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Ahmad Abuel Afieh *

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Ahmad Abuel Afieh

Development of Hospital Management Information System; aabuelafieh@gmail.com

Abstract: Health care operations in many hospitals are experiencing increasing demand which is however hindered by the limited resources available. The imbalance between the demand and service provision capacity within the hospitals have resulted in long waiting times for service delivery due to overcrowding, high costs of treatment as well as low levels of patient's satisfaction. The above problems are attributed to the development of hospital management information system. This dissertation is focused on investigating some of the causes of the increased cost and time consumption as well as low levels of patient's satisfaction in the application of hospital management information system. The study used comparative design to make a comparison of the respondents from two different hospital facilities where 400 health workers were drawn for research. The questionnaire was used as a survey tool for the study that involved both qualitative and quantitative analysis. The results of the study indicate various playing factors that arise due to the development of the hospital management information system. These factors include the large functionality of the system, the need for training of the end users, the increasing ageing population, and delays. The identified factors play a significant role in the way the information system impacts the time taken, the cost involved, and patient satisfaction.

Keywords: health; hospital; doctors; technology; information system; time; cost

Chapter 1: Introduction

Hospital leaders manage multiple areas of administrative, medical, financial, and the processing of services with support from the information system. The ability to achieve this is partially attributed to the system's coherent storage of data in the database for easy access and meets the needs of the authorized users. As the application of information technology continues to dominate the health sector, the need to facilitate timely and relevant information for hospital administration to make essential decisions continues to increase (Anyanwu, Sheth, Cardoso, Miller, and Kochut, 2003). The technological condition has enabled global competition in the information health society. Hospital management information systems have been perceived as one of the means through which health facilities save economic indicators including cost and time. The use of hospital management information system has become widespread following its perceived value (Berner, 2007). The success rate of the service delivery by an institution can be easily determined by the data provided through the information systems. The introduction of hospital management information systems is a target to improve processes by allowing efficient management of patient's information within the hospitals. Information system often fails as well to meet the intended objectives. In this situation where the system fails to meet the intended purpose, cost, time and patient's satisfaction are affected. This dissertation focuses on investigating some of the causes of the increased cost and time consumption as well as low levels of patient's satisfaction in the application of hospital management information system.

Despite the critical role played by the hospital information system, there are situations where problems such as increased time, cost consumption and patient dissatisfaction arise. Hospital management information system attempts to ensure that the multiple information about financial,

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medical, and managerial functions of hospitals are met by providing an institutional framework. However, when vastly used, these systems applications are limited to the billing of the healthcare services offered and recording of the patient information (Berner, 2007). Though various improvements have been made to the system with the addition of new modules including the follow-up patients, internet appointment, and analysis of the request and display, much has been left out. The improvements have only been one-sided benefits where doctors have found it possible to transmit requests directly to the laboratories by the automatic means and monitor the outcomes through the same means. Less effort has been given to the physical interaction between the doctor and the patient in the name of service automation.

Cost implication has been a serious issue following the quickly changing health environment that prompts hospitals to adopt hospital management information system to keep up with the looming competition. The fast change is caused by the rapid computer equipment expanding capabilities which have resulted in the substantial shortening of the life cycles (Demirel, 2015). It is in this context that it becomes necessary for the management to keep developing an information system for the health facilities to avoid being swayed away from the competitive market. The development of the hospital management information system has been presented as an excellent example of the shortened life cycle within the health care industry. Hospitals have often been involved in the merging and restructuring following the change in which the business of healthcare is operated. Operations such as the implementation of the prospective payment system which is based on diagnosis-related groups, preferred provider organizations, health maintenance organizations which are movements similar to the Medicare system with the private sector have changed how things operate in the health sector. Consequently, more time is being taken through the closure and conversion of the institutions following the competition and the increased cost to compete successfully (Demirel, 2015). It has become a challenge for other hospitals which enter into the use of a variety of strategic steps to ensure that their institutions continue to survive. Hospitals have found themselves in a critical situation involving more resources and time than expected to cope-up with the fast-changing healthcare environment facilitated by the development of the hospital management information system.

The Rationale for Doing the Research

For action and decisions within the health sector to be accurate, there is always a need to have timely and reliable health information as the foundation though; the information is often not available. It, therefore, becomes a challenge for decision-makers in the sector to identify needs and problems, follow up the progress, make interventions and evaluate them, and finally make decisions based on the evidence. Weak health information systems have been identified as a challenge facing the healthcare sector. Various weaknesses have been identified that affect the use of information systems which include inadequate capacities, staff limitation, unskilled staff who are left in charge of data handling, poor coordination, and lack of integration among other weaknesses. Experts in the sector have associated these weaknesses to the various issues facing the healthcare sector such as high cost of treatment and running the existing weak systems, a lot of time being used in handling various hospital functions, and the dissatisfaction recorded by patients who visit the health centers. Amidst these troubles facing healthcare sectors, developed countries try to formulate workable solutions though, those in developing countries still face challenges. It is based on this that the rationale of this research focuses on looking at the insufficient adoption of hospital management information system, find the disconnection, and find the solution for the issues raised.

Statement of Research Purpose

Hospital management information system has facilitated the way doctors and patients meet through the use of technology presenting the risk of patient dissatisfaction. Patients can make their requests to the doctors through mobile apps and at the same time the doctor uses the same system to send feedback to the patient. The entire treatment process occurs through the automation method and any concern by the patient may suffer delay following the busy schedule by the doctor. Similarly,

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time and high cost involved occur as a result of fast-changing technology that prompts the quick change in the way hospitals to manage their systems. It is on this basis that the purpose of the study focuses on investigating these problems arising out of the development and implementation of the hospital management information system. The basic aspects identified in the study as the major problems behind the development of the system are patient dissatisfaction, increased time, and cost involved.

Research Objectives

Health facilities have found the use of the information system effective and efficient in the provision of health care. However, challenges have risen in the use of the information system where the intended purpose fails to be met. The problems have been noticeable which researchers investigated. This research is intended to achieve the following objectives:

- To discover how hospital management information system led to the increase in the cost of offering healthcare services.
- To determine how increased time use was a considerate factor in the development and implementation of the hospital management information system.
- To investigate how hospital management information system contribute to the patient not meeting their expected satisfaction.

Methodology

The researcher uses a comparative study design in examining the responses from the survey carried out within the two hospitals facilities involved. The study used either qualitative and quantitative design, or mixed method, to present the collected data for analysis. The survey was carried out in two facilities that operate differently with one allowing the use of hospital management information system while the other facility lacked the invention. The study as well intended to use both primary and secondary data to find the solution to the research problems indicated.

Limiting and Delimiting Factors

The study encountered multiple factors that limited the entire process of collecting data, analyzing, and presentation. Accessing relevant information helpful for the research was a challenge in the sense that the entire hospital management information system is sensitive since it contains confidential information. According to the Health Insurance Portability and Accountability Act, all sources that contain health information of patients need to be protected and free from access by unauthorized groups (Act, 1996). Some health care workers were unwilling to take part in the research while others deliberately indicated biased information in questionnaires. The financial factor was a limiting issue since the research happened in two different institutions for comparison purposes.

Brief Outline of the Organization of the Study

The study is organized in five chapters. The first chapter is the introduction that gives the background information about the hospital management information system. Within the introduction is the problem statement that expresses the gap that exists in the use of hospital management information system that attracts the need for the study. The objection section within the introduction helps the research to focus on specific phenomena and find the answers. The second chapter is the literature review that presents the previous studies about the hospital management information system. Under various sections, the researcher presents findings on the information that other researchers and writers presented the information system. The methodology chapter describes the procedure followed in the entire study process about the collection of data. The section presents both primary and secondary data as well as various study designs applied in the research process including comparative study design, survey questionnaire, and the qualitative and quantitative designs. The fourth chapter is the results and discussion which presents the findings of the survey

 doi:10.20944/preprints202405.1833.v1

and relate the same with the available information to conclude. Finally is the conclusion and recommendation chapter that sums up all the ideas presented in the research paper examines evidence and offers final verdict and recommendations.

