

UNIVERSITY OF OSLO
Department of Informatics

Security, Privacy and Policy in
Management of Patients' Data:
A case study from Malawi

Master Thesis

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Dedication

I dedicate this thesis to my wife Emma and our son Dwight

Abstract

One of the growing concerns in health systems is the security of health information and patients' records. Through literature I have found out that these concerns are mostly viewed in developed countries unlike in least developing countries. The lack of good policies enforcing privacy and confidentiality of health information has resulted in adverse effects in the delivery of good healthcare services in developing countries. The research has aimed at understanding the extent to which policies facilitates the management of patients' data with respect to its privacy and confidentiality at Kamuzu.

A case study approach was used to understand the context in whole and a qualitative research approach used in analyzing the findings of the research. As such empirical techniques for data collection within a case study such as document analysis, observations and interviews were used in this research. Activity Theory is the theoretical framework was used in this research. At the end, I provide recommendations on how policy and security can better fit in maintaining privacy and confidentiality of patients' data.

The results have showed that several systems being used for data management at KCH and there are policies and legislation that governs health workers in their work places. These policies and legislation are outdated which calls for their amendment to include technological changes that have been happening in the hospital. There is also need to train health workers to be abreast with the legislation, policies, working guidelines and technological changes so as to effectively carry out their work.

Keywords: Activity Theory, Policy, Privacy, Confidentiality, Computerized Information Systems, Nurses, Clerks

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Abbreviations and Acronyms

AR	Action Research
AT	Activity Theory
CHAM	Christian Health Association of Malawi
DHIS	District Health Information System
EHP	Essential Health Package
EPR	Electronic Patient Register
HA	Health Assistant
HCI	Human Computer Interaction
HIS	Health Information Systems
HMIS	Health Management Information Systems
ICT	Information and Communications Technology
IS	Information Systems
KCH	Kamuzu Central Hospital
MOHP	Ministry of Health and Population
OPD	Out Patient Department
QECH	Queen Elizabeth Central Hospital
TSPMIS	Touch Screen Patient Management Information System

1 Introduction

If a drug manufacturer mails patients literature about a drug the manufacturer knows they are taking, based on a pharmacy's database, is that misuse? Or is it a public service? Would patients answer differently depending on whether their drug was for heart disease or AIDS? Would patients be surprised that their prescription information was being used for marketing purposes, or would they think it a perfectly logical and appropriate activity? (Dennis, 2000, p. 4)

How far can patients' data be made readily available to third parties? From the above scenario, if the "leaked" prescription was of another ailment apart from the two mentioned, would it still be considered as a breach of privacy? Another scenario will be if a health worker who is not involved in medical care of either a friend or relative accesses their health records without their consent in order to help, can it also be considered as a breach to privacy or not?

It is obvious that patients' data is private and confidential. This is because it contains personal identification information together with ones health problems or conditions, diagnostics, medication, just to mention a few. Having this in mind and with respect to current policies and guidelines, how far do they address issues of privacy and confidentiality toward managing patients' data in our hospitals?

With the growing use of computers within our societies, there are also worries on the security and privacy of information. Even with computerized health information systems, there is a need to assure patients that their data will remain private and confidential. Dennis pointed out that easier and rapid access of records is one benefit of computerizing information but this also poses a potential threat to confidentiality (Dennis, 2000). She also

pointed out that a few people may argue that risks of computerization outweigh the benefits. Therefore, “careful thought must be given to the design of safeguards for computerized patient data so that these systems enhance rather than detract from the security and confidentiality of health information” (Dennis, 2000, p.6).

For example, due to strict access controls it would be unreasonable to impose system security constraints that would prevent a doctor to access records of a patient who is in a critical condition. In this scenario, it can be noted that too much emphasis on security may hinder legitimate access to patients’ data and the opposite is also true. If access controls are loose, there is needed to strike a balance between the two. As such, in this research I also researched on this is another area that this thesis also researched on.

1.1 Motivation

The coming of computers has brought tremendous benefits to human kind (Karaja, 1995). The same has brought challenges with respect to availability of information. The challenge of accessing information from computer system has always fascinated me. I am also fascinated with Computer Forensics – the investigation on compromised computers and their systems for evidence. This has been the first motivating factor in carrying out this research. Computer Forensics can be used in considering the privacy of information and assuring whether the information has been compromised within a computer system. This in a way tarries with the debates that arises in the United States of America after the adoption of Kassebaum-Kennedy bill (Starr, 1997), on the privacy and security of personal health information. The main concern was and is still on challenges computerized health systems poses on the security of health information. Professor Merida Johns shared similar sentiments in her report on risks new computer technologies bring in

the health sector (Johns, 2002). She elaborated that Computerized Information Systems today make it easier to collect, maintain aggregate and disseminate health information than it was some years ago. Though there is close to none on the literature of privacy and security on patients' data in Malawi in relation to Health Information Systems (HIS), also considering that the Malawi Government through the Ministry of Health and Population (MOHP) has engaged the use of computerized Health Information Systems as one of the tools in attaining the its Millennium Development Goals (Malawi, 2003). The other challenge is on how to consolidate the computerized systems into the existing manual system without compromising patients' rights to privacy and confidentiality.

The other motivating factor to this research was the handling of patients' records in some hospitals. I have encountered a situation whereby a patient visits a hospital today and got treatment but their records are kept at the hospital. On the next visit, for continual treatment, the records have gone missing. There is no basis on what treatment the patient received last and what has to be done currently. Thus this prompted me to research on how patients' data is handled in our hospitals. How legislation and policies guide work practices and to what extent they are followed or not followed within our hospitals.

1.2 Definitions

The following section, presents the definition of the main concepts discussed in this research paper.

1.2.1 Health Information System

An information system is an organized collection, storage, and presentation system of data and other knowledge for decision-making, progress reporting, and planning and evaluation of programs. This can either be manual or

computerized, or a combination of both. Lippeveld and Sauerborn defined health information systems as a set of organized components and procedures having the objective of generating information which will improve health care management decisions at all levels of the health system (Lippeveld and Sauerborn, 2000). The definition suggests that HIS plays an important role in the provision of better healthcare service. Alike, Malawian government concurs with the same stance by introducing HIS in its health provision services through the Ministry of Health and Population (Malawi, 2003). Therefore, the overall objective of HIS is to improve the health services management through optimal information support as concurred by Lippeveld and Sauerborn (2000).

As such, some of Malawi's health personnel are in touch with ICT either as active users or as producers of data. The reports by MOHP in Malawi highlights the same (Chaulagai C N et al., 2001; Chaulagai C N et al., 2005). Just like what happened in USA after the adoption of Kassebaum-Kennedy bill (Starr, 1997) same worries clouds upon Malawi towards the safety of health information with the introduction of computers in healthcare services. Thus, what warrants security of information and right to privacy by patients?

By incorporating IS in Malawi health sector, there is also need to consider some complex issues as presented by (Zelmer et al., 1999). Some of these issues include the following: (i) preserving privacy, confidentiality, and security; (ii) identifying, compiling, and integrating high quality comparable data of different types from a wide range of sources; and (iii) preparing comprehensive easy-to-understand reports for the public on health and the health system. Even though some of these are incorporated in the new computerized health information systems, their effectiveness is not totally 100%. Lieber et al. explains that information technology / systems can have all necessary functionalities to effectively serve our health industry, but there

is more that needs to be done. They further said “*technology alone is not the solution. A complete solution involves technology, re-engineered work flow processes, user training and executive commitment*” (Lieber et al., 2003, p. 28).

1.2.2 Security

In information systems, computerised or manual, security is of major concern. To secure means to make certain something is protected from danger or risk and security is a state of being free from danger. It can also be defined as measures taken as a precaution against theft, espionage or sabotage. These definitions pin points to the fact that there is need to protect whatsoever against something. In IS unauthorised access to information poses a major threat. When it comes to HIS, major concern is towards unauthorised access to patients’ data as discussed in the following section on privacy and confidential.

In their book Committee on Maintaining Privacy and Security in Health Care Applications of the National Information Infrastructure, Commission on Physical Sciences, Mathematics, and Applications, National Research Council (1997) indicated that the major threat of health information or rather patients’ data is lack of control over legal or legitimate demands for data made by either second or third parties to the provision of health care services. The group proposes that protection of electronic health information requires a combination of both technical and organizational practices (ibid).

The works of Win (2005), Brooks and Warren (2004), Liu et al. (2003) proposes some technical aspects of implementing security measures over patients data within health information systems. Though the consideration is on users, the target is mainly the software. This differs with the study done by Brox on information security in distributed health information systems in Scandinavia (Brox, 2006). The study identified that it is

problematic to share sensitive health information among three different countries due to restrictions in legislations. All these cases leave a gap in understanding what policies there are in securing management of health information or patients' data within an organization. What are the weaknesses and strengths of current policies with the incorporation of computerized health systems and how these can be enhanced?

1.2.3 Privacy and Confidential

Most of the times, we tend to use privacy and confidential interchangeably. It is not easy to define privacy because it is subjective. The Cambridge University (2008) defines privacy as someone's right to keep their personal matters and relationships secret or the state of being alone. That is how we like to keep information pertaining to us to ourselves.

Concerning confidential, the Cambridge University (2008) defines it as being secret, often in a formal or military situation. As such, confidentiality restricts the accessibility and dissemination of information and, it is one of the six fundamental components of information security as defined by ImVajra (2009). Being a fundamental component of information security, it is also crucial in the health sector. The Brain Injury Resource Foundation (2009) also defines confidentiality as a principle which states that personal information about others, particularly patients, should not be revealed to persons not authorized to receive such information. Thus it is an undoubted fact that confidential has to do with a degree of trustworthiness with another party not necessarily the owners of information.

Needless to say, confidential and privacy goes hand in hand. As such, there is need for privacy in health information systems. Gostin et al. (1996, p.6) present the following reasons why there is need of privacy with health information.

1. *Patients, often physically and mentally vulnerable, divulge intimate details of their lives to their physician; medicine's paternalistic traditions have long recognized that the patients' weakened position compels strict confidentiality assurances even in the face of government demands.*
2. *Both law and ethics in the latter twentieth century emphasize autonomy as a theoretical justification for privacy; patient autonomy encompasses the right to control the dissemination of personal health information.*
3. *Confidentiality is central to a trusting physician/patient relationship; physicians implicitly or explicitly pledge to guard patient secrets.*
4. *Respecting confidences promotes patient candor about health and disease risks; failure to respect informational privacy could lead to decreased disclosures, less frank revelations, or, worse, reluctance to seek care.*
5. *Unauthorized disclosure of information could result in embarrassment, stigma, and discrimination.*

Healthcare information contains a vast amount of personal information: demographic information, genomic information, medical information, and special needs information, personal or social information (Gostin, 1997; Gostin et al., 1996). Therefore, the challenge that exists is managing this information, keeping it private and confidential in the whole process of providing better healthcare services.

1.2.4 Policy

In view of the above elements: HIS/IS, security, privacy and confidential, the question is what policies are there to guide all these elements in the management of health information? A policy is a plan of action to guide decisions and actions or a policy is a statement of principles and/or values that mandate or constrain the performance of activities used in achieving institutional goals. The term may apply to government, private sector

organizations and groups, and individuals. The health sector has policies too on governing its operations. Policies in the health sector provide a governance of good healthcare services. The exchange and sharing of this sensitive health information have to happen according to current external conditions established by laws, regulations and liable authorities. Brox says these external conditions create various limitations, making requests for adaptive health information systems. Especially, when developing new solutions, defining the balance between protection of personal privacy and availability of information, is a great challenge (Brox, 2006).

In her paper, Brox, concentrates on policies guiding the exchange of health information across borders (Brox, 2006). That is what legal frameworks there are in exchange of information between two different organisations residing in totally different geographical regions, worse still in different countries. Though she said that exchange of health information within the same organisation can be “*problematic*” (*ibid*), she never highlights how the laid-up policies are affecting the exchange of information within the same organisation or whether these policies are being followed. Muula in his paper on health rights and Malawi’s health problems, argues that health rights which are also promoted through legislations like the Malawi Public Health Act and policies like the Essential Health Package, can alleviate some of the health problems the country is facing (Muula, 2005). The gaps that exist are in the analysis and evaluation of these legislations and policies that have been long before put in place.

1.2.5 Management

TGGI (2009) defines management as a process used to achieve organizational goals. The group also provides four key functions to management which are:

1. Planning – this occurs at all levels of the organisation. Thus from top management down to the supporting staff. In this case from the

hospital administration all the way to different sections, units and wards of the hospital;

2. Organizing - this mainly deals with allocation of resources, division of labour and tasks and on the know-how of accomplish the tasks. The one in-charge at that particular time, links the resources, tasks and the knowledge in order to accomplish a desired task;
3. Directing – this is not synonymous with managing. It deals with creation of assignments, how they can be accomplished, interpretation of working policies, and informing workers on how to follow these policies in the course of their work. Basically it has to do with supervision of the workforce; and
4. Controlling - This is basically done by management. It involves evaluating of activities and assuring that organisational objectives and goal are being met.

1.2.6 Health Practitioner

Health personnel are those individuals who are working with the realm of the hospital. Within the health community, there are doctors, nurses, doctors' intern and student nurses. The Medical Council of Malawi (2007), use the term practitioner to mean medical doctors, surgeons, dentists or general practitioners. As for nurses, these are persons who are specially trained to take care of patients with various medical problems. Normally they help doctors in the daily duties.

1.2.7 Clerk

A clerk is a person who works with records, does recording keeping and filling.

1.3 Research Problem

On healthcare market, one of the up-coming commodities is health information (Moran, 1998). Due to some scrupulous minds of drugs makers

and insurers (*ibid*) as Moran points out, health information and patients records is of great importance to their businesses. This kind of information is most likely to be used for increasing sales of their commodities and hence maximizing on profits. It is apparent that health information and patients' records is supposed to be used by the right people for the right reasons and at the right time. For this reason there is need to secure patients records with regards to its confidentiality by keeping it safe as well as when transferring within and between health facilities.

Of recent, the Ministry of Health and Population introduced computerized systems like Electronic Patient Register (EPR) and Touch Screen Patient Management Information System (TSPMIS) in most of its major hospitals for handling patients records (Malawi, 2003). The purpose of these systems is to aid in management of patients' records. On the other hand, the Ministry of Health and Population is also adopting an Essential Health Package (Malawi, 2002). Essentially, some of EHP objectives are to contribute to poverty reduction in Malawi, to increase the efficiency of publicly funded health services and to improve equity of access to health services. The same EPH document provides a charter of patient's rights and responsibilities to be adopted of which has been as of now. The charter states that a patient has a *"right to adequate information; right to respect and dignity; right to privacy and confidentiality"* (*ibid*) just to mention a few.

Despite all these introductions of computerized systems, Essential Health Package, the promulgation of the charter on patients' rights and responsibilities, the other challenge health facilities are facing is on shortage on resources which includes human resource (Kang'ombe, 2008). There is a shortage of nurses and doctors. Therefore with these meager resources, to what extent are policies facilitating the management of patients' data with respect to its privacy and confidentiality?

1.4 Research Objectives

Since the objective of this research is to understand the management of patients' data in a government hospital, following are research objective questions to aid in addressing the problem question.

1. To what extent do existing policies influence health workers action when handling patients' data?
2. How do existing policies enhance or hinder legitimate access to and sharing of patient information need for treatment?
3. What is the capacity of health workers handling patients' data?
4. What is being done to complement the existing manual system with computerized system in order to maintain data privacy and confidentiality?

1.5 Research Context

In Malawi, there are a number of healthcare service providers. The Ministry of Health and Population (MOHP) accounts for 60% of the total healthcare service providers in the country. The Christian Health Association of Malawi (CHAM) comprising of independent church-related and other private voluntary agency facilities accounts for 27% of the providers, The Ministry of Local Government provides 8% and the Army, Police, private practitioners, commercial companies and pharmacies provide the rest (ONSD, 2005). The organization of the healthcare system is set such that rural hospitals, health centers, health posts, outreach clinics and through community initiatives provide primary level services. District hospitals and CHAM hospitals provide secondary levels while central hospitals provide tertiary level services (ONSD, 2005).

Being the leading provider in healthcare services, the Malawi government through MOHP has embarked on the usage Health Management Information Systems (HMIS) in its government hospitals (RHVP, 2006; Chaulagai C N et al., 2005). For example, Kamuzu Central Hospital is using the Electronic Patient Register to record patient data (Fraser et al., 2005). Hence the research was conducted at Kamuzu Central Hospital because of its usage of EPR and secondly, because it is one of the biggest referral and busiest hospitals in the country.

