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Design and Investigation of Consultation and Referral System in Tikur Anbessa Hospital

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A project submitted to Addis Ababa University School of Public Health and School of Information Science

Presented in Partial Fulfillment of the Requirements for the Degree of Master of Science in Health Informatics

Addis Ababa University

Addis Ababa, Ethiopia

June/ 2016

Table of Contents

ACKNOWLEDGEMENT	vi
LIST OF FIGURE	vii
LIST OF TABLES	viii
LIST OF ACRONOMYS AND ABBREVIATIONS	ix
CHAPTER ONE: INTRODUCTION	1
1.2 Statement of the problem	3
1.3 Research Questions	4
1.4 Objectives of the study	5
1.4.1 General Objective	5
1.4.2 Specific Objectives:	5
1.5 Scope and Limitation of the Project	5
1.5.1 Scope of the Project.....	5
CHAPTER TWO: REVIEW OF RELATED LITERATURE	8
2.1 Health Care System.....	8
2.2 Health Information System.....	8
2.3 Health Care Service Quality	9
2.5.1 Essential Elements of a Referral system	10
2.5.2 Factors Affecting Referrals.....	11
2.6 Consultation system	18
2.7 How information system improves Referral and consultations System	20
CHAPTER THREE: METHODS	23
3.1 Project Setting	23
3.2 Project Design	23
3.3 Design tools	24

3.4 Sample Size	24
3.5 Sampling Techniques	25
3.6 Methods of Data Collection	26
3.7 Method of Data Analysis.....	26
3.8 Data Quality Management	27
3.10 Dissemination of Result	28
3.11 Operational Definitions	28
CHAPTER FOUR: RESULTS AND DISCUSSIONS	29
4.1 Quantitative and Qualitative Data Results	29
4.1.1 Socio-demography profile of health workers	29
4.1.2 The Socio Demographic Profile of Patients Participated in this Study	30
4.1.3 Patient Referral Acceptance and Way of Communication in TAH Referral center	31
4.1.4 Reasons for patient Referral to TAH	32
4.1.5 Challenges patient face to Attend Treatment during Referral Process.....	34
4.1.6 Problems related to referral paper.....	35
4.1.7 Patients explain referral acceptance of TAH	36
4.1.8 Patients think current referral way of communication has effect on healthcare	37
4.1.9 Current consultation and way of communication on patient care-giving.....	38
4.1.10 Perceived importance of referral and consultation feedback to patients	39
4.1.11 Patient Challenge with Consultation Communication Processes	40
4.1.12 Way of Referral and Consultation Communication Patients Prefer	42
4.1.13 The Distance of TAH from Patients in kms	42
4. 1.14 Days it take to Patients to arrive at the Hospital.....	43
4.1.15 Transportation costs patients spend in ETB during the Referrals	44
4.1.16 Times patients spend during waiting for health workers in TAH	44
4.1.17 Health care Provider Explains about Retaining of Patients at the Referring Institution	45

4.1.18 Health care Providers Explain Design of Referral and Consultation System	45
4.1.17 TAH Health care Providers' Recommendation for Referral and Consultation System.....	46
4 .2 Discussion	47
CHAPTER FIVE: PROPOSED WEB-BASED SYSTEM	51
5.1 Requirement Analysis of the Existing System.....	51
5.2 Non-Functional Requirements.....	52
5.3 Functional Requirements.....	52
5.4 Data modeling.....	52
5.5 Object-Oriented data model.....	53
5.6 Object-Oriented Analysis (OOA)	53
5.7 Use cases.....	54
5.8 Use case description for System Use case modeling.....	56
5.10 Conceptual/ Domain/ Modeling	61
5.11 Sequence Diagram	65
5.12 Web-based Architecture for W C&RIMS	71
5.13 User-Interface Flow Diagrams	72
5.14 Usability	72
5.15 User Interface Designing/Prototyping/	73
5.16 Evaluation of user Inter face Prototype.....	77
CHAPTER SIX: SUMMARY, CONCLUSION AND RECOMMENDATIONS	78
6.1 Summaries	78
6.2 Conclusion.....	79
6.3 Recommendations:.....	80
REFERENCE	81
ANNEX: RESPONDENT'S BACKGROUND.....	86

ACKNOWLEDGEMENT

First of all, I would like to thank Almighty God.

My sincere gratitude goes to my advisors Dr Mitike Molla, and Ato Getachew Jemaneh for their profitable direction, friendly facilitation and support throughout the entire period of this project work. Without their support and guidance, it would have been impossible to finish this project.

I would like to acknowledge Addis Ababa University, Tikur Anbessa Hospital Outpatient and Emergency departments.

I would also like to thank my families and friends for their endless love, encouragement and moral support. I wish them well health and wealth for the rest of their life. It is difficult to mention all individuals to appreciate their contributions for this project. I would like to say heart fully thanks to all those who have helped me in different ways making this project come through.

LIST OF FIGURE

PAGE NO

Figure2.1 Framework of Factors Affect Referral System	17
Fig 2.2 Frame work of the study designing.....	21
Figure 3.1 below showed schematic presentation of sampling procedures.....	23
Figure 5:1contextiual framework of existing system.....	49
Figure 5.2 Use case Diagram for system use case modeling	52
Figure 5.4 Alternative scenarios for login.....	63
Figure 5.5: Login sequence diagram for WC&RIMS.....	63
Figure 5.6: consult/ refer /patient sequence diagram for WC&RIMS.....	64
Figure 5.7: register consultation/ Referral/ Result sequence diagram.....	64
Figure 5.8: Edit consultation/Referral /form System Sequence Diagram.....	65
Figure 5.9: view consultation/referral/ system sequence diagram.....	65
Figure 5.10: Allocate Patient System Sequence Diagram.....	66
Figure 5.11: Add User System Sequence Diagram.....	66
Figure 5.12: Schedule Appointment System Sequence Diagram.....	67
Figure 5.13: View feedback System Sequence Diagram.....	67
Figure 5.14: generate report System Sequence Diagram.....	67
Figure 5.15 Three tier architecture for Web-based System.....	68
Figure 5.16 User Interface flow diagrams for WC&RIMS.....	69
Figure5 18 home login page.....	71
Figure 5.19 log in page.....	72

LIST OF TABLES

PAGE NO

Table 4.1 Descriptive statistics of qualitative sample of health care professions.....	28
Table 4.2 socio-demographic characteristics of the outpatient and emergency attendees.....	29
Table 4.3 showed Frequency distribution of Referral from health facility.....	30
Table 4.5 Reason of patient referral.....	32
Table4.6 Challenge s patient face during the referral process.....	33
Table 4.6 problems patient faced with referral paper.....	34
Table 4.5 patient explain referral acceptance.....	35
Table4. 8 patients think current referral way of communication has effect on health care.....	36
Table4.7Current consultation and way of communication on pt care.....	37
Table4.11Perceived importance of feedback to patients.....	38
Table4. 9 patient worries with consultation processes.....	39
Table4. 10 Way of referral and consultation communication patient prefer.....	40
Table4. 12. Distance from patients come.....	41
Table4.14 Day's takes to patient to arrives.....	41
Table4. 12 Transport cost patient spent	42
Table4. 14 Time patients spend for waiting health worker.....	43
Table 5.1: Conceptual/domain modeling concepts.....	59

LIST OF ACRONOMYS AND ABBREVIATIONS

ARM	Annual Review Meeting
BR	Business Rule
CCO	Coordinated Care Organization
CGI	Common Gateway Interface
EHRIG	Ethiopian Hospital Reform Implementations Guideline
EHSDP	Ethiopian Health Sector Development plan
EHSTP	Ethiopian Health Sector Transformation Plan
FDRE	Federal Democratic Republic of Ethiopia
FMOH	Federal Ministry of Health
GDP	Growth in Domestic Product
GP	General Practitioner
GTP	Growth and Transformation Plan
HIV	Human Immune deficiency Virus
HSTP	Health Sector Transformation Plan
IP	Internet Protocol
IT	Information Technology
JAR	Java Archive
Java EE	Java Enterprise Edition
JSP	Java Server Page
MOH	Ministry of Health
MySQL	My Structured Query Language
OO	Object Oriented
OOA	Object Oriented Analysis
OOA/D	Object Oriented Analysis and Design

OOD	Object Oriented Design
PCP	Primary Care Provider
PHC	Primary Health Care
PHP	Hypertext Pre Processor
SPSS	Statistical Package for Social Science
TAH	Tikur Anbessa Hospital
UC	Use Case
UI	User Interface
UML	Unified Modeling Language
WC&RIM	Web- based Consultation and Referral Information Management System
WH O	World Health Organization

Abstract

Introduction: Referral is a process by which a health worker at one level of the health care system having insufficient resources (drugs, equipment and skills) to manage a clinical condition seeks the assistance of a better or differently resourced facility at the same or higher level to assist in or take over the management of the client's case. In tertiary hospital such as Tikur Anbessa teaching Hospitals which receives patients from all over the country, the referral system is lengthy and complicated. It is therefore imperative that information should be managed in the most effective way possible in order to ensure a high quality service delivery.

Objective: This project, therefore, aimed to describe challenge that affects patient referral and consultation system and to design web based consultation and referral information management for Tikur Anbessa Hospital referral center Hospital.

Methodology: Mixed method research was conducted by combining patient survey, document review, in-depth interviews of staff and object oriented analysis as the same time done. It was a cross-sectional study design. The quantitative data were analyzed using SPSS and the qualitative data were analyzed thematically and complemented the quantitative findings.

Result: A total of 295 patients participated in the quantitative survey while 19 health workers took part in the qualitative a study. Majority of patients participants 165 (55.9%) were males as in the health workers group where there were male participants. Most patients 238(80.7%) reported to have been referred from other health facilities. For most patients 280 (94.4%, reason for referral to Tikur Anbessa Hospital was, to get better treatment and diagnosis .2/3, 199(67.5) want to have feedback to their referring health facility for their follow-ups at the end of their treatment at Tikur Anbessa Hospital to nearest health facility at the end of care. Waiting time was one of the major problems reported by 266 (90.2%) where 59(20.0%) reported to have been waiting for 4-5hrs without being seen by a specialist. Qualitative research participants also acknowledged the long waiting time before patients received the required care. More than 3 in 4 patients 234(79.3%) reported that there was a huge delay in consultation communications processes with specialists. Health worker participated in the qualitative research also indicated poor communication, between receiving and referring health facilities, unnecessary referrals, and patients coming without important documentation as a source of delay in care and patient overcrowding. The designed WC&RIM system registration, validation patient, generate report and re direct communication between health institutions.

Conclusion: Problems of coordination, inappropriate referral, and hospital over loading, late response of specialist, poor feedback, and utilization problems are seen and this problems cause waiting time in hospital. To fulfill this gap web based consultation and referral information management was designed and evaluated.

Recommendation: The hospital should coordinate, Communicate /consult/ the referring patient before referral for available service and retain the patient if possible to the nearest health facility. After assessing the referral system, we designed a web based system to decrease waiting time. This could enhance accessibility of services and information. Fast, and redirect/fed back/ communication is possible through web based.

Key term: referral and consultation system, web based consultation and referral information management system

CHAPTER ONE: INTRODUCTION

The introduction section highlights a backdrop of the project work. It provides a background on health care referral and consultation system. It then highlights the statement of the problem for this project. It also shows the research questions, general and specific objectives followed by the scope and significance of the project.

1.1 Background of the Study

A healthcare referral is a system in which a health worker at one level or different of the health care system, having inadequate resources like drugs, equipment and ability to handle a clinical condition, look for the assistance of a superior or differently resourced facility at the similar or advanced level to support in, or take over the management of, the client's condition or case (WHO, 2013). The referral process involves the generation of big data every day. It is estimated that up to 30% of the total health budget is spent on handling this big data. It is therefore imperative that information should be managed in the most effective way possible in order to ensure a high quality service delivery (Health information and quality authority, March 2011).

Good referrals are those that send the right patient to the right service or specialist at the right time. Failures in communication, lack of protocols for care handover, differing systems of care provision between providers, and lack of clarity about where responsibility and accountability for patient care lies in such situations are challenges associated with referral system in health care (Health information and quality authority, March 2011). Also pathway of referrals is more important to indicating that you operate an efficient practice capable of providing most advantageous patient care and gate keeping can therefore be seen as an organizational mechanism to triage coordinated care (Saltman et al 2006).

Referral guidelines are valuable if: Secondary health care providers are participated in dissemination of activities, formal referral sheets are Used, Secondary health care institutions

is quick to respond to changes in primary care referral. As a result Production of referral guidelines based on clearly defined and agreed patient pathways (WHO, 2006).

According to Scottish Executive Health Department Directorate of Delivery 2007 factors that may improve referral quality include the following four:

Clinical triage: clinical triage is a main part of referral coordination service to route referrals to the most appropriate health professional and location. Information systems: use information systems, including the web based transfer of patient information between health care providers used for patients do not have to repeat their medical history and to avoid the harmful, over testing, wasteful effects and poly pharmacy. Easy to get to and good first contact care: In many countries, overuse of emergency departments can be explained by access and quality issues. Provider payment systems that are associated with health system purpose: Referral system shall be developed by improving utilization of health care facilities at all levels, improving accessibility of care according to need, assuring continuity and improved quality of care at all levels, rationalizing costs for health care seekers, providers for best utilization of health care facilities at all levels and improving the communication within the health care system (MOH, 1993).

Referral system is one of Continuous quality improvement processes in health facilities, health administrative structures and community level Health Development Army to identify areas for improvement in their domain (EHSTP, 2015). The Ethiopian health service is now restructured into a three tier system. These levels are: The primary care level has three kinds of service points health posts, health centers and Primary hospitals, the secondary care level is comprised of General Hospitals, The tertiary care level is comprised of Specialized Hospitals patient management based on maximal subsidiary providing follow-up is effective at the primary care level to referred patients referral processes are facilitated and enhanced through electronic procedures as much as possible(EHSDP IV final 2003)and(HSTP, 2015).

Consultation system: Consultation lies at the heart of professional communication and is pervasive in any medical practice. It is an essential unit of medical practice which creates an intimate relation between the patient (a person who is ill, or believes himself to be ill seeks the

advice of a doctor whom he trusts) and the care provider where, in the intimacy of the consulting room or sick room. This is a consultation and all else in the practice of medicine derives from it.”This definition relates to consultation in medical practice but of course consultations take place in all healthcare professions (James, 1960).

Several authors indicated different number of key steps in the development of consultation analysis. Primary Care Consultation describe four areas to be systematically explored each time: A patient consults management of the patient's presenting problem, modification of help-seeking behaviors, management of continuing problems, Opportunistic health promotion (Stott and Davis 1979).

The Inner Consultation describes an intuitive five-stage model: Connecting with the patient and developing rapport and empathy summarizing with the patient their reasons for attending their feelings, concerns and expectations, Handing over or sharing with the patient an agreed management plan which hands back control to the patient Safety netting or making contingency plans in case the clinician is wrong or something unexpected happens ,Housekeeping or taking measures to ensure the clinician stays in good shape for the next patient(Roger, 1987).

According to functions of individual documents used for patient care, Consultation request function when a different specialty opinion is sought, the form serves as a communication tool for the different consulting parties, location MR as a permanent record, processed when any consultation is needed, the original physician will put the request in the physician’s order sheet and sign a consultation request. Nurses will contact the consulting specialist to see the patient and record the result/opinion/ on the consultation request. The consultation request is kept in the medical record (Blue print for Hospital Management in Ethiopia, 2007).

1.2 Statement of the problem

The WHO Geneva 1987 Expert Committee on the Role of Hospitals at the referring health institutions listed challenges with referral system are overcapacity of patients in hospitals with improper referrals, self- referrals, un investigated referrals, exposed to distance, transport,

payment. Limited knowledge of health care profession at referring health institutions leading to insufficient flow of information to the referral accepting health center and to health care professionals at the referral center is the hindrance to quality care-giving service. In geographic regions with a lot of small practices, the logistic problem of working with many health care providers is service agreements a main problem in health institutions (O'Malley et. al, 2009). There are key problems that challenge health care systems: demographical, epidemiological growth, scientific advancement, technological expansion, cultural, globalization and socio-economic developments (De Maeseneer et. al, 2007).

Problems that challenge effective referral system and which need improvement are: inadequate documentation in the referral paper, formless referral letters, un interested health care professionals to help patient, delay in consultation between department or no consultant feedback from the specialist, poor coordination referral communications, self-referral, patient not know is information and insufficient resources or logistic services at referring health institutions (Qureshi et. al, 2001).

Healthcare referral service within the growing world need up to date healthcare environment, and important referral service system is a necessary and essential foundation for ensuring and advancing the quality of healthcare services, not just in the developed country (Bal et al., 2007). Paper based referral processes has problems such as insufficient information, lost, misplaced, wrong history and medication, medication errors are resulting from illegible handwritings paper records. Standardization problem of referral format, lack of the knowledge of referral prioritizing, problems of coordination communications of referral and feedbacks between referring health institution and specialists are other characteristics of paper based referral systems (Thiong'o, 2013). Therefore, the planned project was fill the gap by describing the problem and designing web based consultation and referral information management system for referring and accepting health care institution.

1.3 Research Questions

What are the factors that challenge health care consultation and referral systems at Tikur Anbessa Hospital referral center?

How do information systems enhance the flexibility of service delivery?

What is the nature of consultation systems at TikurAnbessa Hospital referral center?

1.4 Objectives of the study

1.4.1 General Objective

The general objective of the study was to assess factors that affect patient referral and consultation system and to design a Web-based Consultation and Referral Information Management System for health care institutions referral center.

1.4.2 Specific Objectives:

- To assess waiting time of patients before they reach physicians
- To describe the referral and consultation system and the communication system
- To assess the effect of tools for referral and consultation focusing on patient-empowerment
- To define and analyze user and system requirements that addresses users 'needs.
- To design system for Web based Consultation and Referral Information Management System and develop a prototype for the consultation system and evaluate.

