Comprehensive Review of Information Systems, Medical Institutions

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Abstract—**Hospitals as one of the most important social organizations, play a major role in improving the country's health status and health services and there are one of the most critical for organizations that for managing properly them must gather information to form correctly, and After monitoring and classification and derive the appropriate form and at the right time, they are been available to all decision makers, especially hospital administrators and chiefs, so sufficient familiarity with basic concepts and various hospital information systems and the separation between information about their patients and hospitals are very important.**

Index Terms—**Hospital information systems, systematic review, hand search.**

I. INTRODUCTION

Today Information as one of the most important sources of power is raised in the world. Transcendent of the supremacy world to the backward world is information, rather than economic, military and cultural and political. In other words the first distinction in underdeveloped countries and even developing countries is the production, organization, and information application.

And dissemination and using of that is considered a social indicator and the growth of this indicator means national promotion will be. Information affect on our Insight and behavior significantly. Also statistics and information is a major and valuable resource for managers of an organization. As human resources, material and financial resources have a specific role and values in the process of producing, but there in the era of information and communications, is particularly valuable information. But there in the era of information and communications, information has a special value.

Summary, information is resource of all management activities. Information is vital Flow and based decision-making process and planning. Managers will not be able to make decisions effectively without having complete information about a topic. Thus, we need comprehensive information system for a management, because the management process relies on gaining accurate and appropriate information.

As regards the organization's ability to perform its mandate effectively will depend to the quality of the decisions adopted on the organization and Quality decisions is depended to

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quality of information that make decisions based on that and we have collective statistics and data that without applying new technology we cannot collect and analyze them correctly.

Information technology has changed the information exchange environment greatly due to increasing growth and development and application of computer facilities and data transmission networks and the World - Wide as the Internet, through valuable information and variety services, in recent years. As regards, technology and electronics and computer tools inbreed the phenomenon of information explosion in the past decade, so we must establish systems that can generate data and manage them [1]-[2].

In Information technology and information era, information is the vital force health care. In the health sector using efficiently information systems enumerate undeniable necessity to achieve efficiency goals, effectiveness and quality of service and client satisfaction. No doubt we need to a comprehensive information network of rural health houses level till third referral system level to provide the healthcare country system's aims, such as specialized and super specialty centers in the Country and Ministry.

Physicians, nurses and other health care providers need medical information to treat a patient. Because of health care organizations role in determining the health and promotion of human society, trial and error task is irreversible. Therefore, management has a particular matter based on good, accurate and timely information and owning an information management system.

Hospitals as one of the most social organizations play a major role in improving the country's health and health services and are one of the most critical organizations that them information is gathered correctly to run properly them. It is provided all hospital decision makers especially administrators and chiefs after monitoring and classification and deriving to an appropriate form and at the right time.

Therefore, complex organization's yield with multiple segments need to access to information such as hospitals. Information may be related to patient care or hospital's work, so segregation between information of patients and hospital is important.

On the other hand information of patients changes about the size of it egregiously over many years. This is because of diagnosis and treatment Facilities expanding constantly. Hospital characteristics and also due to the growing needs of operational information is constantly changing. These changes to hospitals increasingly rely on computerized information systems leads. Also characteristics and needs of Hospital are changing constantly due to the growing of operational information. These changes lead hospitals to rely

on computerized information systems increasingly.

The only way is using the computer to collect, store, communicate, and deliver large amounts of information that obviate the needs of consumers. Consumers may be a Nurse that enters information about the patient to system or supervisor of the clinical departments plans to provide care next week, Or a member of the board uses the hospital system to support management. For answer all these needs we should be familiar enough with hospital information systems concepts and managing those Therefore concepts and hospital information system Types are described.

II. System Definition

System is a set of elements that come together to achieve a common target, as there is a interactive relationship between these elements. Next system feature is existence collocation in the relations between the elements; it means each element has a role. It may be elements or components of system act independently, but changes in the status of each element on other elements and in the result affects the whole system. (Interactive relationship)[3].

III. Information and Data

Data (DATA): Data are facts and phenomena related to an object or a phenomenon in general and transferred a characteristic of it to us, they have the concept themselves but Applied for them is not expected, but if the case should be processed and commuted into information they have become meaning. For example, data may be working hours number of organization's employees that for the user are relatively meaningless when the number of working hours per employee in multiplied by the rate of pay his work hours, its result is his Gross received. When added gross amount received Employees together, the total amount is salary and premium in the organization. The fee for the owner of the company is information. So the information is processed data or significant data.

