

# The Importance of Using Database Management Systems in Hospitals

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## Abstract

The main function of a Database Management System (DBMS) is to store and secure personal and corporate data. In the modern era every area of business needs a DBMS to manage its data, and so do hospitals. Whether the organisation is a hospital, private health centre, clinic or office, it needs effective health management. Medical records must have all of its patients' medical histories, and even all information about the hospital's departments, doctors and other staff. Hospital database systems not only record and keep track of detailed personal communications and medical histories, they also create current accounts and are used in cost and personnel management, organising appointments, arranging patient admissions and hospitalization. This article mainly tries to explain how necessary a database is for any kind of hospital, the benefits it brings and how it should be used. It also examines the current record of the "N Kay Medical" hospital in Khachmaz, Azerbaijan and the creation of a database system for the hospital to help hospital staff and those who handle the hospital's data to perform their work more effectively and efficiently.

**Keywords:** Data; Database; Database Management System; Health; Hospital; Hospital DMBS; Doctors; Data Record

## Introduction

**Hospital Database System: this is an intelligent system developed to improve the quality of health services offered to individuals and to ensure safe and speedy integration of patients, doctors and health institutions (Haggerty, 2019). But:**

First of all, what are data?

The singular form of the word data (datum) comes from the Latin language. Data refers to any events or ideas that a person finds worthy of formulating or registering.

When data are stored on computer, this is mostly done by use of a database management system.

### **What is a Database?**

The most common definition of database is a collection of data arranged in accordance with its intended use. It is a store of information in which logical and physical data are associated with each other (**Haggerty**, 2019).

The data collected on a specific topic are assembled within a database program. When required, all the information collected, or that which meets the specifications desired, can be displayed and printed; new information can even be generated from the original input and used for various purposes.

### **But how is a database used?**

The answer is, by software known as database management systems (DBMS), by which various complex operations, such as creating a new database, editing, developing and maintaining the database, are performed.

### **Hospital Database Management Systems**

Hospital database systems now provide multifaceted support for the diagnosis, treatment and follow-up of diseases and their management. On a hospital database every process and all data are safely recorded and stored. Examination, medication, surgery and hospitalization reports and all the health institution's records are kept together with the finest detail about patients, and the patient is asked to re-enter each time on his / her application. Personal information (Name / Surname, Birth Place / Date, Blood Group etc.) and contact information are stored safely. Each transaction is stored securely in the database and can be queried separately. With parametric query screens and search forms, search options are offered via multiple options (Name, Gender etc.). The user-friendly, flexible and convenient search interface provides fast and easy access to information (existek.com).

## Material and Methods

I live in a town where none of the hospitals have a Database Management System, but we all know that a database is an external part of every area of business nowadays. So, I thought that for this study it would be better to explain why every hospital needs a database management system by actually developing one for a hospital to see how it actually works. I visited one of the hospitals that I have used since childhood and began gathering information and interviewing doctors for my research, which includes departments, patients, doctors and rooms, as well as how appointments, treatments, medical tests etc. are handled. I tried to merge all the information and arrive at a solution. I noted that data were stored in a traditional Microsoft Excel file system; the main problem with a traditional file system is that data definition is part of an application program that only works with that specific application. It is known that files require changes to design and coding whenever a new kind of data appears and a management system is desperately needed to manage such large amounts of data. I was there nearly every day for one week and pointed out that the hospital urgently needed a database system that could manage all the data.

Previously, the hospital used to give a type of ticket to patients, who had to bring the tickets with them every time they attended an appointment. But that was not working at all, because patients were always losing their tickets and had to pay five manats for a new one. All the data were stored on paper in an archive and if hospital staff wanted to check a patient's history they had to search the whole archive just to find that one patient's history. As may be imagined, that took a long time; and there was no data protection. If a patient who had been through some procedure returned for a check-up and that patient's history could not be found, that could cause a lot of problems. Those problems could be avoided with a database.

After gathering all the information necessary, I searched the internet for information on designing a good database and was assisted by Microsoft Support, following its database design guidelines to fulfil all the essentials of a good database design (support.office.com).

In this study, some articles and theses on the internet were read for research (Amaechi *et al.*, 2018; Verbeke *et al.*, 2012; Ripan, 2017; prezi.com).

## Result and discussion

Based on the existing record, the tables required were established by using Microsoft SQL Server 2014 (microsoft.com).