1.5 Scope and Limitation of the Project

1.5.1 Scope of the Project

The present study was delimited to describe the challenges involves three groups in its generality of stake holders, patient and health care provider with referral and consultation systems at Tikur Anbessa Hospital center of referral and design web based information management for consultation and referral information management system for TAH. It focuses on studying how to bring faster and simpler referral and consultation system. This further helps to facilitate management of patient data with timely communication among service providers before referral by consultation between health facilities. The study focuses on investigating

how referral service providers make possible redirection of patient to different facility prior to service delivery. The study assesses how to make easy to share best practices among technical staff and timely report generation to facilitate for feedback or bi- directional communication between health facilities. It ensures that the right information is provided at the right time to the right person at the right place with the appropriate security in line with continuity of patient information with a reduction in the risk for miscommunication within a secure system and at the right cost was achieved.

1.5.2 Limitation of the project

This project had different limitations. These were:

- Time and budget limitation: Time for intervention of this project was short and also the total budget for the project was not enough to implement further interventions.
- Familiarity of the project designing soft ware for project completion was the basic limitation.

1.6 significance of the Project

A prospective study of reasons for referrals and time spent from referring sites to arrival at Tikur Anbessa Hospital in emergency obstetric by Tadesse Kitila explain that the hospital had received 496 emergency referrals of which 459(92.5%) were from within Addis Ababa city and 37(7.5%) from outside Addis. A mean wait time from arrival at referring sites to arrival at Tikur Anbessa Hospital was four and half-hours (two hours 48 minutes at referring site plus one hour and 42 minutes of referral-arrival interval (Tadesse ,2001).

Wait for elective surgical admittance associated with high morbidity and mortality. Data on delay for elective surgical admission from hospitals indicate that in 2004, nationally, surgical patients waited for 2 weeks on average before they had surgery. In the years 2005, 2006 and 2007, the figures that indicate postponement for elective surgical admission were 17, 15 and 14 days respectively (ARM, 2015).

An ideal referral system would ensure that patients can receive appropriate, high-quality care for their condition in the lowest cost and closest facility possible, given the resources available to the health system, with seamless transfer of information and responsibility as that patient is required to move up or down the referral chain. Although few referral systems anywhere in the world live up to this ideal fully, it does provide a target in relation to improving the current situation. Improving the effective functioning of referral systems broadly requires progress in three areas: referral system design, facilitation of the smooth transfers of patients and information between levels, and refer to as effective referral discipline (Walford and Grant, 1998).

However, in developing countries including Ethiopia, the referral and consultation system is often weak during process. Patients wait more time at outpatient and in emergency room until the bed is available at in patient. Some referrals are not appropriate, the specialist response late to requested consultations and the hospital not give feed back to the referring health institutions, the consultation and referral communications coordination's are also poor, inappropriate referral can waste health worker time and patients' time, cost, resource and care.

Since the hospital is central referral center, it can provide coordination of referral communications, consultation service all over the country before taking referral for chronic disease like diabetes, cancer, HIV and; for elective surgery it can give advice at their home or near health care by giving consultation before referral or for emergency case it can facilitate/coordinate/ or ready necessary condition before the patient reach the hospital.

As the result of implementing the findings into use, conducive and simplified service-giving environment will be created. Thus clients will get timely and efficient services. The country as a whole benefits from the study because it contributes to the whole growth and transformation program (GTP).Specifically; TAH was benefit from the findings which were help the Hospital to conduct its activity in a smooth manner.

CHAPTER TWO: REVIEW OF RELATED LITERATURE

This chapter provides general conceptions and related research works on referral and consultation system. It also highlights the health care system, health information system, health care service quality, patient flow, factors affecting referrals: policy, physician referral decisions, waiting time, communication, documentation, cost, coordination, utilization, distance, factors enhance successes of referral system, and consultation system.

2.1 Health Care System

There is a wide variety of health care system around the world, with as many histories and organizational structures as there are nations. Their benefit should be:

Patient-centered: is referrals are responsive to patient and family needs and preferences.

Efficient: A referral is limited to those that are likely to benefit patients, and avoid unnecessary duplication of services.

Equitable: is the availability and quality of referrals does not vary by the personal characteristics of patients, regulation and provision of health actions that Provide health care to a given population (WHO, 2000).

The health system should seek to make improvements in the following dimensions of quality, effective, efficient, acceptable/patient-centered, equitable, safe, and timely. The main goal of the health system is ensuring that everyone who needs health services (Promotion, prevention, curative, rehabilitative and palliative services) is able to get them without undue hardship (HSTP, 2015).

2.2 Health Information System

Is a system that involves data generation, compilation, verification, analyses, synthesis, communication and use. It collects programmatic, epidemiological and administrative data from the health sector and other relevant sectors, analyses the data and ensures their overall quality, relevance and timeliness, and converts data into information for health-related decision-making (HSTP,2015).

2.3 Health Care Service Quality

Is even more difficult to define and measure because of distinct healthcare industry characteristics such as intangibility, heterogeneity and simultaneity make it difficult to define and measure quality. However, healthcare service quality depends on service process and customer and service provider interactions (Laughlin and Kaluzny,2006).Quality of healthcare also defined as consistently delighting the patient by providing efficacious, effective and efficient healthcare services according to the latest clinical guidelines and standards, which meet the patient's needs and satisfies providers, (Mosadeghrad, 2013).

Quality care is the Provision of care that exceeds patient hope and achieves the highest possible clinical outcomes with the resources available. System for improving the quality of healthcare based on three dimensions: quality professional, client, and management. Professional quality is based on professionals' views of whether professionally assessed consumer needs have been met using correct techniques and procedures. Client quality is whether or not direct beneficiaries feel they get what they want from the services. Management quality is ensuring that services are delivered in a resource-efficient way (Ovretveit, 2009). High-quality healthcare means providing patients with appropriate services in a technically competent manner, with good communication, shared decision making and cultural sensitivity (Schuster et. al 1988).

Some healthcare quality attributes such as timeliness, consistency, and accuracy are hard to measure outside a subjective assessment by the customer. It is often difficult to reproduce consistent healthcare services. Healthcare services can differ between producers, customers, places, and daily. Quality healthcare includes characteristics such as availability, accessibility, affordability, acceptability, appropriateness, competency, timeliness, privacy, confidentiality, attentiveness, caring, responsiveness, accountability, accuracy, reliability, comprehensiveness, continuity, equity, amenities, and facilities (Mosadeghrad, 2012).

Despite its importance, inter specialty communication occurs inconsistently. Proper interpersonal communication and provider-patient interaction are among the measures for the

process quality of care, and process is one of the three major parameters from which inferences can be drawn about the quality of health care, as it refers to what is actually done in giving and receiving care (Donabedian, 1998).

Coordinate the overall referral activities within the health facility, rescored and report the referral activities to the facility management, compile, analyze and interpret data to improve referral service, take part in the quality assurance programs of the referral system by participating regular review meeting within and outside the hospital, perform supportive supervision (FDRE, MOH, EHRIG, 2010).

2.5 Referral System

Referral System is a process by which a health worker transfers the responsibility of care temporarily or permanently to another health professional or social worker or to the community in response to its inability or limitation to provide the necessary care for patient. Referral is a two way process and ensures that a continuum of care is maintained to patients or clients. It also involves not only direct patient care but support services such as transport and communication (FDRE, MOH, GFIPRS, 2010).

2.5.1 Essential Elements of a Referral system

Essential Elements of a Referral system is a group of organizations that in aggregate provide comprehensive health care services in a defined geographic area.

1. A unit that coordinates and oversees referral activities
2. Designated referral focal persons at each health facility
3. Directory of services and organizations within a defined territory
4. Standardized referral format
5. Feedback loop to track referral
6. Documentation of referral
7. Monitoring and evaluation

Therefore, a good referral system will have a defined package of services provided at different levels of care, encourages an environment in which the core referral hospital is viewed as a community resource, should be responsive to local situation, Should include a properly functioning communication and transport system and it should also be inclusive of the private sector, nongovernmental organizations and community based care including social services.

Responsibilities of the receiving facility: conducts situation analysis of the current referral process to identify gaps and strengths, assigns referral coordinator with clear roles and responsibilities, devises follow up plans and ensures the plans are communicated to the referring facility /professional/, ensures staff at points of entry clearly understand the referral process, provides continuing education about the referral process to staff and the community, ensures referred patients are seen by appropriate professionals, all investigations and documents attached with the referral form from the referring facility should be considered to protect patients from unnecessary cost and ensures that all prescheduled referrals are attended without undue delay. A standard referral form will be developed. The contents of the form include clinical, administrative content and feedback (FDRE, MOH, GFIPRS, 2010).

2.5.2 Factors Affecting Referrals

Researchers have numerous factors such as inappropriate records of referrals require of standard structure of referral letters, holdup in feed-back from hospitals and inadequate resource and facilities in health centers are major factors that challenge the functionality of health care referral system. The WHO Expert Committee on the Role of Hospitals at the First Level listed problems within the health care referral system. These were excess numbers of patient in hospital, the hospital with improper referral, self-referrals, or poorly diagnosed referrals, challenge of remoteness, exposition to transport, or payment, lack of confidence health care profession at the referring health institution and insufficient flow of information to the accepting and from the referring hospital (WHO Geneva, 1987).

The most difficulties to the current health care referral system included: inadequate information to accurately identify the patient in question including :difference in name usage oversight of key pieces of information including date of birth, illegibility of hand written

referrals potential for hospitals to lose referrals, written on small notepaper or prescription paper, inadequate clinical information to enable hospital staff to triage the patient effectively for example, reason for referral and identification of what was being requested from the service, Information provided by the GP in a referral letter no longer being up to date by the time, the patient attends their outpatient appointment due to lengthy waiting times for appointments. Outpatient staff noted that the patient's clinical condition and medications may have changed between the time of referral and their first attendance in outpatient services. Radiology staff noted that a patient's symptoms may have changed and that the patient may also have had a similar procedure performed in another facility (Health information and quality authority, March, 2011).

More patients are taking the initiative in starting the referral process by asking their primary care providers to initiate referrals (Gombeski, et al. 1990) or seeking specialists on their own (Fieselmann and. Hendryx, 1994).Numerous studies list prohibitive transportation costs, lack of transport, and no community support for finding transportation and poor road conditions as key barriers to referral compliance. Expenses related to the cost of transportation, medical care, food and accommodations for accompanying family members prohibit patients from complying with referrals (Bari et al, 2006).However; several other factors were affecting the success of referral system as indicated below:

2.5.2.1Policy

The World Health Organization (WHO) gives the overall working definition of integrated service delivery as his management and delivery of health services so that clients receive a continuum of preventive and curative services, according to their needs over time and across different levels of the health system (WHO, 2007).Also future policy interventions to control cost growth will likely attempt to modify referral practices by either trying to prevent inappropriate referrals or steering providers to refer to colleagues who utilize fewer services. (Song Z,et al)

2.5.2.2 Physician Referral Decisions

Physician referral decisions influence many aspects of patient care; including subsequent costs and quality (Glenn JK et al 1987) .Obvious difference in referral rates among individual physicians independent of patient case mix have been noted in a variety of settings, implying that there is substantial heterogeneity in the threshold for referral among physicians (Franks P, et. al 1999).Besides deciding whether or not to refer in the first place, physicians also influence which other specialists patients see (Forrest CB, et al 2002) .The specific specialist to whom patients referred can profoundly impact the clinical care trajectory for that patient because individual physicians differ in their approaches to care, including the use of high-cost services and quality of care (Schneider EC and Epstein AM 1996).A study conducted in Manchester eye hospital to assess general practitioner (GP) referrals by analyzing 500 consecutive referral letters content, this study examined the content and quality of referral letters that are extremely variable in terms of presentation, information provided and the need for priority. In 500 referral letters, 81.8% had recorded the diagnosis, 10.8% had information about the duration of symptoms and 6% had information about treatment given (N. P. Jones, 1990).

2.5.2.3 Waiting Time

The practice of bypassing the lower levels of health care make many patients spend long waiting hours to see highly trained medical workers in hospitals. This is not only a waste of time but also a misapplication of the highly trained health workers time (Osibogun A. 1996)

A 2006 survey of California hospitals found that nearly half of ER patients thought they could have resolved their medical problem with a visit to their doctor, but they were unable to obtain timely access to care.Overall, the total cost of unnecessary physician office visits and unnecessary emergency room visits is just under \$31 billion annually, or about \$300 per American household per year. Occupational Health Management, Self-Care Can Save Millions in Health Costs, Unnecessary Visits to ED, other Costs Avoided, (Occupational Health Management, and November 2001).

2.5.2.4 Communication

Others have examined inter specialty communication in specific settings or situations and found, for example, that use of standardized note formats and computer access to medical records were associated with better communication. In another study, practices in which a care coordinator worked on-site with the patient's PCP for patients with chronic conditions had improved coordination and were cost neutral (Forrest CB, et al 2000).

2.5.2.5 In Appropriate Referral

Both under referral and over referral can affect quality of care. Under referral can lead to inappropriate, cost-ineffective, or even dangerous treatment, and may result in costly litigation (Strohmeyer and Shula 1988). Over referral can lead to fragmented care by committee, over testing and repetitive testing, dangerous poly pharmacy, patient confusion and isolation, and complacency on the part of generalists who lose their motivation to continually acquire new knowledge (Berczeller PH. 199). Lay referral networks involving family and friends have a major influence on consulting behavior (Scambler A, Scambler G.1984).When appropriate, referrals from generalists to specialists can lead to improved patient outcomes, as well as decreased costs through optimal use of physician, hospital, and laboratory services. Studies have suggested benefit for certain patients with severe depression (Eisenberg L. 1992), other referrals may be avoidable, poorly timed, or of limited value in guiding diagnosis or treatment and, thus, potentially inappropriate (Menken and Behar, 1990).

A study conducted reasons for out patient referrals from generalist to specialist measurements and main results: For each referral, the generalist rated a number of medical and nonmedical reasons for referral, as well as factors that may have helped avert the referral; the specialist seeing the patient then rated the appropriateness, timeliness, and complexity of the referral. Both physicians rated the potential avoid ability of the referral by telephone consultation. Generalists were influenced by a combination of both medical and nonmedical reasons for 76% of the referrals, by only medical reasons in 20%, and by only nonmedical reasons in 3%. In 33% of all referrals, generalists felt that training in simple procedures or communication with a

generalist or specialist colleague would have allowed them to avoid referral. Generalists and specialists failed to agree on the avoid ability of 34% of referrals (Martin T and Donohoe et .al, 1999).

2.5.2.6 Documentation

These include documentation of patient's medical history, easy access to medical data from remote sites, improved communication among the various providers involved in health care, easy access to medical information and state of the art resources over the Internet and clinical decision support. About half the time, the reason for dissatisfaction is a delayed or missing referral letter and reports. Other reasons include dissatisfaction with redundancies in the referral process, missing information in the referral communication, time required to write a referral note, and difficulty in finding a specialist (Gandhi and Sittig, 2000).

A study on a patient referral system conducted in Honduras which covered all 25 public hospitals, use of proper referral form, and reception of reply for referrals shows that In Honduras, only eight hospitals (32%) used registered lists of referral cases. The referral form of the Ministry of Public Health was used at all health facilities including health Centers/posts, but the following problems were noticed: supply of referral forms was not constant, the referral form was not duplicated for record keeping and a standard reply form for referrals did not exist, which might have resulted in very few (1.4%) of the total sent referral cases receiving a reply the study recommends that it is essential to develop an efficient information system for patient referral(Ohara K, 1998).Completeness of documentation of referral papers and reasons for referral among referred patients to TikurAnbessa Specialized Hospital Emergency Department shows About 12.2% referral letters were not entirely legible (Mulunesh, 2014).

2.5.2.7 Cost

Although more patients' treatment at lower costs, improved cooperation between hospitals and health centers, increased productivity of about threefold in Helsinki referral system and he concluded that careful planning and appropriate implementation is essential for the success of the referral systems (Wootton and Harno, 2003).

2.5.2.8 Coordination

Problems of coordination are likely to arise at key interfaces between primary and secondary care, between curative care and public health services, and between specialties within particular Subsectors (Rat et al, 2004).

2.5.2.9 Behavioral Factors

A patient's perceived vulnerability to an illness may also be related to locus of control, or the extent to which a person feels that he or she has personal control over his or her health (Ingham and Miller 1983). Where as in relation to locus of control, contact with a doctor has been found to be a mediating factor between Experience of psychosocial distress and expressed beliefs about personal efficacy in health (Murray and Corney, 1991).Patients' perception of their own vulnerability to illness has been found to be an important determinant of health seeking behavior. High attainers usually perceive themselves to be both ill and vulnerable to illness (Benson and Turk,1988).Referral decisions are not just a matter of technical or organizational considerations they also involve emotions, stress, fear and anxiety, on the part of the health professional as well as on the part of patients and their family (Bachman HK, 1999).

Health Belief Model proposes that the balance between risks and benefits from seeking care are an important determinant of health seeking behavior. The benefits relate mainly to the person's belief in the effectiveness of the action which is likely to be proposed when medical care is sought, balanced against his or her perception of how effective self-care is likely to be. The costs of seeking care may be financial prescription charges, transport costs, lost time from work or physical barriers to care such as access, as well as perceived negative physical outcomes from treatment (Ingham and Miller, 1983).