Chapter 2: Literature Review

Theoretical Framework

Karl Ludwig von Bertalanffy is a well-known Australian biologist who largely accredited to the development of Systems theory. By the time von Bertalanffy was lecturing, the Newtonian concept of closed systems and linear cause-and-effect were already in place and many organizations struggled to embrace the use of these systems despite the challenges owing to limitations. Going forward, various improvements were made on the closed systems, but even with these changes, von Bertalanffy continued to make discoveries of the systems leading to him to develop the current known General Systems Theory is identical to the development of Systems Theory. This was in a bit to examine how these systems worked leading to their discovery that it impossible to reduced systems to a series of parts functioning in isolation. He developed a suitable strategy that could help understand the entire systems if better results were to be discovered (Ball, 2003). The development of Systems Theory by von Bertalanffy gives a way to the concept of the hospital management information systems that functions by bringing together all the parts of the systems. Increased research on this discovery by von Bertalanffy has disclosed that failure by the organization to keep systems' parts together usually result in issues.

The concept of Systems Theory as put forth by von Bertalanffy was essential in this study. The systems theory examines the interrelationship between different parts of the systems and how working together enhances the ability of these parts to function correctly. Looking at the systems theory from the health sectors and specifically within the hospital set up, it is true that von Bertalanffy' s discussion could help to address some of the growing system issues such as cost, time waste, and unsatisfactory by the patients.

Systems Theory

The systems theory has been applicable widely across many disciplines including health sector specifically in the hospital when developing hospital management information system. As early as the 1980s, the application of systems theory began within management science. Systems theory application is based on the assumption that as much as many individuals continue to work and achieve excellently, diverse influences tend to act upon them. However, the same functional and efficient systems account for these diverse influences in addition to embracing them. According to this systems theory, whenever errors occur, the focus should be on the surrounding that allowed the errors to occur but not on the individual fallings. Smart interventions also tend to influence the outcome formed upon the study of common behaviors and patterns across time.

The system theory is relevant to this study since its underlying principles seem intuitive primarily to health professionals. Health care professionals who are in charge of the hospital management information system can use these principles by focusing on how individual organs work together, effects caused and affected as well as the effects of the environment. All the organs within the hospital must work together if the intended goals of the hospital are to be achieved.

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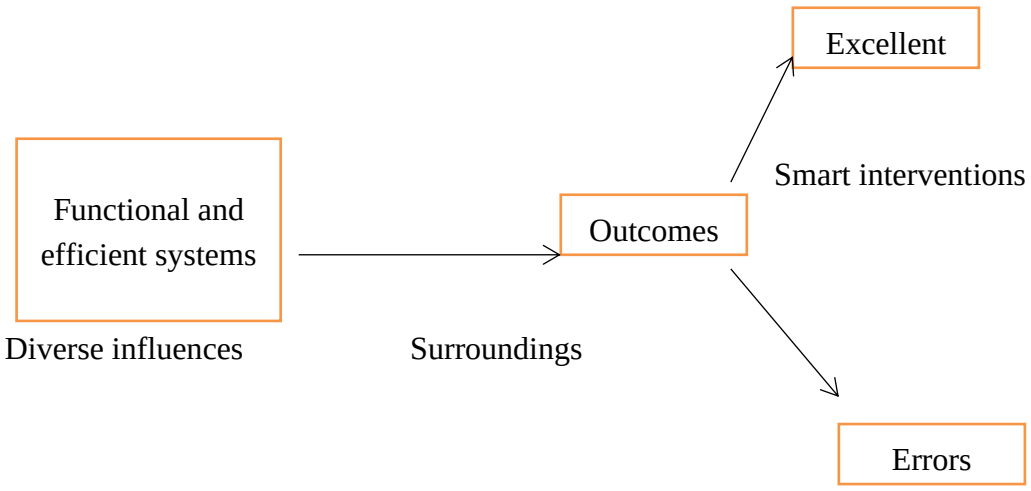

The theoretical framework is aligned with the hospital management information system that has various parts or organs that work together. The successful working of these organs often leads to achieving of the desired results. However, the failure of the system may cause errors hence resulting in health issues such as time wastage, extra cost incurrence, and low-level services to customers causing dissatisfaction.

Developing an Information System for the Healthcare Institution

The considerations and approaches to healthcare facilities to establish an information system has been studied and published by multiple professionals and academicians. Ferrand and Chokron (2003) investigated the various weaknesses that presently posed by the system planning methodologies that multiple hospital administrations use. They went ahead to present a model that theoretically indicates how important factors for choices of the information system computerization relate to each other. Pivnicny and Carmody (2009) extended in examining the criteria developed by different hospitals when selecting an information system vendor. The two further went to consider the description of how the hospital could acquire an information system that is more sophisticated at the cost that is much affordable to save on the resource use incurred by the facilities. They also investigated the idea of how clinical and financial information could be integrated into a bit to facilitate patient management that is better. Greer and Rockness (2001) examined how medical record tracking system, registration-billing system, outside information requirements, time-management system, and financial control system could be integrated into three phases.

Various health care researchers carried out many field-based studies on the integration of information systems within the health care facilities. An evaluation model of the information system was carried on the development of the system in the case of the West Virginia University Hospital. In extending this field observation, there was a further examination of the phased introduction of the automated systems within the department of the medical records in the same hospital. Greer and Rockness (2001 examined the architecture of the new information system within hospitals that is based on the use of a large personal computer (PC) local area network (LAN). Greer and Rockness explored how the information system architecture of sizeable medical group practice could be developed. The focus of their published literature on how to develop information systems in the healthcare sector was mainly on two principles. First, it was the structure of the information systems designed by the institution and second was based on the principles of the development of the systems. The decision of developing information systems was based on the reasoning process that considered theoretical research. Ferrand and Chokron (2003) identified the factors deemed essential for allowing the organization administrators to consider in the selection of the multiple applications of the computers for designing their information systems. They made a decision model which included various dimensions. During their study, they made suggestions presenting multiple theories on planning models which incorporated all the three mentioned dimensions or which could well utilize any of the three more efficiently and effectively. The attempts by all these researchers

 doi:10.20944/preprints202405.1833.v1

were ways to define the development and the incorporation of the information systems for use in healthcare institutions.

Development and Types of Hospital Information Management Systems

Bengshir (1996) views information systems as systems whose aim is to provide accurate, and information that is up-to-date in a situation when needed. In the public sector, the information management systems are used to monitor the environment taking into account how external factors interact with each other and with the public authorities (Bozeman and Bretschneider, 1986). Different types of hospital management information systems help the institutions accomplish their functions. For instance, the systems keep a lot of data since hospitals themselves are involved in processing a wide range of information. The particular information available ranges from the workforce by patients to what the tasks undertook by the staff to follow the functioning of the hospital and allow administrative tasks to be performed. This type of system allows the provision of feedback on the processes involved in patient care for hospitals. The system is therefore convenient that it will enable the development of a diagnosis and treatment protocol which special patient may require.

Between the 1960s and 1970s, there was the development of the first-generation hospital information management systems. In 1972, there was the use of the first hospital information management system in El Camino Hospital in California. However, this system was limited in the sense that it only provided for inputs and result reporting services requests. There were no provisions for emergency and outpatient services. However, with time, there was drastic development of computers to multi-tasking from single-tasking as well as becoming more user-friendly.

In the mid-1970S the period that extended into late 1970s, there was the emergence of the second generation hospital management information system. These systems led to hospitals focusing on using financial systems, and the problems relate to finance. The system functions mainly by transferring information from the end user to financial systems. The system was further able to bring information together from various clinics and other files of integrated patient care information putting it into the computer. The late 1970s marked the beginning of the third generation hospital management information system. This type was influenced by the introduction of database technology that started in the 1980s focusing on multiple problems within the health sector. The fourth generation hospital management information systems began in the 1980s integrating the third party systems such as financial and other systems in other departments. Since then, hospitals have been looking for ways of adopting best system practices that could allow them to perform well in the market. Besides, the early types of hospital management information systems showed weaknesses that were later corrected by the subsequent systems. Today, hospitals have adopted management information systems that can address multiple related issues such as delay and high costs.

