Journal of Health Informatics in Africa

11th Health Informatics in Africa Conference (HELINA 2018)
Peer-reviewed and selected under the responsibility of the Scientific Programme Committee

Hospital Information Systems in the Ghanaian Psychiatric Hospitals: Post Act 846 of 2012 Review Analysis

Welborn Amoako Marful[1] and Alfred Winter[2]

[1] Department of Computer Science and Information Technology, University of Cape Coast, Ghana.
[2] Institute for Medical Informatics, Statistics and Epidemiology (IMISE), Leipzig University, Germany.

Introduction: Information systems are expected to exist in every hospital in almost every country to offer a systematic process of collecting appropriate records for health service delivery at all levels. This holds at least for non-computer-based information systems. Quality healthcare by hospitals depends mostly on well-organised data for accuracy, timeliness and completeness and representativeness.
Objective: This study assessed existing the existing information system scenarios in psychiatric hospitals in Ghana since the passage of the Act 846 of 2012 which aims to transform the psychiatric health system in Ghana.
Methods: The authority responsible for psychiatric health in Ghana was contacted for access to the three psychiatric hospitals to arrange interviews and document reviews. The study used structured interviews to gather information from the psychiatric hospitals' directors, hospital administrators, records officers, additional staff each from hospitals for analysis.
Results and Conclusions: The analysis suggests the presence of independent information systems in these hospitals which are manual-based systems. The various systems in the hospitals have been in existence for years with no knowledge of migrating to computer-based hospital information systems. The analysis further suggests the need for a trans-institutional computer-based information system to improve psychiatric service delivery and to ease information exchange for management decisions and policies.

Keywords: Hospital Information System (HIS), Information System (IS), Information Management (IM), Information Technology (IT), Trans-institutional health information systems (tHIS), Psychiatric, Ghana.

1 Introduction

Health service and health delivery are known to be a developmental issue around the globe both in developed and developing countries. Managing the health information system (HIS) ought to be an essential part of all health systems. This will make the provision of information more reliable and timelier for treatment needs, efficient resource allocation and policy formulation. There the need for attention to be given to the importance of healthcare systems to offer the needed medical support. To provide medical assistance if not solutions in countries, hospitals and other international aid agencies and Non-Governmental Organizations (NGOs) will rely on a well-functioning system the information required.

Globally, psychiatric health needs significant attention because of particular issues and problems of placing a significant burden on other aspects of health and well-being. This is true because mental health problems are becoming a growing public health concern (1) as a result of population growth.

* Corresponding author address: wmarful@ucc.edu.gh
 J Health Inform Afr. 2018;5(2):27-31. DOI: 10.12856/JHIA-2018-v5-i2-203

However, healthcare organisations including psychiatry have realised the need to increase efficiency, reduce operational costs and improve patient care and safety to deliver the quality of services to patients as well as staff. To provide high-quality patient care and effective economic management of psychiatric hospitals, it is essential that the hospital information system (HIS) can become an integral part of the service delivery so as make correct information fully available on when, where and the format needed. This will allow for the fast and efficient processing of important information that cuts across professional boundaries within these institutions and to improve the productivity of health professionals.

Problems in psychiatric health are not only found in rich countries but also in low-income and middle-income countries. Similarly, in the Africa, psychiatric problems like low funding coupled with conflicts, natural disasters and brain drain of mental health professionals from government services (1) are also compounded by fragmented and independent information systems (ISs) leading to inconsistent and contradictory information (2) in psychiatric health producing poor quality information and unfavourably affect the smooth delivery of healthcare services and management.

This situation is not different in Ghana with psychiatric health constituting a burden on public health as few resources are allocated for service delivery. Quality healthcare services by hospitals depend mostly on systems to produce important health information (3) which is well-organised data for accuracy, timeliness and completeness and representativeness. An information system is, therefore, expected to exist in every hospital to offer a systematic process of collecting appropriate records for health service delivery at all levels.

However, HIS seems the only promising factor aimed at meeting most operational challenges facing hospitals and the healthcare-related organisations having the task to support patient care, hospital administration and economic business management within hospitals. As "socio-technical subsystem of an institution, HIS comprises all information processing as well as the associated human or technical actors in their respective information processing roles." (4). Appropriate information and HIS are crucial to strengthening the health system in developing countries (5).

The Ministry of Health (MoH) in Ghana is responsible for all health-related issues and advises the government as well. Before 2012, when the Mental Health Act (Act 846 of 2012) (6) was passed, all public health care delivery services including psychiatry were performed by the Ghana Health Services (GHS) and the Teaching Hospitals.