2.5.2.10 Utilization

A variety of reasons for the underutilization of radiotherapy have been suggested and speculated upon including insufficient treatment resources and inadequate knowledge of radiotherapy among referring physicians, and these are likely not the only ones responsible. However, there is very little published data actually documenting the factors influencing palliative radiotherapy referral (Vulto JCM, et al 2005). Accessibility and price have been among the most important factors affecting utilization of health facilities in Ethiopia (Kloos H, et al 1987). On the other hand, there are also reports suggesting that usage of health facilities is sensitive not just to the distance to the nearest facility, but also to the quality of health care provided (FMOH, Ethiopia. 2001). A study conducted in TAH assessment of knowledge, accessibility and utilization of palliative care services among adult cancer patients at Tikur Anbesa specialized hospital indicate that access to patient care was a problem were 9 out of 10 (89.8 %) respondents reported to have difficulty in accessing the care due to utilization of PC services (Serawit et al, 2014).

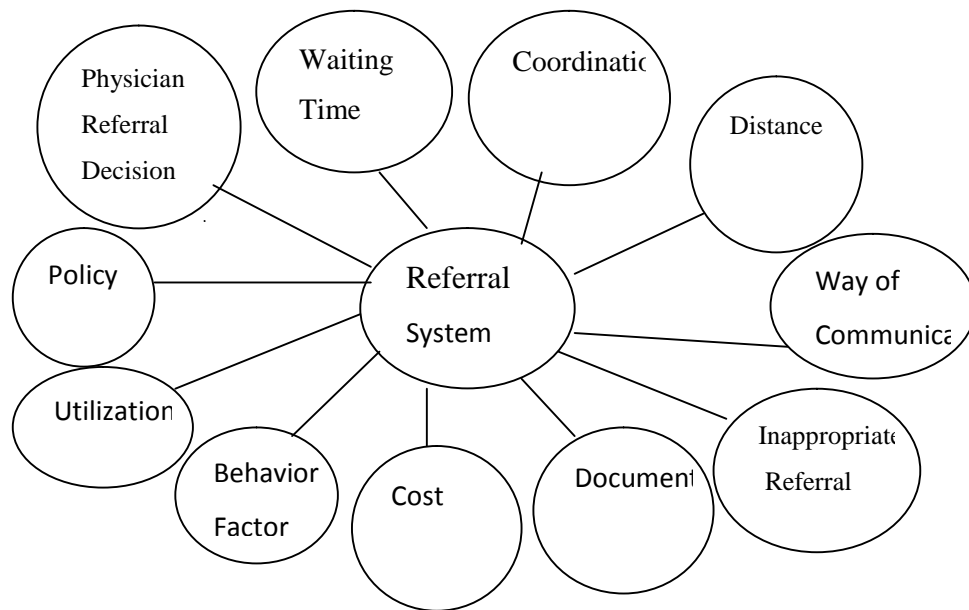
2.5.2.11 Distance

In Nepal, a distance of more than 1 h to the maternity hospital was significantly associated with an increased risk of home delivery by almost eight-fold (Wagle et al, 2004). In many varied, low income settings, poor geographical access has consistently been found to be associated with decreased use of health facilities for labour and delivery (Gage, 2007). Women have also been shown to be at higher risk of maternal death due to poor geographical access in South Africa, West Africa, Burkina Faso and Zimbabwe (Fawcuset al., 1996). The referral system was meant to complement the PHC principle of treating patients as close to their homes as possible at the lowest level of care with the needed expertise (King 1966). Problems of geographical and financial accessibility are well documented reasons for abstaining from or delaying obstetric referral (Thaddeus & Maine 1994).

By their nature, referral hospitals must be limited in number and will inevitably be sited in major towns and cities. As a result, a significant portion of the population, especially people

living in rural areas, will tend to live at some distance from the nearest referral hospital. Studies of the accessibility of referral hospital care have repeatedly confirmed the existence of a steep distance-decay function, indicating that other things being equal individuals with a given need for a clinical service will be less likely to access that service the farther away from the referral center they live in countries such as Ethiopia (Kloos 1990) and Nigeria (Okafor 1983).

Figure 2.1 Framework of Factors Affect Referral System



2.6 Consultation system

Consultations address approximately 80% of the health problems and emphasize health promotion (Dresang et al, 2005). Effective communication between primary care physicians (PCPs) and specialists regarding patient referrals and consultations is necessary for coordinated care .It is important to patients and physicians, and improves patient outcomes and physician satisfaction. Inter specialty communication is increasingly important because medical sub specialization and technological advances fragment care across numerous physicians. (Star field,1998).

The referring PHC physician should include both quantitative and qualitative information in the referral letter as this improves consultant satisfaction (Tanielia et al, 2000).Each referred

patient should have a minimum wait for the appointment in order to enhance the success rate of the referral process consultation is necessary (Grunebaum et al, 1996).

The consultant referred to should also develop a good therapeutic alliance with the patient, evaluate him/her comprehensively, and provide clear guidelines to the patient all factors that help the PHC physician in effective follow-up and ensure a strong collaboration between the primary and secondary levels of health care. The referring physician should carefully review the contents of consultant feedback letters, which should be attached to the patient's file for future reference. (Spiessl et al, 2000).

Communicating patient information at the time of specialty referral is essential to high-quality consultation, coordinated and safe patient care. Both primary care and specialist physicians value this information exchange for shared patients, but dissatisfaction with the current referral process is widespread among primary care physicians (PCPs) and their consultants (Williams and Peet 1994).

However, many consultations are initiated by the general practitioner as part for example Planned follow up of a chronic disease. Up to half of consultations may be initiated by doctors (Martin and Russell, 1991) and there may be little agreement between doctors and patients about the need for re attendance (Armstrong et al 1990). Among all socio-economic groups, those who are permanently sick have the highest consultation rates of all. Excluding the permanently sick, unemployed patients are more likely to consult than those in employment (RCGP et.al. 1995).

In order to care for themselves, patients need to feel in control of their illnesses, and part of this involves having adequate information. The need to gain further information about a condition may be an important factor leading to consultation (Van de and Knottnerus, 1992). People who cope with illness by seeking information tend to use more Services when compared to those who tend to avoid information. Finding ways of providing better information for patients may be an important way of helping them to deal with both acute and chronic illnesses (Davey et al, 1993).

Patients who choose to use self care first are less likely to consult the doctor (Robinson and Grandfield, 1986). Suggest that service providers will increasingly encourage people to rely not on formal services but rather to manage problems through informal networks Stressful life events are more common among consulting patients than non-consulting patients (Lydiard and Jones 1989).

Feedback may facilitate more accurate assessment of clinicians' own skills by providing them with information that they may have unintentionally overlooked or underemphasized, and by identifying problems that could jeopardize patient satisfaction in a clinical consultation routine feedback to clinicians has been shown to improve client outcomes at the end of trainees' practicum training, compared with no feedback (Reese, et al 2009).

Although multisource feedback is the accepted workplace assessment of professional behaviors in training doctors (Evans et al 2007), Interpersonal and communication skills in clinical Consultations have been identified as a core competency in physicians, because adequate skills could enhance patient Satisfaction, therapy compliance, symptom relief and cost effectiveness (Reinders ,et al 2010).

2.7 How information system improves Referral and consultations System

The use of information and communications technologies in support of health and health-related fields, including health-care services, health surveillance, health literature, and health education knowledge and research has the potential to greatly improve health service efficiency, expand or scale up treatment delivery to thousands of patients in developing countries, and improve patient outcomes (Bette, 2000).

The availability and accessibility of the web made secure transfer of confidential patient information fast and reliable. Patients can take their information wherever they go for medical care. Most importantly beyond clinicians' use of the Web as a tool to support evidence-based practice, patients may use Web-based information to enhance their interactions with physicians and to become more knowledgeable partners in managing their own health. The web can also enable patients to make informed health care choices (William, 2002).When electronic referrals were introduced, many were hopeful that there would be large economic savings and many benefits for the users (Hasman, 1992).

The use of standard messages for exchanging information between hospitals, health care provider could result in relatively large saving their time (Harno et al, 2000). The use of information technology improves healthcare by increasing adherence to guidelines or protocol-based care, reduction of medical errors, and clinical monitoring and data aggregation which are not feasible with paper (Chaudhry and Wang, 2006).

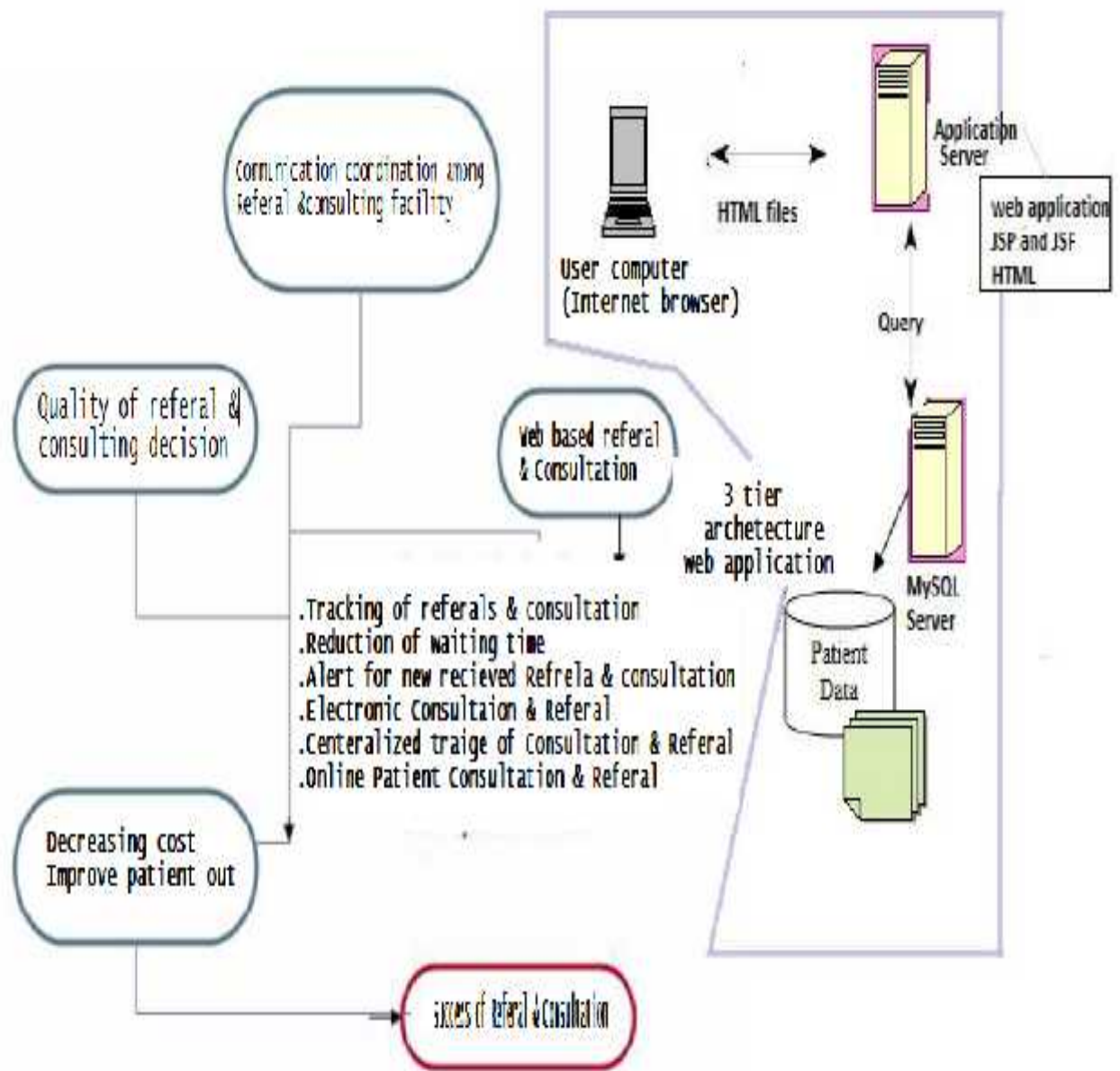
The e-Referral tool used in San Francisco's safety net system discussed further below in the context of health IT has focused on organizing referrals electronically and sorting those requiring specialty office visits from those that simply require a specialist's advice and guidance, thereby dramatically reducing the number of days to appointment and allowing specialists to focus on cases in which their expertise truly is needed (Chen and Yee 2011). A study in Denmark published in 2004 found that electronic referrals were more cost-effective than paper-based referrals and that significant cost savings were possible through the widespread use of electronic messaging across all healthcare systems (Cannaby and Wanscher, 2004).

Identification of practice factors with the potential to enhance communication can inform efforts to improve care coordination. Such efforts include health information technology (HIT) adoption; patient-centered medical homes, which emphasize coordination by PCPs and accountable care organizations (ACOs), which strive for shared accountability for patients among physicians(Forrest CB et al 2000).

An electronic referral system between secondary and primary care improved clinical effectiveness, lowered direct costs, increased productivity and was cost-effective (Harno et al, 2000). Information and Communication Technologies are increasingly seen as a possible solution to optimize the quality of referrals and patient flow (Hutten et al 2003). Among these are the standardization of the content and language of the information transferred between referring clinician and medical specialist through the use of communication protocols and the introduction of new technologies to improve the process and outcome of communication. Similarly, the introduction of standardized care paths, or care programs, has been identified as

a promising way to optimize patient flow and to enhance the quality of care (M. Berg et al 2005).

Fig 2.2 Frame work of the study designing



CHAPTER THREE: METHODS

The third chapter presents the methods employed for this project work that comprises the project setting, project study design, project study population, project study variables, data collection instrument, data quality issues, ethical consideration, result dissemination and operational definitions.

3.1 Project Setting

The project will be carried out in Addis Ababa Ethiopia. Ethiopia is located in the North Eastern part of Africa. The second most populous country in Africa, with an estimated population of 90 million in 2014. Addis Ababa is the capital and largest city of Ethiopia. It is located at the geographic center of the nation and covers about 540 Km². Tikur Anbessa Hospital totally hold 123000 m.sq areas of land and its building has settled on 45000m.sq. Has been made to be administrated as subordinate under the Addis Ababa University medical faculty and has case teams greater than 66. From this case team 28 is out patient, 3 of them emergency case team. The hospital is one of teaching, and center of referral which take referral from all over the county with average outpatient attendant per month 26668.

3.2 Project Design

A mixed method of both qualitative and quantitative research design was employed in conducting the study. Quantitative studies among patient's outpatient and emergency attendant by structured interview. With qualitative research among staff in generating the data concerning their attitudes, behavior and experiences of the referral and consultation process by an in-depth interview to get an in-depth opinion from them and; document review for documentation of referral and consultation process, availability of form, eligibility of referral and guideline by adopted check list.

For the designing of the web Based WC&RIMS with having the Object Oriented software design techniques an iterative and incremental Object Oriented Analysis and Design Cycles were used.

Those are use case diagram, class diagram, sequence diagram, system architecture; Micro soft Visio was used for designing of system.

3.3 Design tools

In the designing of the prototype for this project Dreamweaver 2015 version 5.5 was used. HTML is used as a front end for the construction of the interface and PHP is used as a middle ware to create the different functionalities and connections to the database. MySQL server issued as a back end server to create tables and save various data on them.

3.3 Population of the Project

All health professionals, case team heads, hospital board member in TAH. In addition registered data, availability of form, registration book and facility's reports, way of communication were assessed using adopted operational standard toolset to check referral and consultation process quality.

3.4 Sample Size

Sample size for quantitative data was determined by a single population proportion technique using the following assumptions (level of confidence taken to be 95%, CI= critical value of 1.96), a 5% margin of error (d=0.05), 50% proportion of utilization of referral and consultation system and the required sample size by using the following formula.

$$\begin{aligned}n &= (z / 2)^2 (p (1-p) / d^2) \\n &= (1.96)^2(0.5 (1-0.5) \\&\quad (0.05)^2) \\&= 3.8416(0.5*0.5)/0.0025 \\&= 3.8416(0.25)/0.0025 \\&= 0.9604/0.0025 \\n &= 384.16 = n=384 \\&\quad n/1+n/N\end{aligned}$$

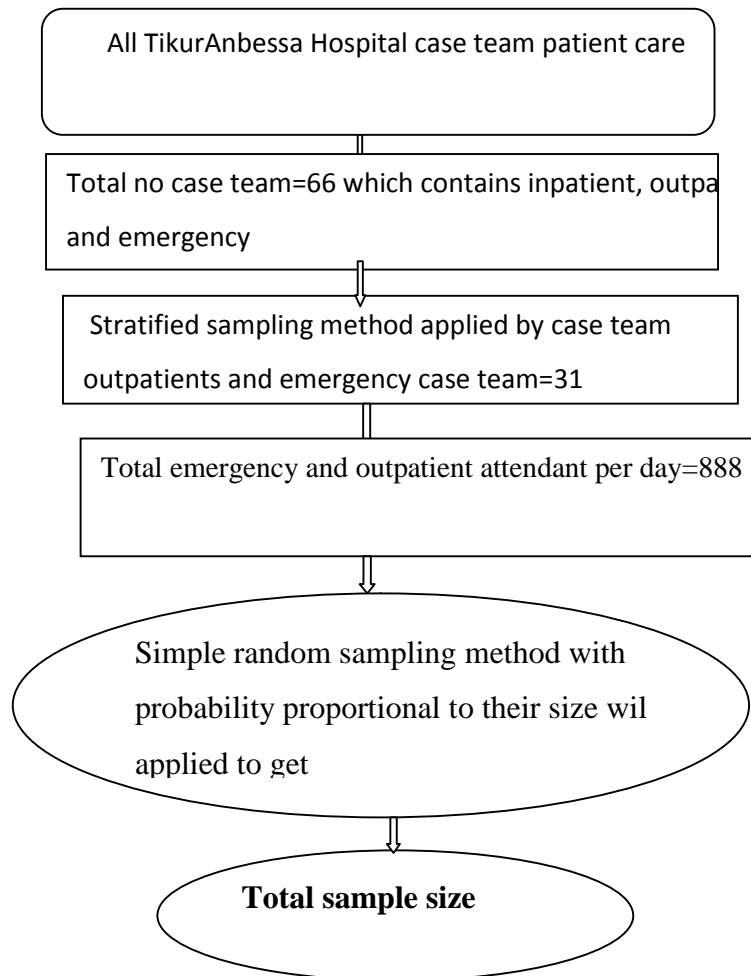
Since total population of outpatient and emergency attendant per day is =888

$$384/1+384/888=384/1.4324=268$$

Total sample size =268+with 10% non-response rate =295

3.5 Sampling Techniques

To get a representative sample of study subjects from the hospital, selection was first stratified by case team. Then by considering patient department they have care and proportion of the population, simple random sampling method was applied by stratified the case team. Total outpatient attendants and emergency per day=888. Figure 3.1 below showed schematic presentation of sampling procedures of patient by their case team in TAH of different case team



3.5.1 Inclusion Criteria

Health care providers who are working with referral processes, case team head or directorates ,department heads, referral focal person, and triage and liaisons officer, hospital board member and whose experience more than 6 month in the selected department was the inclusion criteria

for qualitative study. For quantitative study patient present at the day of data collection at outpatient and emergency case team were included.