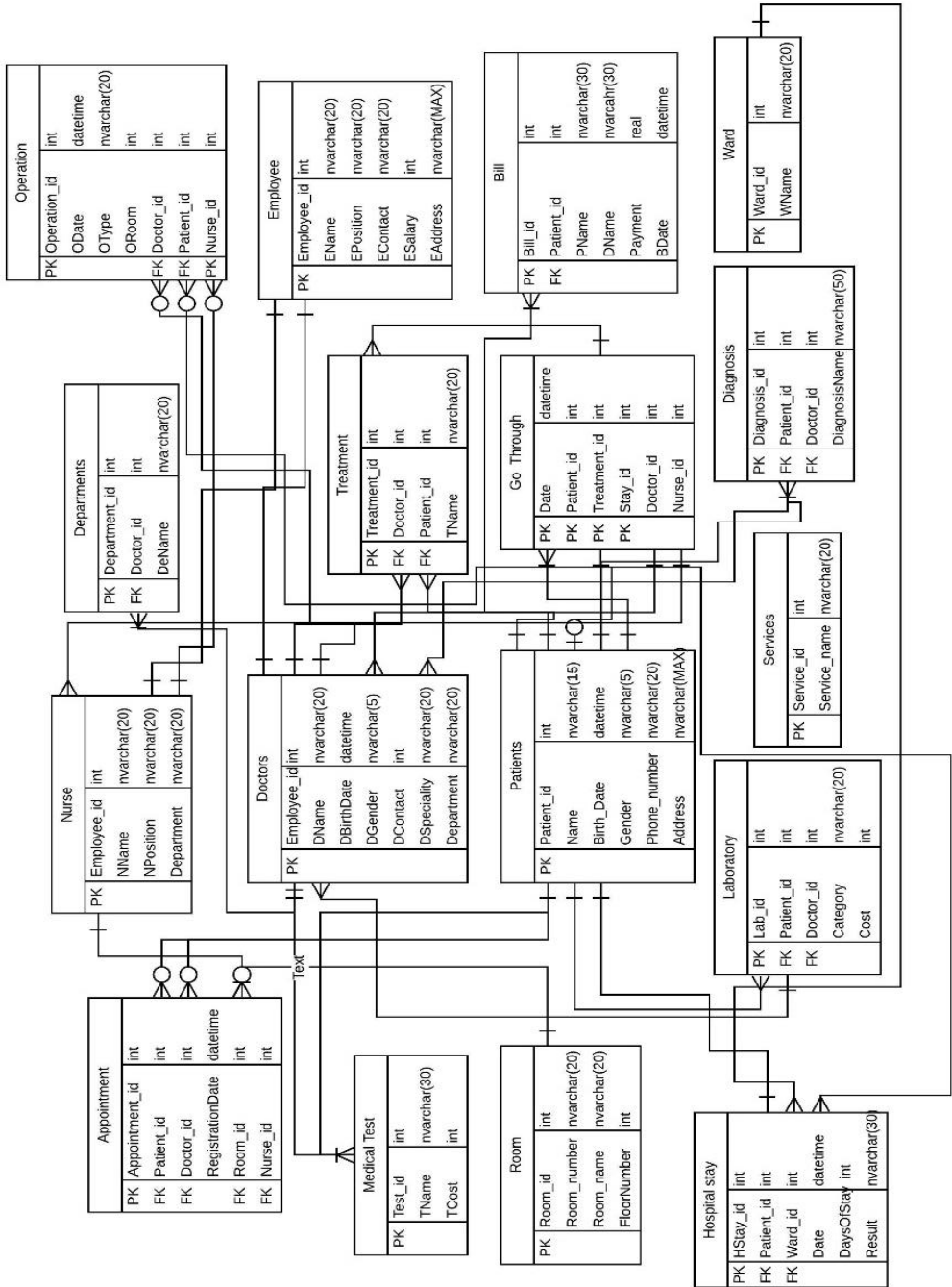


Figure 1. Complete Entity Relationship Diagram.

This included Patients, Doctors, Medical Tests, Nurses, Services, Appointments, Rooms etc. After creating the tables the required relationships were developed between tables with an Entity Relationship Diagram (ERD) (lucidchart.com).

The very next task was to query the database to test its operation by using SQL query language (James *et al.*, 2014).

By implementing a database, any hospital is able to update and check medical records, bill patients, check patients into wards and rooms and match them to the appropriate doctor.

In this thesis we have attempted to demonstrate the pros and cons of having a Hospital Database Management System. In this chapter, we can write much about the ease, success, improvement, benefits etc. that our small hospital will achieve by having a Hospital Database Management System:

- Faster access to more, useful, information,
- Efficiency in decision making,
- Efficiency (More work, lower cost),
- Patient satisfaction,
- Effective use of resources,
- Prevention of time wastage,
- Provision of better quality medical services,
- Facilitation of communication between employees,
- Measurement of employee performance,
- More effective planning of material requirements,
- More effective planning for operating rooms and diagnostic units,
- Introduction of requests and treatment results and many other benefits (techjockey.com).

In addition to the above-mentioned benefits, it is important to mention the problems caused by the system. These disadvantages are;

1. A reduction in patient privacy and subsequent physical, moral and social harm.
2. The data collected may be considered as commodities to be bought and sold and may also be non-objective.

As can be seen, both positive and negative aspects of the developments are of great importance (Healthcare, 2018). Here, the possibilities (benefit-harm) offered by technology should be considered together, both in terms of the patient and the medical profession, and the use of technology should be at the rate that medical ethics overlap with the firsts.

For this reason, it is necessary to make legal and technological arrangements to ensure that the system is regulated on legal grounds, that it is secure and there are control facilities. However, some events revealed that, despite all the measures taken, it was not possible to completely eliminate negative effects.

The most important stage after database creation, the transition to automation in the health institution, will follow to see how it works and what improvements are necessary. As this hospital transforms to a completely new stage, it will definitely face some issues of transition. The transition is gradual and necessary training is provided to staff who will use the program.

Thus, the following should be done in the near future: ensure security of the data stored in the system, select equipment able to carry the load effectively. Transactions are totally dependent on computers, so maintenance is necessary and backups should be made to maintain functionality 7 /24.

## **Conclusion**

The success of these innovations and implementation of information systems in hospitals depends on strong, supportive leadership and the participation of employees in all departments of the hospital. With this, the hospital information system ensures continuity of care by making data active and up-to-date, while reducing cost by accelerating care services. Many examples can be given of these kinds of database management systems; they include SoftClinic, ProMed, PaleBlue, Hospicare, among others.

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