

Full Length Research Paper

Adoption of Health Information Management System (HIMS) for Auchi Polytechnic Cottage Hospital

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ABSTRACT: Information management system advancements have benefited in the operation and management of activities in a variety of human endeavors. This project aimed to increase the efficiency and efficacy of service delivery at the Polytechnic Cottage Hospital by enhancing information technology and information systems. Patients' records are managed utilizing a standard manual method at the research site. This project included a design for a Health Information Management System

as well as a general model based on the Nigerian health system's specific demands. The Nigerian health sector has a referral system; this project is predicated on the need to exchange patient data across many health care providers using a uniform sharing policy to access the grid of information from various Health Information Management systems.

Keywords: Health sector, patients, record, integrated data

INTRODUCTION

Auchi Polytechnic Cottage Medical Hospital in Auchi is used as a case study in this study to create a health information management system with interoperability among health organizations. Medical records or health information, whether in paper or digital format, has become a vital aspect of clinical decision making in today's medical setting, when a multidisciplinary team offers treatment to a single patient (Alnashmi et al., 2022). Medical records are essential communication tools, and they comprise. They do not, however, confine themselves to laboratory or diagnostic test findings, treatment plans, pre- and post-operative care, consent papers, discharge records, and so on (Zhao et al., 2020). Health practitioners and academics have constantly rebuilt and improved the design and operations of health care systems (Chaulagai et al., 2005). Other issues in the Nigerian health system include the burden of documentation and accessibility. Because it is done manually with paper, creating and managing patient records in our health care system is a nightmare. Taking medical records by hand without an information system is difficult. Retrieving such information from patients' case notes is a nightmare because files can

become mixed-up, old, and faded, and when they are recovered, several pages may already be gone due to how they are stored. It is more difficult to share such information with other health providers when a patient requires expert assistance. The application of ICT in healthcare is not new. Though not widely used in the Nigerian health system. ICT has been successfully applied in other fields, and it has now been deployed in healthcare. It increased the efficiency and effectiveness of healthcare services (Almunawar et al., 2012).

Healthcare has progressed from the industrial to the information age, and the availability of health information systems enables timely management of patient records and a clearer picture of ailments across populations. A functional and integrated health information management system (HIMS) is the bedrock of a strong health system and the key to making sound, evidence-based health policy decisions (Hodge, 2012).

HIMS is critical at both the patient and national levels. At the patient level, healthcare facilities require timely information about patients from numerous sources at the point of service in order to deliver optimal care. In contrast,

at the national level, health data assists the government in developing policies and initiatives to improve the health of the population (Parikshit et al., 2016).

A health information system (HIS) is a system that manages healthcare data. This comprises systems that collect, store, manage, and transmit a patient's electronic medical record (EMR), systems that manage a hospital's operations, and systems that support healthcare policy choices (Seid et al., 2021). A well-functioning Health Information System is an integrated activity that includes the collecting, processing, analysis, reporting, and utilization of health data by several levels of practitioners for decision making (Kebede et al., 2020).

Health information systems can include those that manage data pertaining to the actions of providers and health organizations (Chen and Wan, 2021). As part of an integrated effort, these can be used to improve patient outcomes, inform research, and impact policy-making and decision-making. Because health information systems frequently access, analyze, or store huge amounts of sensitive data, security becomes a top priority. This is regardless of the digital system's documentation (Alnashmi et al., 2022).

The significance of information systems in monitoring and improving health-care quality cannot be overstated. Everyone in the healthcare sector, from patients to clinicians to public health officials, can use health information systems. They gather data and organize it so that it may be used to make healthcare decisions. Moukéné et al. (2002) define health information systems as focusing on efficiency and data management. The primary motivators for health information systems are:

Analytics of data

The healthcare business is continuously generating data. Health information systems assist in the collection, compilation, and analysis of health data in order to improve population health and minimize healthcare expenditures. The healthcare data analysis can then be used to improve patient care.

