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DETERMINATION OF PATIENT'S INFORMATION SUPPORT FOR EFFECTIVE HEALTH CARE SERVICE DELIVERY: A SYSTEMATIC REVIEW OF SOME LITERATURES

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ABSTRACT

Patient Information is information about an individual's patient lifetime health status and health care, stored such that it can serve the multiple legitimate users of the record within and outside the hospital. This study sought to determine wither patient information the support is supporting for effective health care service delivery or not. A comprehensive systematic review of peer reviewed and literature was undertaken to identify wither patient information supported effective health service delivery or not. The review testifies that patients' satisfaction had significant positive correlation with health care service delivery. Which also has a direct link with communication level of staff relationship with patients, environmental cleanliness and comfort facilities, cost of services and delay in obtaining services had a positive relationship with patient satisfaction as well as health care service delivery in hospitals. Conclusion and recommendation was made despite of the potential benefits and contribution of health information for effective health care service delivery, as revealed by many Studies there are still many errors in patient information management. However, government and nongovernmental organizations need to put more efforts in training and proper management of patient's information.

Keywords: Determinant Factors, Effective Health Care Service Delivery, Information Support, Patient's Information and Stakeholders Satisfaction.

II. OBJECTIVES

This study was intended to determine patient's information support for effective health care service delivery.

III. METHODOLOGY

This study was done using a systematic review; the literatures were searched on determination of patient's

information support for effective health care service delivery with the help of libraries, books, conference proceedings, data bank, and also search engines available at Google, Google scholar. In our searches, we employed the following

Keywords and their combinations: Determination of patient's information support, effective health care service delivery and stakeholder's satisfaction.

In the searching areas of title, keywords, abstract, and full text. Technical reports were excluded since we focus on research papers. By analyzing our collected literature.

Google Scholar reviewed was done. The available evidences indicated that patient's information support for effective health care service delivery on the systematic reviewed carry out.

IV. INTRODUCTION AND BACKGROUND

High quality information is essential for effective health management systems, scientific progress and development. Certainly, if there is high quality information about healthcare system, the citizens can be guaranteed living a qualitative healthy life and a long lifespan. One of the promises of the information revolution is that it would increase opportunity for all people to share knowledge (Koelmoos and Smith, 2011). The Internet has created room for information to be available to scholars, researchers, and layman at their doorsteps. The flow of information through its highway has made the world to be a global village because Internet has changed the way people communicates, their attitude toward health services, information make people to create, share and process information enormously.

According to Anyakoha (2005) the information revolution is far more surpassing than the industrial and other evolutions of the past. The speedy transition to electronic publishing has further revolutionized the world to a global village and this is making it much easier for healthcare professionals to access and use the available health care information. In agreement with Koelmoos and Smith, individuals can sit in the comfort of their homes and access available information using different search engines especially the latest versions in a twinkling research studies conducted, findings and how individuals can participate in carrying out a study. Health Finder is a health resource that is maintained by Department of Health and Human Supplements. The Database provides information about dietary supplements for HIV/AIDS patients, MedLine Plus is also a health database maintained by NIH's National Library of Medicine to provide health information on HIV/AIDS. It is a National Institute of Health website for patients and their families and friends, produced by National Library of Medicine which provides information about diseases, conditions associated with HIV and wellness issues in languages that one could easily understand. It offers reliable, up-to-date information while PubMed is a comprehensive database of article titles and abstracts to health information, anywhere, anytime and for free. There is no doubt about the fact that using high quality information available will enhance the effective management of health system and the wellness of people globally.

According to the international journal of health informatics December (2009) on a survey on the use of health in formation in seven nations highlight as publish by Ashish, David, Daniel and Tim. The survey of the common wealth found became available in late 2006. The researchers were able to obtain result of health information among the ambulatory physician in only four of the seven nations: United State of America, Australia, Canada and United Kingdom. The result of the study of Ashish et al (2008) revealed four nations

(UK, Netherlands, Australia and New Zealand had universal application of health information among the practice. (each has 90% application). The Germany has (40-80%. US and Canada had a minority of ambulatory care physicians who proved that the use health information consistently has contributed (10-30%) to the success in health care service delivery while there is a quality of data for hospitals compared to countries who does not use health information management properly.