Healthcare Issues Related to Hospital Management Information System

Healthcare professionals who have done studies on the hospital management information system have found various issues arising within the health facilities. Ansoff, Kipley, Lewis, Helm-Stevens, and Ansoff (2019) established that hospitals spend millions of funds in the purchase and carrying out operations using the hospital management information system. The explanation behind the higher amounts used is attributable to the continuous introduction of the technology related to the hospital management information technology that includes computerized information technology. Various operations involved have been found to contribute the high-cost involvement. Such operations include online admission, digital laboratory services, financial data management, nursing operations, and computerized pharmacy. Further, these many operations require the use of modern technologies including the hospital management software to facilitate the delivery of service which also adds to the high cost. Pearlson, Saunders, and Galletta (2016) have previously been involved in the research where they indicated that advanced training for the nurses to have the required skills to perform their duties and handle the computer systems of the hospital management information explains the high cost involved. Other cost avenues include the cost of maintenance as

 doi:10.20944/preprints202405.1833.v1

well as the cost involved in the hire of private professionals and experts to assist in the operation of the information systems.

The researchers have discussed the vast congestions within the hospital facilities as one of the issues associated with the adoption of the hospital management information system. This is because the use of hospital management information system is associated with the information department and the authorities hence causing congestion. Weaver, Ball, Kim, and Kiel (2016) explored time wastage and consumption in hospitals following the development of the human management information system. These researchers indicated that when hospital management information system is used, congestions and delays are experienced in hospitals since hardware factors alongside network problems and failures tend to play critical roles. Delayed provision ancillary services provision, increased the population of the aging people thus having many patients who are not able to use technology, staff shortages, and limited resources are among the factors that add to delays experienced. A time when the hospital management information system is introduced in the hospital for the first time, limited training and low public awareness contribute to the cases of congestion. Challenges mainly occur where those patients who have not been informed about the new system will consume considerable time when served through the hospital management information system. Kerzner (2017) explains the time taken is more when compared to well-informed patients. Similarly, the level of training offered to the nurses concerning the operation of the computer system to store and retrieve patient's information within the system has been identified as another issue that arises with the introduction of the new system (Eden et al. 2016). Another factor is the issue of increasing aging population that is a major cause for delay in the hospitals with the use of hospital management information system hence leading to congestion due to having older patients taking longer when giving out their details for use in the systems.

An essential issue that has risen and seems to be attracting multiple numbers of researchers is the dissatisfaction attained by the patients once the hospital introduces hospital management information system. Boissy et al. (2016) showed 89 percent of the patients indicated that they could not get satisfaction following the adoption of the technology capabilities of healthcare in the hospitals. Boissy et al. (2016) identified there was an indicator of 84 percent of patients complaining about their poor communication with the nurses as they engaged on their health data and details stored in the hospital management information system (Boissy et al. 2016). Similarly, the delays caused by hospital management information system development when patients are trying to access their medical details have been identified the severe other cause of dissatisfaction among the significant number of patients. The similar case applies to cultural diversity and values that have also been found to contribute to a patient's dissatisfaction as far as hospital management information system is concerned (Boulware, Cooper, Ratner, & LaVeist, 2016). An example is given of the cases where some societies have negative perceptions about the information system when used in care delivery. This is in addition to the language barrier between the patients and nurses hinder the operations hence highly contributing to the dissatisfaction of the patients (Cohen, Coleman, & Kangethe, 2016).

Definition of Health Information Management Systems

According to the Health Information System strategic plan of 2009 to 2014, the health information management system is defined as the integrated and comprehensive structure which collects, collates, analyses, evaluates, uses, and manages, disseminates, and stores all the data and information that is related to health (HIMSS Analytics, 2010). The health information systems within the hospitals operate like any other software which consists of different parts that interrelate, depend on each other and work together towards a given common goal. Thus, the system generally combines health information and information management where information on health is collected to allow its management and comparative analysis of data that is based on the population in various surveys.

Technological research has associated health system as a tool that is powerful to all health care delivery that is more effective and efficient in the health care facilities (HIMSS Analytics, 2010). Statistically, health system consists of the registration of the civil process in different countries which include the registration of births, recording of the prevalent causes of death, and having records of

 doi:10.20944/preprints202405.1833.v1

the risk diseases that affect the largest population. However, examining this health information system from the context of the hospital level, the study has found the system widespread and used by many health care institutions. At the hospital level, the information system which sometimes interchanges between the hospital and clinical information systems are based on the systems of the computer. Hospitals have been in the fond of using these systems to facilitate the information on patient care and diseases. Haux (2004) found the vast workload by the hospital management information systems as the engine behind the high cost of money that is involved. Haux believes that it is because of the extensive information covered by the information system that applying these systems requires excess time. He further argued that in any case, the system does not consider all the requirements for its functioning; wastage is possible ramifications that most facilities have incurred in the past.

Related Challenges of Hospital Management Information System

System complexity, delay in entering data into the system, and the high resources needed to run the hospital management information system are some of the challenges that have influenced strong industry and academic. Specifically, most researchers tend to investigate the high cost and time wastage involved despite the perceived effectiveness and efficiency of the system. In the process, Al-Ahmad et al. (2009) discovered that any information management system related to health significantly differs from other environments where information systems are applied. The reason the researchers give is that, for instance, hospital management information system is complex, is not operated or owned by a single person, and the information contained in this system is susceptible. The hospital management information system, in this case, is managed even by the senior managers; hence it involves a series of the users. Dorsey (2000) found the continued participation of the hospital management information system by all players including the senior management as the force behind its success. However, Dorsey did point out the risk that comes with this long chain of participants which include the delay in service delivery. Dorsey also criticized the nature of applying information system in hospitals for its lack of "single-user." Anyone within the hospital institution can access the system and use it which possesses the dangers of delays where the person taking over is not well-conversant with the system being used (Dorsey, 2000). This is especially essential in cases where there lacks commitment to any of the parties involved in running the entire hospital management system at a particular time. For instance, if the system user mandated to enter information does not commit to working on time, the doctor at the receiving end will be unable to access the information needed for patient treatment. In this case of non-commitment, both time wastage and patient dissatisfaction are likely to arise as significant issues. Non-committed is one cause of the failure by the system to meet the intended purpose of its initial introduction.

Elder and Clarke (2007) found that hospital management information system is subjected to failure as a result of disengagement between clinicians, doctors, nurses, and the other end users of the system. The researchers further recommended that the lack of focus on the end users of the information system does not only lead to the failure of the hospital management information system but other projects involving information communication technology. In this context of the hospital set up, Elder and Clarke (2007) referred to patients as the end users of the systems. Sometimes doctors and clinicians can fall in this category of the end-users. Elder and Clarke (2007) discussed in length the issue of doctors lack engagement at the time of introduction of new technology in the clinical setting. If this happens, end-users including the doctors have been on the top list of those people within the hospital that resist this management of the information system which may end up failing. Some of the identified reasons by the clinicians include the feeling that the systems often waste time or end up affecting the safety of the patients. Since the doctors are always at the center of service delivery in the clinical setting, they normally have the power of the institution even though such power may be informal hence would want their wishes implemented.