1.6 Thesis Structure

The thesis has been organised in way that Chapter 1 introduces the research. That is the research problem and the objective questions. Inclusive in it, are definitions of the main concepts discussed in this there plus the research context. Literature review is presented in Chapter 2. This presents the theoretical concept used in the research as well as other similar works around the research topic highlighting on what has been done and the gaps that exist between them and my research topic. Chapter 3 is on research methodology. Methods for data collection used like interviews, observation and questionnaires are talked of in this chapter. What transpired during and through the research is in Chapter 5, research findings. Basing on the findings and using the theory discussed in Chapter 2, Chapter 6 being the heart of this research and by using hermeneutics mode of analysis. Discusses and analyses the research with reference to the research problem and objective questions. The conclusion of the research and contributions are presented in Chapter 7.

2 Empirical Setting

This chapter presents the setting in which this research took place. The research was done at Kamuzu Central Hospital in Lilongwe district. As such, the country profile of Malawi is presented first stating the geographical location and population status. The situation on the health sector in Malawi is presented second highlighting on the facilities available and status on health personnel in government hospitals. Lastly information relating to Kamuzu Central Hospital is presented.

2.1 Country Profile

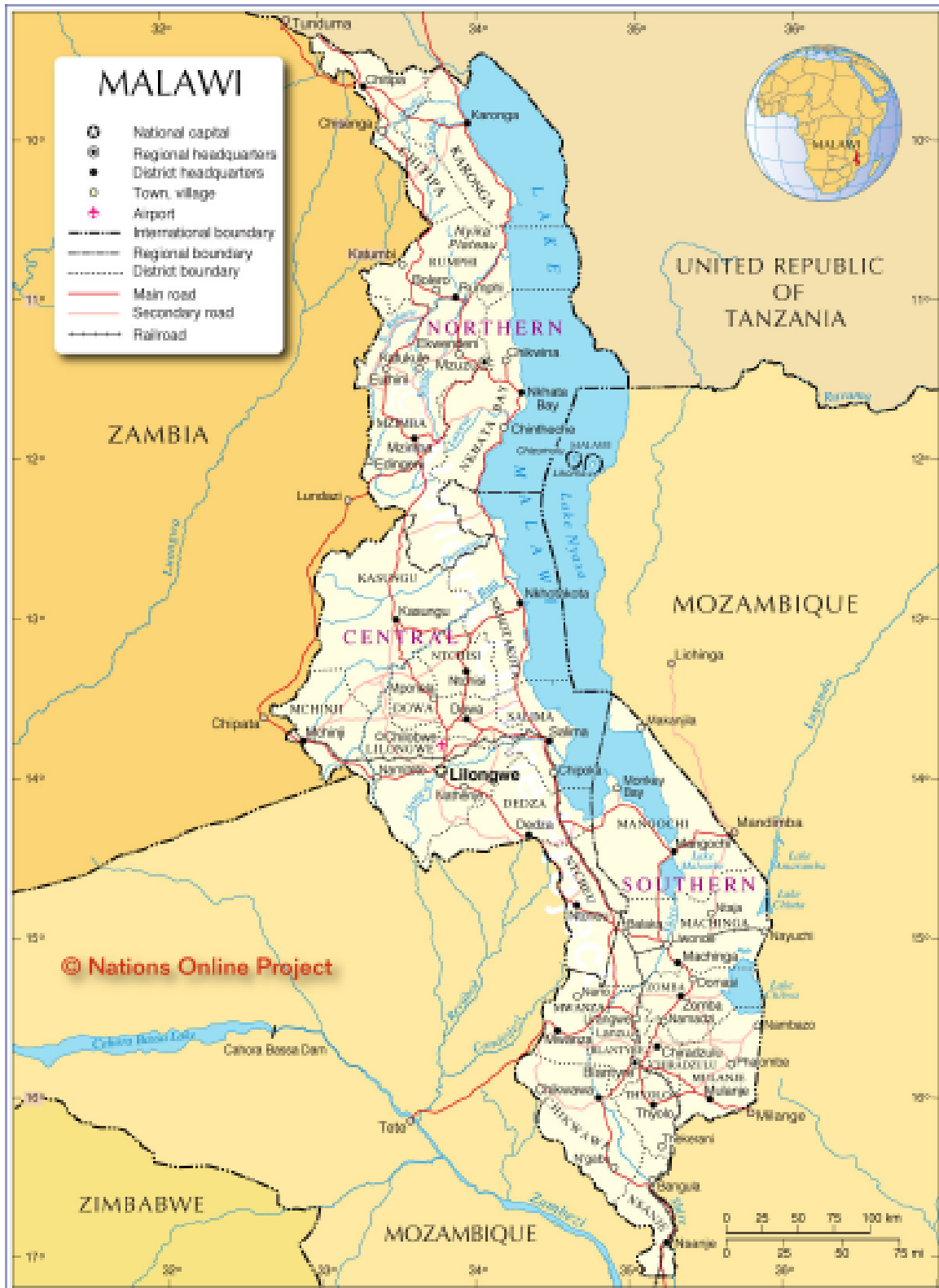
This section I present Malawi country profile. A brief description of its geographical location, population statistics, and health sector in Malawi will be presented.

2.1.1 Geography

Malawi is a landlocked country in south central Africa bordered by Tanzania to the north, Zambia to the west and Mozambique to the east and south (Map1.1 Map. Over 1/5 of the total land area of 118,000 sq km comprises of Lake Malawi. Administratively, Malawi is divided into three regions: Northern, Central and Southern. The country is further divided into twenty-eight districts. The Northern Region has six districts, Central Region nine districts and Southern Region thirteen districts.

2.1.2 Population

In 2008 the government of Malawi conducted its national population and housing census. Preliminary results indicate that the population of Malawi is now at 13,066,320 inhabitants an increase of 32 percent from 1998 census results. Of the 13,066,320, the result shows that Lilongwe, Blantyre, Zomba



Map1.1 Map of Malawi showing geographical regions¹

¹ Source from: http://www.nationsonline.org/oneworld/map/malawi_map.htm

and Mzuzu have the highest population figures. Lilongwe City boasts with a population of 669,021; Blantyre City, 661,444; Mzuzu City, 128,432; and, Zomba City, 87,366. At national level, Lilongwe district which is in the Central Region has the highest number inhabitants at 1,897,167 (Malawi, 2008).

2.2 Malawi Health Sector

In Malawi, there are a number of healthcare service providers. The Ministry of Health and Population (MOHP) accounts for 60% of the total healthcare service providers in the country. The Christian Health Association of Malawi (CHAM) comprising of independent church-related and other private voluntary agency facilities accounts for 27% of the providers, The Ministry of Local Government provides 8% and the Army, Police, private practitioners, commercial companies and pharmacies provide the rest (ONSD, 2005). The organization of healthcare system is set such that rural hospitals, health centers, health posts, outreach clinics and through community initiatives provide primary level services. District hospitals and CHAM hospitals provide secondary levels while central hospitals provide tertiary level services (ONSD 2005). Table 2.1 below shows the distribution of health facilities by type and ownership in Malawi.

2.2.1 Central Hospitals

Malawi at the moment has four central hospitals. There is Queen Elizabeth Central Hospital (QECH) in Blantyre, Zomba Central Hospital in Zomba, Kamuzu Central Hospital (KCH) in Lilongwe and Mzuzu Central Hospital in Mzuzu. Mzuzu Central Hospital is the main referral point for the Northern Region; KCH is the referral hospital for the Central Region; Zomba Central Hospital caters for the East-Southern Region; and QECH for most districts in the Southern Region of Malawi. These central hospitals ideally are supposed to provide referral services. However because of the situation on the ground

they also provide services that are supposed to be provided at district level because in these areas there are no district hospitals.

Table 2.1 Ownership and Type of Facility¹

Type	BLM ²	CHAM ³	LG ⁴	MOHP ⁵	NGO ⁶	TOTAL
Central Hospital				4		4
Clinic	27	8	4	2	1	42
Dispensary		8	4	54		66
Hospitals		22		22		44
Health Center	1	115	12	288		416
Community Hospital		17		19		36
Maternity		1	12	2		15
Psychiatric Hospital		1		1		2
Rehabilitation Center		1		1		2
VCT Center						146

2.2.2 Health Personnel

Malawi like some other countries in the Sub-Sahara region is facing a serious shortage of health personnel. Between November 2007 and May 2008 the Ministry of Health and Population together with the Center for Social Research in Malawi carried out a Human Resource for Health census and verification process to establish the number of health personnel there are in Malawi.

From the census that took place, the Physician population ratio was estimated at 1:53176 and was highest in the Northern Region (1:62039) followed by the Central Region at 1:53031. Across the Zones, the highest population per Physician ratio was recorded in the Central East Zone at 1:203730 followed by the South East Zone at 1:136310. In urban areas, the Physician

¹ Source: http://www.theglobalfund.org/search/docs/5MLWH_1142_0_full.pdf

² Banja la Mtsogolo – a reproductive health NGO

³ Christian Health Association of Malawi

⁴ Local Government

⁵ Ministry of Health and Population

⁶ Non Governmental Organizations - referrals to not for profit NGOs

population ratio was 1:10326 while in the rural areas the ratio was 1:152016.

At national level, the Nurse Population ratio was 1:2964 and was highest in the Central Region (1:3502) followed by the Southern Region at 1:2880. In urban areas, the Nurse Population ratio 1:1141 while in the rural areas the ratio was 1:3952. Across the Zones, the highest Nurse Population ratio was observed in the Central East Zone at 1:3837 (Kang'ombe, 2008, p. 57-59).

Table 2.2 presents a compilation on the required Human Resource for MOHP and CHAM hospitals by the Global Fund organization.

Table 2.2 Current and Required Human Resources (MOHP and CHAM)¹

Cadre	MOHP target cadre for Malawi	Current number in post	Current vacancies	% of actual staff to target
Physicians	433	139	294	32
Nurses	8440	4717	3723	56
Clinical Officers	1405	942	463	67
Medical Assistants	1500	718	782	48
Laboratory Technicians	507	251	256	50
Pharmo Techs	285	93	192	50
Environmental Health Officers	1662	304	1358	18
Health Surveillance Assistants	12,615	3600	7400	33

While Table 2.3 shows a comparison on the physician patient ratio and nurse patient ratio of a selected countries in the Sub-Sahara region. This aims at

¹ Source: http://www.theglobalfund.org/search/docs/5MLWH_1142_0_full.pdf

providing an insight on the human resource crisis Malawi is facing. These figures were computed by the World Health Organization for the year 2004.

Table 2.3 Human Resources for Health per 1000 Population for 2004¹

Cadre	Botswana	South Africa	Ghana	Malawi
Physicians	0.40	0.77	0.15	0.02
Nurses	2.65	4.08	0.74	0.59

From the figures above, it is evident that Malawi is facing a crisis in Human Resource for Health personnel.

2.3 Kamuzu Central Hospital

Kamuzu Central Hospital is one of the four central hospitals in Malawi. It is found in Lilongwe which is the Capital City of Malawi which is in the Central Region. KCH serves as a referral hospital for cases within the Central Region. The hospital is divided into two wings that are approximately three kilometers apart and it has a bed capacity of 980 (Kachiza, 2005). These are Bottom Hospital, which is the old hospital and the new hospital which comprises the main wing. KCH serves as a teaching hospital for Kamuzu College of Nursing, College of Medicine, and Malawi College of Health Sciences.

At present, Kamuzu Central Hospital is providing several services that can be categorized as: Clinical, Administrative and Support Services. These are summarized in Table 2.4 below.

¹ Source <http://www.who.int/entity/whosis/5.1%20Health%20systems%20HRH.xls>

Table 2.4 Services Offered at Kamuzu Central Hospital

Category of Service	Service offered
Clinical	Medical, Surgical, Obstetrics and Gynecology, Pediatrics, Ophthalmic, Dermatology, Dental and Intensive Care services
Administrative	Human Resource Management, Financial Management, Laboratory, Radiology, Pharmacy and Environmental Health
Support	Catering, Laundry, Transport

There are also other units operating within the main hospitals. These are community health services through the Light House, Pastoral care Academic and continuing education to both pre-service and in-service staff and, Research through various organizations and projects such as, University of North Carolina project (UNC), Malaria project just to mention a few.

From the setting of Kamuzu Central Hospital, one concludes that it is a community on its own. More also as it is one of the referral hospitals in the country, hospital workers do not work in isolation. They work as a community. The hospital community comprises of the board of directors, the hospital administrators and the medical staff (Snook, 1981). Medical staff or health workers community is composed of doctors, nurses and clerks.

2.3.1 Health Personnel at KCH

For the period between January and December 2008, Kamuzu Central Hospital had 48,359 cases of admission. Within the same period, there were 50 doctors (including doctor interns) and 237 nurses. This translates to a doctor patient ratio of 1:967 (48,359/50) and the nurse patient ratio of 1:204 (48,359/237). As for hospital clerks, there were 35 clerks. More on health personnel will be discussed in Chapter 6.

2.3.2 Information Systems

Kamuzu Central Hospital and the other central hospitals in Malawi are using a number of Information Systems. The Health Information System: National Policy and Strategy of 2003 (Malawi, 2003), presents a number of IS used in government hospitals. Some of these systems are:

- Logistics Management Information Systems (LMIS),
This system will be able to provide necessary information on drugs, vaccines, contraceptives and other commodities, supplies and their use.
- District Health Information Systems (DHIS) software
The software is used to enter data, process and generate reports which are used for monitoring as well as planning and management of health services.
- Electronic Patient Register system (EPR)
To be used to computerize all inpatient records in all central hospitals. Demographic data such as age, sex, address, specific diagnosis, treatment, results, and duration of stay in hospitals are recorded by the system.
- Touch Screen Patient Management Information System (TSPMIS)
The system supported by Baobab partnership is to replace the paper based system at Kamuzu Central Hospital. The main purpose of this system is to provide online information for management of care to an individual patient.

For the sake of this research, as it is dealing the management of patients' data, further explanation to EPR and TSPMIS will be discussed in Chapters 5 and 6.

3 Literature Review

Information Systems research is defined as an applied research method that inherently includes a growth in knowledge within the area under investigation, and challenges how current professional practice can be enhanced (Shankes et al., 1993). In this chapter I will present and elaborate on the theory and its concepts used in my research.

3.1 Theoretical Context

A number of different theories have been used in IS research providing a basis of understanding and analysis of findings in an attempt to provide solutions. For this research, concepts from Activity Theory (AT) will be used. Activity Theory is based on the socio-psychological theory whose roots are the works of a Russian psychologist Vygotsky (Crawford and Hasan, 1996). The following sub-sections follows and explains the transformation of AT from its conception up to its current state.

3.1.1 1st Generation AT

AT is not a “theory” in the strict meaning of the term theory. AT is a powerful and clarifying descriptive tool rather than a strongly predictive theory (Ryder, 2008). The first generation AT was close to behaviorism – it focused on an activity as composed of a subject, an object and mediated by a tool (*ibid*). For a subject (who is a person) to achieve its objective, tool(s) must be used on the object to accomplish the activity. Figure 3:1 shows this relationship.

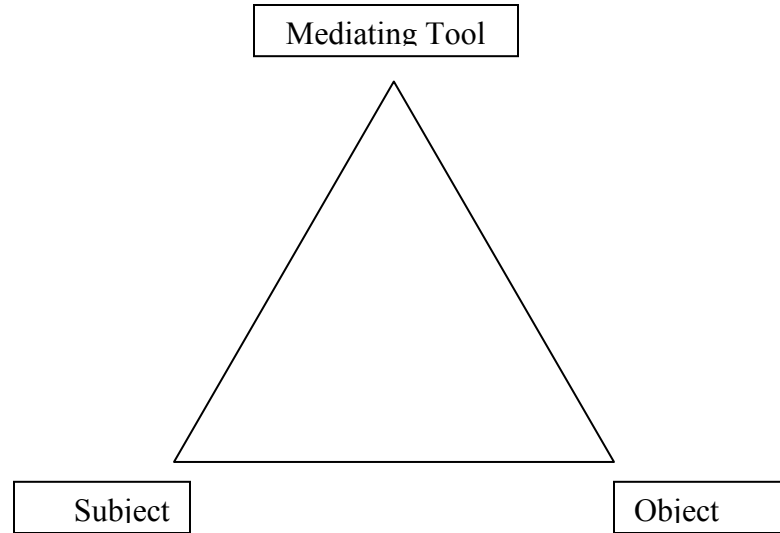


Figure 3:1 1st Generation of Activity Theory

This stipulated that in AT the unit of analysis was object-oriented action mediated by tools and signs. It did not recognize other humans playing a role in the activity and the social relation of the subject to other humans. This was a shortfall of Vygotsky's Activity Theory.