Subsequently, the Act established the Mental Health Authority (MHA) in 2012 to oversee the Psychiatric Health activities in Ghana. Since independence in 1957, Ghana with a population of 28 million has only three state-owned psychiatric hospitals; namely, Accra Psychiatric Hospital, Pantang Psychiatric Hospital and Ankaful Psychiatric Hospital.

This study aims at assessing the existing information system scenarios in the psychiatric hospitals in Ghana since the passage of the Act 846 of 2012 which aims to transform the psychiatric health system in Ghana.

2 Methods

The MHA which is responsible for psychiatric health issues in Ghana was contacted for access to the three psychiatric hospitals to arrange interviews and document reviews.

2.1 Data Collection

Interviews using structured questions for qualitative evaluation were conducted in the three psychiatric hospitals to find the information system situation since the Act 846 of 2012 was passed. The first phase period spanned between May and July 2016 during which 13 respondents comprising of the three psychiatric hospitals' directors, two hospital administrators, two information technology (IT) personnel, three records officers and three additional staff each from hospitals were interviewed to assess the complete information system condition.

During the second phase interviews in a year later between June and July 2017, only the hospital directors and the IT personnel were involved again using structured questions to ascertain if any changes had been made to the information system and management situation.

 J Health Inform Afr. 2018;5(2):27-31. DOI: 10.12856/JHIA-2018-v5-i2-203

2.2 Document Analysis

A methodological review of available documents in the facilities was undertaken to obtain an additional comprehensive view of the information system. Available documents in the hospitals containing information for this study were evaluated to supplement the interviews results. These documents were mainly used for data collection, processing, management and exchanges such as different patients' forms folders, and report formats. Such documents offered the source of information, how information is processed, managed and exchanged. The analysis of the documents was successful as it was done along during interviews with the respondents who are all staff of the hospitals.

3 Results

The results of this study are mainly presented based on the three-layer graph-based meta-model ($3LGM^2$) tool after the general information systems and processing in the psychiatric hospitals. The $3LGM^2$ tool provides an effective means for describing and even modelling hospital information system based on hospital functions at the domain layer, logical tool layer concentrating on application components supporting enterprise functions systems and the physical tool layer describing the physical data processing components.

3.1 Information Systems

Information technology in this modern world is seen as an important breakthrough in most if not all aspects of life. The full benefits of IT in health including psychiatry can be realised with a well-organised infrastructure necessary to support service delivery and security during an exchange of health information beyond an individual provider or health care delivery system.

To provide quality and improved services, hospitals need to put in place an information system that is most efficient and effective for the management of information that is vital in healthcare related decision-making. Despite the benefits of a computer-based information system in hospitals, the analysis from the interviews portrayed the complete existence of manual-based information systems in all the three hospitals. The systems are also fragmented within hospitals and independent among them. The respondents are, however, aware of these systems and their effects but have no idea when such systems would be changed for a computer-based to reap the benefits.

Additionally, the current information system in the psychiatric hospitals in Ghana demonstrates a shortfall in meeting these requirements towards the adoption and use of information systems in care delivery. Despite the current information system's ability to support the functions, weaknesses such as low security, duplication of records and missing files with regards to paper-based records still exist.

It came to light through the study that the hospital with IT department does not recognise such department as a core functional unit in the hospital. For instance, the personnel responsible for IT issues are not considered part of management members of the hospitals. Reviewing the available documents, the IT departments were either missing from the organisational structure or not given any prominence. Apart from the Pantang hospital director who shown a keen interest in adopting a computer-based system, the others could not provide any convincing reasons of the readiness to move towards the use of computer-based information systems to support the hospitals' functions.

The interviews at the records department and with other respondents confirmed the existence of non-computer-based information system in these hospitals. Information collection and processing in the psychiatric hospitals are done manually like the use of pens, calculators, paper forms and folders to provide the needed services. All the personnel in charge of records indicated that the storage and management of most information such as patients' and hospital-related records are also in the paper-based filing system and stored on shelves.

3.1.1 Functions and Entity Types (Domain Layer).

Aiming to describe the current situation and to obtain a holistic view of the information system, this study obtained candid information on the existing hospital (enterprise) functions (like Patient admission and Patient Discharge and Transfer) and the entity types (like Patient details and Reports) which were identified

 J Health Inform Afr. 2018;5(2):27-31. DOI: 10.12856/JHIA-2018-v5-i2-203

as being similar in the hospitals. These functions and entity types provided a better understanding of the systems for data collection, processing, storage and dissemination within the hospitals or with other external institutions.