Another challenge identified with the development of the hospital management information system is associated with the non-coherence nature of the system. Al-Ahmad (2009) defined this non-coherence state of the information system as a system which is complex which involves the

 doi:10.20944/preprints202405.1833.v1

complexity of the clinical information technologies, research and practices, and medical science. All these operations are fragmented, disorganized, and lack progress as a whole or coherently. The major challenge that hospitals have faced that have in most cases led to the failure of the system is the fact that health institutions instead make assumptions whenever developing the management information system. The idea that the system will automatically work for a particular hospital since it has worked somewhere else is rampant. Thus, the management team ends up underestimating the complexity involved. Consequently, the hospital management information system faces risks of failing and to salvage the ailing situation involves extra resources. There should never be an assumption when developing the information system is the hospital does not intend to fail in its operations. Fundamentally, the developers of the hospital management information system should note that technology has been seen as a mean through which some essential processes are bypassed in an attempt to accumulate the system capabilities. Various elements are therefore brought into integration to supplement and complement the applied technologies. Thus, in any case, these systems fail to coordinate and work together; there is a likelihood that the entry information system may fail to pose the health issues mentioned.

Information Management System Security Issues

Brandy (2011) argues that the threats of data security breaches have never stopped but instead continue to increase dramatically even with the many attempts to provide security within the hospital management information system for various institutions. According to the health care strategic report, between the year 2014 and 2015 alone, hospitals encountered over 3 million names which were exposed to the data breaches threats. Brandy (2011) expanded research on threats in healthcare due to data breaches explaining it evident that more healthcare organizations including the hospitals are still at risk of losing protected health information having noted that over one thousand facilities lost the information in 2016. Since January 2010, the security survey of the management system society and healthcare information indicated that over 5.3 million individuals were affected by the loss of the personal identification information (Sedlack and Tejay, 2011). These damages from the patient information led to a loss of about $6 billion according to Sedlack and Tejay (2011). The amount was reached after the high-level theft of computers and media materials used in the hospital information system, negligence loss of information to the third party, system hacks, virus attacks, malicious insiders, and web exposure. Consequently, in addition to the loss of finance, patients and some health facilities tend to lose confidence in the use of the hospital management information system due to the vulnerabilities they pose. Further, the loss of the information belonging to the patients violates the privacy law that protects the patents in health sectors.

Organization Culture and the Performance HMIS

Mead (2006) and Triandis (2006) are among the researchers who studied organizational culture helping out to understand how multiple values are generated, sustained, and amenable to change. Their studies considered the development of the information system in the organization and how this system brings about multiple values in the company and generate the required change that improves the functioning of the organization. Organizational culture brings about a body of solutions to numerous problems that the organization seems to have been consistently facing. New members of the organization are shown how to perceive in a new way, think, and feel concerning the problems. Organizational culture is effective when it helps the company improve its performance. Therefore, for the hospital management information system to function well in line with the initial objectives of the company, there is a need for the management of this system to be made routine. Thus, the hospital has to make the vision statement for the development of the hospital management information system available while establishing and maintaining the support services. These support services may include training, planning, supervision, human resources, finance, and logistics. By having the support services for the information system, developing the priorities of actions becomes part of the institution making this a culture (Bozeman, Barry, and Stuart, 1986). It is therefore easy that through the system, health-related issues such as cost, time, and quality of services are identified and

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appropriate actions given the priority. Operations within the organization such as faster communication and operation are made easy with the help of the management information system. Something that should fundamentally be considered is the excellent knowledge and information on the technical skills of the routine health information system users if they are to use and sustain the system effectively.

Issues related to the hospital management information system arise whenever the set of technology is low. In this case, the well-designed paper-based hospital management information system will still achieve the desired levels of performance. In case the indicators are relevant, it becomes complex to fill data collection forms, and user-unfriendly software for information system affects the level of confidence and motivation of the developers and implementers of the hospital management information system (Bozeman, Barry, and Stuart, 1986). The system software may sometimes fail to properly process data input for various purposes which may result in poor decisions by the management of the hospitals affecting the complete use of information. These are some of the concerned areas of hospital management information system that have not fully been explored to examine how the system impacts the performance of the health sector. The primary focus of hospital management information system has been on service delivery and the management of the resource function of the health system. The situation has left significant loopholes for critical issues that are related to the information system to affect the function of the health system.

Human Capacity and Training

Any technology would not be sufficient in terms of the impact of human capacity and training if the people lack a better understanding of putting the technology into effective use. The health sector has had this challenge of lack of well-trained human resources, especially in developing countries. The issue seems to have escalated further as hospitals tend to adopt a management information system for their functioning and operations. In most of the facilities that are associated with developing countries, capacity available and human resources are limited based on the technical skills required on how to use ICT. Similarly, there lack high-level technical support skills that ensure there is adequately set up and maintenance to have results that reflect adequate reliance on experts and external sources. The dependence on external capacity in terms of resources and experts often comes to many hospitals due to lack of enough training and human capacity within the company. In this state, the costs related to the development of the hospital information technology goes up. At the same time, there is a significant retention problem reduced in addition to hospital facility lacking personnel that is locally qualified. The need to have training and human capacity development when it comes to information system technology is something that should go beyond recipient hospital facilities and be adopted by the international e-Health consultants and health facility. If the condition extends to the international level, issues related to the high cost, a lot of time being wasted, and low-quality treatment and service delivery to patients would be something of the past. Thus, human capacity development and training within the hospitals if well utilized allows effectiveness and efficiency in hospitals for the use of management information system.

Recent years have seen an increase in the use of computers in the healthcare sector especially in high-level hospitals and other private facilities. In all these cases, as Huryk, (2010) puts it, healthcare workers have been influenced by multiple factors that tend to shape their attitudes towards using computers specifically when it comes to hospital management information system. The underlying factors include the educational level of the workers, their age, and years of experience they have been exposed to computers which have played a significant role in the way health workers are supposed to produce using the technology. Training of workers including the clinicians by the healthcare facility has been identified as a significant boost towards successful development of hospital management information system. According to Marques et al. (2011), for workers to fully utilize the system to have maximum results, they require technical skills of running the system despite the complexity involved. The acquired skills usually foster positive attitude on electronic medical records leading to the adoption of electronic medical records in higher capacity. Thus, it essential that healthcare institutions consider having incorporated the training of workers to acquire requisite skills

 doi:10.20944/preprints202405.1833.v1

that allow them easily use the information system to avoid related issues such as delays in service delivery since this increases the time use in servicing patients. With the efficiency and competency of workers, high cost eliminating will be achieved quite easily. Similarly, training contributes significantly to capacity development of the company in the sense that workers already trained and have the information about the use of the information system will often readily accept any change that the hospital may need for innovation.

Knowledge Gaps

Almost every healthcare facility depends on the use of information communication technology in all the areas of its operations. As hospitals to create value for every facet of its service delivery, nowadays rely on process application and information streamline. Following the aim of this study to focus on understanding the issues related to the hospital management information system development, further research has been carried out. The focus of further research is to help understand how various hospitals manage their management information systems and why related issues tend to arise (Austin, Charles, Boxerman, Stuart, 2013). In a bit to understand the knowledge gaps that facilitate these issues, concepts and terminologies that are related to the field of health information systems were examined. Similarly, it involved the history of the management information system highlighting generations through which health management information system has been through (Austin, Charles, Boxerman, Stuart, 2013). Finally, the conclusion was concerned with the recent trend and development of technologies and tools that assist in creating and in the management of the health information system.

There is need to understand the knowledge and skills applied by various hospitals in the use of the management information system. Hospital's future health information systems tend to lie in the vision of having hospitals that are paperless in what could be seen as creating improvement with the healthcare when it comes to using technology to ensure they become effective and efficient in service delivery (Davis, 1994).. The future hospital embodiment in some hospitals of some levels especially in private sectors has confirmed the existing gaps in knowledge where private health facilities are well equipped with necessary health information management system. The application of this technology has often resulted in efficiency avoiding issues such as cost increase, time wastage, and poor quality of delivered services. The successful development and implementation of the hospital management information system by high profiled hospitals and others in private sectors defines the knowledge gaps existing in the use of information technology. Similar gaps can be illustrated based on the current health status of health among different countries. According to the global survey by the World Health Organization (2011) on 114 countries that are members, there are many disparities in the development of the health sectors in different countries. Countries perceived as developed entirely have well-utilized health information system since they have high resources available for them. Besides, these countries have the expertise, and capitals to have solutions implemented. The case is different in developing countries that have less developed health information systems hence no skill which expresses the knowledge gaps.