3.1.2 2nd Generation AT

Recognizing the shortfalls of the first generation AT by Vygotsky, Leontiev extended the theory by adding several features in an attempt to separate individual actions from collective activity. Therefore the second generation AT stipulates that the unit of analysis is an activity as explained by Nardi (1996, quoted by (Mappin et al., 2000)) that *“context is not an outer container or shell inside of which people behave in certain ways. People consciously and deliberately generate context (activities) in part through their own objects [objectives]; hence context is not just “out there.” Context is both internal to people-involving specific objects and goals-and, at the same time, external to people, involving artifacts, other people, and specific settings. The crucial point is that in activity theory, external and internal are fused, unified. It is*

the objective of activity theory to understand the unity between consciousness and activity”.

Thus, the Leontiev’s model of activity is conceptualized into a hierarchy of activity which is presented as follows (Figure 3:2):

Level		Oriented towards		Carried out by
ACTIVITY	—	OBJECT / MOTIVE	—	COMMUNITY
ACTION	—	GOAL	—	INDIVIDUAL OR GROUP
OPERATION	—	CONDITIONS	—	ROUTINIZED HUMAN OR MACHINE

Figure 3:2 The hierarchical structure of activity

Source: <http://www.edu.helsinki.fi/activity/pages/chatanddwr/activitysystem/>

This means AT comprises of a hierarchy of events. Activity being the top most which is object or motive oriented. Within it are actions which are goal oriented. These are performed by individuals or community. Actions are made up of operations which are short lived and these operations are condition oriented at particular moment in time. Thus AT does not live in vacuum, it interact with a network of other activities.

Kaptelinin (1997) and Rodriguez (1998) presents five basic principles of activity theory: hierarchical structure of activity, object-orientedness, internalization / externalization, tool mediation, and development. Hierarchical structure stipulates that world be organized into functionally subordinated hierarchical levels. The levels are activities, action and operations as conceptualized by Leontiev. These levels can move up and down depending on previously performed action. Object-orientedness presents activities as composed of different goal-directed actions but aiming

to meet the same goal. Internalization / externalization “*emphasizes that internal activities cannot be understood if they are analyzed separately from external activities, because they transform into each other*” (ibid). As for mediation, it emphasizes that tools in a broader sense, both internal and external mediate human activity, shape the way human beings interact with reality. People create these tools in order to control their activities. Development in activity theory is not the object of study but is also a general research methodology. AT requires that human interaction be studied and analysed in its development context.

As a result, the first generation AT was changed by adding in rules, community and division of labor and renamed to Activity System. This helps to visualize the whole activity process as follows (Figure 3:3):

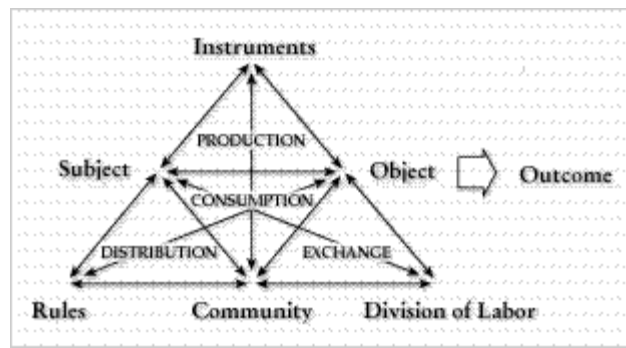


Figure 3:3 The structure of human activity

Source: <http://www.edu.helsinki.fi/activity/pages/chatanddwr/activitysystem/>

Therefore in view of Engeströms’ structure of human activity, Mappin et al (2000), summarised the activity system as follows:

The subject refers to the individual or group whose point of view is taken in the analysis of the activity. The object (or objective) is the target of the activity within the system. Instruments refer to internal or external mediating artefacts which help to achieve the outcomes of the activity. The community is comprised of one or more people who share the objective with the subject. Rules regulate actions and interactions within the activity system. The

division of labour discusses how tasks are divided horizontally between community members as well as referring to any vertical division of power and status.

An example is given by Engeström on how AT can be used to understand human activity system. He gives an example of a physician or doctor on he interacts with different instruments (medical knowledge and stethoscope or questions) in performing different actions when interacting with different objects (patient records, test results and, patient and his father) in order to have a preliminary image of task as the outcome (Engeström, 2000, p.961-962). This shows that there is an intertwined of activities in order to fulfil the desired outcome as discussed in section 3.1.3. That's why Ryder (2008) argues that AT is socially inclined and that the interaction between agents and their environments is the reason why tool mediation plays a central role within the approach. For that reason, the composition of activity by subject, object, actions and operation amounts to the unit of analysis (Rodriguez, 1998).

3.1.3 3rd Generation AT

Considering the statement that AT does not happen in a vacuum, this paved way to third generation of activity theory. Engeström states that the *“third generation of activity theory needs to develop conceptual tools to understand dialogue, multiple perspectives, and networks of interacting activity systems”* (Engeström, 2001, p.135). This recognises that in AT there are different sub-activities that are intertwined into the main activity system as depicted in Figure 3:4. That is to say the artefact element has its own activity, under rules there is also an activity going on alike within the community. The bottom line is that all these different activities are connected together into one main activity in order to achieve a desired goal (Figure 3:5).

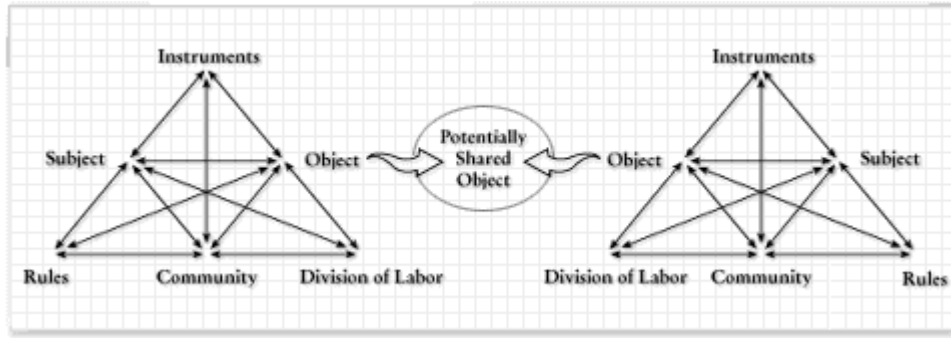


Figure 3:4 Two interacting activity systems as minimal model for the third generation of activity theory

Source: <http://www.edu.helsinki.fi/activity/pages/chatanddwr/activitysystem/>

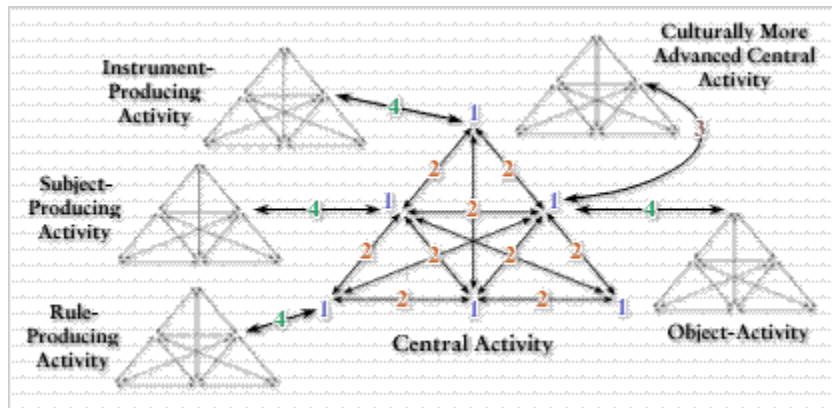


Figure 3:5 Four levels of contradictions in a network of human activity systems

Source: <http://www.edu.helsinki.fi/activity/pages/chatanddwr/activitysystem/> and (Mursu, 2002)¹

3.2 Application of AT

The summary of second generation and the emergence of the third generation AT by Engeström form the foundation of this theory towards this research. How can AT aid in a deeper understanding of security, privacy and policies in

¹ Meaning of levels:

Level 1: Primary inner contradiction (double nature) within each constituent component of the central activity.

Level 2: Secondary contradictions between the constituents of the central activity.

Level 3: Tertiary contradiction between the object/motive of the dominant form of the central activity and the object/motive of a culturally more advanced form of the central activity.

Level 4: Quaternary contradictions between the central activity and its neighbor activities.

management of patients' data though mostly AT has been used in the field of HCI and software development in developing countries. This is evident in the works of (Mursu, 2002; Mursu and Korpela, 2003).

Activity Theory in this research provides a better framework for analyzing the complex dynamics of healthcare system in Malawi (Crawford and Hasan, 1996). The healthcare environment involves interacting human and technical elements. In the objectivity of the overall activity, these remain *“subjective, creative and emotionally experienced behaviors together with automated, logical analytical and routine modes”* which are embedded in modern technology as Crawford and Hasan (1996, p.55) puts it. The theory facilitates in fusing answers from the following questions:

- What activities are being studied in this case study?
- What tools are needed for the defined activity?
- Who is / are the subject(s) or community understudy?
- How is the division of labour like in the management of patients' data?
- What is the object or objective the subject or community working on?
- What is the intended outcome of this whole activity?

4 Research Methodology

The chapter presents the paradigm used, the research approach, criteria used for selecting area of research, and the methods used in data collection for this research.

4.1 The Paradigm

Myers (1997) states that “*all research (whether quantitative or qualitative) is based on some underlying assumptions about what constitutes 'valid' research and which research methods are appropriate*”. Three paradigms used in information systems research are positivism, interpretivism and critical research. The positivism research assumes objectivity in outcomes and that objects are measurable and independent of the researcher / observer. Interpretivism research attempts to understand phenomenon within its context while critical research paradigm focuses on “*the oppositions, conflicts and contradictions in contemporary society*” (*ibid*).

The underlying research philosophical paradigm that suites well with this case study is interpretivism. The paradigm is best suited because the primary objective of the research is to understand the social context of health information systems in Malawi. This will be done by considering the policy aspects, security and privacy of health information and its systems. Walsham elaborates that interpretivism method of research adopt the position that our knowledge of reality is constructed socially by human actors (Walsham, 1995). The same Klein and Myers commented that IS research can be classified as interpretive if it is assumed that our knowledge of reality is gained only through social constructions such as language, consciousness, shared meanings, documents, tools and other artifacts (Klien and Myers, 1999). That's why there is a need to describe, explain and interpret if at all, why there are differences in practices of health workers and how to improve them.

4.2 Research Approach

Since this research surrounds understanding of how patients' data is managed at Kamuzu Central Hospital, aspects relating to legislations, policies, guidelines and best practices were investigated.

Williams (2006) argues that the best approach to Information System Security research is through Action Research (AR) methodology. Just like case study approach, AR also describes the richness of the environment under study but it is more concerned with intervention and reflection. Its strength lies in the iterative cycle of assessment within a real situation, reflecting on actions taken with potential participant input by anticipating practical and applicable output. And since most of Information Security research is focused on technical aspects of problem solving (ibid), that is why Williams state that it is an ideal methodology for Information Security System research. With such, there is need of ample time to implement changes and reflect on them.

As for Case study methodology, it is not much different from Action Research because it excludes the elements of intervention and reflection and its strength is that it can provide information useful for hypothesis training (Williams, 2006). Case studies are particularly important for understanding complex phenomena in context. Zaniel (2007) commented that case study is a research strategy which focuses on understanding the dynamics present within single settings. Therefore the examination of data within its context of use, the explanation of complexities of real life situation in health facilities and the ability to analyze the outcome of the research in a qualitative form provides the advantages of using the Case Study approach. Additionally,

Case Study strengths lie in the fact that they are done on a relatively small geographical area and with a limited number of individuals as subjects (ibid).

Since the main objective of this research is to have an understating of how Malawi Health Information System is managed, in respect to new information technologies deployed in providing health care services, and also in view of health legislation and policies at hand, case study approach seems appropriate. Secondly, time constrain was also a contributing factor to the criterion of choosing case study approach. Time was too short to implement any action change and reflect on it as is the case with Action Research. The third reason is because case studies typically combine data collection methods such as archives, interviews, questionnaires, and observations (*discussed more in section 3.5*). The evidence may be qualitative, quantitative, or both (Williams, 1996). These can be seen to satisfy the three tenets of qualitative method: describing, understanding, and explaining (Tellis, 1997). Thus, Tellis's three tenets steers the aim of this research.

4.3 Ethical Considerations

It is imperative and normal for one to obtain ethical clearance when conducting research in Malawi. In order to conduct my research within the health sector, the first thing I did was to obtain permission to conduct research from The Ministry of Health and Population. The application consisted of the research proposal for the board to review and have an insight of what kind of research I will be doing. Secondly, there were some forms (*see Appendix A.1*) to be filled from the ministry describing the extent of the research and what it entails. This is done in order to access what impact the research will have on the subjects involved and the community as a whole.

Having obtained ethical clearance from MOHP, the second step was to obtain permission from the Kamuzu Central Hospital. This is where I conducted my

research. An application letter to the hospital director (*see Appendix B.1*) was written to obtain the permission to conduct research on the premises. With the attached letter from the ministry, it was not a problem getting the permission from the hospital director (*see Appendix B.2*).

On data collection, consent was sought from the participants to have questionnaires filled, conduct interviews and have pictures taken (*see Appendix C*). Within the form, it was stipulated that names of all participants will be held as confidential except if the participant permits that it be revealed.

4.4 Selection Area Criteria

The section presents the criteria used when conducting the research.

4.4.1 The System

My research was more concerned with management of patient's data and the main focus was on the health management information systems being used at Kamuzu Central Hospital. Previous literature on type of computerised systems being used influenced my focal area. There have been talks and literature concerning the types of IS (referring to computerised information systems) being used in government hospitals. But upon further enquiries and investigations on what's exactly on the ground, there was a shift in focal points.

I noticed that there were some IS being used at the hospital but were not the type of IS like the Electronic Patient Register I was to base my research on. As such, I concentrated more on the manual side of the IS which had to do more with the management of patients' data.

4.4.2 Sections Visited

Since Kamuzu Central Hospital is a big hospital and due to limitation in time factor, my criterions on choosing the study units or sections were based on a number of factors. First, most hospitals have two major types of departments, Out Patient and In Patient departments. As such I wanted to know what happens in both sections. Thus I visited both departments.

In OPD, I visited the Under Five Clinic. With this, I followed how information from the clinic is managed from OPD to admission too. More on information flow is presented in the following Chapter 4. I also visited the adult side clinic in OPD which deals with general medical cases. For this, I wanted to differentiate how information is handled.

Secondly, for the In Patient, there are a number of wards to visit, and some are busier than others. One of the criterions was based on the amount of work within the ward. On top of that, since Kamuzu Central Hospital is a government hospital, there are non-paying wards and paying wards. Treatment of patients in these wards also differs. This prompted me to investigate, if there could be difference in management of patients' data in these different wards. Therefore the wards that I visited were children's or paediatric ward (the busiest ward at the hospital); non-paying ward or surgical ward (less busy than paediatric) and then the paying ward which is far less busy than the non-paying ward.

In all these departments and wards of the hospital I visited, the following sections describe the methods I used to collect data for this research.

4.5 Data Collection Methods

Individual case studies consist of a "whole" study, in which facts are gathered from various sources and conclusions drawn on them. Stake (1995) and Yin (1994) identified at least six sources of evidence in case studies which are: Documents, Archival records, Interviews, Direct observation, Participant-observation, Physical artifacts. The same, Crawford and Hasan (1996) pointed out participatory, evolutionary, contextual, holistic and developmental as methods of data collection when using activity theory.

Thus they recommend developmental, evolutionary, contextual and holistic methods of data collection if research involves implementing a new product or program. Since this case study did not involve prototyping, implementing a new program or product evolutionary, contextual, holistic and developmental methods were not used. Direct observation, interview and document review methods were preferably used in data collection and collation.

The basis of choice was based on evaluating the importance and complexity of each method depending on the type of research I was doing and the area of the research. For instance participant observation was thought could be difficult because in hospitals at time it's a race against time. Patients don't want to wait for long when they have medical problems. More over, it takes a competent person to be in that position. Knowledge of activities taking place is also of paramount importance to the whole process. Considering all these factors, it proved to be unworthy to engage participant observation in my data gathering.

Apparently there have never been any writings in Malawi within the health sector in relation to the topic of security in managing patients' data. This made it hard to have a reference point into what has been researched before.

Therefore, the only options left in data collection were that of document review, direct observation, interviews and the use of questionnaires.