The complete psychiatric health care in Ghana as may exist elsewhere comprises information about patients and their relations, specialised medical professionals (psychiatrists and psychiatrists nurses) and other institutions are involved in care delivery. Additionally, the hospitals deal with other external institutions needing their services. The presence of such collaborations means that information is exchanged.

3.1.2 Application systems and their Integration (Logical Tool Layer).

The application components are responsible for the processing, storage and transportation of data representing entity types. The analysis of the interviews results revealed that there is the presence of both computer-based and non-computer-based application components used in the hospitals to support the functions and entity types.

The hospitals' functions are mainly supported by non-computer-based application components containing the patient records in paper-based forms kept as folders in each hospital. These non-computer-based applications components have no computer-based interface to communicate with any other unit hence are moved and used by human actors. These are used to communicate with the other units of the hospital such as the laboratory and to communicate with any other external institution like the judicial service.

In addition to a special laboratories application software, the analysis further depicted that, only the Pantang psychiatric hospital that uses a Mental health information system (MHIS) software application in addition to the manual system. The MHIS contains a spreadsheet software (Microsoft Excel) and Patient database (EPI info) for easy storage, processing, updating and retrieval of patient health and other related records. Although useful, participants from the other two psychiatric hospitals indicated that there are no such databases in their facilities.

With specific importance to security and storage patients' information and other information are is kept confidentially in paper format in files and folders. They are only released upon written request.

The responses from the interviews indicate that the hospitals deal with other external institutions to which information is exchanged and as seen in Table 1 below.

Institution Name	**Information exchanged**
Ministry of Health	Annual review reports
Mental Health Authority	Annual review, quarterly review and financial status reports
Practitioners and other psychiatric hospitals	Medical and status reports
Insurance companies	Claims data
Police, Prisons and Judicial Services	Discharged letters, patient's status or assessment reports

Table 1. Institutions and the kind of information exchanged

The interview responses further confirmed that the information is exchanged predominantly in printed-paper format. For security and confidentiality purposes, they are kept in a sealed envelope, and either hand-delivered or sent by traditional post. Occasionally, the required information may be sent by via Short-Message-Service (SMS) or WhatsApp messenger especially when they brief.

3.1.3 Computers and their communication (Physical Tool Layer).

The physical tool layer is responsible for the physical data processing components such as computers, servers, network components can be touched and used to receive, forward, store, or purposefully process data but also include non-computer supported devices.

The interview analysis pointed out of the existence of predominantly non-computer supported devices in all units the hospitals. The data generation is basically done with the use of a non-computer-based physical data processing components (like a patient folder, pens, pencils, calculators, telephones and paper-based patient for care services and "Monthly Outpatients Morbidity Returns Tally Sheet" and printed reports for communication with the MHA etc.

 J Health Inform Afr. 2018;5(2):27-31. DOI: 10.12856/JHIA-2018-v5-i2-203

In addition to a computer at the Pantang hospital used for the MHIS, each hospital has a computer and printer in its laboratory. There is also the presence of standalone computers, printers and photocopiers in the administrative office not for supporting clinical duties but for secretarial and other administrative works.

3.2 IT Governance and Information Management (IM) Policies

The role of good IT governance and information management serve as the basis for sustaining high-quality health information systems (HIS) in hospitals to produce and manage hospitals' information. A significant component of the interviews was, therefore, devoted to identifying the presence of IT governance and IM policies if any in the hospitals. Despite the existence of information which is non-computer-based, the interviews responses exposed that there are no such policies to provide a strategic means for processing and managing information in the hospitals. Given the findings, IT governance and information management policy issues for effective and efficient use of IT are absent in the Ghanaian psychiatric hospitals. This, thus, suggests that there is the absence of a standard for governance and management of information in the hospitals.

The responses asserted that two of the three hospitals (Accra Psychiatric Hospital and Pantang Psychiatric Hospital) has a dedicated IT department and headed by professional IT staff. Nevertheless, in both situations, the IT staff are not members of management body hence all IT issues and policies are based on the decisions of the non-IT staff who are mainly health workers.

4 Discussions

Information technology in this modern world is seen as an important breakthrough in most if not all aspects of life. The full benefits of IT in health including psychiatry can only be realised using a well-organised infrastructure necessary to support service delivery and security during an exchange of health information beyond an individual provider or health care delivery system.