3.5.2 Exclusion Criteria

Health care providers who was absent during data collection period, ageless than 24 and patient whose seriously ill was not include in the study.

3.6 Methods of Data Collection

The data was collected from TSH staff members who are actively engaged with referral and consultation process. The researcher was employing both qualitative and quantitative approach using the following tools: document review, structured and in-depth interview. Questionnaires was prepared by English by reviewing different literature and guideline towards ensuring data collection techniques and to check all the filled questioners for the analysis and securely handled by chronological order and it was corrected as commented. One supervisor and 04 data collector were participated in this study. Prior to data collection pretest was conduct among 5% of the sample size on one hospital for detection of potential problems associated with the questioner or data collection technique.

Based on the pretest necessary corrections like redundancy of question, question needed skip patterns etc... was identified and incorporated. Data collectors and supervisors were selected from the health facilities and they were train on data collection by principal investigator. The data collector responsibilities were guiding the questionnaires after obtaining verbal consent of the study subject. The supervisors' responsibility was to supervise all the data collection till completion of data collection. The principal investigator was also being in the area till completion of data collection for an overall supervision towards ensuring data collection techniques and to check all the filled questioners for the analysis and securely handled.

3.7 Method of Data Analysis

Quantitative data: After collecting all questioners the data was checked for completeness and consistencies and analyzed by SPSS version 20. Descriptive statistics used to present the data. The data from qualitative study will be summarized a thematic analysis across cases (on main points)and thematically arranged in relation to research question .Data is linked to related quantitative data so that sound complementary analysis and interpretation was done.

Qualitative data: The coding procedure was chosen as a method for it is top down by ascending alphabetically and it is inductive approach for analyzing data. The process of coding began with application of series of codes to each transcript, later the codes have been grouped into concepts of similar content for easy comparison. The researcher used the codes as short words or phrases in descriptive sentences, which had been obtained in the interviews. The researcher organized and sorted the data to develop the framework by integrating the different themes that are patterned by way of sorting. After summarizing all the data, the shared information and opinions of the respondents that emerged from various cross sections of the respondents were summarized and compiled with quantitative data in conducting the analysis and conclusions

3.8 Data Quality Management

To ensure the quality of data the questionnaires were adopted from WHO, FMOH guideline, protocol and literature. The questionnaire and the checklist for the data collection were discussed among the research team. To ensure the quality of data, training was given for data collectors and their supervisor for one day about the objectives, importance of the study, methods of interviewing, confidentiality of information and informed consent. The questionnaire was prepared using simple and easily understandable language by including the variables study in the research. Based on which appropriate changes were made. The qualitative data were collected by the Personal Information to get firsthand information and to capture contextual issues.

3.9 Ethical Clearance

The study obtained approval from the School Of Public Health Research and Ethic Committee. A formal letter was written from Addis Ababa University to all the concerned authorities to facilitate the study. Each selected participant was briefed about the aim of the study and selection process and benefit of the study along with their right to refuse. Furthermore the study participants were reassured for an attainment of confidentiality for the information obtained from them and written consent was taken before the interview. To maintain confidentiality of information, individual identifiers were not taken.

3.10 Dissemination of Result

The result of this study will be submitted to Addis Ababa University, School of Information Science and School of Public Health, Health Informatics Program, Tikur Anbessa Hospital, Ministry of health and other stakeholders. We will also present the studying national scientific conferences and will send it for publication.

3.11 Operational Definitions

Referral: is a process in which a health worker at one level of the health system having insufficient resources to manage a clinical condition seeks the assistance of a better or differently resourced facility at the same or higher level to assist in or take over the management of the client's case.

Consultation: is the essential unit of medical practice is the occasion when, in the intimacy of the consulting room or sick room, a person who is ill, or believes himself to be ill, seeks the advice of a doctor whom he trusts.

Referral System: The inter relationship and coordination of patient care services from one health care facility to another.

Patient referral feedback: Sending patient referral information back to the referring organization

Referring unit: Is a health service organization that initiates the referral process. A facility can be both a referring and receiving unit depending on circumstances.

Receiving unit: is a health service organization that receives patients or clients from referring units and ensures that required care is given to the client and returns the patient with feedback.

Triage: is the process undertaken in hospitals in which a priority is assigned to a patient referral based on the information contained in the referral letter.

CHAPTER FOUR: RESULTS AND DISCUSSIONS

This chapter demonstrates the findings of quantitative and qualitative data. All of the variables that were generated from the raw data are summarized. It also presents the quantitative analysis and interpretation of results complemented by qualitative results that specifically address the research objectives. The data was analyzed using coding procedure and constant comparative approach adopted based on standard theory.

4.1 Quantitative and Qualitative Data Results

4.1.1 Socio-demography profile of health workers

Health workers participating in the in-depth interview at Tikur Anbessa Hospital were health care professionals working as referral and consultation processes, case team heads, coordinators, liaison officers' and triage nurse. Out of 23 requested, 4 of them refused, and 19 were interested for the interview. Among the volunteers, 53% respondents were males, and 47% were females. Among the 19 respondents, 36% have 21-30 years experience, 32% respondents have 4-10 years experience, 16% have 11-20 years experience, and 16% have ≥ 31 years of experience. From the total 19 respondents, 42% were coordinators, and 52.6% were MSc nurses.

The following table shows bio-data of health care professionals at outpatient and emergency departments of TAH.

Table 4.1 Descriptive statistics of qualitative sample of health care professions June, 2016

Sex	Variable	total number	Percentage%
	Male	10	53%
	Female	9	47%
Work experience	4-10	6	32%
	11-20	3	16%
	21-30	7	36%
	>=31	3	16%
Current position	Outpatient	1	5.3%
	Directorate	1	5.3%
	Specialist	4	21%
	Resident	8	42%
	Coordinator	2	10.0%
	Triage nurse	2	16%
	Staff nurse	1	10.0%
	Liaison		
Professions	Specialist	2	10.0%
	Resident	4	21%
	MSc nurse	10	52.0%
	BSc nurse	3	15.0%

4.1.2 The Socio Demographic Profile of Patients Participated in this Study

The majority of the patient respondents in the present study were males, 165 (55.9%) and 81 (27%) aged between 30-34 years. The academic status of the majority 93(31.5%) of the patient participants was between grades 9 and 12; 139 (47.1%) were married and 10 (3.4 %) were widowed. About a quarter, 71 (24.1%) were self employed; 135 (45.8%) speak Afan Oromo; 12 (4.1%) speak Tigrigna; while the rest were Amharic speakers. Hence, translators were used for 78(26.4) individuals who could not speak Amharic

Table 4.2 socio-demographic characteristics of the outpatient and emergency attendees in TAH referral center, June 2016

Variable		Frequency	Percent
Sex of respondent		165	55.9
Male		130	44.1
Female			
Age of respondents	20-24	32	10.8
	25-29	56	19.0
	30-34	81	27.5
	35-39	47	15.9
	40-44	41	13.9
	45+	38	12.9
Educational status	Illiterate	33	11.2
	Primary(1-8)	78	26.4
	Secondary (9-12)	93	31.5
	Diploma	54	18.3
	Degree &above	37	12.5
Marital status	Single/never married /	120	40.7
	married	139	47.1
	Divorced	26	8.8
	Widowed	10	3.4
Employment	Government	59	20.0
	Non-government	13	4.4
	Self-business	71	24.1
	farmer	64	21.7
	other	21	7.1
	no employment	67	22.7
Language	Afan Oromo	135	45.8
	Amharic	80	27.1
	Tigrigna	12	4.1
	Other	68	23.1
Translator used	Yes	78	26.4
	No	217	73.6

4.1.3 Patient Referral Acceptance and Way of Communication in TAH Referral center

The majority of the patients, 238(80.7%), were referred from health facility out of the total outpatient and emergency patient in TAH. The majority of the qualitative respondents state that TAH is different from other hospitals because it receives referral from all over the country. According to the informants, patients appear with referral paper from referring hospital of different regions of the country. If the referral is made from within Addis Ababa, usually, there

is liaison communication in emergency case for securing bed by phone. However, hospitals out of Addis Ababa send patients' without any communication. In addition, the hospital accepts patients without referral communication whenever they are brought by police, self-referral, accidents, staff and staff family members. This way of communication is very traditional which lacks documentation of cases and procedural patient care-giving.

When a patient arrives at TAH, linking to respective department is decided by central and emergency triage. With communication through liaison office, the hospital accepts according to their case through phone and referral communication paper in case of emergency if the bed is available.

Table 4.3 showed Frequency distribution of Referral from health facility in TAH referral center, June 2016.

Variable		Frequency	Percent	95% Confidence Interval	
				Lower	upper
Referral from health facility	Yes	238	80.7	75.9	84.7
	no	57	19.3	15.3	24.1
Self-referral	Yes	96	32.5	27.5	38.6
	no	199	67.5	61.4	72.5

4.1.4 Reasons for patient Referral to TAH

The reasons for referral in TAH from the total outpatient and emergency patient 295, 280 (94.4%) patients were referred for better treatment and diagnosis, 80(27.1%) were for Self-interest, 38(12.9%) were for family hospital staff, 69(23.4%) were for catchment area. The other reason is for the referring health institution does not have good facility counts 251(85.1%). Qualitative results indicate that many referrals from remote areas were due to under-utilization and further treatment and diagnosis. The qualitative participants indicated that TAH is also is not ready to accept all referrals as it should. There was no space for waiting room. There were no resources, no phone in emergency for communication between the health institutions. There were no spaces to accept new patients.

“There is no space for waiting room. There is no resource, no phone in emergency for communication between the health facilities. No space to accept new patients” (Emergency Nurse).

Many patients in the hospital were from remote rural areas of the country. There is no restriction either by distance or by the status of the referring hospital. The hospital does have poor equity and efficiency in its systems of communications in receiving and treating patients because the patients wait more time, waste more many and time due to referral processes. When patients come from other health institutions, they spend one to two days on their way and spend more money for transportation cost; there is not access to transportation. Poverty makes patients to come to the hospital too late after referral date because they stay until they prepare themselves. TAH has catchments in case of emergency so that this is problematic to the hospital for it is very overcrowded with patients. Catchment is not needed for the hospital. Moreover, obstetric emergency receives patients from 24 health centers, 18 of them are catchments of TAH. Self-referral was also appearing many times.

Both qualitative and quantitative result show that many cases sent to this hospital were for need of further diagnosis and treatments because referral health institutions were not well developed and poor coordination of referral processes communications between health institutions.

Table 4.5 Reason of patient referral in TAH referral center, June 2016.

Reason of referral		Frequency	Percent	95% Confidence Interval	
				Lower	Upper
better treatment and diagnosis	yes	280	94.9	92.5	97.3
	no	15	5.1	2.7	7.5
Self interest	yes	80	27.1	22.0	32.2
	no	215	72.9	67.8	78.0
Family hospital staff	yes	38	12.9	9.2	16.9
	no	257	87.1	83.1	90.8
Catchment area	yes	69	23.4	18.6	28.5
	no	226	76.6	71.5	81.4
Referrer health facility has not well utilized	yes	251	85.1	81.0	89.2
	no	44	14.9	10.8	19.0

4.1.5 Challenges patient face to Attend Treatment during Referral Process

Among the challenges patients face during the referral processes, 65 (22.0%) patients reported that cost of the services were high, 193(65.4%) had a problems related to lack of transport, , , 175 (59.3%) were having difficulty with long distance, 49 (16.6%) were exposed to Poly pharmacy, 266 (90.2%) were exposed to time wastage; but the other patients never face problems. Respondents in qualitative data also explain Costs to accept the referral and consultation is the list price or even no charge, but patients come from remote areas of the country are exposed to costs of transportation, food and other expenditure.

Informants say, “But many patients are re-evaluated at outpatient to see where to send them if the patient is referred without investigation. This will introduce additional waiting time which is an additional cost for patients coming from rural areas”

(Outpatient department, female staff)

Thus, the results show that patients wait more time in the hospital and suffer from transportation, distance, and are exposed to unnecessary costs due to waiting too long. Waiting time more important challenge to affect the service.

Table4.6 Challenge s patients face during the referral process in TAH, June 2016.

Challenge s patient face		Frequency	Percent	95% Confidence Interval	
				Lower	Upper
Referral process	Yes	65	22.0	17.6	26.8
	No	230	78.0	73.2	82.4
Cost of service	Yes	193	65.4	59.7	70.8
	No	102	34.6	29.2	40.3
Transportation	Yes	175	59.3	53.6	64.7
	No	120	40.7	35.3	46.4
Distance	Yes	49	16.6	12.2	21.0
	No	233	79.0	74.2	83.7
	Not sure	13	4.4	2.4	6.8
Poly pharmacy	Yes	266	90.2	86.8	93.6
	No	29	9.8	6.4	13.2
Waiting time	Yes	266	90.2	86.8	93.6
	No	29	9.8	6.4	13.2

4.1.6 Problems related to referral paper

From the total 295 patients, 73 (24.7%) had lost their referral paper, 21 (7.1%) was referred inappropriately, 15 (5.1%) were sent to wrong places, 35 (11.9%) were misinformed about the referral content. Respondents of the qualitative data also explained that, sometimes patients appear without referral paper, may be the referral paper was lost or damaged due to many things. This can cause poor communications or lose their referral information. Referral information accuracy and content is also poor. Nothing was known about patients previous medical history.. The severity of the case was not written briefly; there is a gap in treatment given at referring hospital due to lack of proper documentation. Poor documentation of medication and investigation of referring institution and eligibility of hand writing were mentioned as common challenges.

There was no confidentiality during referral acceptance. Patients referred from rural and non-literate areas have difficulty of finding location and show their referral to other persons. Timeliness of the referral depends on the patient condition without any restriction. Patients are usually late due to absence of early referring, poor infrastructure, poverty; lack of finance and access to transport. Patient around the hospital and nearest to the hospital, emergency case and patients have no problem with financial or social or other condition can present at the day of referral without delay. However, patients who have problems related to their social status, including, poverty, distance or other problems come late after the referral data or when their case was complicated. . Table 4.4 supports the above statement.

Table 4.6 problems patient faced with referral paper in TAH referral center June 2016

Problems related to referral paper		Frequency	Percent	95% Confidence Interval	
				Lower	Upper
Referral paper lost	yes	73	24.7	20.0	29.5
	no	222	75.3	70.5	80.0
Inappropriate/not need specialty care/ referral	yes	21	7.1	4.1	9.8
	no	270	91.5	88.5	94.6
	not sure	4	1.4	.3	2.7
Miss placed	yes	15	5.1	2.7	7.8
	no	280	94.9	92.2	97.3
Miss information	yes	35	11.9	8.5	15.6
	no	260	88.1	84.4	91.5

4.1.7 Patients explain referral acceptance of TAH

A little less than half 128 (43.4%), respondents indicated that the referral acceptance was well-coordinated, however most 172 (58.3%) said it was not well coordinated. The majority, 233(79.0%) mentioned that patents' have to wait for a long time before being assessed by physician, and 146(49.5%) explained it is difficult to obtain information. The qualitative research participants (health professionals) also support that, the hospital's referral acceptance is not coordinated.

Table 4.5 patient explain referral acceptance in TAH referral center, June 2016.

Referral acceptance explanation		Frequency	Percent	95% Confidence Interval	
				Lower	Upper
Well-coordinated	yes	128	43.4	38.0	49.5
	no	163	55.3	49.2	60.7
	not sure	4	1.4	.3	2.7
Not Well coordinated	yes	172	58.3	52.2	63.7
	no	119	40.3	34.9	46.1
	not sure	4	1.4	.3	3.1
Too long waiting time	yes	233	79.0	73.9	83.7
	no	57	19.3	14.9	24.1
	not sure	5	1.7	.3	3.4
Difficult to obtain information	yes	146	49.5	43.7	55.2
	no	125	42.4	36.9	48.5
	not sure	24	8.1	5.1	11.5

4.1.8 Patients think current referral way of communication has effect on healthcare

From the total outpatients and emergency patients 168 (57.9%) believe that the current referral way of communication delays in communication effect on their care; but 177(61.0%) believe that they were exposed for wastage of time and money; and 96(33.1%) believe that there is poor health care decision on their care. The rest, 157(54.1%) believe that there is poor quality of care-giving. Both qualitative and quantitative results indicate that quality of referral processes can affect quality of care-giving, wastage of time and money. Because of many reasons like poor documentation ,overloading, in-appropriate referral, late presentation of patients that cause their case complicate, too much waiting time in hospital also cause poor quality of care-giving.