4.5.1 Document Analysis

Every organization has fundamental principles and guidelines on which its operations are based. Most of these are framed in accordance with the constitution of that particular country. Therefore during this research I analyzed some of these guiding documents like Medical Practitioners and Dentist Act, Nurses and Midwives Act 1995, Code of Nursing Ethics for Malawi with Interpretative/Explanatory Statements, and Code of Ethics and Professional Conduct. The first document is by the Government of Malawi and the latter three are by the Nurses and Midwives Council of Malawi. These documents were read and analyzed in order to understand what entails to be a health practitioner in Malawi. Some of the accompanying documents that I read are: the Universal Declaration of Human Rights Article 12, The Constitution of the Republic of Malawi Chapter IV Section 21c, and the Charter on Patients' and Health Service Providers' Rights and Responsibilities by the Government and Civil Society in Malawi.

Though these documents were read and analyzed, there are some shortfalls with them. The documents mainly stipulate what is supposed to be done in general within the "big picture". The shortfall comes when considering the eagle's point of view. Narrowing down to circumstantial situations is not stipulated in them. Another limitation with document analysis is the understanding part of it. It is a given fact that understanding of writings differ from person to person. People turn to be bias towards legislation, policies or guideline whether due to ineptitude or deliberate cause.

4.5.2 Observation

Considering the objectives of this research and in fusing case study approach and activity theory together, observation is the main method in data

collection. The two methods of observation, passive or direct and participatory observation were considered. As highlighted already, participatory observation was not used in this research. I did direct observation in the afore-mentioned units of the hospital. Mostly in the OPD, I was a “*fly on the wall*”. That is by merely observing what was happening without interfering with the activities. The observation also constituted of:

- How patients and their information are treated
- How nurses and clerks conduct themselves in helping patients
- How nurses and clerks handle patients’ data

4.5.3 Questionnaires

The other method used in data collection was on the use of questionnaires. Questionnaires provide efficient data collection, as lots of subjects can be tested relatively quickly and cheaply. However, respondents may not complete the questionnaires as instructed or at all and the information collected can be limited. Out of fifteen questionnaires (*see Appendix D*) that were handed out, only eleven were fully or partially completed, two were returned unfilled and two were reported missing by the participant.

One major limitation with the questionnaires was the understanding of questions there in. Some participants complained that the questions were too technical IS wise not medical field wise which proved to be hard for their comprehension. This was because of difference in IT literacy among the participants. As such, I had to explain and elaborate some questions for their understanding. This also led to some unanswered questions in case of participants whom we never had a chance to talk like inconsistency in given numbers pertaining to question one (*see Appendix D*).

4.5.4 Interviews

Complementing the questionnaires, I also conducted a series of interviews. The complement was when the interviewees did not understand some of the

questions in the questionnaire given. I also conducted unstructured interviews with the clerks, nurses and a doctor intern. Since the work in hospital is a bit complex, I was hoping to get more information with this type of interview unlike the structured interview. Secondly, even though the unstructured interview approach needs a bit of time, I believe that one gets to understand better the subject matter with this kind of approach.

Apart from explaining further the questionnaire, the interviews explored further the type of work the interviewee does from time to time. I also explored how the policies and work guidelines are followed within ones work environment. This helped me to understand more how management of patients' data is influenced by the work guidelines and policies against ones work environment and in context situ.

The main limitation that I faced with this approach is time. With the nurses and the doctor intern, it was not possible to arrange separate time for the interviews since most of the times they were perpetually busy. As such we had to break in between thereby interrupting the whole interview process.

5 Research Findings

Using concepts derived from Activity Theory, this chapter presents the findings on patients' information flow at Kamuzu Central Hospital. Figure 5:1 depicts the flow from the time a patients visits the hospital. The figure shows the flow for both out-patients and in-patients. As such the Out Patient Department (OPD), children's or pediatric ward, paying ward and non-paying ward were visited during this research in order to understand how patients' data in handled. Therefore the section presents findings on the subjects (persons who are handling information), objects (targets of a particular activity) and tools (artifacts used) in managing patients' data.

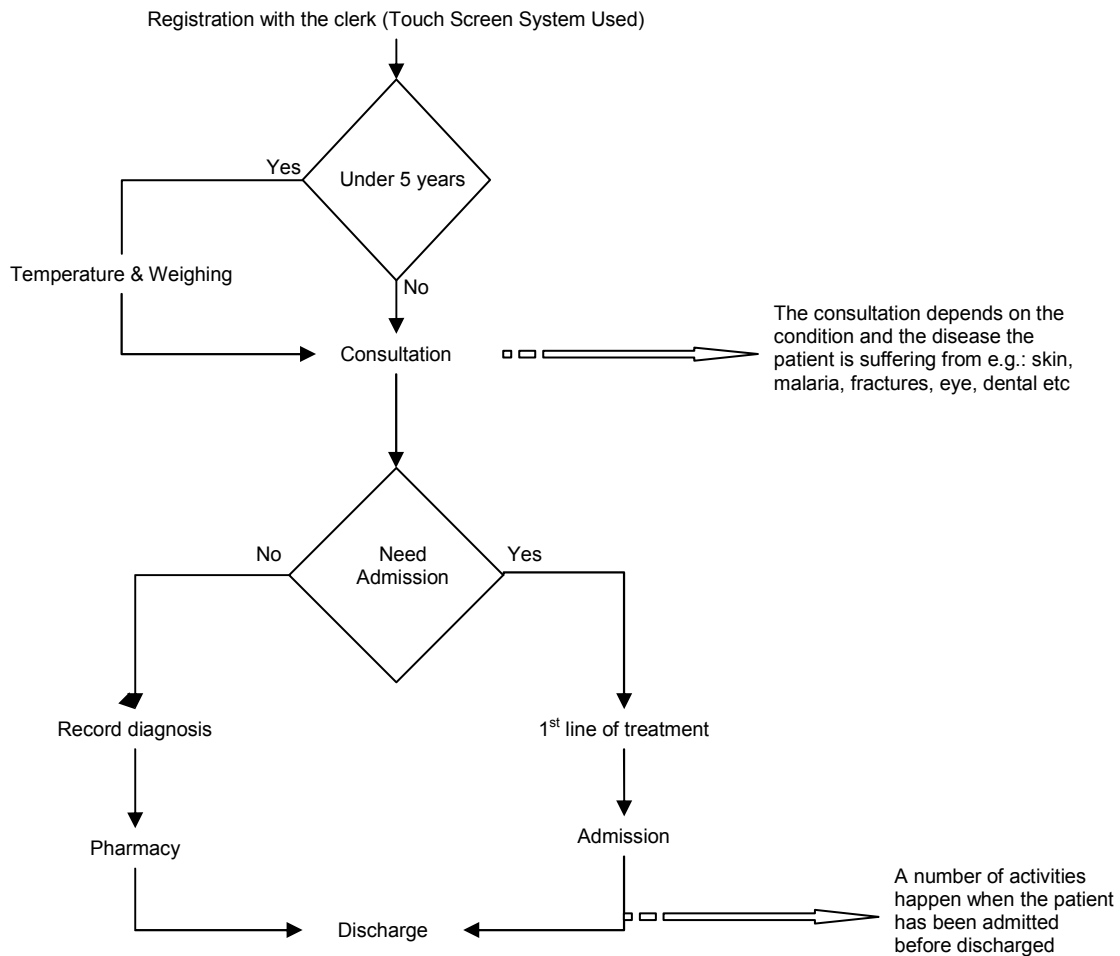


Figure 5:1 Summarized Flow of Patients Information at KCH

5.1 Actors

In every activity, there are players of the activity. These are the subjects of the activity. In the activity of managing patients' data within a hospital, there are a number of subjects involved in different activities at different times.

5.1.1 Clerks

KCH being one of the biggest referral hospitals in Malawi, the hospital administration decided to employ clerks who help out in some activities of the hospital. This group is part of the hospital community. In this regard, clerks are to be differentiated from Hospital Attendants (HA) in a way that an HA does the cleaning of the hospital areas, and are also send on any other errands assigned to them from time to time. While hospital clerks, they have a definite job description. This includes the following:

1. Making sure there is stationary available in their assigned department
2. Registering of patients upon admission and discharge from the hospital
3. Filing of patients' records – from the wards to the archives.
4. collecting of data used in DHIS and compiling monthly reports from their departments to HMIS office

During the course of the research, it was reported that KCH has a total of thirty-five clerks. Apparently this is just above half of the ideal number of clerks the hospital was to have (*see Appendix F*). The ideal number was supposed to be fifty. But due to other constraints, the hospital can not accommodate the remaining figures. It should be noted that departments which are busier than others, have more than one clerk. Supposedly, two clerks were to be assigned to a department or ward and were to work in shifts. Thus to succumb to the danger of where by one of them cannot show up for work at one particular time.

5.1.2 Nurses

From this research, I found that KCH has a total number of 245 nurses which is a considerable small number considering how busy the hospital gets with a number of patient visitations. These nurses are distributed to most of the departments within the hospital. I also found that KCH all engages trainee nurses for Kamuzu College of Nursing in its daily activities. Even though this is the case, these trainees can not operate on their own without the supervision of a fully qualified nurse.

Table 5.1 below present numbers of qualified nurses allocated to wards visited during my research. The numbers shows how many nurses are in the ward at a particular time of the day.

Table 5.1 Distribution of Nurses in visited sections at KCH

Ward	Number of Nurses	
	Day time	At Night
Pediatric ward ¹	10	8
Paying ward:		
4A	2	1
4B	2	1
Non-paying ward:		
2A	3	2
2B	3	2
Under Five clinic	2	
OPD 1	2	

Concerning their job description, I found out that nurses have got a file (*elaborated the contents of it thereof in Section 4.3*) that guides them in their

¹ Pediatric ward is divided into 3 sections: Acute – have 6 nurses both during day and at night; Recovery and Malnutrition/Orthopedic both have 2 nurses during day time and 1 nurse at night.

daily duties. This is a must for all nurses to have and abide by it. In fact by the time they are completing their studies, the nurses make a pledge of service (*see Appendix E*). The pledge is what defines them as nurses and have to live by it throughout their working experience.

5.1.3 Doctors

Kamuzu Central Hospital has fifty doctors. Out of these six are medical doctors that attend to different patients in different departments or sections of the hospital. There are five surgeons who unfortunately are all volunteers. The rest are specialized doctors in different fields. In addition to these “*permanent*” doctors, there are also doctor interns who are supervised by the qualified doctors depending on their fields of interests. These doctors are not assigned to specific wards. The reason being they are few and compared to the magnitude of the hospital and secondly, different medical conditions are assigned to different departments of the hospital, hence the hospital can not afford to confine the already few doctors to one department.

As for their job description, that depends on their field of specialization. For instance, medical doctors will attend to cases from OPD, skin, dialysis, medical admission wards 2A and 2B. In all this, they are also guided by the Medical Practitioners and Dentist Act, and the Code of Ethics and Professional Conduct.

5.2 Objects

According to the findings of this research, in this scenario, there are a number of objects involved. But the main object in the health care sector, in providing health services to its “customers”, is the patient himself. The patient is the focal point of all activities within the hospital. When providing health care services, the patient is the target.

Other tools (discussed later in the chapter), are assumed as objects depending on the activity that is taking place. The health passport is an object in the event of registering the patient, and also when the patient is collecting medication at the pharmacy. The medical personnel in charge at these post, draw their attention to what been written in the passport in order to provide a good service.

5.3 Rules

In every institution or organization, they are rules and regulations to be followed. On the other hand, there are policies also that guide the operations of the organization. As for government agencies, the ministries, mostly their regulations are based on legislations. As for working policies, it depends with the type of business the government agency is involved in. This is true with the Ministry of Health and Population in Malawi. Its working regulations on health practitioners are also based on some legislation.

I found out that the underlying document for most of the working regulations is The Constitution of the Republic of Malawi. In terms of doctors, the Medical Practitioners and Dentist Act Chapter 36:01 contained in the Laws of Malawi Volume V forms the basis of their guidelines in execution of their work. In addition to this, medical practitioners also follow the Code of Ethics and Professional Conduct prepared by the Medical Council of Malawi.

As for the nurses and midwives, they are required to have a Professional File compiled by the Nurses and Midwives Council of Malawi. A number of materials are in this file. It thus contains:

1. The councils Vision Statement and Mission Statement
2. Nurses Prayer and Song
3. Nursing Etiquette

4. Philosophy of Nursing
5. Nurses Pledge of Service and, the meaning of the Lamp in the Pledge of Service
6. Definition of a patient and for nursing in Malawi
7. The Charter on Patients' and Health Service Providers' Rights and Responsibilities, and
8. Nurses and Midwives Act 1995.

5.3.1 Of Policies and Rules in Data Management

Technically, the professional file is suppose to contain all the information a nurse is suppose to know before taking the oath and start working as a fully trained nurse. The same is true with doctors. The act, code of ethics and professional conduct form the guiding tools for doctors with their practice. Apparently due to shortage of nurses and doctors the country is facing resulting into heavy workloads on the available nurses and doctors, abiding of rules to the management of patients' data in some instances it is shaky. Contributing to that is also the engagement / inclusion of trainee nurses who are not fully qualified.

On whether current policies and working rules are effective or not and, for the strengths and weaknesses, it is interesting to find out that there are different views to this. Being a hospital that is bound by rules and regulations, the available policies and rules to some are, as quoted in the questionnaires: *"good and helps in proper patient management."* To others like from the pediatric department, the same poses difficulty in managing patients' data since the patients keep their own records – that is paper records of the patient is attached to the bed on which the patient has been allocated. This makes it easier for the doctors to find when making their rounds / visiting the patient. The other reason is because the pediatric ward is congested (there more than the required number of patients in one ward)

and busier, hence it eases the problem of carrying a lot of files for patients when attending to them if they were to be kept in the nurses office. Mostly all this is attributed to shortages of resources. The positive side of these rules and policies to a few is that they are “*simple and straightforward making work easy*” while most participants had different views. The weaknesses posed by current policies and rules as pointed out are that: “*they are vague*”. It is felt that they are not detailed enough and are shallow in their wording in order to govern better working conditions. Worse still, they are not well disseminated to most personnel so as they know what is stipulated in them.

This is echoed also in the responses when ones intuition surpasses rules and guidelines. Though a few respondents said that never happens because they are bounded by the operational guidelines and code of ethics, a number of them had different view. Within the medical profession, there are some cases when ones intuition comes first. For example “*in case of emergency*”, or “*when following the guidelines will hinder the provision of services*”. The same, intuition takes precedence over guidelines when one is in dilemma maybe because resources are not available.

As seen, most of the workers have trouble following the rules and policies either because they are not aware of what they stipulate, requiring of them to do, or because of heavy workloads which poses as a scapegoat to not following the rules and policies. Adding to that, the “readily available” of these rules and policies and their vagueness also contribute to workers not following them.

5.4 Instruments Used

Several tools or instruments are being used at Kamuzu Central Hospital for collecting and managing patients' data. The tools being used are in two categories: paper form and computerized form.

5.4.1 Computer Based Tools

Under computer based tools, the hospital uses three systems: Electronic Patient Register (EPR), Touch Screen Patient Management Information System (Photo 5.1) and the District Health Information System software (DHIS). The Touch Screen System and EPR, both are used to register patients when they come to the hospital. The clerk is the one responsible on entering the information into the system. Patients' demographic data and problems the patient is having are also recorded by the system, as such they are directed to an appropriate consultation unit. The problems that are recorded, by the end of the day, are categorized and aggregated. These problems' categories include skin, dental, eye, fever.

The second computer based tool used at the hospital is the DHIS. The DHIS is one of the tools used by the hospital more specially for reporting and decision making purposes. Apparently, DHIS does not keep patients' identifiable information. Data inputted into the system is aggregated data from the Touch Screen Patient Management Information System and also the paper based records from the clerks both in Out Patients Department (OPD) and the wards.

For the sake of this case study, though these two computer systems are tools being used at the hospital, they proved not to be of much concern in the whole research undertaking. This lies in the fact that, considering the research focus area and the core functions of the systems of not storing patients'

personal identifiable information; they were not profoundly investigated as the major sources in achieving the objectives of the research.