IV. Definition of Information System

An information system consists of a designed complete system for productions, gathering, organize, storage, retrieval and dissemination information in an institution, organization or any other defined areas of society [1].Organizational information system is an information system for work on data that are related to the organization. If the organization is responsible for work of production, gathering and disseminating statistical data of the population and uses of an information system for this duty, this information system, is not an organizational information system, but human resources information system or accounting system in organization, are included one of the organizational information systems. Organizational information systems are used for three cases, operations implementation, operations control, and decision making in organizations. Organizational information systems can run manually or Computerized, or a combination of both.

A. Management Information System

Information management system is sets procedures that is designed for collecting, processing, store and distribution of information to support decision-making, planning, coordination and control. In other words, an information management system is a formal method for the preparation and presentation necessary and timely information, to managers to facilitate decision-making, planning and control management process.

Organizations have always had a kind of information management systems. With entry the computer in organizations, information management system became a formal process. At first, computer was used for Financial Affairs and accounting, so units were responsible for data processing that called Electronic Data Processing Units (EDP). With the increasing development of electronic data processing units, computer-based information system (CBIS) was designed as a management information system. Information management systems include the sub-systems which are based on computers. [2]

- Trade processing system (TPS)
- Management Information System (MIS)
- Decision support system (DSS)
- Executive Information System (EIS)
- Executive Support System (ESS)
- Expert system (ES)
- Office automation systems
- Knowledge workers Systems (KWS)

V. Information Systems in Organizational Hierarchy

A. Trade Processing System (TPS)

Organizational information systems are responsible for performing and controlling of organization's operations through the definition of processes and procedures and information processing. Storage, personnel, accounting, procurement, contract management, sales, inventory control, property, internal proposed, customer reviews management, and training systems and... are Processing operations systems. In this system, the controlling of system is low and reporting of system is limited.

B. Management Information System (MIS)

MIS is a type of Organizational computer systems so that takes organization's internal information of processing operation systems and abstracts them into useful and full of meaning formats, as a summary management reports till they are used to perform administrative tasks such as control and decision making. This system is used in organized and planned situations that specific information requirements are distinct. Information management system is used mainly by tactical managers to perform the tasks of planning, financial, human resources and project management. The system offers information as defined forms. In this system, the possibility of planning is too low but control is very much, so the system can offer reports are the moment. [1][5]

C. Decision Support System (DSS)

DSS is types of computerized information systems that

help to management in organizational decision making requires modeling, formulation, calculating, comparing, choosing the best option or predict likely scenarios. This system helps administrators to solve not planned or semi-programmed problems. This system offers a database associated with the types of decisions that have the ability of solving problems, must be taken. In this system, it is possible to Planning and Average control. The system provides using non-expert in the computer. It reports periodically [3].

VI. EXECUTIVE INFORMATION SYSTEM (EIS)

Usually the system is said that a set of wider capabilities than executive information systems, including support for electronic communications (e.g. email, computer conferences, and word processing), data analysis capabilities (e.g. spreadsheet, language, search...) and organizing and planning tools (as the electronic calendar...). Thus, Executive Support Systems have features for supporting information and communication in addition to decision support. Also, this system offers specialized information for senior managers in planning and Monitoring fields. This information usually provides from outside the organization. In this system, the possibility of planning is too much but control is too low. The system is able to offer group reports. The system also called strategic information systems.

A. Executive Support System (ESS)

ESS is a designed Management information system for gathering, analyzing and Summarization key internal and external organizational information that help senior managers and decision makers. In fact, a special type of DSS is to help deciding on high levels of organizational.

B. Expert System (ES)

ES is a type of computerized information system that collects information about individual knowledge or skill of an expert, and like his/her will give the desired results. This system is used for solving and decision making problems in specific fields. In fact, it is used knowledge and defined analytical laws by experts in specific fields. [4]

C. Office Automation Systems (OIS)

Computer systems are used to perform many routine administrative tasks such as typesetting, preparing bills and transfer documents. In fact, this system is responsible for preparation, storage, retrieval and transmission of
information between the sectors and units within an organization. [4]

D. Knowledge Workers Systems (KWS)

It helps to experts in production and application of new knowledge in the organization. Design using computer systems are used by product designers not only allows them to easily change the desired shapes without re-drawing, also it enables them to test the product without making physical samples.

VII. INFORMATION NEED OF MANAGERS

Information management system must be able to provide requirement information of different levels managers in organization. So according to different levels of organization management, different information is required.