The impacts related to the gaps in knowledge have been massive on the affected countries and hospital facilities since they face negative experiences and poor services. In this condition, as competition sets in the healthcare environment, these countries and hospitals are disadvantaged as they lose customers who switch from one health provider to the other due to poor services. Other contributing factors are the high cost, low-quality services, and delays. Hence, despite the critical role played by the health information system in terms of effectiveness and efficiency, some providers are exposed to low knowledge than others.

Chapter 3: Methodology

The methodology chapter provides a description of the process and procedures involved in the accomplishment of the study. Research design, population study, sampling procedures, data collection and the procedures of data analysis description are presented.

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Research Design

Research design often defines the way the study was planned and conducted which includes the pattern of the study. This involves the techniques and procedure the researcher employed in addressing the research problems. In this research, comparative study was suitable in understanding the various healthcare issues arising out of the development of the hospital management information system. The research design was comparative in the sense that the study involved an examination of the experience in two hospitals with different operations. One of the hospitals had the hospital management information system implemented for its operations while the other hospital had not implemented the use of hospital management information system. The various experiences in these hospitals were the focus which depended on whether the facility had the hospital management information system incorporated in its operations or not. The experiences in these two different levels of operations in hospitals involved describing the amount of time and cost involved in each case of a hospital as well as the satisfaction attained by the patients in each scenario.

To help understand the experiences, a descriptive survey research design approach was conducted. The survey design was essential in describing and explaining the various events in the context and occurrence of the real-life experience within the targeted setting. The survey allowed the research to have more information described concerning the three aspects under the study; time and cost involved in service delivery and the patient satisfaction level after the care service delivered. To explore and understand the beliefs, attitude, behavior, and the interaction of the people in different health settings, qualitative research designs were used in this study. Similarly, the study involved quantitative research in giving empirical investigation of social phenomena systematically using numerical or statistical data using the computation techniques. The quantitative research design allows researchers to put time and cost into perspective in a way that could allow illustration of the problems that emerge from the use of the hospital management information system.

Study of Target Population

The population under study was targeted from two hospitals with different operations involving one that had implemented hospital management information system while the other hospital had not embraced this kind of technology. Zikmund, Babin, and Griffin (2012) described the population as an extensive collection of all the subjects that allowed the drawing of the sample for measurements. The population was the health care workers within the two facilities working in different departments that involved the use of the hospital management information system. The involved departments were administrative, stores, laboratory, clinics, dentists, outpatients, inpatients, and health recording among others. The decision by the researcher to involve this population was because they are the health care workers who on a routine basis involve in the management of the hospital management information system. At the same time, these groups have information about the patients, interact with them, and know the feelings that the patients have. There was no selectivity on the people to take part in the study since all the workers present and willing to engage in the study were allowed to do so excluding those who left the study while going on. In total, 400 health care workers were involved in the research survey from both facilities with each facility producing its sample of participants. The 400 number was convenient so as not to lock anyone out of the study since all of the health workers were affected with the hospital information system in one way or the other.

Sampling

The sample was needed to allow the accuracy of the study since it entails choosing a particular number of participants from the entire population to take part in the research. Since the study involved health workers from different departments, both stratified random sampling and purposive sampling techniques were found suitable for this research. Every sample size had an equal chance of being accepted. The health workers were stratified into different departments based on their operations. On the other hand, the adoption of purposive sampling was to ensure that only the

 doi:10.20944/preprints202405.1833.v1

population of the particular characteristics of interest was chosen. Thus, the information relied upon to make the determination was in-depth rather than general. The first facility with a hospital management information system presented about 150 participants while the second facility presented a total of 250 participants. The gap in participants of the two facilities was because it was easy to get participants in the health facility without hospital management information system than it was in the other facility with the information system implemented. The process of recruitment considered workers who interact with the information system at least once in a week. Those workers who regularly use hospital management information system were the most preferred group since they have firsthand and more information about the system. However, first, the researcher sought approval form the relevant departments before seeking the consent of the participants. Those who agreed to take part in the study signed a privacy policy form and were also required to indicate the most convenient time for them to take part in the study.

Data Collection Methods

The methods of data collection involve gathering and measuring information which is related to the study to assist in addressing the research problems. The data collection methods vary depending on the cost involved, the time for research, and any other resource required by the researcher. Data collection involves two types of data: primary data and secondary data. Primary data includes the data collected through questionnaires and personal interviews which are carried out either through face to face conversation or through the telephone. However, secondary data refers to data already collected by scholars, analyzed, and published. Thus, secondary data is stored in documents. For this research, both the primary and secondary data was involved. Primary data was collected with the help of the questionnaire that was self-administered. On the other hand, the review of documents helped in the collection of secondary data. Since the aim of the study was to understand the situation of the developing hospital management information system in the hospital facilities, describing the said situation in terms of opinions, practices, and attitudes found the questionnaire a suitable tool to help collect this kind of data.

The questionnaire was most appropriate to inquire about the specific issues related to the development of hospital management information system. The particular issues the questionnaire aimed were the time and cost involved as well as the level of satisfaction among patients. The survey used involved both open-ended and closed-ended questions that were answered by the health care workers who took part in the study from both facilities. On the other hand, the documentary review considered the use of internet tools such as Google Scholar and additional health care information stored in health records that could be accessed. Besides, there was a review of the scholarly journals and other literature written about the hospital information management systems comparing the current trend in comparative studies.

Instruments of Research

Pilot Study

A pilot test comes before the actual research that aims at detecting the weaknesses in the instrumentation, design, and provision of proxy data for the probability sample. The pilot test helps to validate the wise, consistent formatting of instruments as well as the understanding of the respondents before the actual research is carried out. When pre-testing, similar procedures are followed as those to be used in the actual study to reflect on how the results of the study would look like. However, in the pilot study, the sample is smaller; statistically, 10 percent of the population targeted. For the current research, a pilot test was carried in two participating hospital facilities with different operations. The first hospital facility had fully developed and using the hospital management information system while the other facility has not the system in place. The pilot study was carried out two before the actual research to reduce the period between the two studies that could cause any significant changes in variables.

 doi:10.20944/preprints202405.1833.v1

Study Validity

Validity was essential in this study as it could help to define the degree to which instrument could measure what was expected to be measured in the study. For the current research, the validity was tested by administering questionnaires to respondents that were in the initial small groups. Though, the respondents, in this case, were not part of the actual study but were involved in answering the questionnaire to validate the collected information. However, the involved survey for the study was well planned for and prepared in a way that it reflected the objectives of the study while addressing all the raised issues that were under the investigation.

Reliability

As an instrument, reliability measures if the study can give similar results any time it is administered for the research. In a nutshell, it describes how consistent the measurement is when repeated several times despite the changing conditions. Therefore, to ensure the reliability of the study, various tools of data collection were tested during the pilot study to determine whether the produced results could be achieved and were consistent. The test was essential in establishing whether the questionnaire could give the same results when used in the same field in a different occasion.

Data Collection Procedures

Before the actual process of data collection, the research has to seek the approval of the project from the relevant authorities within the school and the two hospitals that were involved in the study. First, the consent was sought from the Health Department within the institution and proceeded to ask consent from the administrations of the involved hospitals. The processes marked the initial steps of ensuring the study conforms to the professional code of ethics as expected of the research of this nature that involves essential organizations like hospitals. Before carrying out data, informed consent was sought from the participants where they were first informed of the study and its aims. This also involved signing an agreement policy that ensured the information of the participants was kept private and confidential.