Collaborative care

Access to patients' health information is a crucial issue in today's healthcare. Patients should ideally have a complete and up-to-date copy of their medical records that they may share with any practitioner (Chen and Wan, 2021). Patients frequently seek treatment from a variety of healthcare providers. Healthcare practitioners can access shared medical records through health information systems such as Health Information Exchanges (HIEs).

Cost control

The use of digital networks to share healthcare data results in efficiencies and cost savings. When regional markets

employ health information exchanges to share data, healthcare providers notice lower costs. On a lesser scale, hospitals strive for the same efficiencies with electronic health records.

Population health management

Health information systems can collect and analyze patient data, as well as identify demographic patterns. Big data can be used by clinical decision support systems to assist diagnose and treat individual patients. The technology can also be used in reverse. This study focuses on the implementation of an effective system for a local hospital and how more than one hospital can benefit from it. The suggested method collects crucial information from patients such as (body temperature, pulse rate, respiratory, blood pressure and pain assessment). This information is saved in the database and is available for consultation with the Medical Doctor. They assess the patient and may recommend additional inquiry through various laboratory/testing/analysis and obtain the results in order to write a prescription or send the patient to other specialists as needed (Figure 1).

Benefits of the proposed system

As with any well-designed information system, this will bring operational efficiencies, better patient services, and almost real-time availability of information for decision-makers and researchers.

1. accessibility of information with the aid of a computer or any PDA's.
2. Organised patient information with accuracy and with little or no errors.
3. Hospitals will be less crowded because the medical system built will help patients be treated and information maintained.
4. Compared to the manual way, the medical system operates quickly and saves time due to clear and concise records.
5. Possibility of using analytics on the data: At the individual patient level, the health data obtained can be used for risk assessment, readmission prediction and prevention, infection and deterioration prediction, and much more.

Gathering and analyzing health records/data for all categories of health-related organizations is critical for healthcare organizations to operate efficiently and successfully. These data, however, are dispersed across numerous distinct databases situated at various hospitals and health centers shown by layer 3 (Figure 2). These are owned by either private individuals or the government. The Health Information Management System is proposed to model a better way to share health records, which will lead

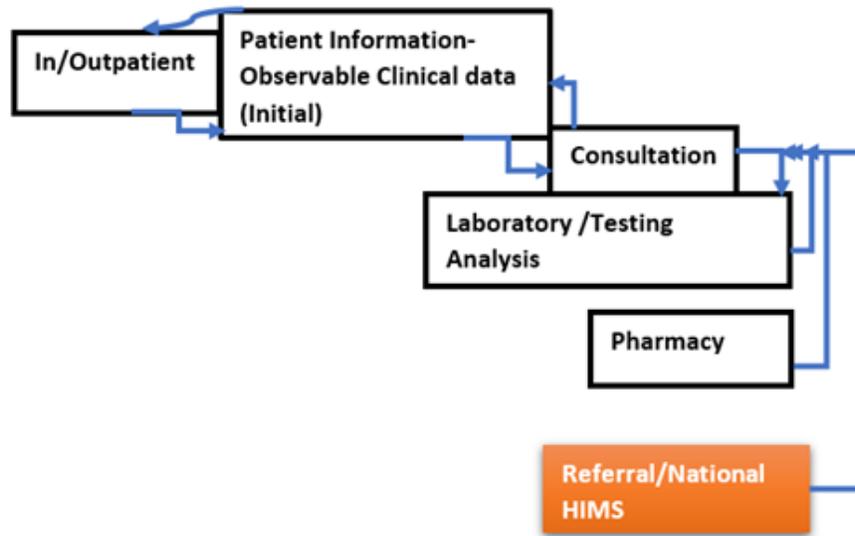


Figure 1: Proposed design flow process for a health information management system.