According to Tang and McDonald (2006) as cited by Health information Systems: Concepts, Methodologies, Tools, and Applications, "Health Information is information about an individual's lifetime health status and health care, stored such that it can serve the multiple legitimate users of the record. Iakovidis (1998) also argues that the purpose of health information, he said that information should be toward the support of continuity of care, education and research. On the other hand, health information system is defined as a set of interoperable information system components establishing appropriate mechanisms to generate, use, store and retrieve information while ensuring confidentiality at all times (Blobel, 2002).

There are many perceived benefits of making health information systems interoperable. Health information can contribute to more effective and efficient patient care by facilitating the retrieval, organization, processing, communication and viewing of patient health record data from different sites (Tang and McDonald 2006).The duplicate data entry and prescribing can be avoided, while real-time transferring of patient data between care sites can be improved, if information is captured, maintained, and communicated securely and consistently, in line with clinical needs. Moreover, health information systems complimented by clinical decision support tools are capable of reducing errors, improve productivity and decision- making choices, benefit patient care by providing automatic reminders, alerts to possible drug interactions, flag of abnormal values and lists of possible explanations for those abnormalities, along with other possible functions too numerous and constantly evolving to mention (Garg et al., 2005). Nevertheless, meeting these potential requirements and benefits necessitates the interoperability among various clinical oriented information systems that support the seamless communication of health record data, while preserving faithfully the clinical meaning of the individual authored contributions within it. Electronic Health Records is interoperability of different information technology systems and software applications to communicate by exchanging data accurately, effectively and consistently to use the information that has been exchanged. More specifically, according to Brown and Reynolds (2000).

I.1 The ability to communicate data (connectivity).

a. The data received by the receiving system is sufficient to perform the task and the meaning attached to each data item is the same as the understood by the creators and users of the sending and receiving systems.

b. The task is performed to the satisfaction of the user of the receiving system

The outcome of this effort was the development and evaluation of different health information prototypes, which were based on a set of architecture models, exchange formats, specifications of access and integration tools and a standard architecture, all made available and placed in the public domain. This initiative was later continued under the name good electronic health record (health information) with strong participation from Australia. Currently, this initiative is maintained by an international online, non- profit organization, called the open health information foundation, whose aim is to promote and facilitate progress towards the development of high-quality and interoperable health information's to support the needs of patients and clinicians. the concept of these initiatives, proposed and defined independently by the Australian health information team, is a

knowledge-based model, also known as the archetype modeling technique, which facilitates on one hand the specification of a generic clinical record structure, and on the other hand the specific semantic definitions of clinical contents that need to be standardized (beale, 2002). This model utilizes a dual- level methodology to define the health information structure, more specifically, the first level.

I.2 Health Information System (H.I.S)

A Health Information System (H.I.S.) is defined as a system that deals with the collection, procession and storage of all data and information created and handled in a hospital. (Winter, 2001) According to another approach, the Health Information System (H.I.S.) is defined as a socio-technical subsystem. It is implemented only when the social, technical and economic dimensions are optimized and structured around autonomous working groups.(Winter, 2001) Under this approach a Health Information System (H.I.S.) consists of two subsystems:

- The computer-supported system and
- The Non-computer-supported system

The concept of computer-supported system is any computer system designed to facilitate the management of administrative and medical information moving around a hospital, with the ultimate aim of improving the quality of care provided.

In each case, the Health Information System (H.I.S.) cannot be considered as mere information procedure, although it is not associated with the supplied knowledge, since the creation, recovery and transformation of data is created within the hospital setting, and is directly related to receiving, monitoring and decision supporting by data analysis. For this reason, the modern modeling of Health Information System (H.I.S.) is supporting the sustainability and the interoperability of each system to distinguish knowledge and information. (Degouled, 1997)

These approaches require the approval of clinical information systems, as a subsystem of the Health Information System (H.I.S.), which together with the laboratory information system (L.I.S.) and the Nursing Subsystem are the main components of an Integrated Health Information System in a Hospital.