During the actual data collection, the questionnaire was the main instrument used and was administered to sampled respondents. All the respondents were reminded to read out the instructions on the survey, enter relevant information, respond to the questionnaire and later return it once the activity was complete. The questionnaire involved was composed of semi-structured questions to allow the respondents to give definite answers for specific questions while giving their opinions in other questions provided. The survey was presented on the standardized script to allow the clarity of the material used in the research as well as ensure its attractiveness. Use of standardized text increases the motivation of the respondents when answering questions and the strategy was applied by the researcher to have reliable information from the respondents.

The administration of the questionnaire was done on different days since the schedule for each hospital varied from 12 noon to 2 pm. This was during the lunch time and was considered most convenient when most of the health workers were in the lunch break. The time of the survey was approximately two hours and the researcher worked within this time. For convenience, the researcher visited various units of departments where workers work from to allow them fill the surveys. Therefore, there was no central location for the survey to take place since the policy of the hospitals allows workers to work within their areas. Though, the researcher remained around to ensure he assists in the interpretation of the questions and help the respondents through the survey period. Due to the busy schedule of the facilities, the questionnaire only took 30 minutes to be completed and returned to assist in data analysis. Though, administering the survey was done at the same time in one session for all participants. Therefore, to meet the target of the researcher, there were no personal interviews since the study involved many participants involving the health workers considering the busy schedule they have. The participants were not mandated to include names though one would do so at will though including gender and the facility of work was required for easy analysis of the

 doi:10.20944/preprints202405.1833.v1

collected data. Since the survey sessions took place in different work units, it was a challenge to do the recording. Similarly, it could be against the privacy code of the respondents considering they deal with patient's information that should be kept confidential. However, the researchers present in each unit where the surveys took place were required to take notes of what they observed and the events that could be considered in data analysis for reliability purpose.

Data Analysis and Presentation

The initial step involved scrutinizing of collected data for consistency and completeness before it was coded for analysis. Researcher created themes for the responses in line with the three objectives of the research. The identified themes were related to cost, time, and patient satisfaction. After identifying themes, codes were generated for the identified themes depending on the strength and the effect of the themes on the objectives of the study. The coding of data was essential to make the analysis process easy and simple by grouping responses into different strata's. Each stratum contained data illustrating a common theme in line with the objectives of the study. Codes were provided in line with the three objectives of the study that looked at the issues arising from the use of the hospital management information system. Thus, this involved arranging of common themes. Correlation analysis was used to test the level of impact the independent variables have on the dependent variables. In this case, correlation analysis tested how development of the hospital management information system impacted high cost, increased time, and patient dissatisfaction.

Data that had been classified, it was tabulated into columns and rows of tables. The study involved qualitative design which required data to be summarized and presented by the use of Statistical Package for Social Science (SPSS) aligning with the objectives of the study. Tables, charts, and graphs were essential in presenting data. Due to the time constraint and the huge amount of data involved, responses were only summarized and presented through tables. The comparison was made based on the groups of the coded data.

Chapter 4: Results and Discussion

This chapter involves the presentation of data, analysis, results, and discussion of the study with the view of addressing the major problem of the study. The discussion presented here is in line with the three objectives of the study including: finding out how hospital management information system led to the increase in the cost of offering healthcare services; determining how increased time use was a considerate factor in the development and implementation of the hospital management information system; and investigation on how hospital management information system contributed to patient not meeting their expected satisfaction.

Rate of Response

Analyzing the rate of response intended to examine the number of participants who responded to the questionnaire. The results were presented in Table 1 as shown below

Table 1. Rate of response.

Hospital facility	Distributed	Returned	Percentage
1st facility (HMIS implemented)	150	130	86.67
2nd facility (HMIS not implemented)	250	210	84.00
Total	400	340	85.00

From the table, a total of 400 health workers from the two facilities participated in the study; 150 from the first facility that used hospital management information system and 250 from the other facility that had not implemented the information system. From the first facility, the 130 responded to and returned the questionnaires while the second facility had 210 responding totaling to 340 of all those who responded. Considering the percentage rate of respondent was 85 percent which is a significant rate to make a valid determination on the issues of hospital management information

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system presented (Boulware, Cooper, Ratner, LaVeist, & 2016). The rate was considered adequate since the participants were healthcare workers who are aware of the impacts the information system was based on the benefits and issues raised.

Professional Expertise

Understanding the professional levels of the participants was essential to help the researchers understand the extent to which the hospital management information system impacted the particular health facility. This could help in evaluating whether the use development of hospital management information system has helped serve the intended purpose and if it has failed; to what extent it had negatively impacted the hospital facility.

Table 2. Professional expertise.

	1st facility (HMIS implemented)		2nd facility (HMIS not implemented)	
Professional expertise	Frequency	Percentage	Frequency	Percentage
Doctor	25	20.83	35	16,67
Nurse	35	29.17	65	30.95
Technician	20	16.67	40	19.04
Others	40	33.33	70	33.33
Total	120	100	210	100

From the table above, the study involved professional expertise in both facilities that included doctors, nurse, and technician among others. It is evident that the first hospital facility which has developed a hospital management information system involved the little number of professional expertise compared to the other facility that has not implemented the use of the hospital management information system. The scenario is attributable to the idea that information systems allow many operations that could be done by human resources. Hence, in the first facility, patients will interact with the technological system more they interact with professional experts. Thus, patients may lack crucial opportunity to meet doctors to understand better their health problem which may demotivate the patient or make him feel that the service offered was not satisfactory. Nurses are professionals who give primary care to the patients, and a high level of health care services are recorded in facilities with more number of nurses. Looking at the state of two hospitals, the facility uses hospital management information system has the low number of nurses, 35 who care for the patients as compared to the second facility with 65 nurses, more than the first hospital facility.

Acharyulu (2011) is among the researcher who supports the idea that facilities with more manpower tend to fasten service delivery to the patients, unlike facilities whose manpower is limited. It is easy and fast for the second facility which has 35 doctors to meet customers and attend to them than it is for the first facility with fewer doctors, 25 because the facility has adopted the information system. Additionally, when carrying out his study on information management in health care system, Acharyulu (2011) was quick to point out that as the evolving paradigm continues to shift due to technological, social, and IT changes, there is need to have more knowledge based on the healthcare system. Going by the researcher's opinion on the changes occurring, it is evident that running information system requires enough knowledge and in absentia, there is likelihood that the system is bound to fail. This could be used to substantiate the view of various healthcare workers who were involved in this study.

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Highest Level of Education

Relevant knowledge and skills have been identified as key factors behind the motivation of health workers to use technological changes within the hospital institutions. Huryk,, (2010) suggests healthcare workers have been influenced by multiple factors that tend to shape their attitudes towards using computers specifically when it comes to hospital management information system. However, the equivalent knowledge and skills of the implementers of the information system is determined by the education level of each of them. As well as understanding the education levels allows the management to consider the level of training required for each of the workers. The education level of the health workers was considered for two levels in line with the objectives that aim at establishing the cost involved in the development of the hospital management information system, and how faster the workers could use the technology in service delivery. The following pie charts indicate the results for the two facilities under research.

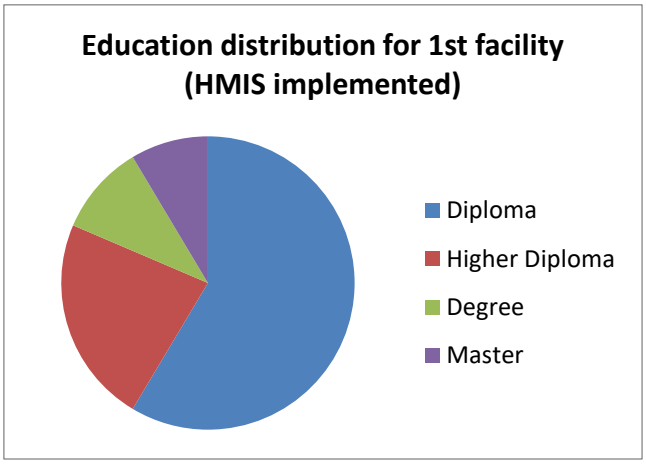

Figure 1. Education distribution for 1st facility (HMIS implemented).