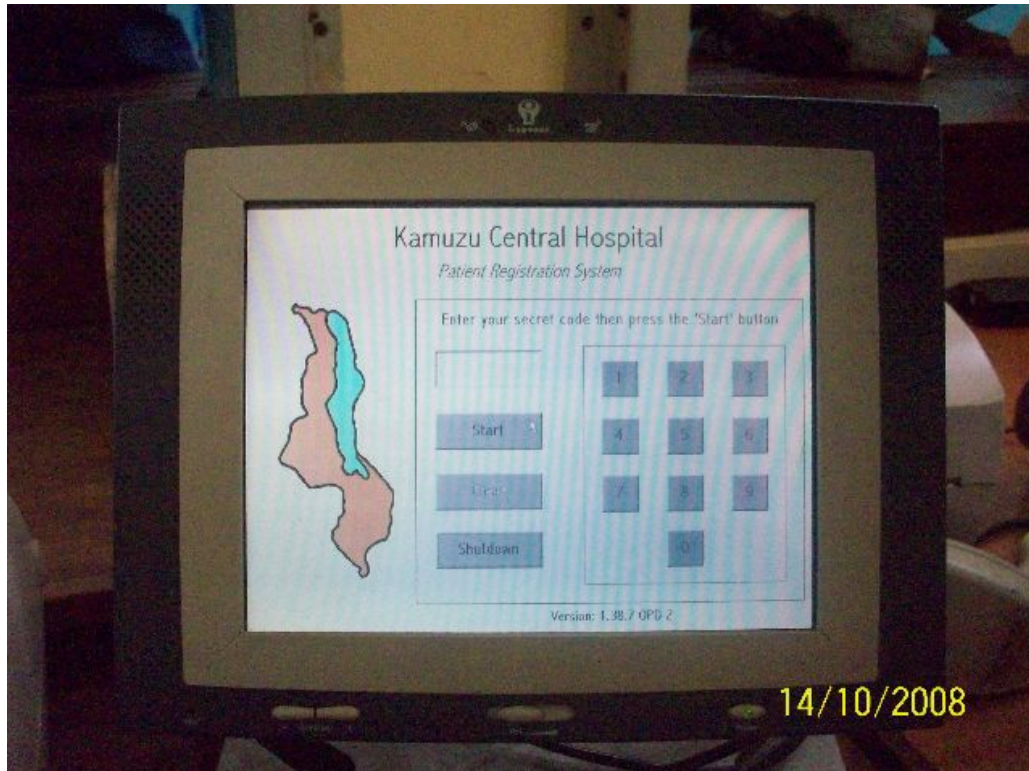


Photo 5.1 Screenshot of Touch Screen Patient Management Information System

5.4.2 Paper Based Tools

Complementing the computer based tools, are a number of paper based tools for managing patients data. First and far most are the health passports which are a requirement that each patient must have (Photo 5.2). The passport contains patients' diagnosis and medical history. The treatment a particular patient has been receiving is recorded in the health passport. The passport is kept by the patient and is needed every time the patient visits the hospital or any other health facility within the country.

Information recorded in the passport is also recorded in the clerks' outpatient register (Photo 5.3) or the admission book (Photo 5.4). Thus the registers

complement the health passports. By the end of a defined period, it's the same information from these registers that are aggregated and entered into DHIS for decision making purposes.



Photo 5.2 Types of Health Passports

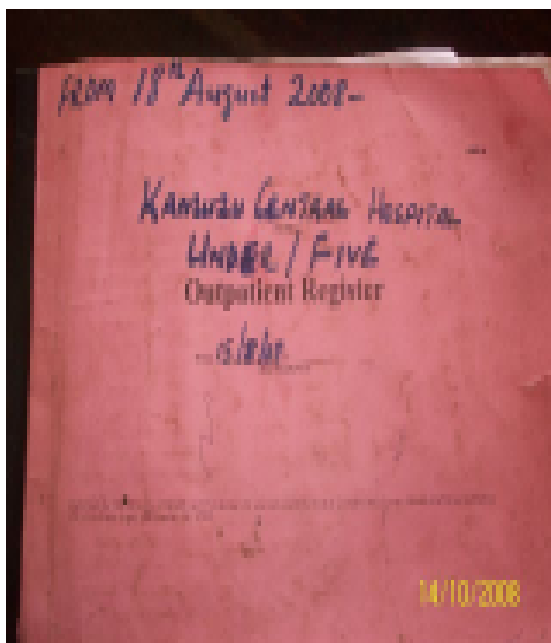


Photo 5.3 Under Five Clinic register

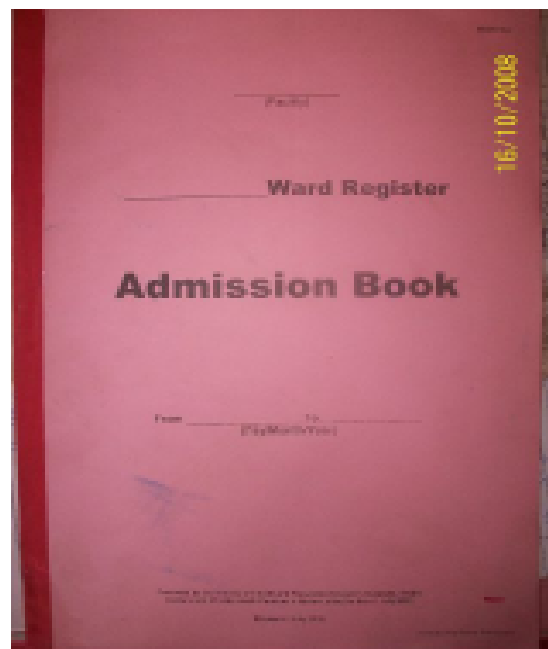


Photo 5.4 Admission Book for in wards

Apart from these, there is also the discharge register. In this register, the patients' number is recorded, date of admission and the date of discharge. More to that is main diagnosis at discharge plus its code, secondary diagnosis at discharge plus its code, summary of treatment the patient was receiving and the patient outcome is also recorded. The doctor authorizing the discharge counter signs in the same book.

5.4.3 Of Tools and Data Management

Of all the tools being used at Kamuzu Central Hospital, the question I had was how well are the tools helping with the privacy of patients' records? Firstly is of the involvement of patients in management of their data. While it was pointed out the some patients are aware of their rights, others, said that some are not and might go home without knowing of their rights the bottom line remain that it is the duty of health personnel to sensitize the patients on this. Although efforts are being made concerning this issue, as evident by posters put around some sections of the hospital, like the pharmacy and in some wards highlighting patients' rights and responsibilities (Photo 4.5). The fact still remains that some patients know of their rights and responsibilities, while others don't. This has a bearing on the quality of service they receive.

The hospital having engaged computerized system, this has been welcomed with different perceptions and point of views. Even though it was commented that the computerized systems has brought with it a number of advantages like:

- patients' data is kept safe and it provides a continuations base incase a file goes missing,
- provides more protection to stored information as access is through the use of pass-codes,
- it has provided the establishment of coding system.

The same, it has brought along some disadvantages like:

- out patient records are not stored thereby compromising it privacy,
- relevant patients' data such as diagnosis are not kept, and
- Pertinent issues pertaining to patients are not discussed.



Photo 5.5 A picture showing Patients' Rights and Responsibilities as stipulated in the charter on patient rights¹

Even though there is a computerized system, when it comes to exchange of information, it was reported that there are different form of exchange considering whether it is within the same organization or between

¹ See Appendix G for an English Version

organizations. When sensitive information is being exchanged within an organization like KCH, consultation forms or letters are used. At times round-table discussion necessitates the exchange and all this is guided by professional ethics. Similarly, when the exchange is between organizations, consultation forms, referral letters are used. In some instances, the exchange is through the head of department and as well meetings or round-table discussions are convened.

Within the exchange processes, normally verbal consent is sought from patients and if it is not possible, from the guardians. It is also interesting to note that no consent is obtained if the exchange is between medical personnel of the same organization which somehow contradicts with the right to informed consent as stipulated in the charter (*see Appendix G*)

6 Discussion and Analysis

In qualitative research, there are different modes of analyzing and interpreting qualitative data. Myers (1997) presents 3 modes: hermeneutics – which is concerned with the meaning of text for people in situation and uses context (time and place) of writing to understand; semiotics – which is concerned with the meaning of signs and symbols; narrative and metaphor – which are recital of facts or stories told in the first person. Since this research is concerned with understanding meanings in work practices, hermeneutics mode of analysis will be appropriate.

The following paragraphs discuss and analyze the findings of this research guided by the activity theory by considering the problem question presented in Chapter 1:

To what extent are policies facilitating the management of patients' data with respect to its privacy and confidentiality?

An in-depth discussion of the objective questions will also be discussed and analyzed. The research questions to be answered were:

1. To what extent do existing policies influence health workers action when handling patients' data?
2. How do existing policies enhance or hinder legitimate access to and sharing of patient information need for treatment?
3. What is the capacity of health workers handling patients' data?
4. What is being done to complement the existing manual system with computerized system in order to maintain data privacy and confidentiality?

Taking into account the activity theoretical framework used in this research, the discussion and analysis will be threefold. Hierarchical structure, tools

mediation, object-orientedness, internalization / externalization concepts of Activity Theory will be taken into account when discussing. Since an activity does not happen in a vacuum, and that health workers do not work in isolation, the hospital community will be second to be discussed and analyzed. Within this section, subjects involved in the activity process of providing health care service will be discussed including their division of labor. Secondly, the discussion will touch on the tools used in providing the services, the effectiveness of these tools in combating issues of security and privacy. The rules element in the theory will be the third to discuss basing on the research findings. Figure 6.1 illustrates how the discussion relates to the elements of activity theory.

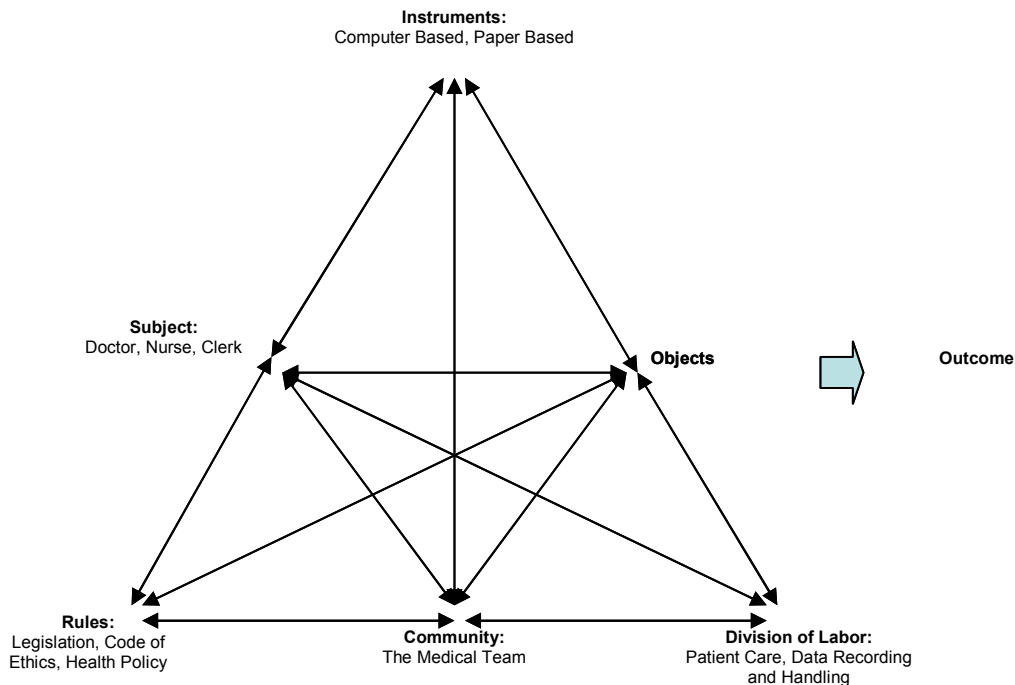


Figure 6.1 Triangle showing areas of discussion in relation to Activity Theory

6.1 Division of Labour

The division of labor side of Activity Theory describes how an activity is divided into different units of action depending on the subjects performing

that activity capacities and capabilities. The subjects are found in the community in which the activity is taking place. This corresponds to the Hierarchical Structure concept of Activity theory that divides the theory into 3 levels: activity, action and operations (Mappin et al, 2000).

In the book - Hospitals: What They Are and How They Work, Snook (1981) explains that a medical team comprises of physicians (doctors) and nurses. In addition he adds that there are also some support services within the hospital which are:

- Ancillary – this includes the pharmacy, laboratories, radiology physical therapy, just to mention a few
- Environmental – includes housekeeping, laundry and maintenance departments
- Administrative – purchasing, personnel or human resource also volunteers
- Patient – nutrition or dietary and social service department.

Kamuzu Central Hospital health workers community is not far different from the one presented by Snook. As for personnel essential to patient care, there are doctors and nurses as well, with only one addition of clerks because of the reasons to be discussed later. Doctors do their doctorial work as stipulated in their Code of Conduct booklet (*further discussed in section 5.3*) with nurses helping them in taking care of the patients by administering medication and any help in the absence of a doctor. The same nurses have to take care of patients' records and documentation. Though the job of capturing and filling patients' records is done by clerks, in their absence, nurses have to do the job. This also includes the capturing of information into the computerized system. Consequently at Kamuzu Central Hospital, clerks belongs Health Management Information Systems (HMIS) department. This department

oversees the management of all patients' records and it provides summaries at the end of predefined period of the year.

This group of clerks has alleviated a lot of problems in handling of patients' records at the hospital, because there is a shortage of nurses and doctors as the officer in charge of HMIS said:

“The clerks have been there to help nurses in managing patient records. This is due to the fact that there are a few nurses and doctors to handle such information. But these should be differentiated from the Hospital Assistants.”

Hospital Assistants (HA) normally are sent on petty endeavors around hospital premises. They are assigned duties like that of cleaning around the hospital, laundry just to mention a few. Thus, Hospital Assistants are part of the environment support service of the hospital. But the main concern is of the clerks. By understanding their job description and the training received (*reference from Chapter 4*) it is more evident that these clerks lack adequate training in handling patients' data in terms of its privacy and confidentiality. On top of that, most clerks were employed by the hospital as part of the environmental support staff such that some were drivers and hospital attendants.

6.2 Subjects

Subjects are the actors of the activity within the Activity Theory. For an activity, action or operation to take place, interference of a subject is needed. Depending on the type of activity, different subject will play different roles. This section discusses subjects needed in the provision of health care service at Kamuzu Central Hospital. Furthermore, their professional requirements and training needs will be discussed.

6.2.1 For the Team and HMIS Department

Following the discussion on division of labor above, it has been pointed out that the medical team consists of doctors and nurses. This applies to medical teams at Kamuzu Central Hospital. Though KCH does have these teams, the problem that exists is that these teams are not adequate. There is a shortage of health personnel both doctors and nurses (Mangham, 2007) even the clerks. But this does not warrant improper management of patients' data. There is need for qualified individuals to handle such sensitive data. For example in United States of America, the Joint Commission on Accreditation of Hospitals (JCAH) requires that personnel handling health information (Registered Record Administrator or Accredited Record Technician) in American hospitals should be certified by the American Medical Record Association (Snook, 1981). Apparently in Malawi there is no association or body that accredits or qualifies personnel in handling health information in our hospitals. As a result there is reliance on in-house trainings. This has resulted in having unaccredited personnel doing the job. As such one is bound to question the authenticity in the quality of work done by the clerks.

6.2.2 Training requirements

Snook (1981) pointed out that the Joint Commission on Accreditation of Hospitals standards states that it is appropriate for all medical staff to participate in programs of continual education. This helps personnel to be abreast of changes within their field. Medical personnel need to engage themselves in “*continued medical development (CMD) or continued medical education (CME)*” (Muula, 2005).

With all the technological changes happening within the hospital medical care system, the incorporation of computerized information system, it is necessary for health personnel to be trained in using of these facilities. Currently, training (in-house training to EPR) is mostly biased towards hospital clerks. Dennis (2000) emphasizes that the training be customized to the needs of the

personnel. In this case, nurses and doctors also have to be taught the information they need to know on how to protect the confidentiality on patients' data when using the computerized system.

Nurses and Midwives Council of Malawi have included the following clauses on nurse's continual training and competency (Malawi 2002, p 4):

The nurse must not only be well prepared to practice but must maintain her knowledge and skill at a consistently high level – meaning the knowledge, skills and attitudes of a nurse to be in consistent check whether they are of high quality at all level and at all times or not. This can only be done if the nurse recognizes the need for continuing professional growth development.

The nurse must maintain competency by continued learning – meaning nursing knowledge and skills are changing constantly. The nurse, therefore, should take own responsibility to access to continuous updating and expansion of knowledge and skills on which nursing practice is based. Nursing knowledge gained in pre-service training forms the basis of ones practice. With increased experience, one moves from novice to expert who therefore demands need for more knowledge and skills for improved competency.

Coincidentally some responses received during the research, revealed that some nurses and doctors at Kamuzu Central Hospital lack further training in their fields. Most nurses complained that they are deprived of further training. Mostly personnel in high level office are the ones that are subjected to further trainings and refresher courses. For example on issues of patients' privacy and data confidentiality, it was pointed out that maybe because this is "*over emphasized*" during normal qualification training, they felt that that is why they are not sent for further training. But the situations differs hence there is need for training to cope with changes in situations.