Besides, the traditional concept of the hospital has now been extended with the concept of acute health care organizations, consistently, the Health Information System (H.I.S.), which is considered as management information systems, to consist of the following applications (Smith, 2000):

- General services: Catering, personnel, supplies and maintenance
- Financial applications: Accounting and payroll
- Clinical applications: Pharmacy and laboratories
- Management of patients: Imports, exports, and emergency health record

Although generally there is a discrepancy regarding the most appropriate model for describing a Health Information System (H.I.S.), the most interest will be focused both separation and classification of subsystems, as the fullness of all supporting applications for optimal operation of the hospital. (Beale, 2002)

However, in general acceptance, each Integrated Health Information System in a Hospital must have the following main objectives (Littlejohns, 2003):

- Improve patient's care
- Improving the management of the hospital
- Improve the role of the hospital in the broader of health system

In this paper, we consider the following interconnected subsystems as basic units of Integrated Health Information System in a Hospital:

- Administrative Budget Subsystem (A.B.S.): Management Personnel and payroll protocol, analytical and general accounting, asset management, treasury and hardware stores, supply management and procurement and payables management and available.
- Management of Patient System (M.P.S.): Management of import and export patient, appointments and evening outpatient clinics, medical expenses, cost of medical procedures, pharmacy management and individual / general prescriptive medicines and medical supplies, reagents management, project management and maintenance of therapeutic diets based claims and management of feedstock.
- Medical Subsystem (M.S.): Management and monitoring of inpatient and outpatient management of medical diagnoses and findings, patient records.
- Laboratory Information System (L.I.S.): Management of laboratory tests and sampling applications consumables and reagents and management results.

I.3 Nursing Subsystem (N.S.): Management of nursing care, drug delivery and use of health materials, compliance with treatment and monitoring of disease progression, management of beds and special situations and accountability.

I.4 Management Information System (M.I.S)

The decisions of the management of the hospital organization must be based on availability, analysis and data processing and information that can be gathered from the individual parts of the organization. The Management Information System (M.I.S.) provides the ability to collect data from all activities of the organization, so that proper composition indicators arise who will evaluate the activities and assist the administration in making decisions. The M.I.S. in a hospital draws information from all the hospital information subsystems and presents comprehensible and workable manner to management. (Vagelatos, 2010)The data, which needed at least one Management Information System in a Hospital, is not limited by:

- Cost data.
- Personnel data and salary data.
- Medical instruments incurred by patients.
- Diagnostics

V.THE NEED FOR HEALTH INFORMATION SYSTEM

Nowadays there are reasons that make necessary the introducing and proper use of an information system in modern hospitals, under the overall need improving both their mode of operation and the service of health. The main specific objectives that must be met for the purpose is:

The overall improvement of hospital services (improving quality care and service to patients). (Lousa, 2010) This goal can be achieved by:

- Introducing and managing electronic health records, which it will gather and present all the appropriate data in critical care factors, course of disease, etc.
- Correlating of these data in accordance with the rules of medical science to serve the physicians in making decisions relevant to the proposed action.
- Providing accessibility on older care records (in the same and/or in another hospital) to be directly, trace the history of the patient.
- Reducing bureaucracy.
- Improving reporting of transactions and speed servicing.
- Minimizing errors.

One other goal is the limitation of manual processes and the improvement of working environment. This goal can be achieved by:

- The automation of processes.
- The linkage and integration of individual systems in a complete system.
- The upgrading of the internal working environment.
- The assured efficiency in handling daily operations.
- The management and development of human resources.
- The use of modern information technologies.

II. 1 Basic Health Information Subsystems

The information subsystems which are making up an Integrated Health Information System in a Hospital distinguished the following subsystems: the Health Information System (H.I.S.), the Laboratory Information Systems (L.I.S.), the Management Information System (M.I.S.) and the Picture Archiving and Communication Systems (P.A.C.S.) (Winter, 2001)

II. 2 Laboratory Information Systems (L.I.S)

Laboratory Information Systems (L.I.S.) software is installed on a computer, which is connected to the appropriate medical equipment. They are responsible for storage of clinical data, for the verify of the accuracy of the tests, for the calibration, for the creating or updating patient records, for the gathering information from a variety of equipment such as blood analyzers.

The medical devices that perform various measurements called lab analysts and have microprocessors that control and coordinate the proper functioning of equipment. The user can carry the same time the electronic laboratory information system metrics from devices. The laboratory analyzers used to interconnect whole system through specific provisions related to a computer and the system thus a single body of production.