Table4. 8 patients think current referral way of communication has effect on health care in TAH referral center, June 2016

referral way of communication effect		Frequency	Percent	95% Confidence Interval	
				Lower	Upper
Delay in communication	yes	168	57.9	52.1	63.8
	no	122	42.1	36.2	47.9
uncoordinated care	yes	155	53.4	47.9	59.3
	no	127	43.8	38.3	49.7
	not sure	8	2.8	1.0	4.5
Not cost effective	yes	177	61.0	55.5	66.2
	no	109	37.6	32.4	42.8
	not sure	4	1.4	.3	2.8
Poor health care decision	yes	96	33.1	27.6	38.6
	no	177	61.0	55.2	66.6
	not sure	17	5.9	3.4	8.6
Poor quality of care	yes	157	54.1	48.3	59.7
	no	120	41.4	36.2	46.9
	not sure	13	4.5	2.4	7.2

4.1.9 Current consultation and way of communication on patient care-giving

From the whole respondents on current consultation and way of communication, 163(44.7%) believes in delaying of communication, 133(45.1%) believes in lack of coordination, but 162(54.9%) believes in the presence of coordinated. Moreover, 173(58.6%) believes in wastage of time and money, 83(28.1%) believes that there is poor diction of health care, and 144(48.8%) says there is poor health care. To conclude with a response, “Yes, so many, cases develop complication which leads to death due to lack of communications”. Cases that are coming to the emergency unit are dying as they come without prior communication. Patients could die while waiting for registration and issuing patent card without proper evaluation and diagnosis” (Emergency medicine profession)

Table4.7Current consultation and way of communication on pt care in TAH, June 2016

consultation way of communication challenge		Frequency	Percent	95% Confidence Interval	
				Lower	Upper
Challenge of communication in pt care	yes	179	60.7	55.3	65.8
	no	103	34.9	29.8	40.7
	not sure	13	4.4	2.0	6.8
Delay in Communication too late	yes	163	55.3	49.2	60.7
	no	132	44.7	39.3	50.8
Not coordinated	yes	133	45.1	39.3	50.8
	no	162	54.9	49.2	60.7
Waste time and money	yes	173	58.6	52.9	64.1
	no	122	41.4	35.9	47.1
Poor diction	yes	83	28.1	22.7	33.6
	no	202	68.5	63.1	73.9
	not sure	10	3.4	1.4	5.4
Poor care	yes	144	48.8	43.1	54.2
	no	151	51.2	45.8	56.9

4.1.10 Perceived importance of referral and consultation feedback to patients

Among 295 respondent 199(67.5%) were need feedback to their nearest health facility at the end of care .From 295 respondents that need feedback to their nearest health institution at the end of care, 135 (45.8%) need feedback via mail, 107(36.3%) need feedback through phone, 147(49.8%) need feedback on paper and 38(12.9%) need feedback by fax.

Results indicated that feedback is not given to their referring institution most of the time because the patients assume their case is too difficult if once they are treated at TAH. Feedback is good for patients who come from remote areas or far from their home and for referral accepting hospital like TAH. Due to poor feedback to the refereeing health institutions, the hospital is over crowded with referral. If feedback is given early to the referring health institution, it will help them to manage similar cases by their own ways which will further decrease overload at accepting institutions. Usually if the referral is inappropriate, the central triage gives feedback to the catchment after evaluation by physicians.

The following statement by a staff member indicates the situation. “Feedback is not common in this hospital; if feedback was given it might have decreased the over- loading of hospital and waiting time” (Outpatient department, triage professional).

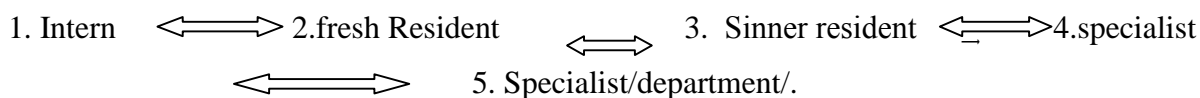
Table4.11 Perceived importance of feedback to patients in TAH referral center, June 2016.

need feedback		Frequency	Percent	95% Confidence Interval	
				Lower	Upper
need feedback	yes	199	67.5	61.4	72.5
	no	88	29.8	24.7	35.3
	not sure	8	2.7	1.0	4.7
	Total	295	100.0	100.0	100.0
Mail	yes	135	45.8	40.0	51.2
	no	147	49.8	44.4	55.6
	not sure	13	4.4	2.4	6.8
Phone	yes	107	36.3	30.8	42.0
	no	188	63.7	58.0	69.2
	Total	295	100.0	100.0	100.0
Paper	yes	147	49.8	43.7	55.6
	no	148	50.2	44.4	56.3
Fax	yes	38	12.9	9.2	16.9
	no	228	77.3	72.5	82.4
	not sure	29	9.8	6.8	13.2

4.1.11 Patient Challenge with Consultation Communication Processes

All patients worry about the different services they are expecting from the hospital. Most of them, 223(75.6%) worry about the consultation processes, 76 (25.8%) are concerned with unnecessary cost, 124(42.0%) had difficulties with the distance, and 51 (17.3%) worry about the services in the poly pharmacy, and most other patients- 226(76.6%) worry about the waiting time whereas, about half 137 (46.4%) worry about poor communications, while 234 (79.3%) worry about late response of health specialists. Other respondents never worried with consultation communication processes. Qualitative results indicated that consultation out of hospital with other health institution does not exist.

Coordination of consultation is poor because of delay in response from health specialists. However, consultation between departments in the hospital is common where it is processed within 24 hours by chain of command as follows:



In emergency consultation responses should be abrupt, delay causes a lot of complications, but this is not happening in this hospital. There is delay in responses; nobody wants to take risk. The specialist response more than 24 hours some times in emergency case. As a result for example a patient with gangrene of below knee may get his leg amputated above knee due to late response from specialists. Sometimes seniors come for consultation after patient expired; this is at times because they give priority for teaching than patient care. Delivered mother develop deep vein thrombosis due to late response of specialist such type of consultation process makes late response to care (Adult emergency, Emergency medicine profession).

Table4. 9 patient worries with consultation processes in TAH referral center, June 2016

variable		Frequency	Percent	95% Confidence Interval	
				Lower	Upper
worries with consultation processes	yes	223	75.6	70.8	80.3
	no	65	22.0	17.3	26.4
	not sure	7	2.4	.7	4.1
service cost	yes	76	25.8	21.0	30.8
	no	219	74.2	69.2	79.0
Distance	yes	124	42.0	36.3	47.8
	no	166	56.3	50.5	62.0
	not sure	5	1.7	.3	3.4
Poly pharmacy	yes	51	17.3	13.2	22.0
	no	244	82.7	78.0	86.8
waiting time	yes	226	76.6	71.5	81.0
	no	69	23.4	19.0	28.5
Poor communications	yes	137	46.4	40.7	52.2
	no	158	53.6	47.8	59.3
Late response of specialist	yes	234	79.3	74.9	84.1
	no	61	20.7	15.9	25.1

4.1.12 Way of Referral and Consultation Communication Patients Prefer

From the total of 295 patients who prefer communications processes to empower themselves during referral consultation process, 184(62.4%) prefer paper, 159 (53.9%) prefer mail, 122 (41.4%) prefer phone, and 61(20.7%) prefer fax to empower their way of communication. Other patients are not sure which way of communication tools empower them or not prefer any of the tools.

Table4. 10 Way of referral and consultation communication patient prefer to empower their self in TAH referral center, June 2016

Way of communication to empower their self		Frequency	Percent	95% Confidence Interval	
				Lower	Upper
Paper	yes	184	62.4	56.9	67.8
	no	94	31.9	26.8	36.9
	not sure	17	5.8	3.1	8.8
Mail	yes	159	53.9	48.5	59.0
	no	131	44.4	39.0	49.8
	not sure	5	1.7	.3	3.4
Phone	yes	122	41.4	35.3	47.1
	no	165	55.9	50.5	61.7
	not sure	8	2.7	1.0	4.4
Fax	yes	61	20.7	15.9	25.1
	no	214	72.5	67.5	78.0
	not sure	20	6.8	4.1	9.8

4.1.13 The Distance of TAH from Patients in kms

From all respondents, 73(24.7%) came from 0-100kms followed by 69 (23.4%) who came from 501-1000 kms, 49 (16.6%) from 201-300 kms, 39 (13.2%) from 401-500kms, 34(11.5%) from 301-400kms, 26 (8.8) from 101-200kms and 69(23.4%) 501-1000kms. Qualitative respondents also explain that many patients coming to the hospital are from remote rural areas of the country. There is not any restriction by distance. There is poor equity and less efficiency because patients wait more time though they come from remote areas and waste more money and time due to poor referral processes. When patients come from other health institutions, they spend one to two days on their way and spend more money for transportation cost. Even

there is not access to transportation; poverty makes them to come to the hospital too late after referral date in preparing themselves.

Table4. 12. Distance from patients come TAH referral center in kms, June 2016

variable		Frequency	Percent	95% Confidence Interval	
				Lower	Upper
Distance from patient come in kms	0-100	73	24.7	19.7	29.8
	101-200	26	8.8	5.4	12.5
	201-300	49	16.6	12.5	21.0
	301-400	34	11.5	8.1	15.6
	401-500	39	13.2	9.5	16.9
	501-1000	69	23.4	18.6	28.5
	+1001	5	1.7	.3	3.4

4. 1.14 Days it take to Patients to arrive at the Hospital

From 295 respondents who take time to arrive at the hospital, 94(31.9%) take 130-60minutes time to arrive at the hospital, followed by 74 (25.1%) take two days time, 66(22.4%) one day time, 40(13.6%) 1-2hrs time, 11(3.7%) 3-5hrs, and 10(3.4%) 6-8 hours. when the patients come from other health institutions, they spend one to two days on their way and spend more money for transportation cost. Even there is not access to transportation; poverty makes them come too late to the hospital after the referral date. They need time to generate money for the necessary expenditures.

Table4.14 Day's takes to patient to arrives TAH referral center, June 2016

Days respondent arrive the hospital	Time	Frequency	Percent	95% Confidence Interval	
				Lower	Upper
	30-60minute	94	31.9	26.4	37.6
	1hr-2hr	40	13.6	9.8	17.6
	3-5	11	3.7	1.7	6.1
	6-8	10	3.4	1.4	5.4
	one day	66	22.4	18.0	27.1
	two days	74	25.1	20.3	29.5

4.1.15 Transportation costs patients spend in ETB during the Referrals

From all respondents of 295, 98(33.2%) of them spend +501 ETB to arrive at the hospital and return to their home; followed by 47 (15.9%) who spend 0-50birr, 40(13.6%) spend 51-100birr, 33(11.2%) spend 301-400birr, 29(9.8%) spend 201-300birr, 25(8.5%) spend 101-200birr and 23 (7.8%) spend 401-500birrr when they come hospital for treatment. Due to far distance of the specialty hospital from the patients’ home, many patients waste a lot of money for transportation.

Table4. 12 Transport cost patient spent to go and return to their home in ETB in TAH, June 2016

	money	Frequ ency	Percent	95% Confidence Interval	
				Lower	Upper
money patient spend to arrive hospital	0-50	47	15.9	11.9	20.3
	51-100	40	13.6	9.8	17.6
	101-200	25	8.5	5.4	11.5
	201-300	29	9.8	6.4	13.6
	301-400	33	11.2	7.8	14.9
	401-500	23	7.8	5.1	11.2
	+501	98	33.2	28.1	38.3
	Total	295	100.0	100.0	100.0

4.1.16 Times patients spend during waiting for health workers in TAH

From all respondents of 295, 59(20.0%) of them wait without any visit by health specialists up to 4-5hrs, followed by 42 (14.2%) wait more than 11days, 41 (13.9%) wait up to 5-30minutes, 35(11.9%) wait one-2days, 27(9.2%) wait 2-3hrs, 27(9.2%) wait 5-10days, 19(6.4%) wait 3-4days, and 17(5.8%) wait 31-60minutes without any visit of health specialists. Patients waste much more time in TAH during waiting for the specialists. They spend their time due to many reasons. For example, the specialists have too much work load, no space to accept new patients, and for re-evaluation of an investigated patient.

Table4. 14 Time patients spend for waiting health worker in TAH, June 2016

time patient spent for waiting health worker	Frequency	Percent	95% Confidence Interval	
			Lower	Upper
5-30minute	41	13.9	10.2	18.0
31-60minute	17	5.8	3.4	8.5
2-3hrs	27	9.2	6.1	12.5
4-5hrs	59	20.0	15.6	24.7
6-7	28	9.5	6.1	13.2
one-2day	35	11.9	8.5	15.9
3-4day	19	6.4	3.7	9.2
5-10day	27	9.2	5.8	12.5
above11days	42	14.2	10.2	18.3

4.1.17 Health care Provider Explains about Retaining of Patients at the Referring Institution

Many health care providers state that” It is good if patient is retained at referring health institution.” Patients with some of the cases like trauma, laboring mother, and cardiac, dehydrated etc. cannot move from place to place. It is good if the physicians go there to help them. Inappropriate referral makes the hospital over loading. Emergency cesarean section and mini surgery is good if planned and retained patients at the catchment and referring health institution. Training for catchment health care provider and fulfilling of materials is necessary. But there must be all available labs, imaging studies and medication. Respondents say,

“It is good option, but there is lack of man-power for specialty fields, and it needs continuity and strength. Communication tool is good like consultation of specialist with information technology if it is possible” (Outpatient physician, neurology resident).

4.1.18 Health care Providers Explain Design of Referral and Consultation System

Many respondents explain that “FMOH, all departments improve referral system all over the country. They were explaining that networking hospitals is vital”. Proper patient should go to proper hospital by using guidelines, and so protocol is necessary. In their view, there must be stronger communication than previous by using tools like phone, radio or web based technology. Proper documentation from the referring institution should exist. Also report change documentation manual to electronic is also necessary. For regional hospitals, consultation before referral and involving senior specialists in consultation system is good. Moreover, report ambulance with health care provider for critical patient should maintain all

the times. Proper communications should exist before a patient is referred for available service. Accordingly, respondents say,

“If it is possible, it is important to provide patient care by the nearest health facility or at his home by using health information technology like ICT, or web based communications is good”(Outpatient directorate (head), physician, position internal medicine).

This implies health care providers need improvement of referral and consultation communications and service quality for patient to enhance service quality.

4.1.17 TAH Health care Providers’ Recommendation for Referral and Consultation System

The majority of respondents explain that referral and consultation system must improve. Its way of communication should improve. Referring and accepting institutions should get training on criteria of referral system. Waiting room for patients who come from rural areas of the country should improve until they get specialty care. Strong communications systems should be used by using tools like radio, rather than phone or electronic /web based/ central system all over the country. There must be sufficient ambulance to make reports for the referral. The hospital should coordinate the referral communication systems.

Coordination of consultation communication also facilitate in patient consultation to reduce patient waiting time in the inpatient and facilitate outpatient admission. Referral system sends due to minor reasons like absence of water, light, equipment etc. must be solved. Computer training should be given for all staff members. Every patient must be referred with proper documentation; the referring hospital must afford transport services; the hospital must lead patients where go. Feedback must be sent back to the referring and consulting institution if the patient can follow his/her care at nearest health institution. The referral must be timely if possible. Health information technology should be applied regarding this. If possible, documentation with software is good. It can be sent between health institutions with electronic /web/ and phone communications before referral if feasible with timely response to consultation/referral/processes. Senior staffs involvement in the referral system and sustainable referral is important to make it more secure.

4.2 Discussion

Summary of the main findings in the present study shows that delay in communication, lack of coordination ways of communication, problems related to tools of communication, late response of specialist, poor feedback mechanism and too long waiting time observed as hindrances in care-giving for patients in a very modern way. The current study shows the status of referral and consultation system, the challenges related to the referral and consultation system and ways of communications accordingly.

4.2.1 Waiting time

Among the challenges patients face during the referral processes 266 (90.2%) were exposed to time wastage. The practice of bypassing the lower levels of health care make many patients spend long waiting hours to see highly trained medical workers in hospitals. This is not only wastage of time but also a miss-application of the highly trained health workers' time (Osibogun A. 1996).

At the central triage, the patients are assigned to respective departments. This process takes about half an hour to an hour. But the patients who come without investigation can wait up to one month at outpatient without getting specialty care because of financial limitation, late investigation, over loading of spaces in the ward. Late response of specialist within consultation process makes late discharge from hospital and also late admission for new patient and increase in waiting time. Referral system throughout the country is not coordinated as such. In case of in-appropriate referrals, patients are simply sent from a health institution of remote area without finance and sufficient investigation. There is not any laboratory or imaging investigation all the times as needed in the hospital. Due to these problems, patients wait more time in the hospital.

When patients come from other health institution, they spend one to two days on their way and spend more money for transportation cost. There is not access to transportation; poverty is a big hindrance so that they come late to the hospital after referral date.

4.2.3 Communication in Referral and Consultation Processes

The hospital accepts patients from private clinics and hospitals, regional hospitals, catchment health centers, and government hospitals and specialty center. Patients appear with referral

paper from referring hospitals from different regions of the country. If the referral is within Addis Ababa, there is usually liaison communication for emergency case for bed by phone.

But regional hospitals send patients without any communication. The hospital accepts patients without referral communications by police, self-referral, by accident and staff and staff's family members and through communication by lesion office where. The hospital accepts patents and assigns them to different units depending on their illnesses and conditions. For example, critical patients will be sent to emergency units and stable patients are sent to central triage. After patients arrive at TAH, linking to respective departments is decided by central and emergency triage. There are also problems related to current referral paper communications. Sometimes, patients come without referral paper. They may lose the referral paper or it may be damaged due to handling which delays or deter patents from getting the services. The rural nature of the country, long distance travel and the literacy and wealth status of patents and the means of transportation could affect the patient presentation with the referral system. In addition, lack of health professional committeemen and level of and status of the professional at the referring units limits they type of referral paper.