1) Operations Management: Management Information System in levels of organization operational management must be able to offer accurate information about daily and weekly activities. This information comes from domestic sources mainly.

2) Middle Management: Management Information System in the middle management level of organization must be able to provide accurate and almost slight information about the activities under the supervision of middle managers. This information comes from domestic and foreign sources.

3) Senior Management: Senior managers pay attention to detail of the subject less than lower managers levels. However, managers may not use of information systems reports because of these reasons:

- Information doesn't relate to responsibility area of gainer.
- Information doesn't have sufficient validity and accuracy.
- Received information is procured too late that will not be worth.
- for extracting useful information from the provided information is required to a lot of time and effort.
- Information has a lot of details that is not used for related purposes.
- Information is not comprehensible. [3][5]

VIII. COMPONENTS OF INFORMATION MANAGEMENT SYSTEM

Storage and processing massive volume of data is impossible without the use of computers. Computers process massive amounts of data with high speed at low time.

1) Hardware includes physical equipment such as computers and its equipment (keyboard, scanner, barcode reader, and sound detection devices…).

2) Software is a set of programs and methods that enables to perform several activities. So computer system will include these components:

- Input: input devices enter the data.
- Data storage: Data after receiving are kept in system memory until processing.
- Processing: Through processing, the data is converted to information.
- Output: output devices give users the information.

Three activities lead to the production information in information system that organization needs them for decision making, operations control, analyze problems and these activities include input, processing and output. In input stage, the raw data are collected from the organization or outside environment and import to system. Processing converts raw data to meaningful information. In output stage, the processed information is sent for individuals or activities that need it. [1], [2]

IX. HOSPITAL INFORMATION MANAGEMENT SYSTEM

Goals of Hospital information management program are:

- Determine the needs of domestic and foreign
- Monitoring requirements
- codify priorities
- standardize data collection
- Development and improvement documents of the patient care
- providing timely, accurate, complete information
- providing fast access to information
- Maintaining the safety and confidentiality of information
- To limit duplication in data entry
- To strengthen patient care activities
- Development of cooperation across the organization through a shared building information
- Staff training in information management system
- Information Management Program annual assessment of access rate to Goals

Types of hospital information systems:

- Clinical information systems: they are designed to support patient care activities that are used for clinical audit of hospital services, such as age and gender information about the patient, laboratory and radiology tests, deaths, infection and ….
- Management Information Systems: they are designed to assist in activities other than patient care in hospitals. Such as financial information systems, personnel, supplier, controlling inventory and procurement ... In addition to this, they are used to do office daily activities in organization.
- Technical Information Systems: they include non-clinical and management information systems design, such as engineering, mechanical, electronic, design, maintenance, Applied Computing systems. For example, information related to building hospital, water facilities, sanitation, electricity, heating, gas, phone, safety, and ... are Technical information. [2]

X. HOSPITAL INFORMATION RESOURCES

Hospital information resources are divided to two Categories: primary and secondary resources. The primary sources include available information on patient medical records. The secondary sources include information that comes from primary sources and are set regularly and accurately such as Disease index. Uses of this information include:

1) Management using. A - Planning and determining- B- organizing and conducting C- controlling and evaluation – D- reporting [6]
2) Clinical using. A - Education and research- B- clinical evaluation and audit other health organizations
3) Producer assess and accreditation organizations
4) Covered population

Information of Patients receiving resources is events that for which events occur and the services to be offered to them and available facilities in the hospital. This information is collected in hospital and is sent like a summary and complete report for the university and eventually Department of Health to be used in the health care policy.

XI. CONCLUSION

Goal of Hospital Information System is information Management that health professionals require it to perform their duties effectively and efficiently. Information systems are large capital for the hospital management if it is planned carefully. Information offers a great help to the Hospital board and manager in strategic planning and goals making. Provided Clinical Data is considered an important tool in ensuring the quality of hospital services. In addition, financial information plays an important role in controlling hospital costs. A hospital information management cycle following steps [6].

Offering effective services depends on determine and identify the information requirements of the organization. Organizations do not focus on information needs they encounter with distributed databases problems such as re-working in data collection, irrelevant reports and deficient using of sources. Goal of management information, identify information needs of organization in providing patient care services, evaluation existing data of accuracy, availability, access, safety, performance, requirements, practical applications development, improve organizational performance improvement in patient care management and support processes and meet corporate goals, reduce unnecessary duplication of input data, providing timely access to information throughout the organization and offering information systems based on patient.

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