There are several pieces of evidence to show the growing use of computer-based information systems in healthcare in most developed countries in Europe and the United States leading to improved quality of health care. However, unlike the other industries, healthcare has suffered in benefiting from the capabilities of computers and related to improving services, knowledge, communication, outcomes, quality, and efficiency (7), especially in Ghana.

Between May 2016 and July 2017, a general assessment of the existing information system was performed it came out that the overall health information system management was weak, data collection in the health facilities was poorly organized, and the flow of information was fragmented.

The described results from the study conducted on the information system in the psychiatric hospitals in Ghana revealed the following consequences:

- The use of a non-computer-based tool to capture data is likely to cause errors, inaccuracies and delays information processing and retrieval.
- The fragmented and independent information systems in psychiatric hospitals may produce poor quality information and unfavourably, affecting the smooth delivery of healthcare services and management.
- The improper alignment of the information technology departments functions with that of the hospital's functions may limit the quality of service and delays in the reporting and information exchanges.
- The current manual working system, using a paper-based file system for keeping record, processing and management of patients' records. Such system causes inefficiencies, reduced productivity and delays in assessing the needed information.
- The reported existing information system and communication exchanges have negative effects on patient health because it may become difficult at times to track patient records leading to inaccuracies in reporting on patients' status. This is because accurate information provides a correct representation of the factual value required for effective usage and of the planned characteristics of a concept.
- The presence of manual systems in the hospitals makes the exposes both health and non-health date to lots of vulnerabilities and insecurity.

 J Health Inform Afr. 2018;5(2):27-31. DOI: 10.12856/JHIA-2018-v5-i2-203

5 Conclusion

The current information system in the three psychiatric hospitals in Ghana have been assessed using structured interviews, and the results have been presented. The responses confirmed the presence of an information system and information processing in the hospitals which are manual-based coupled with been fragmented and independent. The current system for service delivery has been in existence for years with no knowledge of migrating to computer-based hospital information systems.

Information is considered as a strategic asset in hospitals including psychiatric hospitals hence its integrity, accuracy, security and availability must be observed. It is important to consider supporting the psychiatric hospitals in Ghana with high-quality computer-based information systems through systematic planning, monitoring and direction.

The above consequences further suggest the need for a trans-institutional hospital information system (tPHIS) which will be computer-based information system to improve improved psychiatric service delivery and to ease information exchange for management decisions and policies. The tHIS will be the best solution to address the issue of fragmented and independent information systems to ease challenges and improve communication among these institutions since it will become the network of the various HISs of the three psychiatric hospitals.

The Mental Health Authority should consider using the Act 846 of 2012 to embrace the use of information and communication technology for information processing and management in psychiatric health service delivery in Ghana. The existing information system situation may have been because of low budgetary allocation and other impediments in the sub-sector.

References

[1] Hanlon C, Wondimagegn D, Alem A. Lessons learned in developing community mental health care in Africa. World Psychiatry. 2010;9(3):185–9.

[2] Dlodlo N, Systems SH. The Status of Integration of Health Information Systems in Namibia. Electron J Inf Syst Eval [Internet]. 2017 [cited 2018 May 13];20(2). Available from: http://www.ejise.com/issue/download.html?idArticle=1040

[3] Kihuba E, Gathara D, Mwinga S, Mulaku M, Kosgei R, Mogoa W, et al. Assessing the ability of health information systems in hospitals to support evidence-informed decisions in Kenya. Glob Health Action [Internet]. 2014 [cited 2018 May 13];7:24859. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25084834

[4] Winter A, Haux R, Ammenwerth E, Brigl B, Hellrung N, Jahn F. Health Information Systems: Architectures and Strategies. 2nd ed. Springer-Verlag, London; 2011.

[5] WHO. Health Information Toolkit on monitoring health systems strengthening. 2008 [cited 2017 May 8]; Available from: http://www.who.int/healthinfo/statistics/toolkit_hss/EN_PDF_Toolkit_HSS_InformationSystems.pdf

[6] Ghana R of. Mental Health Act, 2012, Act 846. Ghana Publ Co. 2012;Act 846:1–44.

[7] Ortiz E, Clancy CM. Use of information technology to improve the quality of health care in the United States. Health Serv Res. 2003;38(2):xi--xxii.

 J Health Inform Afr. 2018;5(2):27-31. DOI: 10.12856/JHIA-2018-v5-i2-203