Patent privacy is also a problem among illiterate and rural patents. Because as the health facility has no simple and easily understandable signs to each unit and department, patients are obliged to show their documentation by way of looking for access to the place they want to go. Patent friendly health facility save not only patient and physician time but also avoid complication and avoidable life and health risks.

Timeliness of the referral depends on patients' conditions. There is no fixed schedule .Is late due to absence of early referring, poor infrastructure, financial, access to transport and poverty. Patients around the hospital and nearest to the hospital and those who appear in emergency case do not have such a problem related to financial expenditure or in social or other conditions. They can appear on the referral day without delay, but other patients have problems related to social issues, poverty, distance or other problems.

4.2.5 Overloading

Over referral can lead to fragmented care by committee, over testing and repetitive testing, dangerous poly pharmacy, patient confusion and isolation, and complacency on the part of

generalists who lose their motivation to continually acquire new knowledge (Berczeller PH. 199). There is not any restriction without diagnosis, without communications, in-appropriate referral because the hospital is teaching hospital; patients take unnecessary referrals like Cold cases which not need specialty care, self-referral, and staff family and social of the staff. Referral of patients without communication results in many problems like social and financial problems, and it also makes the hospital overloaded. Patients wait more time in the hospital until specialists reevaluate and diagnosis the case. This process cause people overload to the hospital and customers' dissatisfaction. On top of this, informants say, "Every people need early timely management the physician not timely present due too many reasons. We take preeclampsia patient without communications or referral paper referral paper lost no phone or communications tools between referring hospital and TAH due to over loading of unnecessary case patient wait more time in emergency room for more than 24 hours"(Obstetric emergency, Midwife).

This implies that the hospital takes in-appropriate referral that is not needed. Inappropriate referral can cause over loading the hospital, but there is not enough space for complicated cases which need specialty care and the way of referral communication is also poor.

4.2.6 Consultation Processes

Interpersonal and communication skills in clinical consultations have been identified as a core competency in physicians, because adequate skills could enhance patient satisfaction, therapy compliance, symptom relief and cost effectiveness. This implies that consultation between the referring health institution and accepting institution enhance quality referral processes and health services if consulted before referral for available services. Health care providers can also be ready to accept new referral if consulted or communicated before the referral is reaching the hospital in case of emergency condition.

Consultation out of hospital with other health institution does not exist still now, but consultation is communicated by using consultation format by paper and via cell phone. Coordination of consultation is poor; specialists also respond poorly. Due to the hospital is teaching hospital, there is not confidentiality of the patients. Consultation between departments is processed within 24 hours by chain of command. Informants say, "Consultation does not need time or minutes in emergency, but specialists do not respond early. They fear each others

that it causes poor care or make complicate the case. For example patient with gangrene of below knee amputated above knee due to late response of specialist, the senior specialists come for consultation after patient expired some times because they give priority for teaching than patient treatment. Delivering mothers develop deep vein thrombosis due to late response of specialists. Such type of consultation process makes late response to give care”

(Staff Nurse).

This implies that there is communication problem with consultation process and the process is difficult for diction of patient care.

4.2.8 Feedback of TAH to the Referring Health Institutions

Among 295 respondent 199(67.5%) were need feedback to their nearest health facility at the end of care .but feedback is not given most of the time in TAH. Routine feedback to clinicians has been shown to improve client outcomes at the end of trainees’ practicum training, compared with no feedback (Reese, et al 2009). Due to poor feedback to consultation process, delay of admission, discharge and increase in waiting time for new referral accepted create problems to patients because the specialists do not respond early. Poor communication, delay in decision making and consistency are the other major problems. If the referral is inappropriate, the central triage gives feedback to the catchment after evaluation by physician. “Feedback is not common in this hospital, if feedback is given, it may decrease the over loading of hospital and waiting time”, said informants.

4.2.10 Quality Healthcare Service

Among all respondents 54.1% were think current referral way of communication has effect of Poor quality of care on their care. Quality healthcare includes characteristics such as availability, accessibility, affordability, acceptability, appropriateness, competency, timeliness, privacy, confidentiality, attentiveness, caring, responsiveness, accountability, accuracy, reliability, comprehensiveness, continuity, equity, amenities, and other facilities (Mosadeghrad AM. 2012). However, the referral processes regarding these are almost poor at TAH because of many reasons like poor documentation, Overloading, inappropriate referral, late presentation of patients that cause to themselves complication and decrease the healing time and increase waiting time in hospital.

CHAPTER FIVE: PROPOSED WEB-BASED SYSTEM

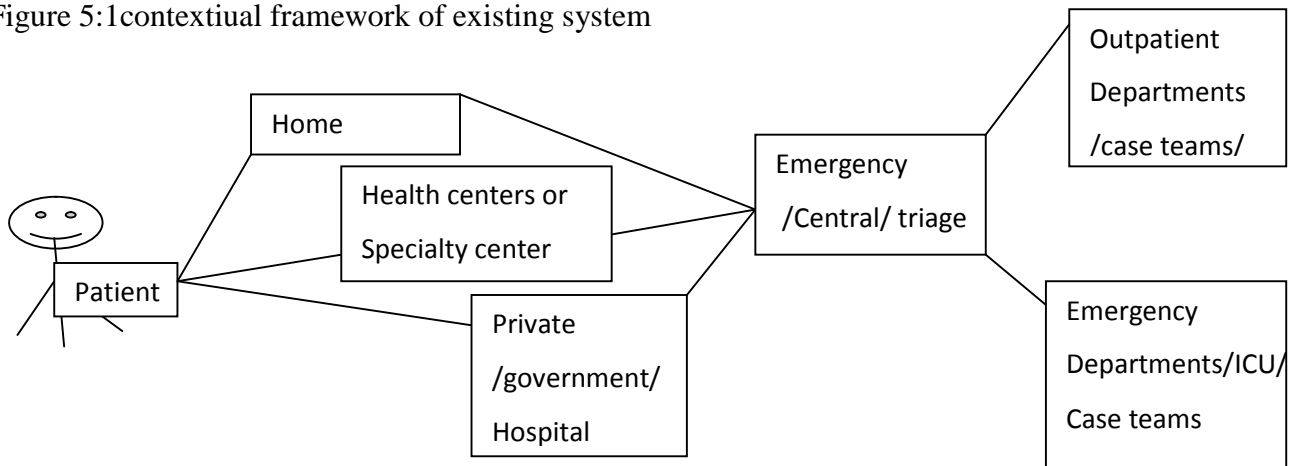
Document Analysis and interview In addition to the data gathering techniques employed above the study carried out document analysis including forms such as consultation and referral slip, register book forms, protocols, standards, way of communication, patient allocation guides known as catchment areas and other formats where referral staff uses to capture referral services related information for delivering required service. Finally the response for interview of the study and document analysis was summarized and used in requirement document. Helps to identify difficulties for current system in detail and helps identify gaps to be filled by the new designed system.

The process encompasses communication and coordination between referring and consulting health care provider regarding tasks to be completed. The overall consultation and referral processes result in a given resource utilization, quality, and outcomes for a patient and for country as well and improve quality of health care.

5.1 Requirement Analysis of the Existing System

Requirement phase of system designing life cycle identify requirement of the existing consultation and referral system and use that as input for the succeeding system development phases, Requirement analysis is done based on the requirements gathered from survey, interviews and document analysis with potential users of the consultation and referral system users and finally organized under requirement specification for W C&RIMS. Use case, UML notation that visualize user requirement is used in this phase (Omer, et al 2008).

Figure 5:1 contextual framework of existing system



5.2 Non-Functional Requirements

The non-functional requirements describe user visible aspects of the system that are not designated to the functional behavior of the system. Nonfunctional also called technical requirements that describe the quality aspect of the system. This study identifies the following technical requirements in designing W C&RIMS.

1. The system should be available to all appropriate individuals along with their corresponding privileges.
2. The system should be able to recovers from any kind of failure like power supply.
3. The system is expected to have less response time.
4. The system should use password and user name for authentication to enter the system and security password for the different functionalities of the system.
5. The system should be implemented on a high speed computer.
6. Since the system is going to handle personal information which is confidential, it should be protected from an unauthorized users and intruder

5.3 Functional Requirements

- Maintaining patient records
- provide retrieval services for users
- update patient records, view records
- schedule appointments
- allocate patient
- generate report
- register and view consultations and referral feed backs
- manage and add users

5.4 Data modeling

Data model is an integrated collection of concepts for describing and manipulating consultation/ referral /data, relationship between data and constraint on the data in a consultation/ referral/ system. Database development is one component of the Web-based system, development of a data model for persistent data was important part to be included.

Data modeling helps to identify the consultation/ referral/ data objects required by W C&RIMS.

5.5 Object-Oriented data model

Object-oriented data model which is used in this study extends the definition of consultation /referral /entity to include not only the attributes that describe the state of the object but also the actions that are associated with the object, behavior. There are steps followed by the researcher in developing a data model for W C&RIMS. Entities including consultation/ referral/ tables, feedback tables, patient allocation tables, users and physicians tables which are the significant objects of interest, consultation /referral /data where this study need to store information is defined. The primary keys which identify uniquely each entity were identified. The relationship that exists between entities which is based on the primary key was defined

5.6 Object-Oriented Analysis (OOA)

In this study, OOA phases emphasis on finding and describing the objects or concepts in the consultation and referral system. An object is a software construct that mirrors a concept in the real world. It could be a user's of the consultation and referral system, screen where the consulting and referral users used, or reports generated from referral service providers. Mainly it is concerned with creating a description of the domain from the perspective of domain objects. There is an identification of concepts, attributes, and associations that are considered noteworthy. The core tasks in OOA phase in designing WC&RIMS was defining the problem to be solved in the existing consultation and referral system and effective understanding of what to build. So the project focus on understanding the requirements document to produce a high-level specification that describes what the system is supposed to do.

The OOA phase can be depicted using UI flow diagramming, System use case diagrams, Conceptual and Data modeling that give a picture of the significant domain concepts or consultation and referral objects for designing W C &RIMS.fig 5.2System use case modeling System use case modeling describes the system by taking into consideration hardware and software requirement that brings technological concerns into account.

5.7 Use cases

Use cases are used to discover and record functional or behavioral requirements of consultation and referral system by writing stories of using a system to fulfill user goals. Important value of use cases is that it emphasizes on the user goals and perspective; I ask the question "who is using the system, what are their typical scenarios of use, and what are their goals?" This is a more user-centric emphasis compared to simply asking for a list of system features. Use cases can be seen as a collection of related success and failure scenarios that describe an actor using a system to support a goal. A scenario is a specific sequence of actions and interactions between actors and the system (Scott W.Ambler2004).

5.8 Actor

Actors are roles played not only by people, but by organizations, software, and machines. For instance: admin, Patient, Physician, consultation, Referral, report, payment, Feedback, Liaison, Department, Triage, Registration and Database connection. Actor is something with behavior, a person, identified by role, including the system under discussion itself when it calls upon the services of other systems.

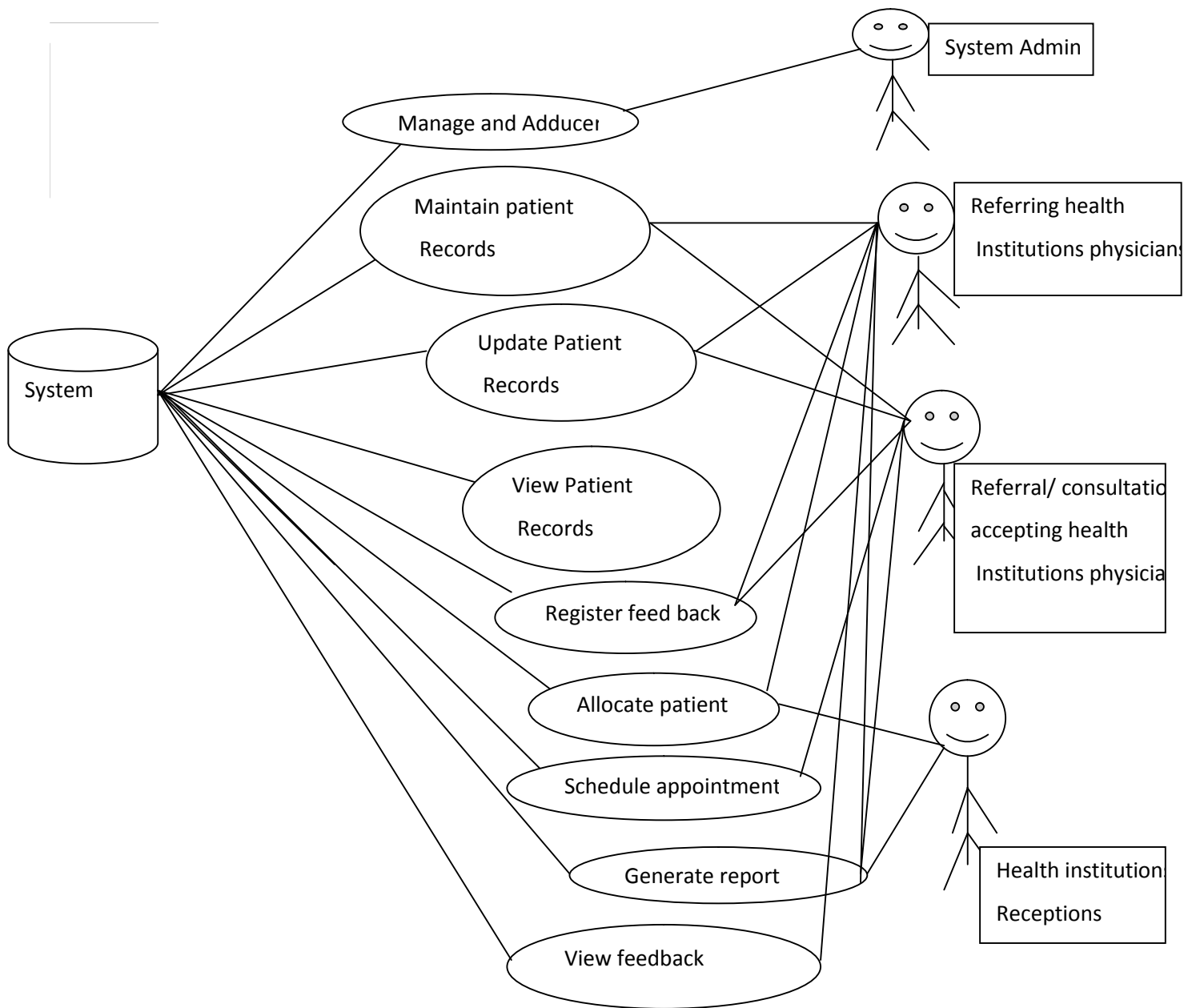


Figure5.2 Use case Diagram for system use case modeling

5.8 Use case description for System Use case modeling

Use case UC1: Login

Scope: Hospitals and health centers

Primary actor: User (physician and consultation/referral/ system administrator)

Pre-condition: The users need to consult/refer/ a patient.

Successes guarantee (post condition): The users successfully logged in.

Main Success scenario (Basic flow):

1. The use case starts when the user opens a consultation/referral/ information system
2. The system displays home screen.
3. The user select proceed to system link on home screen
4. The system displays login screen.
5. The user type username, password and select user type on login screen
6. The system verifies account information.
7. If the user account information is correct
8. The system displays main menu screen.
9. The use case ends.

Alternative scenario:

- 7.1 The system displays invalid login message.
- 7.2 the use case goes to step 4.

Use case UC2: Consult/Refer/ Patient records

Include: Login

Scope: hospital/ Health Center/

Primary actor: Physician

Pre-condition: Physician determines consultation/referral/ indication and login.

Successes guarantee (post-condition): The patient is consulted/referred/ successfully.

Main Success scenario (Basic flow):

1. The use case starts when the system displays main menu screen.
2. The user selects consultation/referral/ link on main menu screen.
3. The system displays consultation/referral/ list screen
4. The user selects add/new consultation/referral/ link on consultation/referral/ list screen
5. The system displays the add/new consultation/referral/ form

6. The user enters consultation/referral/ information on consultation/referral/ form.
7. The system adds consultation/referral/ data on hospital database.
8. The use case ends.

Use case UC3: Register Feedback

Include: Login

Scope: Hospital

Primary actor: Physician

Pre-condition: Patient consultation/referral/ sent to physician.

Successes guarantee (post-condition): The patient data is retrieved successfully and treatment, recommendation, follow up result is registered.

Main Success scenario (Basic flow):

1. The use case starts when the system displays main menu screen.
2. The user selects feedback link on main menu screen.
3. The system displays feedback list screen.
4. The user selects add feedback link on consultation/referral/ list screen
5. The system displays feedback form.
6. The user enters treatment result, recommendation, and follows up treatment on feedback form.
7. The system adds feedback data to the hospital database.
8. The use case ends.

Use case UC4: Update patients records

Include: Login

Scope: hospital/Health centers/

Primary actor: Physician

Pre-condition: A need to change patient consultation/referral/.

Successes guarantee (post condition): The patient data is updated accordingly.

Main Success scenario (Basic flow):

1. The use case starts when the system displays main menu screen.
2. The user selects consultation/referral/ link on main menu screen.
3. The system displays consultation/referral/ list screen.
4. The user selects edit consultation/referral/ form link on consultation list screen.

- 5 The system displays edit consultation/referral/ form.
6. The user enter data to the fields need to be edited on edit form.
7. The system adds the updated consultation/referral/ data to the hospital database.
8. The use case ends.

Use case UC5: Show Consultation/Referral

Include: login

Scope: Hospital and health center

Primary actor: Physician

Pre-condition: The patient data is available on hospital database.

Successes guarantee (post-condition): The patient data is viewed successfully.