The ideal laboratory information system is well established in the medical field when it has to be adapted to the needs and specificities of each hospital laboratories or diagnostic center.(Vagelatos, 2010) General characteristics of an information system laboratory are:

- Unidirectional and bidirectional communication with a host of automatic analyzers
- Order laboratory tests in real time
- Approval and reading results in real time
- Connectivity results and diagnoses
- Management quality medical devices
- Monitoring Supplies
- Statistical analysis

In such a system the software is structured with the reasoning of many users, each has different powers and access to traveling information. Allowing full customization it separation of all laboratories in individual parts, the determination staff of the department and examinations carried out each section. It manages the historical examinations of all patients monitoring tests per patient, part laboratory and clinical, insurance carrier and optionally can perform invoicing and monitor all relevant financial information.(Vagelatos, 2010)

VI. BENEFIT OF DATABASE IN HEALTH INFORMATION SYSTEMS

The main advantages from the use of databases are (Lousa, 2010):

a) **Reduction of unnecessary data**. Redundant data called when those deleted from the database do not decrease the content's information. Generally, the redundant data may be either repeats data stored in different files or data stored can be derived from others. For example, if the application program of health records and the L.I.S. of an organism using two different files, with common data in the hospital's patients, the data is unnecessary repeated.

b) **Independence of data.** The data independence means that application programs do not depend on the organization and access the data files they use. Thus, the applications are not affected by changes in the physical or logical structure of database's data, but also when adding new fields in the records of the databasethe modifications are limited only to programs which use these new fields, for example changes in the areas of office traffic will not affect the patient data used by the health records.

c) **Sharing of data**. The data stored in the database can be used by multiple applications, which contribute to the efficient operation of the information system of hospital. For example the data that is recorded at the Office Personnel can be used by applying the application of payroll.

d) **Data protection**. The central control in the database can be ensuring access to sensitive data (e.g. data of health record) from certain applications and users only with relevant jurisdiction.

e) **Integrity of data**. The maintaining of integrity means that data stored in the database is accurate. Mechanisms of D.B.M.S ensure integrity violation of typing errors, mistakes application programs from incomplete data processing result in damage to computer systems.

Disadvantages of databases

The main disadvantages from the use of databases are (Lousa, 2010):

a) **Requirements to qualified personnel**. For the effective development of information system based on database environment requires staff to be properly trained in the use of the potential D.B.M.S. but also in design

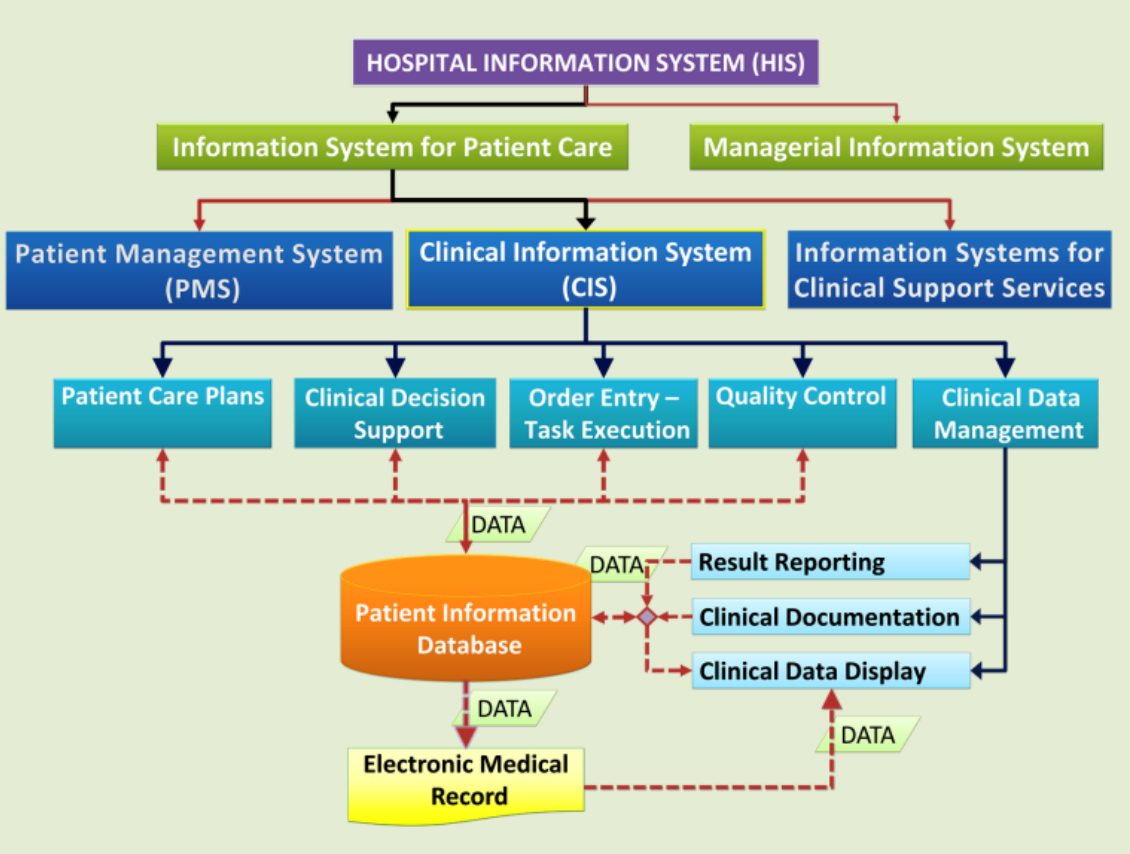
of databases. Staffing failure of the computer departments of hospital with relevant skills leads them to third parties for serving needs with high cost.

