of Interest Statement

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

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