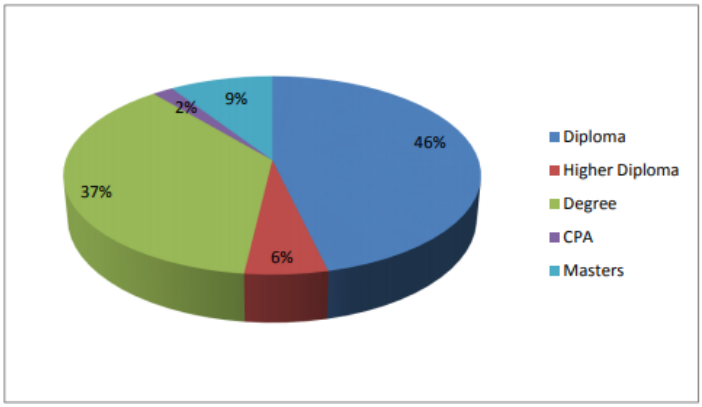

Figure 2. Education distribution for 2nd facility (HMIS not implemented).

The two figures showing the level of education distribution list were vital in expressing the objectives of the study. Considering Figure 1 on the distribution of education in the first facility that was using hospital management information system, it was evident that only the smallest portion of the pie chart indicates individuals with masters while the most significant portion indicates those having Diplomas and below. Contrary to Figure 2 showing a chart of education distribution for the second facility without hospital management information system implemented, the highest percentage shows workers who have masters while the lowest are those having diplomas.

Eley et al. (2008) examined how the levels of education play a role in training for the information technology and its subsequent effect to the cost incurred by the organizations. In their discussion, the researchers indicated that companies that have the majority of high learners especially in information

 doi:10.20944/preprints202405.1833.v1

technology spend the little amount of money on logistics such as training or hiring human resources from outside to help in running the system. Georgina and Hosford (2009) examined how professionals who work with computers and systems allow the organization to improve performance. Performance is reflected in the services people get from using technological materials. The findings by Eley et al. (2008) can be compared to the results from the two different hospital facilities. The result for the current study indicates the small number of workers with masters as the highest levels of learning. It is evident that when developing the information system, the hospital could require more training resources that are comfortably well conversant with the working of the system. The training period is relative but usually involves a lot of money the organization is likely to incur which they later transfer to patients as a burden. Similarly, as Georgina and Hosford (2009) explained, by the facility having low workers in terms of those who have the highest education qualification, the knowledge and skills available within the facility may be little. The condition is contrary to hospital facilities that have not yet embraced information system; the systems may consider having professionals with higher education to compensate for the place of the technology since they may want to cope up with the competition.

Therefore, in hospitals having management information systems, these institutions tend to incur high costs for training their workers who could adequately implement the information systems. Training is highly required as these institutions prefer using of the information system over human resources since they have the perception that technology can do most of the tasks initially performed by workers in an organization. In a similar way, due to the highest number of low education level distribution in facilities with hospital information system, the quality of services given to the patients may not be satisfactory as workers may lack enough knowledge and skills when using the computers. In a nutshell, the facility which has developed management information system showed high chances of handling vast amounts of money on issues to do with training and other logistics. In the same way, low education levels show the enormous potential of having services of inferior quality being offered to patients.

Use of Hospital Management Information System

The respondents were to indicate multiple ways through which the hospital management information system was used in the respective institution and the kind of data generated. This question was to find out the use of hospital management information system in the first hospital facility that had embraced the technology in its operation. This part of the questionnaire directly touched on the objectives of the study where the researcher wanted to establish how the system worked, the amount of data generated, time involved, and the resources needed if the system was to work properly in the institution.

Table 3. System was easy to use.

	1st facility (HMIS implemented)		2nd facility (HMIS not implemented)	
	Frequency	Percentage	Frequency	Percentage
Strongly disagree	45	34.62	n/a	
Disagree	25	19.24	"	
Neutral	20	15.38	"	
Agree	25	19.24	"	
Strongly agree	15	11.54	"	
Total	130	100	"	

Table 4. System was hard to use.

	1st facility (HMIS implemented)		2nd facility (HMIS not implemented)	
	Frequency	Percentage	Frequency	Percentage
Strongly disagree	15	11.54	n/a	

 doi:10.20944/preprints202405.1833.v1

Disagree	20	15.38	"
Neutral	25	19.24	"
Agree	25	19.24	"
Strongly agree	45	34.62	"
Total	130	100	"

The above two tables are in relation to the use of the hospital management information system in the hospital facilities. From the tables, there was no response recorded from the participants in the second hospital facility that has not implemented the hospital management information system since their questionnaire did not provide this part. From Table 3 on whether the system was easy for usage, it was evident most respondents, 45 health workers strongly disagreed with the idea and only 15 workers strongly agreed. Since the majority disagreed, it was all indicative that workers find the use of hospital management information system hard. From the responses, one of the respondents stated, "*it is so procedural, from the time I open the computer, I have to ensure that I have my details at my figure tips including my user name and the password. As if that is not enough, the network has to be active if I wish to access the required information.*" Another one supported the hardness of the system by stating, "*I could not just found the files I was looking for only to realize later that I have followed the wrong procedure to retrieve the files until I asked out for help.*" The responses from the survey carried out for the study illustrates how workers find the use of the hospital management information system difficult.

Successful use of the information system involves proper training of the end-users who include doctors, nurses, and other users. Similarly, patients need to be aware of how the system works if the hospital expects that efficiency and effectiveness is achieved. It is however unfortunate that hospital tends to introduce the system even when the majority of the health workers little expect such innovations in the hospitals. Thus, they find difficulties working with the system and often result in significant delays as a lot of time is used. Similarly, Table 4 on whether the system is hard to use, the majority of the respondents did strongly agree that indeed the system is hard to use. In this case, training of the employees for use is essential if they have to work with the system. However, training involves the use of resources and this adds to the high cost of running this system. It should be noted that when the cost of using the hospital management information system increases, the same burden is likely to be imparted to the patients.

Considering the idea put forth by many researchers like Acharyulu (2011), there is a general view when it comes to practical use of the hospital management information system, then, the knowledge that is embodied in journals and books is not much useful. Acharyulu believes that such knowledge can only become essential if it is read by people who understand the context well, manipulated, and communicated from one person to another. If these views are anything to go by, them the response indicated in this study defines the difficulty involved in the actual implementation and use of the hospital management system. In any case, achieving manipulation and the communication of the written knowledge entails hiring of the information technology experts to facilitate training of workers and other users of the system.

System Functionality and the Cost

The respondents were asked to indicate how the functionality of the system related to the cost. This part of the questionnaire was grounded on one of the objectives about the cost implicated in the use of hospital management information system. The results of the questionnaire were as shown in tables 5 and 6 below.

Table 5. System functionality leads to low cost.

	1st facility (HMIS implemented)		2nd facility (HMIS not implemented)	
	Frequency	Percentage	Frequency	Percentage
Strongly disagree	48 37.62		n/a	

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Disagree	27 22.24	"
Neutral	24 17.26	"
Agree	20 15.38	"
Strongly agree	11 9.54	"
Total	130 100	"

Table 6. System functionality leads to high cost.