b) **Cost of D.B.M.S**. The supply cost of a D.B.M.S. (including the cost of support, training and maintenance) depends on the number of licenses and the computational system for which it is intended.

c) **Problems in Data Security and Integrity**. In case that the weaknesses of the D.B.M.S. are supporting the security procedures and data integrity, the hospital may experience significant operational problems. Also the design phase of the database is the most important step to ensure the integrity and security of data.

VII.CLINICAL INFORMATION SYSTEM

The Clinical Information System (CIS) facilitates direct patient care i.e. activities where care providers i.e. mainly doctors and nurses but also includes Dietitians, Therapists, Clinical psychologists, Clinical pharmacists, Clinical Microbiologists, Interventional Radiologists, Endoscopists, Optometrists, Audiologists and many others. A good CIS provides assistance and guidance for clinicians to perform their work besides capturing pertinent data that is generated.



VIII. EMPIRICAL STUDIES

Some prior work has studied the relationships among hospital costs, and technical efficiency. Blank and Van Hulst (2009) studied the relationship between health information and health care service delivery in Dutch hospitals. Using panel data from 1995 to 2002, they found that there is a significant relationship between them.

Lee and Wan (2003) used DEA and a structural equations model to estimate the relationship between information system integration and hospital technical efficiency. Using data from 349 U.S. urban hospitals in 1997 and 1998, they found that information system integration was associated with a positive efficiency score in 1997- 2007. Their information system measures included an index of clinical systems, but they did not specifically examine the use of EMR.

Kazley and Ozcan (2009) used DEA and windows analysis to examine the relationship between patient information management and effective health care service delivery, using data on 4,606 U.S. hospitals in 2001 and 2004, they found a significant association between them and higher efficiency for small hospitals, but no evidence that patient's information improved efficiency over time. Their measure was a binary indicator for whether the hospital had a computerized patient record with automated status.

Ancarani, Di Mauro, and Giammanco (2009) examined the impact of patient's information and other firm characteristics on hospital units' technical efficiency. With data from a large Italian hospital in 2004, they employed DEA to derive efficiency scores and then regresed these scores on patient's information use and other managerial/organizational aspects. They found that patient's information had a positive and significant relationship with technical efficiency in terms of clinical health care services.

IX. CONCLUSION

Despite of the potential benefits and contribution of patient's health information for effective health care service delivery, as revealed by many Studies there are still many errors in the proper data collection, maintenance and management of the entire data.

X. RECOMMENDATIONS

[1.] In view of the above, the following recommendations are suggested for effective and efficient health information services:

[2.] Provision of trained Health Records professionals to manage Electronic Health Records.

[3.] Computerization of clinical service department should be done for better health care services and developing a good clinical databank that will ease research, training in health care system as well as planning.

[4.] There is need to purchase licensed, recommended software for electronic health records for smooth running.

[5.] There is need for train and retrain of health records personnel for upgrading their skills on

[6.] Information management, since it is a continuous program or a dynamic system.

[7.] There should be constant supply of light or solar system in hospitals and other health institutions.

[8.] Federal government should provide adequate funding to health care delivery.

[9.] Rapid upgrading of electronic health record and use of electronic Coding system

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