Some of the medical personnel, mostly nurses were also concerned with their illiteracy over computers. With the introduction of computerized system,

they felt that they are handicapped to use the system because of lack of training. This has a bearing on tool mediation concept (*discussed in section 5.2*) on nurses and doctors. Through HMIS office at the hospital, it was mentioned that training of the system is mainly provided to the clerks who mostly are being “*promoted*” from being members of the support services to manage health information.

6.2.3 Summary

In summary, the health community at Kamuzu Central Hospital (KCH) has clear defined division of labor. Doctors for treating patients, nurses assisting in patient care while clerks are responsible for patient registration and aggregation of data. The main problem that exists is shortage of personnel to effectively perform their designated duties. On the other hand, with the introduction of computerized system, KCH is running short of fully qualified and competent personnel to utilize the system. This is due to the fact that most personnel, especially doctors and nurses are deprived of further training. This arrangement, poses a great deal to the privacy and confidentiality of patient records.

6.3 Objects

Chapter 5.2 presents objects as patients within the health care service provision activity. Patients are focal points in health care services. For most activities in health care surrounds the patient. When it comes to securing health information keeping it private and confidential, the patient is always on the minds of the service provider. Even though it might look like a one way avenue in keeping patients’ data private and confidential, patients as objects to the activity have a role to play too.

In case of health passports, the onus is left on the patient to keep this safe. The health passport provides the physician or nurse with medical history of

the patient making it easy to render appropriate help if any problems arise. As discussed in section 6.6.4, then it is important to sensitize and educate patients in matters regarding privacy of their information. In addition, patients are supposed to be aware also of their rights and responsibilities within the realm of health care services.

6.4 Instruments

No action is done without a medium. One of the elements in Activity Theory is of instruments used in the activity process. As such tool mediation is an important concept in understanding the complexity of activities. For tools shape the way a user interact with reality. In health care service, health personnel are constantly using some mediums or tools to provide services. Tools like thermometer to measure temperature, stethoscope for listening to bodily sounds. Hence it is important for the user of such tools to be knowledgeable in using them. In Chapter 4 two categories of tools used in management of patients' data: computerized and paper-based tools were presented. This section discusses how these tools compliment each other in the whole activity of managing patients' data in light of their security and confidentiality aspects.

6.4.1 Computerized System

As found out during the research, KCH uses 3 systems: EPR, Touch Screen Patient Management Information System and DHIS. There is no much difference between the EPR and Touch Screen Management Information System basing on the functionality. The EPR contains diagnostics of the patient as added functionality than the other system. Therefore these two will be referred to as EPR unless otherwise stated. In this section, the security aspect of each system will be discussed.

User Access

For all the three systems, to safeguard information, first level of security is by controlling access. Access control mechanisms are essential in protecting sensitive patient information. Smith and Eloff pointed out that access controls includes two primary aspects: one of denying access to health care data to those who are not authorized to do so and, two, to guarantee access to those who are authorized the privilege of exercising their access properly (Smith and Eloff, 1999). Thus only authorized users to the systems are provided with a username and password.

Apparently even this is the case, these systems at KCH with the exception of DHIS; there is no restriction to the modules or level an authorized user has access to. Every user has access to all the records the systems store. A slight difference arise that only the EPR is implemented in pediatric ward and radiology department, while Touch Screen Health Management Information System have several registration points within the hospital premises. It is found both in OPD and all wards of the hospital. As such any authorized user can access any information from any point within the hospital.

Security Functionality

Apart from user access mechanism, all three systems have other different security functionality embedded in them. The core functionality of DHIS software is for monitoring and planning purposes. Therefore only aggregated data is kept in DHIS. This data does not contain any personal identifiable information. There are no concerns of patients' data privacy and confidentiality with this system.

The other two systems apparently store patient identifiable information. These are encrypted with secure shell (SSH) when authenticating. This is so because unlike DHIS which uses a normal Personal Computer, EPR and the TSCPMIS use specialized dumb terminal in there operations. The systems

are networked to servers such that all the processing is done on the back-end server. The advantage of such a setup is that it is hard for any user to copy information to any movable media like flash drive or Compact Disk. Table 6.1 below shows some advantages and disadvantages of using computerized systems at Kamuzu Central Hospital.

Table 6.1 Advantages and Disadvantages of Using Computerized Systems

Advantages	Disadvantages
Information is kept in one repository on the server	If there is loss of communication with the server, no any other information needed for immediate use cannot be retrieved from it
Easily accessible from any point connected to the server within the hospital	Anyone having access to the system, can have access to all records
Only authorized users can access the system	

6.4.2 Paper based tools

The paper based tools used in the management of patient data are in two: the health passport which is kept by the patient and the registers which are found in different departments of the hospital.

Health Passport

One way of security patients' data was attributed to the usage of health passports. Even though the hospital does not keep these passports, it is the patients' obligation to keep them safe. Since the passports are kept by the patients themselves, it was considered to be one way of securing their information. Though in a way that can be true, it is also not appropriate in cases where the health passport is misplaced by the patient. It is a fifty-fifty

situation. This way it also gives patients a right to disseminate or not disseminate their health information to whosoever ask for it.

Registers

As for the registers, every clerk in every department is issued with their own registers. It is the obligation of each clerk to keep safe the registers and information entered therein. It was observed in OPD that clerks are the ones who are mainly responsible for collecting and registering patients' data in the registers. While in wards, though this task is left for the ward clerks, there are times when the clerk is not around, the nurses also assist in registering the patient when being admitted. Table 6.2 shows some advantages and disadvantages of using registers at Kamuzu Central Hospital in regards to security and privacy of information of using registers.

Table 6.2 Advantages and Disadvantages of Using Registers

Advantages	Disadvantages
Register used by the assigned clerk within the department	Can be misplaced by clerk
Only accessible at point of usage	Patients records cannot be accessible anywhere else within the hospital apart from the station where they were recorded
Coding system is used in recording patients diagnostics	Though coding system is used, interpretations are at the back of registers making it easier to decipher the recording
	If lost, no backup available

When it comes to records storing, from the three wards visited during the research, it was noted that their definition of “keeping safe” patients' information is different. There is a high-level degree of safety in recording

keeping in the paying wards than the other two wards. Patients' data when not in use, they are kept safely in folders and then locked in a file cabinet (Photo 6.1).



Photo 6.1 Open and Closed Cupboard used for storing patients' records

Secondly is the non-paying ward. Records of patients are stored in paper folders and then kept in boxes in the nurses' station (Photo 6.2). There is no much difference between these two wards. The exceptional difference is that in paying ward, records are locked up in the filing cabinet while in non-paying the boxes are not locked up in filing cabinets. The only positive thing is that in both wards, records are kept in the nurse's station (office).



Photo 6.2 Patients' records in boxes and folders

In the pediatric ward, things are different. Though there is a nurse's station, apparently, patients' records are not kept there. They are attached to the beds of patients. As long as the patient is still admitted, their records remain by the bedside of the patient.

With this whole arrangement, the security of patients' record is somehow compromised in the pediatric ward than the other two wards. Though there are quite a good number of nurses working in this ward at one particular time, not much emphasis is put on keeping the records safe. It was also observed and noted the pediatric ward is the busiest ward at Kamuzu Central Hospital.

6.4.3 Systems Modes Complementation

After discussing the characteristics associated with each mode of information systems (manual / paper based and computerized) used at Kamuzu Central Hospital, this section will discuss on how these two complement each other. The objective of the Ministry of Health and Population in Malawi is to rollout usage of EPR system in all its central and district hospitals.

As discussed in the previous two sections, each of the systems, computerized and paper based have its own characteristics. But how well do they complement each other? And if they are to shape a user on how he interacts with reality, how are they reacting to both systems?

Starting with the registers, this forms part of the DHIS software. In the Health Information System: National Policy and Strategy document, it indicates that registers and forms will be used for data collection and aggregated for use with the DHIS software. That is recordings of different cases at the hospital are calculated and fed into DHIS for processing and analysis. This in turn is used for monitoring and planning activities by the hospital or the ministry.

In responding to the question on what has been compromised or enhanced with the introduction of EPR, these were some of the responses from the questionnaire:

“More protection to stored information as access is through use of pass codes” and “Relevant patients’ data not kept such as results of diagnosis” (more in Appendix H).

There are mixed feelings and reactions to EPR introduced at the hospital. In this case, the system has enhanced data storage. Since data is stored electronically in the system, only authorized user have access to it. Though this is running in parallel to the manual systems still more it enhances data storage. As discussed in previous sections above, currently EPR compliment is in sort of backup to the manual system.

Despite the advantage of backing up manual system in term of eventualities, others are skeptical of the system because it does not store information like diagnostics of patients. As this is the integral point of medical care, some

nurses felt it could have been better if the system was to keep this information. Table 6.3 presents elements that EPR complements on the manual system being used at Kamuzu Central Hospital.

Table 6.3 Activities Enhanced by EPR

Activity	How EPR has enhanced Manual System
Patient Registration	Cut down on time to register a patient when he visits the hospital ¹
Data Storage	One repository of data storage which is the server
Data Accessibility	Easier to access information from any terminal within the hospital since they are networked
Data Protection	Information only accessible by those who are authorized to do so by using usernames and passwords

6.4.4 Summary

From the discussion above, it has been noted that with all the instruments or tools currently being used at Kamuzu Central Hospital, they have both disadvantages and advantages in maintaining data privacy and confidentiality. The main disadvantage of paper form tools is that they are vulnerable to being accessed by anyone and they lack proper storage of them while the advantage is that they cannot be accessed from anywhere within the hospital premises apart from the department that they are being used.

With the computer based, main advantage is that only authorized user can have access to the information stored therein but the main disadvantage is that, the authorized user can have access to all records stored in the systems

¹ <http://www.baobabhealth.org/>

despite whether the user is a doctor, nurse, clerk or any other authorized user.

6.5 Rules

Rules are guidelines on the usage of mediated instruments and the division on labor among subjects within a community. Subjects are to observe these rules within the activity process.

The basis of work practice rules and guidelines for health workers in Malawi are centered on three guiding principles. The legislation as stipulated by the Malawi Government, the ethical standards or Code of Ethics by the Nurses Council and the Medical Association of Malawi, and the Health Information Policy as presented by the Ministry of Health. In this section I discuss aspects of privacy and security of health information as presented by all these three parties in comparison to the findings of this research. Objective questions concerning rules influencing workers action on handling patients' data and whether the same policies hinder or enhance legitimate access to patient data needed for treatment will be discussed.

6.5.1 Legislation

Since legislation helps in governing entities, bodies or activities, due to passing of time and changes in our communities, to some extent it is bound to change. In her study, Brox (2006) noted that legislation needs to change with time when other factors have changed. She cites the amendment needed to the Swedish health legislation in order to incorporate the sharing of health information. She pointed out that it is practically impossible for several health care providers to use one health record per patient when sharing information as stipulated in the current legislation. Therefore in turn, the legislation has to be amended to cater for this implication.

Considering the above example, at least the Swedish have legislation on exchange of health information. The Ministry of Health and Population in Malawi is governed by legislation too – the Public Health Act. As such all its hospitals are governed by the same legislation. Unfortunately, there is close to none of any mention on the exchange of health information within organizations and, between different organizations. As such, this absence poses security and privacy risks on health information. The only mention is in the Health Information System National Policy (Malawi, 2003) where it is stated that central hospitals like Kamuzu Central Hospital, will prepare quarterly monitoring reports on tertiary care indicators. That is at predefined times, the hospital prepares reports to the ministry presenting aggregated data from the DHIS on different health indicators for decision making. But on the sharing of patients data within the hospital and with other hospitals, the policy statement is silent (*discussed in section 5.3.3*). Worse still when it comes to legislation on the usage of computer technology in the transferability of health information, which has resulted in using different Medias for the transfer as indicated in the HIS National Policy.

6.5.2 Ethical Standards

Ethics is a set of moral principles. Ethical standards are standards of moral judgment. Ethics is a crucial element in health sector because it has to deal with morally accepted actions, or, social or professional behavior. It is a requirement that health personnel within the medical team understand the code of ethics which stipulates on how they are to behave in their work places.

As stated above, all nurses in Malawi have their Code of Ethics. In the booklet on Nurses' Code of Ethics, Nurses and Midwives Council of Malawi (2002, p.4) stipulates that *“a nurse hold in confidence the consumers' personal information and uses judgment in sharing this information – Only*

information pertinent to the consumers' care is disclosed and only to those directly concerned with the care. The rights, wellbeing and safety of the individual(s) should be determining factors in deciding disclosure".

From the outcome of this research, it has been found that somehow this ethical consideration to some extent is being violated in the hospital. The violation is either with intent or unconsciously. For example, considering the clinics in Out Patient Department, there are differences in the whole setup. Under 5years children, though minors, have also a right to privacy. As observed, consultations of adults are carried out in rooms with doors to close (*reference from Chapter 4*) while for children of 5 years below, consultations are done in open spaces and in the audibility of other patients and guardians.

The other situation that is practically the same to breach patient right to privacy contrary to the code of ethics is the discussion of patient problems by teachers or trainers with their student nurses right in the ward in the presence of other patients. Muula (2005) in his paper says that maintaining privacy in hospitals where teaching of nursing and medical students occurs during ward rounds is problematic. He further explains that this is because the discussions are held in the presence of other patients which tantamount to breach of privacy on the concerned patient. This is the same case with Kamuzu Central Hospital since it accommodates trainees from the nearby Kamuzu School of Nursing.

Even though the Code of Ethics does not state that some practical trainer-student discussions are to happen in wards, in the presence of other patients, the question that still remains is whether it is morally wrong or right to do so. Because the object of such an activity can be twofold: First to train the nurse or doctor in real life environment. Secondly it can be of benefit to the patient in a way that the trainee nurse or doctor can contribute to the

already treatment a patient is receiving by offering other improved suggestions (Cook and Gutowsky, 2007). Hence even the goals of this action are different, at the end the object is the same of providing health care service.

6.5.3 Health Information Policies

The Health Information System: National Policy and Strategy (Malawi, 2003) highlights issues pertaining to hardware used, different type of information systems used by the Ministry of Health, data collection, collation and aggregation mostly based on DHIS, its storage, back-up and transferability between different levels of the health sector hierarchy. Less has been presented on how the existing manual system is to store its information, the distribution and transfer of this information among medical professionals within the organization and external organizations, who is in charge of the dissemination of this information, what protocols are to be used. This is evident in some responses from the questionnaire like:

“Through heads of departments; only the relevant people get access to information; use of consultation forms, referral letter”, and others “Don’t know” (see Appendix H).

Surprisingly within the same Health Information System: National Policy by the Ministry of Health and Population (Malawi, 2003), as indicated above, it only highlights how to handle information within DHIS. No compelling regulation is there on the usage of other information systems although they have been mentioned in the document as some systems to be used by the ministry. This leaves a gap on the ways of handling and sharing of information from the Patients Register System being used in the hospital.

There is no standardization of data distribution and the modalities of its exchange. This puts the medical personnel in a dilemma. Absence of proper indication and or direction on handling of health information, results in different departments or wards handling information differently. This portrays elements internalization / externalization concept and that of tool mediation. Internal thinking by the health worker inaction is manifested by the worker using the available tools in recognition that there are meager resources and also that the policy is silent on some other issues.

6.5.4 Summary

It is evident that though legislation, policies and guidelines have been stipulated to be followed in work practices, to an extent they are but due to shortage of resources, some have been circumvented in order to get the job done and there is proper checking mechanism on whether these are followed or not. As such, there is need to review these guiding rules in work places to be abreast of changes taking places and the laps of times.

6.6 Developments and Improvements

This section presents some of the required developments and improvements that need to be done within the Ministry of Health and Population and, at Kamuzu Central Hospital in order to accommodate changes that are happening with regard to the management of patients' data. This discussion makes use of the 3rd Generation of Activity Theory as presented in Section 3.1.3. Figure 6.2 below depicts the 3rd Generation of Activity Theory as developed by Engeström (2001).

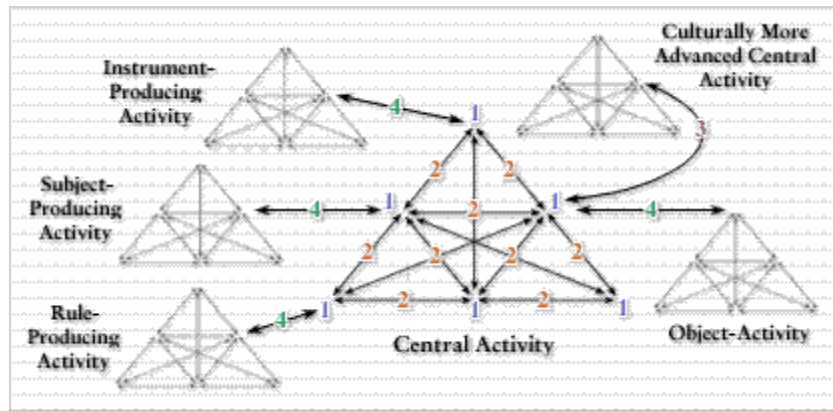


Figure 6.2 3rd Generation of Activity Theory

Source: <http://www.edu.helsinki.fi/activity/pages/chatanddwr/activitysystem/>

The 3rd Generation of the Activity Theory presents three producing activities namely: Instrument Producing Activity, Subject Producing Activity and Rule Producing Activity that are derived from the main or central activity. These producing activities possess similar elements of instruments, subjects, rules, community and division of labor, as is the case with the main activity. This can also be seen in the figure above. It has to be noted though that there are both commonalities and variations across individual producing activities, on how the mentioned elements apply.