Main Success scenario (Basic flow):

1. The use case starts when the system displays main menu screen.
2. The user selects consultation/referral/ link on main menu screen.
3. The system displays consultation/referral/ list screen.
4. The user selects show consultation/referral/ link on consultation/consultation list screen.
- 5 The system displays consultation/referral/ data on consultation/referral/ detail screen.
6. The use case ends.

Use case UC6: Allocate Patient

Include: login

Include: Schedule appointment

Scope: hospital/ Health center/

Primary actor: Physician

Pre-condition: New consultation/ referral/ received.

Success guarantee (post-condition): Patient is allocated accordingly.

Main Success scenario (Basic flow):

1. The use case starts when the system displays main menu screen.
2. The user selects patient allocate link on main menu screen.
3. The system displays patient allocate list screen.
4. The user selects add/new patient link on consultation/referral /list screen.
- 5 The system displays add/new patient form.
6. The user enters patient data to add/new patient form.

7. The system adds the patient allocation data to the hospital database.
8. The use case ends.

Use case UC7: Add User

Include: login

Scope: Hospital and health center

Primary Actor: Administrator

Pre-condition: New users identified

Success guarantee (post-condition): Users are added on successfully.

Main Success scenario (Basic flow):

1. The use case starts when the system displays main menu screen.
2. The user selects create/add user link on main menu screen.
3. The system displays user list screen.
4. The user selects add/new user link on user list screen.
- 5 The system displays add/new user form.
6. The user enters user data to add/new patient form.
7. The system adds user data to the hospital database.
8. The use case ends.

Use case UC8: Schedule Appointment

Scope Referral /consultation/accepting health institution

Primary Actor: Referral /consultation/accepting health institution Physician

Pre-condition: New consultation/ referrals/ received and it is not an emergency case

Success guarantee (post-condition): Patients appointment is scheduled successfully.

Main Success scenario (Basic flow):

1. The use case starts when the system displays main menu screen.
2. The user selects consultation/referral/ link on main menu screen.
3. The system displays consultation/ referral /list screen.
4. The user selects schedule appointment link on consultation/ referral/ list screen.
- 5 The system displays schedule appointment form.
6. The user enters user data and schedule on appointment form.
7. The system adds scheduled data to the hospital database.
8. The use case ends.

Use case UC9: Show feedback

Include: login

Scope: referring/consulting/ hospital/ Health center/

Primary Actor: referring/consulting/Hospital/Health Center/ Physician

Pre-condition: Patient examined by hospitals and his/her feedback registered accordingly.

Success guarantee (post-condition): Patient feedback is accessed successfully.

Main Success scenario (Basic flow):

1. The use case starts when the system displays main menu screen.
2. The user selects feedback link on main menu screen.
3. The system displays feedback list screen.
4. The user selects show feedback link on user list screen.
- 5 The system displays feedback details.
6. The use case ends.

Use case UC10: Generate Report

include: login

Scope: Hospital and health center

Primary Actor: Physicians and Health center receptionist

Pre-condition: consultation/ referral/ tasks performed.

Success guarantee (post-condition): report produced and ready to be accessed.

Main Success scenario (Basic flow):

1. The use case starts when the system displays main menu screen.
2. The user selects consultation /referral/ link or patient allocate link on main menu screen.
3. The system displays consultation/ referral/ list and patient allocate list screen.
4. The use case ends.

5.9 Business Rule Identification

BR1: Validate consultation Information

Description: validates whether the input fields for consultation forms are filled correctly and important fields are not missed and input fields should be filled by appropriate input types

BR2: Validate Referral Information

Description: validates whether the input fields for referral forms are filled correctly and important fields are not missed and input fields should be filled by appropriate input types.

BR3: Check Catchment Area

Description: Health institutions have to check catchment area before referral was done.

BR4: Redirect to Alternative Facility

Description: The health centers have to check the capability of the hospitals before allocating patients.

Related rule: Hospitals can redirect patient to another facilities if it is beyond their capability.

BR5: Settle Financial Issue

Description: The patient must solve all financial related issues before getting referral service at hospitals.

BR6: Alert for new information

Description: Health centers have to alert hospitals for emergency case through e-mail and Hospitals have to access all referrals once a day.

Related Rule: Hospitals should alert consulting and referring health institution if the need for further information

5.10 Conceptual/ Domain/ Modeling

A domain model, also called conceptual models, domain object models, and analysis object models, is the most important and classic model in OOA. It illustrates important concepts in a real world domain of the consultation/ referral /system. It is a visual representation or perspective of conceptual classes or real-situation objects in a consultation/ referral /domain, not a software perspective and illustrated with a set of class diagrams in which no operation, method signature are defined.

The importance of domain model in designing W C&RIMS is that it helps the study to use real world domain in creating software class and fulfills the representational gap between how stakeholders in consultation / referral/ system conceive the domain and its representation in software. Domain model provides a conceptual perspective in consultation / referral /systems and it may show

1. Domains object or conceptual classes
2. Association's between conceptual classes
3. Attributes of conceptual classes

5.10 .1 Conceptual class

Identifying a rich set of conceptual classes is at the heart of OOA in domain modeling. There are 3 ways to find conceptual classes by reusing existing models, using a category list and through identifying noun phrases. Among the 3 mentioned above this study employed finding conceptual classes using noun phrases, to identify concepts in the domain for designing W C&RIMS.

5.10 .2 Association

In domain modeling association is a relationship between classes that indicate some meaningful and interesting conceptual perspective in real domain. Association is defined with multiplicity that describes a numerical relationship between instances of class. For this study the association between classes is defined accordingly as shown below

5.10 .3 Attribute

Attribute is a logical data value of an object. It satisfies the information requirement of the current scenario under designing In developing WC& RIMS the attributes is identified and shown in table 5.1 here below.

Table 5.1: Conceptual/domain modeling concepts, attribute and methods.

Concept	Attribute	Method	Description
Physician	User name Password First name Last name Department email address phone number profession	Login Add Feedback Edit Feedback Show feedback Show consultation Add consultation Edit consultation Show Referral	The physician handles feedback and consultation/referral/ Data. To perform this S/He has to login.

		Add Referral Edit Referral	
patient	patient Id first name last name date user type user name Password	Login Allocate patient Add user	The receptionist at health facility handles patient allocation. The users have to login Before using the system. System administrator with privilege to add user to the system
Feedback		Set	Set Feedback form
	patient Id Date consult Hospital Name Referred Hospital Name First Name Last Name diagnosis Treatment Given Finding recommendation Physicians Name	Get	Contains treatment result, recommendation, treatment, appointment processed by physician.
	patient Id date Department consulted Referring Health institutions Name Clinical Finding diagnosis lab Result Treatment Given First Name Last Name dob sex Keble House Number Occupation Sub City	Set get	Consultation /Referral/ form contains consulted/referred/ patient data which is processed by physician at referring health facility and accepting hospitals
Patient Allocate	Card Number cases consulting/Referring /Health facility consulted/ Referred	Set Get	Patient placement handled by Health centers receptionist.

	/Hospital Name First Name Last Name Date		
System (user manager)	User Type User Name Password	User	The system verifies user Account Information.
Invalid User Exception		Display	A message displayed for invalid user
Consultation/Referral/ Database Connection	Connection statement query result	is Connected write read close Set	A consultation/ referral/ database that lets the user to insert, read data from database.

By using the identified concepts and attributes in table 5. 1 above the researcher develops the conceptual model for developing WC&RIMS as follows in fig. 5.3.

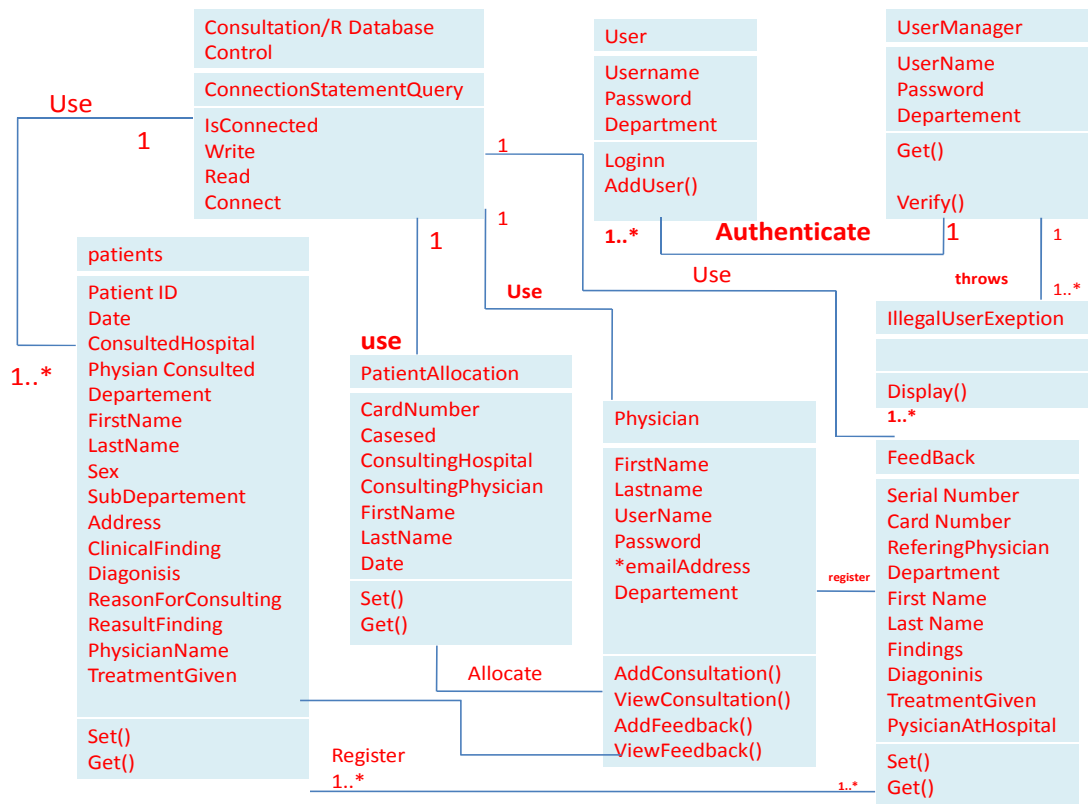


Figure 5.3: Class diagram for WC&RIMS

5.11 Sequence Diagram

UML sequence diagrams model the flow of logic within the consultation and referral system being designed in a visual manner, enabling both to document and validate the system logic, and are commonly used for both analysis and design purposes. It is a common notation to illustrate collaborations among consultation /referral/ objects and shows the flow of messages between objects, and thus the invocation of methods (Scott and Ambler, 2004).

The boxes across the top of the diagram represent classifiers or their instances; typically use cases, objects, classes, or actors. Objects respond to messages through the invocation of an operation and classes do so through the invocation of static operations. Objects have labels in the standard UML format name: Class Name, where "name" is optional and object labels are underlined as it is shown in the format. The dashed lines hanging from the boxes are called object lifelines, representing the life span of the object during the scenario being modeled. The long, thin boxes on the lifelines are activation boxes, also called method-invocation boxes, which indicate processing is being performed by the target object/class to fulfill a message.

The X at the bottom of an activation box, indicate an object has been removed from memory. Messages are indicated on UML sequence diagrams as labeled arrows. Stereotype <<actor>>, <<controller>>, and <<UI>> is used to indicate an actor, a controller class, or a user-interface (UI) class, respectively.

The following section depicts system sequence diagram for designing WC&RIMS

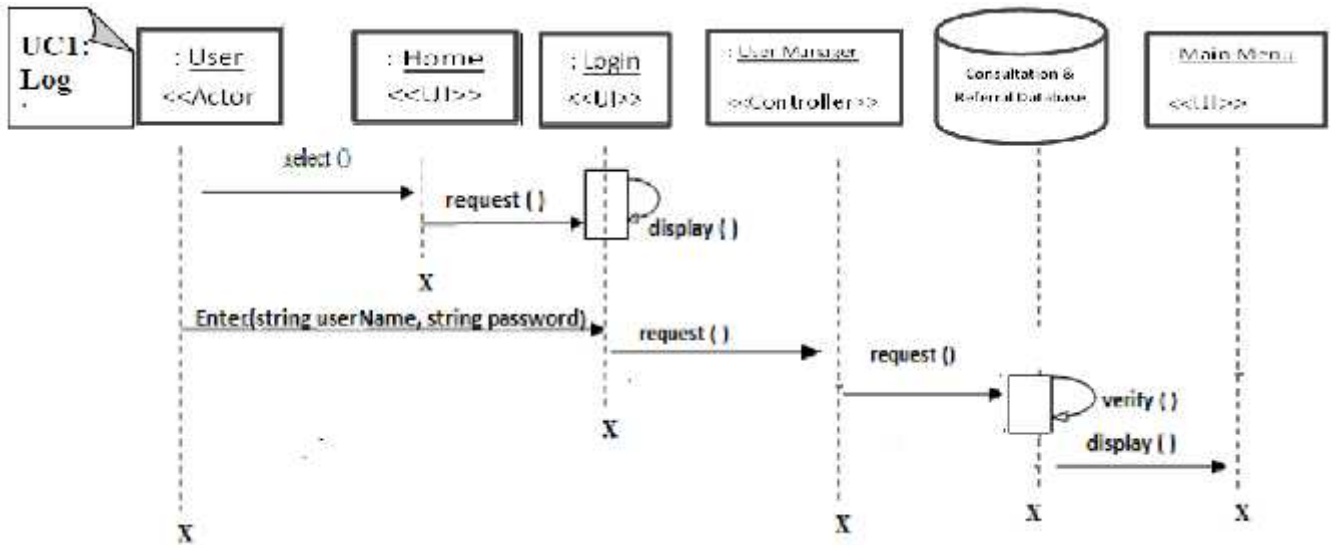


Figure 5.4 Alternative scenarios for login

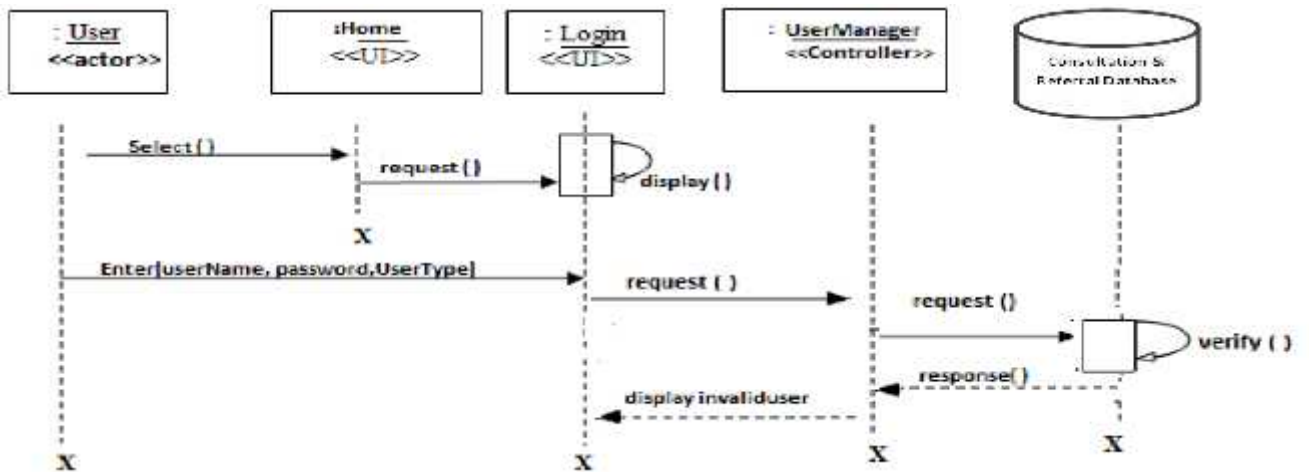


Figure 5.5: Login sequence diagram for WC&RIMS.