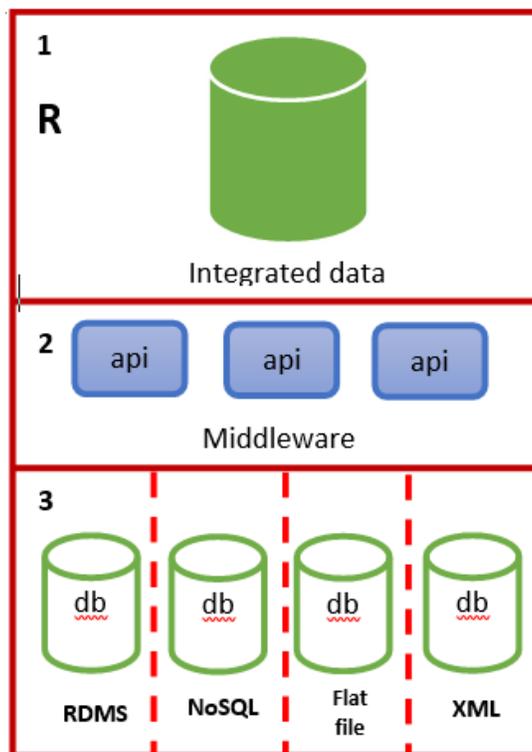


Figure 2: Proposed model for HIMS

1. This is layer 1. It is a virtually integrated data after the transformation of records from layer three
2. Layer 2 contains a set of dedicated APIs transforming the data depending on the db model.
3. Layer 3. These are the set of db's situated at each health Centre/hospital and managed by the owner.

NOTE

- ✓ Each of the db's at layer 3 is independent
- ✓ They are differently modelled
- ✓ One is not aware of the other
- ✓ Some records are common and could be shared, but challenging to share without layer 2

to health situation awareness and improvement, because a person's health record is a document that contains all of the information about that person's health from conception to death (Seid et al., 2021).

The system at a different location is:

- Independent.
- Non-aware of database management or model of one another.
- It is a legal or policy restriction guiding each independent centre.
- The model used may vary.
- There are several dedicated APIs for each of the available models

The middleware bridges the gap between integrated data and the individual data source

It transforms the data into a common and sharable form

The record is sharable

There is a general agreement on the usage and update of the content

Content is as contributed by each of the db in layer 3

Each can use the data separately without limitation

- i. $DB = \{db^{(1)}, db^{(2)}, db^{(3)}, \dots, db^{(n)}\}$
- ii. $db^{(i)} = \{t_1^{(i)}, t_2^{(i)}, t_3^{(i)}, \dots, t_n^{(i)}\}$
- iii. $t_{k_1}^{(n)} \oplus t_{k_2}^{(n-2)} \oplus t_{k_3}^{(n-1)} \oplus \dots \oplus t_{k_m}^{(1)} \Rightarrow R_1^i$
n,m,k 1,2,3,...

i. **DB** is the set of several independently managed databases at each hospital.

NOTE: *DB may not necessarily be the database. It may be a text file or XML as it depends on the available technology the host is operating. So, it contained several heterogeneous databases from several hosts that agree with the terms and policy of the entire system*

ii. $db^{(i)}$ A typical database is located in a hospital/clinic.

iii. $t_1^{(i)}$ A set of values in a row of the table in a database. The word table here could be used interchangeably with tuple, row or record.

R_1^i A tuple of integrated records from several independent databases.

\oplus Transformation triggered by middleware using appropriate API

NOTE: *This symbol \oplus denotes a set of activities that the middleware component might do to ensure that the arrangement and format of the information are in line with the standard supported by the integration layer*

Conclusion

Adoption of a Health Information Management System by hospitals/clinics and the entire country's health sector

plays an important role in improving patients' and health practitioners' experiences. It is reflected in increased work efficiency and decreased doctor work intensity. It does, however, enhance patients' health awareness. It decreases hospital visits, laying the groundwork for the later establishment of a grass-roots medical public health information management system. This study has drawbacks as well, such as an insufficient data search due to time and resource restrictions.

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