For instance, as pertains to rules for securing patients' data, which is the central activity, it is important that the same be instilled across the producing activities. For example, in instrument development, such as software development, existing rules regarding how the systems should enforce privacy and confidentiality apply. In the same line, when training health personnel, these rules also act as guidelines on how patient data has to be handled. However, there are rules that apply to software development, such as those pertaining to human-computer interaction, that do not apply to the training of health personnel. In the same way rules that guide how health workers are supposed to interact with patients, do not apply to software development. The sections below further demonstrate how

instrument production, subject production, and rule production employ elements of the Activity Theory's triangle.

6.6.1 Instrument Developing Activity

Tools and tools knowledge is the focal point in Activity Theory. Hence development of these tools is crucial to the main activity, as tools mediate action and shape the way subjects interact with reality. The table below (Table 6.4) demonstrates how instrument development involves the previously discussed elements of the AT triangle, using software development as an example.

Table 6.4 Elements of Instrument Developing Activity

Element	Rules	Subjects	Instruments	Community	Division of Labor
	Security rules to be embedded into the system Rules on developing secure systems	Software Engineers, Programmers, Analysts, etc.	Software development tools	Development team, Users and other Stakeholders	This depends on subjects involved and the kind of work to be done

To ensure patients' data privacy and security, proper consideration is to be taken when developing instruments such as computerized systems. Like within the software developing cycle, security of the upcoming system needs to start from the initial stage of analysis and design. What needs to be secured and who will have access will be one of the bases for designing a better secured system. Users of the system and systems analysts need to indentify crucial areas of the system to accomplish data integrity and

security. These requirements are passed along to developers and programmers who do the coding. Security measures derived from the analysis and design phases need to be properly coded to avoid easy future compromise of the system when implemented. Some examples these security rules embedded in the system are usage of encrypted user password, encryption of data when being transferred between terminal and server, limiting of access levels of users, just to mention a few.

Smith and Eloff (1999) shares the same sentiments saying the building of computerized systems that ensure patient information security is a challenge because enormous chunks of data are generated electronically. Despite this, it is still important to preserve the integrity of data in computerized systems because if the data is compromised, patients may be incorrectly treated (*ibid*).

6.6.2 Rule Producing Activity

Rules have been put long time before some of the systems were introduced by the Ministry of Health and Population. Rule producing activity relates to rules element of the Central Activity. It is essential to have an iterative process on amending rules and policies due to changes in our communities. Technological changes also will pave way to the amendment of these rules and policies. The table below (Table 6.5) relates the development of rules to the elements of the AT triangle.

Table 6.5 Elements of Rule Producing Activity

Element	Rules	Subjects	Instruments	Community	Division of Labor
	Instilling or imparting knowledge in data security and confidentiality.	Administrators , Legal Advisor and different stakeholders	Legal basis (other legislation, policies, guidelines, etc)	Parliament, Medical and Nurses Council, Medical Professional Associations	This depends on subjects involved and the kind of work to be done

To ensure patients' data privacy and confidentiality is maintained in the hospital, proper consideration also needs to be taken when coming up with rules such as legislation, policies and regulations. For example, an understanding of some fundamental principles like a state's particular laws and regulations should form the basis for detailed rules and policies formulation and amendment to guide health personnel working behavior (Dennis, 2000).

6.6.3 Subject Developing Activity

Capacity development relates to aspects of subject and division of labor within the Activity Theory. This activity involves coming up with personnel who are subjects in the main activity taking place. The implications of this activity are that the production of personnel has a direct impact on how well various activities can be performed. That is, the number and capacity of available staff determines how well a task can be performed. For example, an activity cannot be performed to its fullest if it lacks personnel. It has been discussed in previous sections that there is shortage of personnel at Kamuzu Central Hospital. Currently, in order to sufficiently provide health care services to the community the Ministry of Health and Population in Malawi has embarked on a program of increasing the numbers and capacity of health personnel. This also aims at meeting one of the ministries Millennium Development Goals. The table below (Table 6.6) presents a walkthrough on subjects (personnel) development, in relation to 3rd Generation AT just as has been done in the previous two sections.

Table 6.6 Elements of Subject Producing Activity

Element	Rules	Subjects	Instruments	Community	Division of Labor
	Instilling or imparting knowledge in data security and confidentiality.	Lecturers, Tutors, Trainers, Examiners , etc	Knowledge base, Books, Practical, Assignments, etc	Colleagues, Schools, Colleges, Universities	This depends on subjects involved and the kind of work to be done

In training members of the health team, special consideration should be put on areas which need more members, depending on the activity to be performed. But with respect to the Ministry of Health and Population in Malawi, with the current situation, all areas of health personnel are of paramount importance and need special attention. As such there is need to train more doctors, nurses and clerks, in order to effectively manage patients and their information.

7 Conclusion and Recommendations

In this chapter I present the conclusion to the research I did on the management of patients' data with respect to its privacy and confidentiality. Thus I firstly present a summary to this study's discussion. This is followed by theoretical and practical contributions of this study. Lastly, I present areas of further research.

7.1 Research Summary

This research has been part of an Information Systems research that falls in the domain of security of Information Systems. Entirely, in this research, I have tried to answer the research questions which were meant to:

1. understand the extent to which existing policies influence health workers action when handling patients' data;
2. find out whether existing policies enhance or hinder legitimate access to and sharing of patient information needed for treatment;
3. be aware of the capacity of health workers as pertains to the handling patients' data;
4. Comprehend what is being done to complement the existing manual system with computerized system in order to maintain data privacy and confidentiality.

In the following sections, I present summaries of findings that respond to the above.

7.1.1 Policy Influence on Workers Action

During the course of this research, I have found that in Malawi, later on at Kamuzu Central Hospital, the Ministry of Health and Population has laid out legislation, policies and guidelines which govern health personnel in their

work practices. I have found that the laid out legislation, policies and guidelines form the basis of what health workers are allowed or not allowed to do. In reality, though, some health workers do and some do not follow these rules. This then leads to differences in how different health workers handle patients' data.

Lack of human resource is one of the main reasons why these rules are less influential. A resource like human capacity which is not adequate, contributes to how patients' and their data are handled. Heavy workload on a few workers available makes them at times to waiver some prescribed work practices. For example in life threatening situations or some emergencies, guidelines or policies have less influence, only the instinct of the worker dominates as was commented by one interviewee. This concurs with the position taken by Mangham (2007), which states that staff shortages in Malawi have an impact on quality of health care. There is a considerable amount of pressure on health workers that makes it difficult to complete their duties. However, in contrast to the actual situation on the ground, the Medical Council of Malawi (2007, p.8) has stipulated that "it is unethical to delegate any work to another practitioner or nurse unless he is suitably qualified and experienced to undertake that work".

7.1.2 Policy and Information Access

As pertains to whether current policies have affected access of information, I have found out that current policies are a bit outdated with the changes that have occurred over time and need to be up-to-date. For example, there is legislation only on guiding the actions of doctors and nurses when handling patients and the information presented to them. Nothing has been put up regarding the clerks who are also in constant contact with patients and their information. Though this development does not prevent services from being

provided to patients, or the legitimate use or access of information, the legislation and policies need to be updated according the changes.

Another example is on the sharing of data within an organization or across organizations. As discussed in Section 6.5.3 that the Ministry does not provide explicit means of sharing or transferring patients' information. On top of that, they need to be explicit on the handling of patients' data within the hospital as well as sharing such data with other organizations. Bronx (2006) in her research on Information Security in distributed Health Information Systems in Scandinavia also pointed that legislation also needs to change with time when other factors have changed.

7.1.3 Human Resource Capacity

Kamuzu Central Hospital like many other government hospitals in Malawi runs short of required human resource capacity. There are no dedicated personnel to look into or enforce issues surrounding the privacy and confidentiality of patient data. Instead, the available staff collaborates on the management of patient data. This presents both advantages and disadvantages over the aspects of privacy and security. The advantage is that this enhances team work and clear division of labor.

On the other hand, the teams can also be problematic. The teams consist of individuals who are well-versed, and others who are not well-versed, with existing policies regarding privacy and security of patients' data. It is therefore a challenge for hospital administration to train the lesser skilled individuals (like the clerks) on the aspects of privacy and security. More also, a considerable number of nurses complained of lack of further training on the same. This is contrary to the recommendation by the Nurses and Midwives Council of Malawi (2002), in the Code of Ethics for Nurses that each nurse is

supposed to have continual training to be abreast with what is happening in their field.

7.1.4 Tools Complementation

On tools complementation, I found out those existing tools like the registers, EPR and the Touch Screen Patient Management System complement each other by proving some data to be used in DHIS software. However, empirical evidence has also shown that there is no clear distinction between the Touch Screen Patient Management System and the EPR. They seem to have the same functionalities except that EPR collects more data on patients, like diagnostics and treatment, but is only fully implemented in the pediatric ward and Radiology Department.

From the gathered empirical data in this study, it would be better to adopt one system to avoid confusion in operations. EPR seems to be better suited for this because of its added functionalities. It would therefore be appropriate to have it available on all stations within the hospital. However, developers supporting this application need to limit user level access. Not all authorized users need to have access to almost all modes of the system as is currently the case. That is doctors, nurses, clerks or even hospital administrators need to have different portions of patients' information they can access. But before then, as suggested in Section 7.1.3, this study shows there is need for training on the usage of computerized systems, so users can gain necessary skills to use the systems and maintain information privacy and security.

Further to this, this study suggests that paper-based registers contain sensitive information concerning patients. Though a coding system is used to record patients' details and diagnostics, safe keeping of these registers is still

as important as ensuring the correct use of computerized systems to ensure patients' data privacy and confidentiality.

7.2 Concluding Remarks

In conclusion, the whole research has been an eye opener on how patients' data is managed at Kamuzu Central Hospital. In some instances there are best practices in handling data. However other practices do not conform to set rules and guidelines for handling patients' data. Such practices need to be corrected. As indicated already, this can be achieved through trainings on data security with respect to privacy and confidentiality.

7.3 Research Contribution

In this section I present theoretical and practical contributions of my research.

7.3.1 Theoretical Contribution

This research contributes to the domain of data security in health care. A number of available literatures present what needs to be done in order to secure patients' data but do not examine what really happens on the ground. Some examples include the research done by Bronx (2006) on the sharing of data in Denmark, Norway and Sweden. This research has shown how to marry given rules and guidelines with available resources at a particular health institution.

Empirical evidence has shown that most rules and guidelines are prepared at national level where circumstances might be different to those at health facility level. Hence, there is a need to come up with facility-specific guides derived from the main ones but suiting the local circumstances in order to provide the required services.

7.3.2 Practical Contribution

On the practical side, the usage of Activity Theory has been enlightening too. I have come to realize how different activities overlap each other to achieve the same goal. It has also opened up my perception on how different actors or subjects contribute to achieve a desired goal through division of labor and available tools.

The same, Activity Theory (AT) has opened my views when dealing with privacy issues too. It is a complex situation to maintain privacy when there are too many subjects involved. With AT, I have realized that this should not bring about many problems. The concepts of hierarchical structures, object-orientedness and tools mediation, have contributed to loosening up complexities that exist in the understanding and maintenance of data privacy and confidentiality. The theory eases up understanding of situations when elements of an activity are broken down into smaller parts, understanding them separately and how they contribute to the bigger picture.

7.4 Recommendations

In this section I present some recommendations to programmers, analysts and relevant stakeholders involved in the developing and implementing of Health Information Systems:

- Access Control

This pertains to controlling user access the system. All users must be provided with a unique username and password and these have to be encrypted to avoid being hacked easily.

- Authorization Control

This refers to role-based mode and user-based modes. Since there are different subjects or actors in the provision of health care, the subjects demand different information of the same patient for their work, and then the modes accessed will have to depend on the role and category of the user/subject.

- Physical Access Control

This refers to the actual physical control to where of the hardware running systems are. Like limiting access to the server room and even not to move around computers without proper authorization.

- Media Control

Allowing what media will be used to transfer information from the system to other systems and interested parties.

- Security awareness training

These are trainings aiming at sensitizing or reminding users on proper usage of systems.

7.5 Further Research

From the findings of this research, I have noted that there are number of research areas that can be furthered explored. For instance at Kamuzu Central Hospital, since there are three computerized systems dealing with health information, a possible research area would be on how to integrate all these into one systems. Particular attention should be paid to how best these systems can be combined to provide necessary information for planning and activity monitoring to management, whilst at the same time, maintaining the privacy and confidentiality of patients' data.

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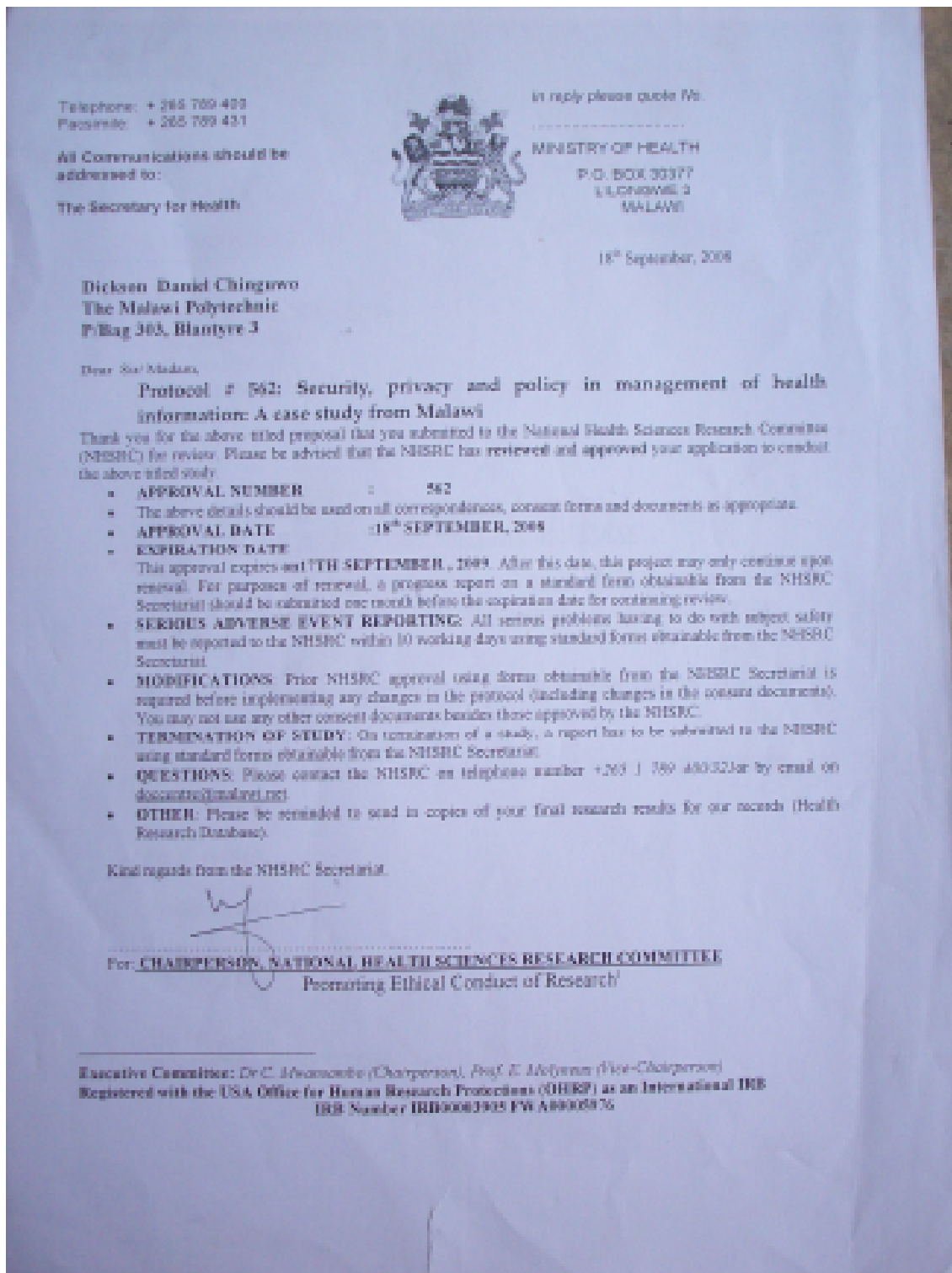
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APENDECIES

Appendix A: Ministry of Health and Population Response



Appendix B.1: KCH Application Letter to Conduct Research

University of Oslo,
P.O.Box 1130,
Blindern, N-0318, Oslo,
Norway.