	1st facility (HMIS implemented)		2nd facility (HMIS not implemented)	
	Frequency	Percentage	Frequency	Percentage
Strongly disagree	12	10.14	n/a	
Disagree	19 14.83		"	
Neutral	23 17.12		"	
Agree	28	24.24	"	
Strongly agree	50 39.21		"	
Total	130	100	"	

The above two tables indicate how the functionality of the hospital management information system impacts the cost of operation within the hospital. The system is involved in carrying out many functions as related to healthcare service delivery. As it is described, hospital management information system is an integrated and comprehensive structure which collects, collates analyses, evaluates, uses, and manages, disseminates, and stores all the data and information that is related to health. Thus, the definition is in line with the responses given by the respondents who related the huge functionality of the system to the high cost. Successful running of all these functions using the hospital management information system requires more resources that are likely to increase the high cost (Cohen, Coleman, & Kangethe, 2016). This explains Table 5 on whether the system functionality lowers the cost an idea that majority of the respondents strongly disagree with. The similar trend of response is observed in Table 6 that indicates that most respondents support the correlation between the system functionality with the high cost. Sampling some responses from the workers, one of the respondents stated, "We use one computer to do everything including entering data, analyzing, getting the feedback and sending the same feedback to the next computer. Everything is located on the same system"

The above view by the respondents can be examined regarding what Berretoni (2011) and the colleagues had to say concerning the functionality of the hospital management information system and its contribution to high cost. This team of researchers was categorical on how the information system has been used to achieve high quality and cost-efficient healthcare. However, Berretoni (2011) and the colleagues were quick to point out that cost-efficiency could only be achieved if all the necessary measures were put in place. There need to have full collaboration among healthcare professionals and stakeholders. In the view of these researchers, it was evident that disparities and cost inefficiency still dominated most hospitals which have fully complied with the use of the information system. This could be supported by one the respondents who indicated, "*The cost to be paid by each patient is determined by the number of stages that a patient undergoes through. However, in all these processes a patient is taken through, the functionality is almost the same acting on the same concern by the patient. Therefore, in actual sense, the system adds unnecessary cost to the already overwhelmed cost of the patient.*" The helps explains the view by the respondents that hospital management information system is overwhelmed with functionality which has instead increased the cost involved in providing health care

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Time Management by Hospital Management Information System

Effectiveness and efficiency is the reasons why health institutions introduce technology with the intention of having the performance of various areas of operation improve. The issue of time management was considered for the study to help understand whether the system assists in time management (Dağlı, 2011). For comprehensive understanding, respondents were asked to indicate whether hospital management information system helped in saving time when attending to patients or whether it increased the time spent. The following were the results:

Table 7. Using system is faster.

	1st facility (HMIS implemented)		2nd facility (HMIS not implemented)	
	Frequency	Percentage	Frequency	Percentage
Strongly disagree	47	36.32	n/a	
Disagree	29	23.14	"	
Neutral	28	19.81	"	
Agree	18	14.38	"	
Strongly agree	9	8.54	"	
Total	130	100	"	

Table 8. Using system takes a lot of time.

	1st facility (HMIS implemented)		2nd facility (HMIS not implemented)	
	Frequency	Percentage	Frequency	Percentage
Strongly disagree	10	9.54	n/a	
Disagree	16	12.13	"	
Neutral	21	16.14	"	
Agree	30	25.91	"	
Strongly agree	54	43.24	"	
Total	130	100	"	

The result in Table 7 shows that majority of the respondents disagreed with the idea that hospital management information system ensures that the operation and processes with the facility are fast. With only about 8 percent agreeing with this, 36 percent which is the highest rate disagreed which meant that the system leads to slowness when used within the hospital facility. The similar pattern of the results as shown in Table 8 with the majority agreeing that the system makes operations slow in the institution.

Al-Ahmad (2009) suggests hospital management information system involves a lot of functions that the system has to carry out to fully achieve the goals. Considering all these operations, it makes the system more complex hence sometimes slows down the processing process. Elder and Clarke (2007) discussed some of the arising issues in the implementation of the hospital management information system. These researchers discussed some challenges the users face such as the old age of the workers and patients who find difficult to disclose the required details for the system to work correctly. This evident from the survey where respondents indicated some instances when they had faced time wasting while working with the system. One health worker said, "*after logging in, the system may take five to ten minutes to disclose the requested information.*" Another stated, *"it can take close to ten minutes filling the details of one patient."* These are some of the responses that indicate the slowness defect on the hospital management information system hence time wastage.

Chapter 5: Conclusions and Recommendations

As hospitals continue to engage in the provision of healthcare, the majority of the facilities tend to examine various ways through which they can improve service delivery. As the competition within the health care sector continues to increase, technological use has been seen as the best way to facilitate service delivery within the sector. The urge to improve service delivery has seen many

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hospital facilities adopt information systems to allow them to run their functions smoothly. Hospital management information system has been seen as the increasing technology adapted to allow the integration of the comprehensive structure of the hospitals to ensure that the rush to offer services within the institutions is filled within the required time. However, with the development of the hospital management information system, several issues have risen in the situation where the target is never achieved. The system tends to increase the cost involved in running many functions for service delivery. A large amount of money is needed if all these functions are to be integrated and run within that single system. Training of the health workers is also needed for them to work with the system which further leads to increased cost. Similarly, time wastage has been highlighted when the hospital management information system is used in hospitals due to the various delays. The delays have been associated with the end-users within the facility being unable to use computers. The increasing population of the ageing people has also been a challenge which often contributes to delays. Finally, delays have been found to cause low patient satisfaction. Another emerging factor for dissatisfaction is the low physical contact between health care workers and the patients since requests and feedback are done using the system.

Literature review discussed presented solid information on the development of the hospital management information system. Multiple sources have examined some of the major issues that are related to the information system. The issues mentioned in this context include the cost implications, time consumption, and clients' satisfaction. The suggestion from multiple sources, however, indicates that hospital management information system positively impacts these issues. However, some unique situations do not apply where cost and time involved is high as patient satisfaction lowers. The presentation in this study is impactful in the sense that it brings out the good and bad side of the use of the hospital information system for users to determine the best option when applying the system

Recommendations

The research provides some of the strategies that can be employed alongside HMIS. Incorporation of economic evaluation can prove essential in ensuring cost benefit when HMIS is introduced in the hospitals. For instance, it can support the decision-making process as well as facilitate payment systems in the large-scale introduction of HMIS. Enhancing patient satisfaction can involve tailoring the IT systems to improve patient-nurse engagement, communications, and interoperability. Moreover, to reduce congestions and delays, the administration can ensure the use of effective computerized equipment with minimum network fluctuations and good processing speed. Nevertheless, the research would suggest for adequate training of the nurses to be sufficiently equipped with skills of handling the newly introduced technologies for healthcare delivery.

Customer satisfaction can be improved by ensuring nurses are trained on the cultural practices of the surrounding communities to be able to integrate the HMIS with evidence-based practices prevailing in the patient's culture. The public can also be trained about the HMIS and its importance so that they can develop positive attitudes towards the system. The training can boost awareness about the systems and hence can motivate the patients to embrace the systems fully. Minimizing the cost of HMIS operation can also involve reduction of the frequencies of hiring professionals and experts of the IT systems by fully training the nurses in place who will then be available full time. Furthermore, the health systems can consider organizing public workshops and seminars where nurses can be trained in the operation of HMIS at a reduced cost.

Areas for Further Research

The area of the health information system is a vast area that has highly discussed by various parties including health professionals, and technological experts. Most of the researchers in this area have examined the implementation of the information system and how impactful the system has been to the health sector. The available information has been vital to many users of the hospital management information system to adopt approaches that give the best results of the technological change in their institutions. Even with the increased research, much has been left out posing research

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and knowledge gaps in the way the information is presented on the health information systems in general. One area that has been left out is the disparity in the way hospital management information systems are implemented in different hospitals. There have been disparities in the way health information systems in different countries and sectors.

It is evident that researchers have indicated that private health sectors have been more beneficiaries of information systems than the public sector. Some of the identified related issues in this study such as high cost, time wastage, and patient dissatisfaction have been fewer experiences in the private sector than they have been in the public sector. The increasing disparities have the reason for the cause of alarm to call for further study to disclose the major causes of these differences. The area of new research is in line with the current research in the sense that the development of hospital management information system has related issues that have been discussed.

Conflicts of Interest: I hereby declare that this paper was entirely my own work and that any additional sources of information have been duly cited.

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