Contact address:
The Malawi Polytechnic,
Private Bag 303,
Chichiri,
Cell: 08896563 / 09570165

The Director
Kamuzu Central Hospital (KCH)
P.O. Box 149
Lilongwe

Dear Sir/Madam.

Request for permission to conduct a study titled “Security, Privacy and Policy in Management of Health Information”

My name is Dickson Daniel Chinguwo and I am a Malawian pursuing a Masters Degree in Information Systems at the above mentioned institution. This is a two year course and I am in my second and final year. To fulfill the academic requirements for the award of the degree, I am expected to conduct a study in my home country. As such, I am asking for your permission to conduct the above mentioned study. My research question is “in this era of computerized systems, what role do legal legislations and policies play in managing of health information and patients’ data for the betterment of healthcare services in our health facilities?”

I am planning to collect data using questionnaires, conducting structured and unstructured individual interviews, and also carrying out observations. I plan to interview and observe doctors, nurses and health assistants.

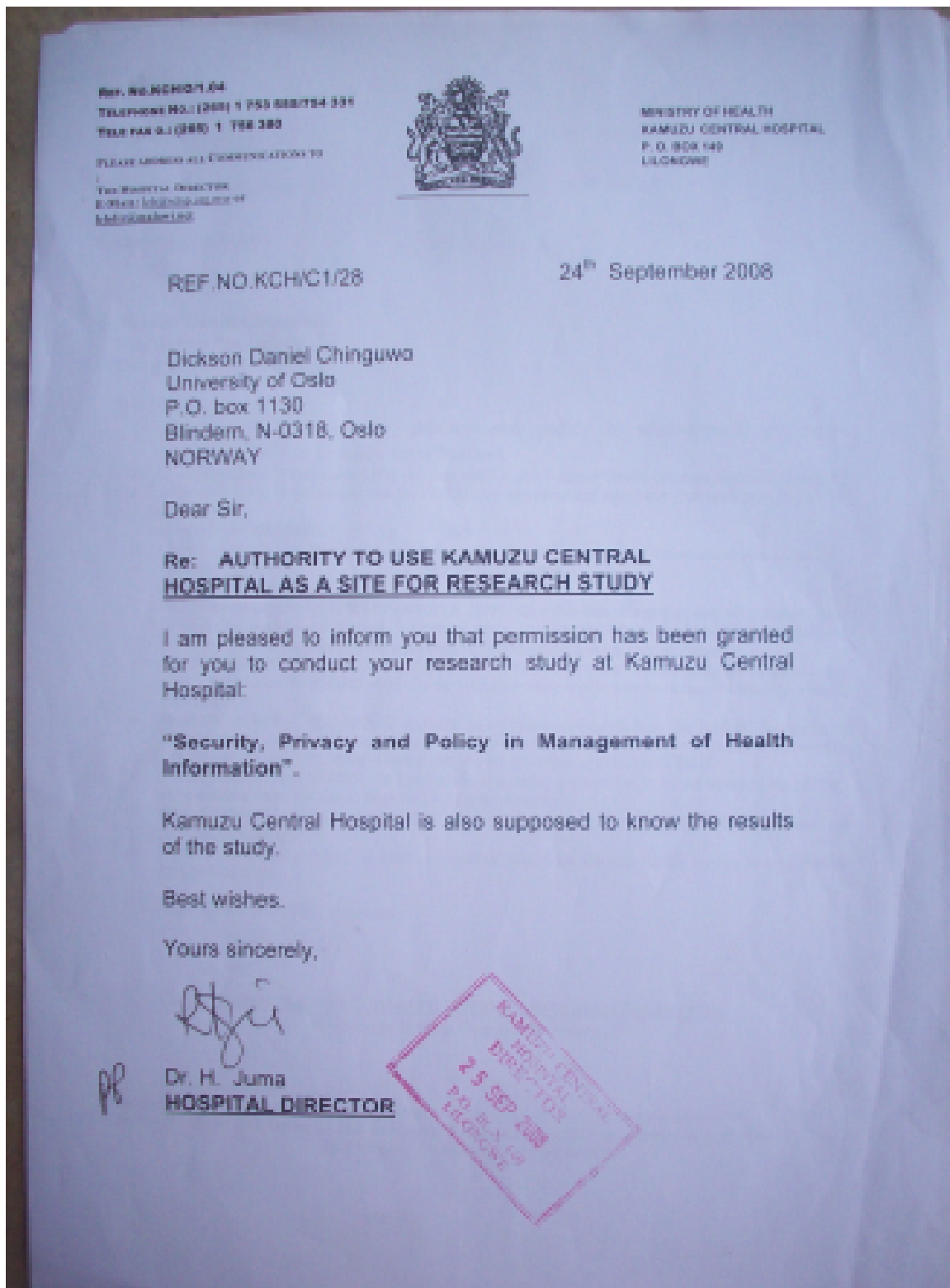
The results of the research will benefit KCH and other government health facilities in understanding the challenges faced in management of patients data and health information as a whole. It will also help in promoting better management of patients’ data as well as health information with respect to privacy and security policies.

Attached is a letter of approval to carry out the study that has already been endorsed by National Health Sciences Research Committee. This study has been sponsored by University of Oslo through the Norwegian Government.

Yours Faithfully,

Dickson Daniel Chinguwo

Appendix B.2: KCH Response to Conduct Research



Appendix C: Research Participants' Consent Form

Informed Consent to Conduct Interview

I, Dickson D. Chinguwo is a student enrolled with the University of Oslo in Norway is conducting a research in the field of health informatics. The research area centers on the security, privacy and policy issues in managing of patients' data and health information within a specific health facility in Malawi. As part of the research, I will be conducting a semi-structured interview. Meaning that it will comprise of structured interviews (to be accompanied with a questionnaire) and unstructured interviews (less formal, just verbal).

Since this is an academic research, it is imperative to note that participation in this interview is voluntary. There is no remuneration package or monetary allowance attached to the exercise both on the researcher or the participant side.

Any information that is obtained in connection with this study and that can be identified with you
will remain confidential and will be disclosed only with your permission.

If you have any questions, don't hesitate to contact

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I have received a complete explanation of the study and I agree to participate in the interviews.

| Name: _____

Date _____

(Signature of participant)

Appendix D: Questionnaire Guide

*Security, Privacy and Policy in Management of Patients Data & Health
Information: A case study from Malawi*

Questionnaire for Doctors, Nurses and Medical Assistants

The following questionnaire is divided into 4 sections: General questions, Security, Policy and Privacy.

General Questions

1. Which department / section are you currently working under?
.....
.....
2. What is the approximate number of Doctors, Nurses, Medical Assistants, Technicians, in your department / section at a particular working time?
3. With the numbers above, in terms of staff, do you think you are
[a] Adequate
[b] Over Staffed
[c] Under Staffed
4. Which type of personnel is lacking most?
.....

Security

1. How is the flow of information for
an out-patient:
.....
.....
.....
an in-patient:
.....
.....
.....
2. In recording patients data, do you use:
[a] manual system?
[b] computerized system?
[c] both?
3. How do the manual and computerized systems compliment each other?
.....
.....
.....

4. Who is responsible for managing
[a] computerized system?
.....
.....
[b] manual system?
.....
.....
5. What other tools are available for managing patients' information?
.....
.....
.....
6. Are the available tools adequate enough not to compromise the stored
information? [Yes / No].
Explain.....
.....
.....
.....

Privacy

1. How is storage of patients' data done:
[a] with manual system?
.....
.....
.....
[b] with computerized system?
.....
.....
2. What measures are taken to maintain privacy of patients' data / records in each system?
.....
.....
.....
3. With the introduction of computerized systems, has the confidentiality of patients' data been enhanced or compromised?

[a] Yes [b] No
4. What has been
[a] enhanced?
.....
.....
[b] compromised?
.....
.....

5. How is the exchange and distribution of sensitive health information done:
 - [a] within an organization?
.....
 - [b] between several organizations?
.....
6. Is patient's consent obtained in exchange and distribution of their information? How is it obtained?
.....
7. Do you think patients know of their privacy rights?
 - [a] Yes [b] No

If No, what is being done to sensitize them on their rights?
.....
8. What mechanism are there to enforce or strengthen confidentiality of patients data
 - [a] within your work-group (same position or level)?
.....
 - [b] when collaborating with other health personnel
.....

Policy

1. What impact do working guidelines have on the management of patients' data and health information in the daily operations of the health facility?
.....
2. What are the strengths and weaknesses of current health information management policies and guidelines?
.....

-
-
3. Do you think working policies and guidelines are followed to the letter or not? Why?

.....

.....

.....

4. What are the strengths and weaknesses of the current working guidelines?

.....

.....

.....

.....

5. When does one follow his/her reasoning instead of following operational guidelines in the management of patients' data and health information?

.....

.....

.....

.....

6. Is there any formal training provided in data security and patient privacy after joining the profession? [a] Yes [b] No
[a] Yes, how frequent and what are the criteria used in selecting individual for this type of training?

.....

.....

.....

.....

[b] No, why not and do you think this is an important element in your profession?

.....

.....

.....

Name (optional) : _____

Position : _____

Date : _____

Appendix E: Nurses Pledge of Service

NURSES PLEDGE OF SERVICE

I SOLEMNLY PLEDGE MYSELF TO THE SERVICE OF HUMANITY AND WILL ENDEAVOUR TO PRACTISE MY PROFESSION WITH CONSCIENCE AND WITH DIGNITY.

I WILL MAINTAIN BY ALL MEANS IN MY POWER THE HONOUR AND THE NOBLE TRADITIONS OF MY PROFESSION.

THE TOTAL HEALTH OF MY PATIENTS WILL BE MY FIRST CONSIDERTION.

I WILL HOLD IN CONFIDENCE ALL PERSONAL MATTERS COMING TO MY KNOWLEDGE. I WILL NOT PERMIT CONSIDERATION OF RELIGION, NATIONALITY, RACE OR SOCIAL STANDING TO INTERVENE BETWEEN MY DUTY AND MY PATIENT.

I WILL MAINTAIN THE UTMOST RESPECT FOR HUMAN LIFE.

I MAKE THIS PROMISE SOLEMNLY, FREELY AND UPON MY HONOUR.

Appendix F: Distribution of Hospital Clerks

Department / Unit	Number of Clerks
1A	1
1B	1
2A	1
2B	1
3A	1
3B	1
4A	1
4B	1
Bwaila Maternity	2
Bwaila TB, Psy.	1
Casualty	1
Dental	1
Eye	2
HMIS	1
Laboratory	1
OPD 1	1
OPD 2 Gynecology	1
OPD 2 Medicine	1
OPD 2 Registry	2
OPD Pediatric	2
Orthopedic	1
Pediatric Ward	3
Pharmacy	2
Physiotherapy	1
SHDU	1
Skin	1
Transport	1
X-Ray	1
Total Clerks	35

Appendix G: Charter on Patients' Rights and Responsibilities

PATIENTS' RIGHTS

1. Right to access to health care
2. Right to choice and second opinion
3. Right to adequate information and health education
4. Right to informed consent/refusal of treatment
5. Right to participation/representation
6. Right to respect and dignity
7. Right to a guardian
8. Right to privacy and confidentiality
9. Right to a safe environment
10. Right to complain about health services

PATIENTS' RESPONSIBILITIES

1. Every patient shall ensure that he/she knows and understands what the patients' rights are and shall exercise the rights reasonable and responsibly.
2. Every patient shall conduct himself/herself so as not to interfere with the rights or well being of other patients and health care providers.
3. Every patient shall accept all the consequences of the patient's own informed decisions.
4. Every patient has the responsibility to ensure or maintain his/her own health and that of society by refraining from -
 - consumption of unhealthy food and water.
 - consumption of alcohol, drugs, substances of abuse and tobacco.
 - irresponsible sexual activity and other life styles that are hazardous to health.
 - degradation of the environment.
5. Every patient has the responsibility to provide health care providers with relevant and accurate information for diagnostic treatment, rehabilitation or counselling purposes.
6. Every patient must know his/her local health care providers and what services they offer.
7. Where applicable, every patient is responsible for settling his/her bills at times as requested by the health providers.
8. Every patient shall comply with the prescribed treatment and keep appointments and shall inform the health professional in good time if unable to do so.
9. Every patient has the responsibility to take care of his/her health records in his/her possession.

Appendix H: General Comment on Questionnaires

The following section presents summaries of responses from participants on questionnaires they filled. The results have been tabulated and divided into different categories based on the questionnaire.

Of Policy and Guidelines

Question	Options		Answers	
	Yes	No	Positive Response	Negative Response
1. What impact do working guidelines have on the management of patients' data and health information?			• Good • helps in proper patient management • storage of data is well guided • source of uniformity which leads to consistency	• not as effective because of lack of resources • difficult since patients keep their own records
2. What are the strength and weaknesses of the current health information management policies and guidelines?			• Well guided and that privacy and confidentiality is being achieved • Information is available for patients • Simple and straight forward to follow	• Not sure • Resulted in poor record keeping • Inadequate information is available to patients and guardians • Poor patient education on some health matters • Sometimes personnel manning the computers are off duty • Not well disseminated to everybody
3. Do you think working policies and guidelines are followed to the letter or not? Why?	X	X	• Followed because they are helpful • Followed and implemented	• Because of heavy workload and flow of information is compromised • Workers are not serious about

				importance of patients privacy • To some extent because some people do not know them • Not to the letter because of attitude in some instances • Not sure
4. what are the strengths and weaknesses of the current guidelines			• Are good and make work easy	• Not sure • Don't know • They are not very specific hence they overlap • Do not go in-depth • Difficult to follow when resources are not available • Not readily available
5. when do reasoning surpass guidelines			• No such a time because we are ever bounded by our operational guidelines and code of conduct	• When resources are not available, common sense takes over • In case of emergency • When one is in dilemma • If following the guidelines will hinder the provision of services
6. Any formal training in data security and patient privacy after joining the profession?	X	X	• On-going job training at least twice a year • Every year, those in the upper level start and of lower level follows	• Not at all. Only to follow the patients charter • These are over-emphasized during training hence a waste of resources. But if it was to do with IT since most nurses and doctors are computer literate

				• Not sure but think its important • Important element in the profession as many people don't know the limits or extent of giving out information • Because of lack of trained personnel • Its important but policy makers neglect that • Don't know why not
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Of Tools and Data Management

Question	Options		Answers	
	Yes	No	Positive Response	Negative Response
3. With the introduction of computerized systems, has the confidentiality of patients' data been enhanced or compromised? 4. What has been enhanced or compromised?	X	X	• Coding system has been established • Some information of patients in ward • Patients' data is kept safe • A continuation base incase file goes missing • Has improved the data capture system for patients • More protection to stored information as access is through use of pass codes	• Relevant patients data not kept such as results of diagnosis • Out patient records not properly stored • Anyone can have access to any data • Pertinent issues are not addressed pertaining to patients • Prone to illegal access by those with good computer knowledge
5. distribution and exchange of sensitive health information			Within an organization: • Professional ethics used • Use of consultation forms • Through handover meetings • One-to-one letters • Round table discussions • Through handovers • Only the relevant people get access to information • Don't know • Accessible only to applicable personnel	Between organizations: • Professional ethics used • Referral letter • Through heads of departments • Round table discussion • Through meetings • Only those organizations that are part of patients arrangement get access • Don't know • Through consultation forms
6. Is patient consent obtained before exchange of information and how?	X	X	• Counseling is done first the dissemination • Patients are asked	• No consent is obtained if exchange is between medical personnel within the

			who they think should of their condition • Asking the patient or guardian • Verbally	same institution • Not always
7. Do patients know of their rights? 8. If “no” what is being done to sensitize them?	X	X	• Health education and civic education of their rights • For those without knowledge they are oriented	• Some • Nothing, others go home without knowing their rights
9. What mechanisms are in place to enforce confidentiality of patients’ records?			Within same workgroup • Coding system of records • Files and records are not kept by patients except in pediatric ward • Constantly reminding each other that patient information is not supposed to be discussed with anyone who is not involved in that patients management • By following professional ethics	When collaborating with other health personnel: • In secluded areas and are reminded not to leaves patients’ files with guardians • Giving handovers • Using of consultation forms addressed only to relevant personnel • By following professional ethics • Utilization of coding system of records