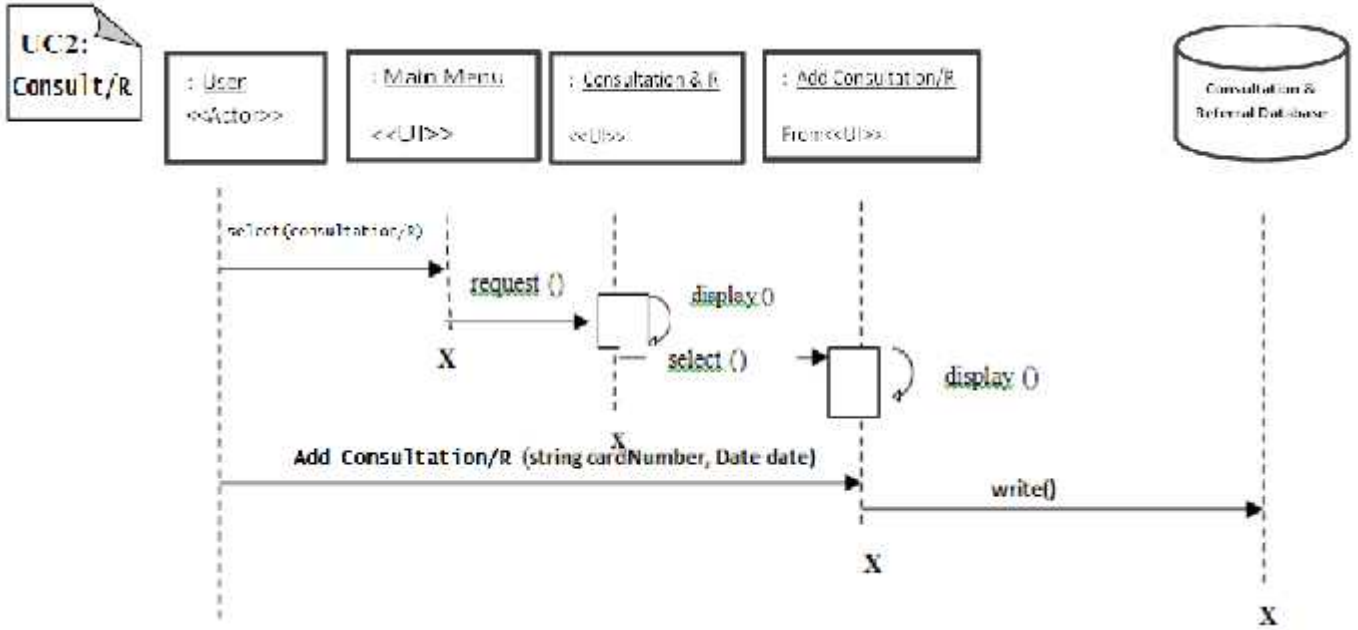


Figure 5.6: consult/ refer /patient sequence diagram for WC&RIMS

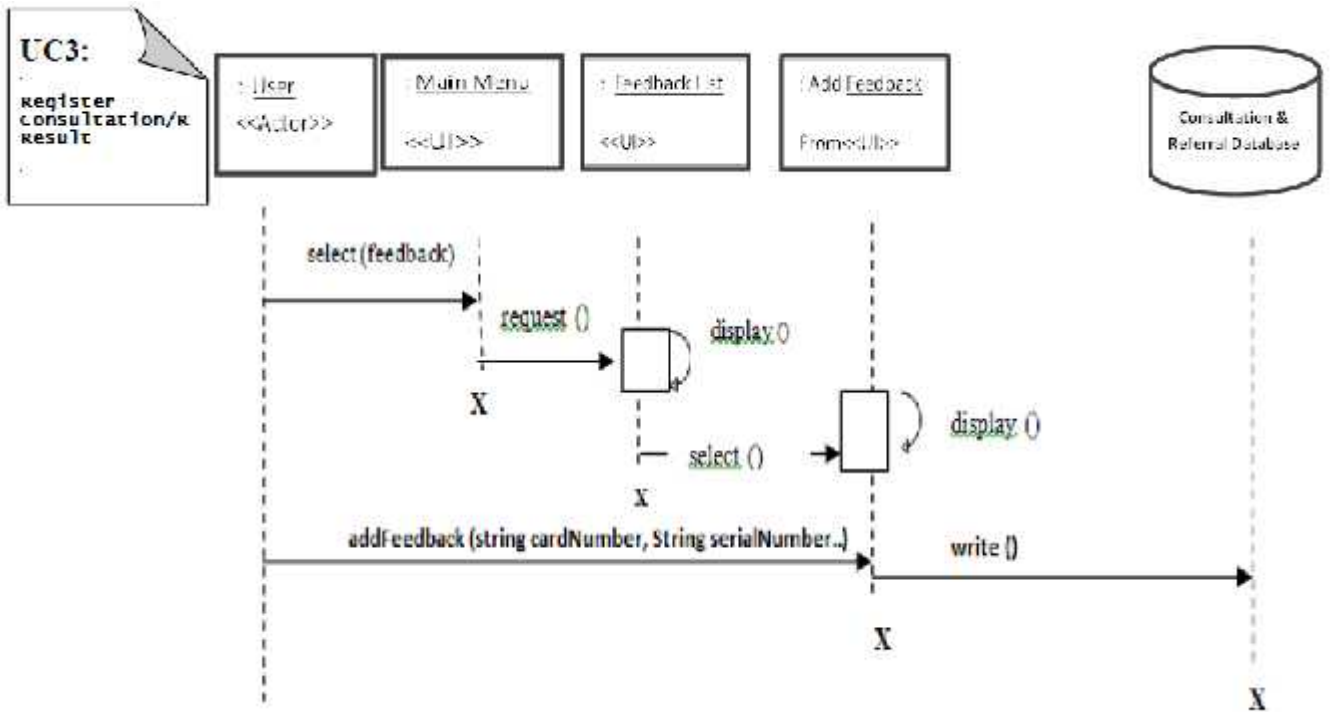


Figure 5.7: register consultation/ Referral/ Result sequence diagram

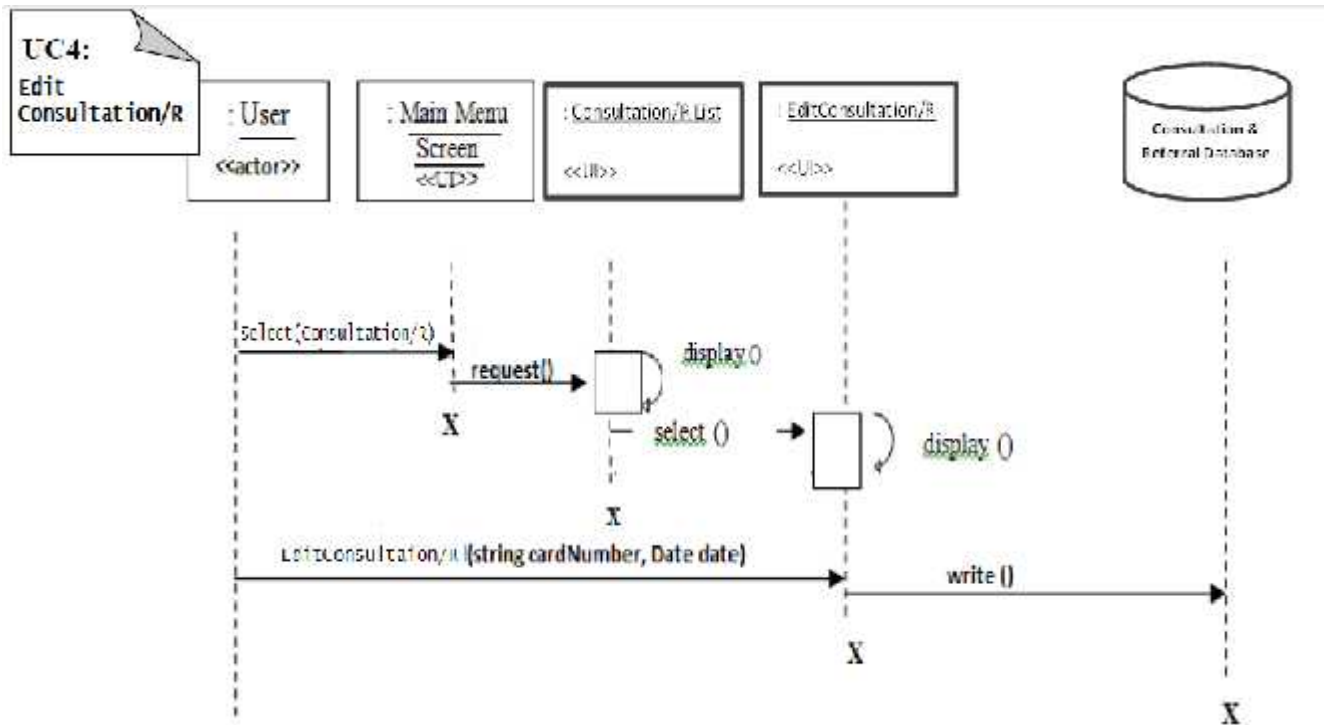


Figure 5.8: Edit consultation/Referral /form System Sequence Diagram

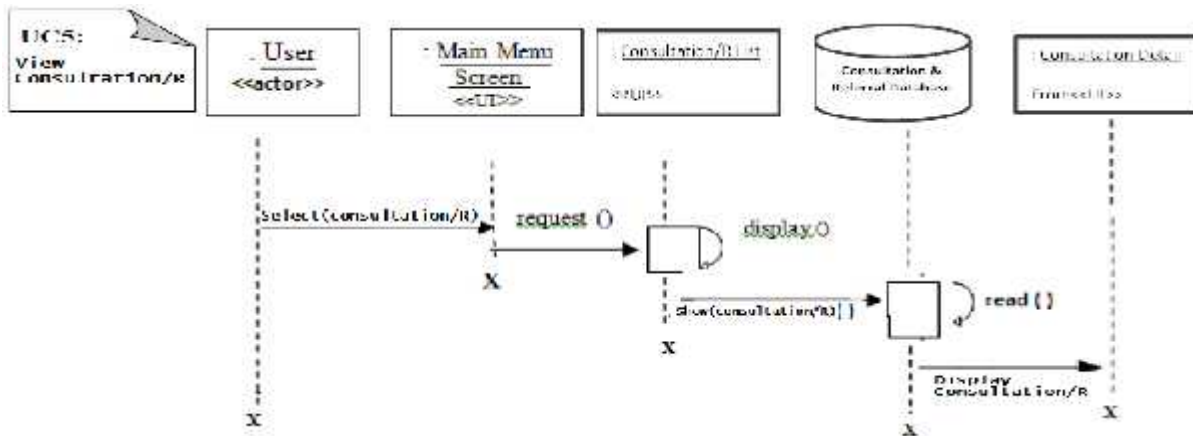


Figure 5.9: view consultation/referral/ system sequence diagram

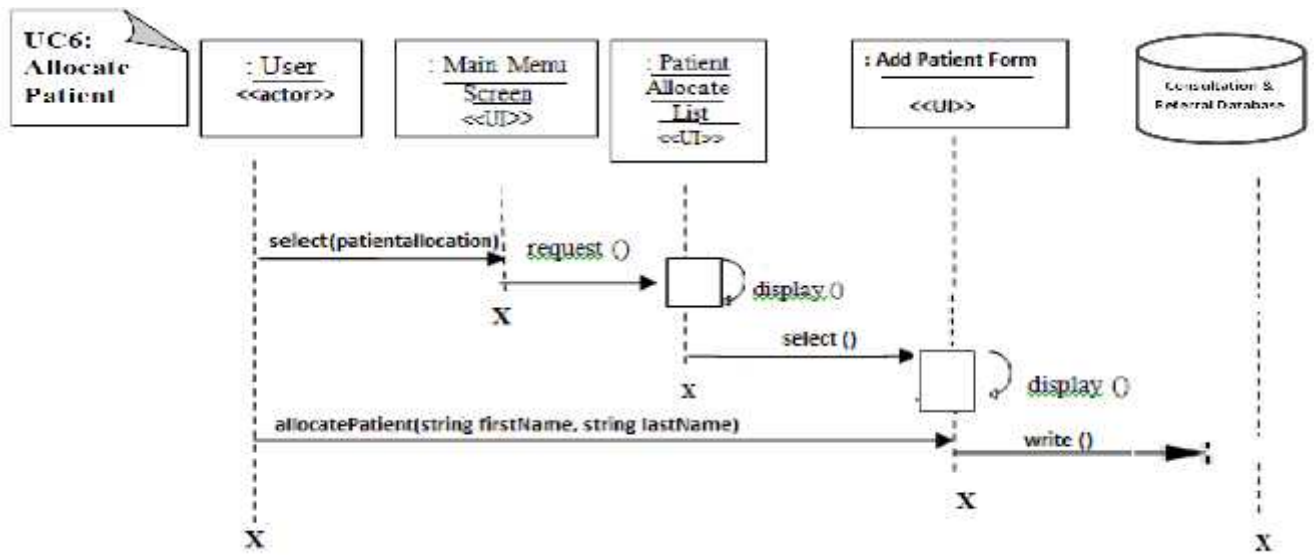


Figure 5.10: Allocate Patient System Sequence Diagram

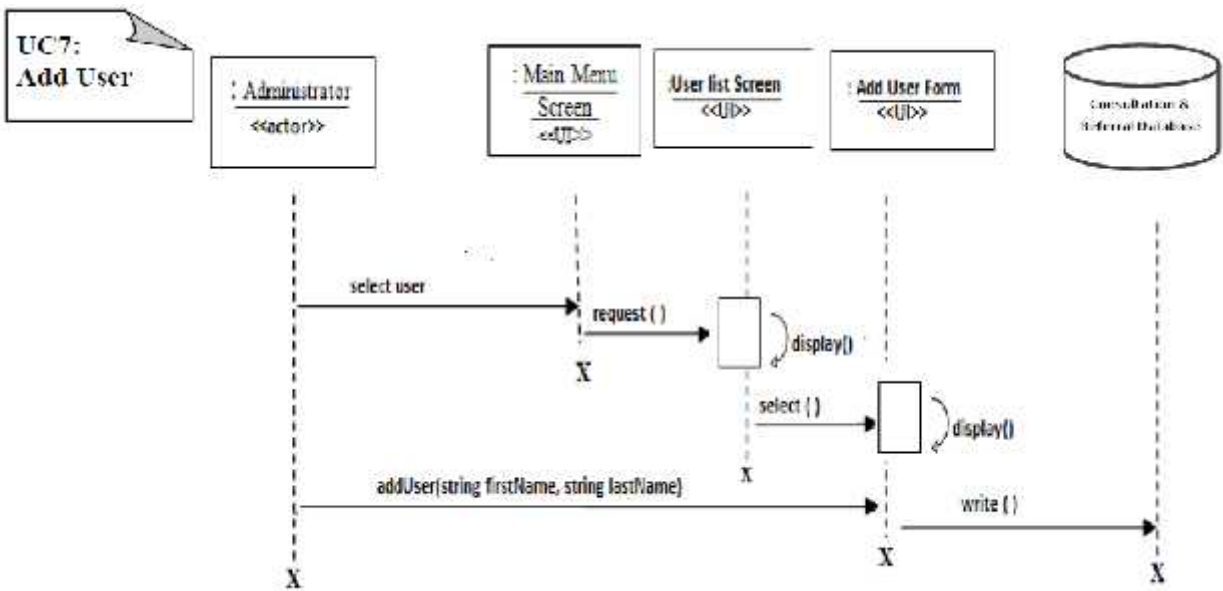


Figure 5.11: Add User System Sequence Diagram

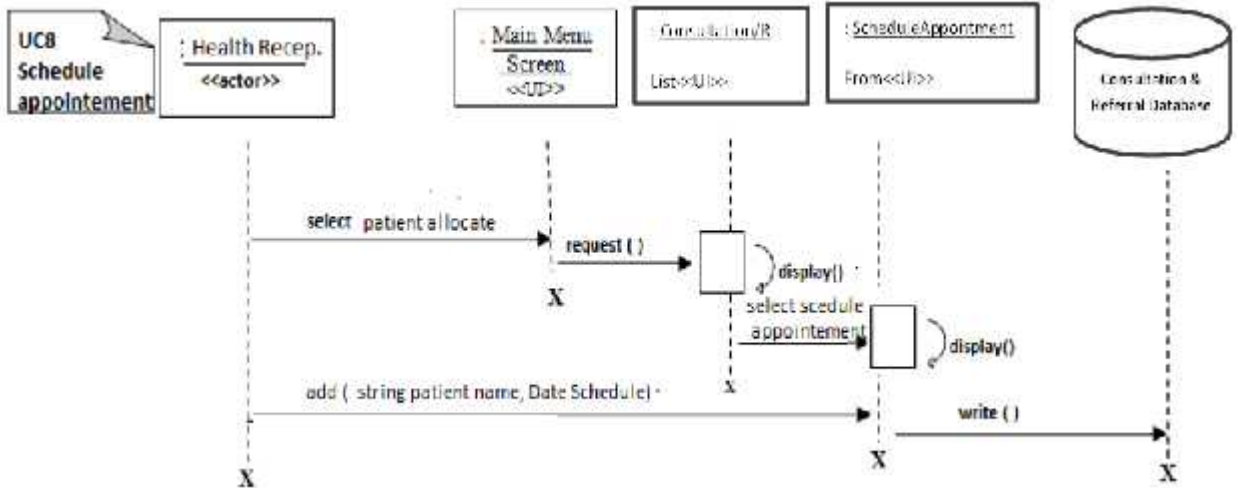


Figure 5.12: Schedule Appointment System Sequence Diagram

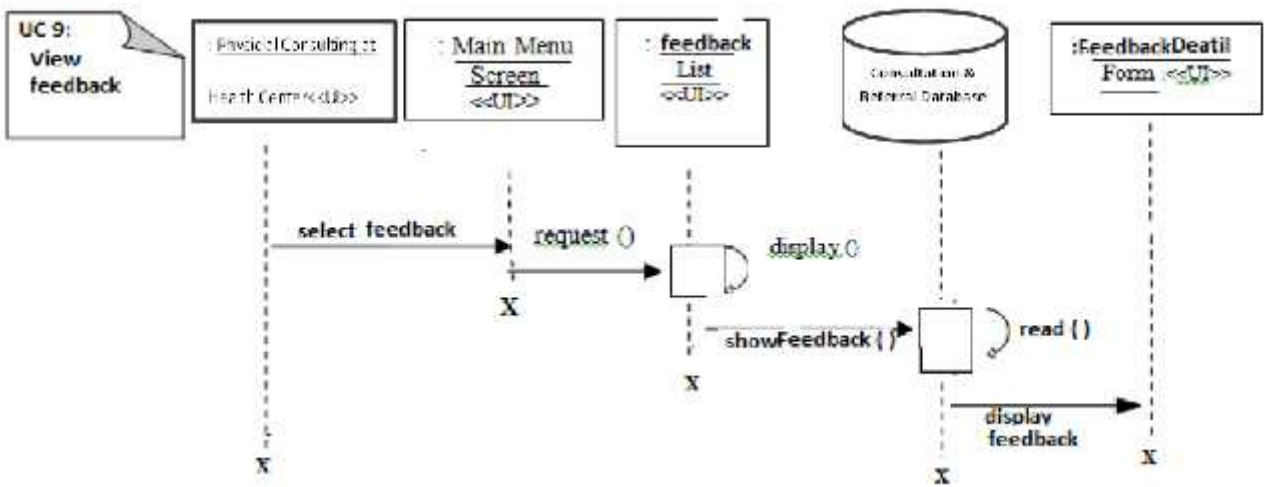


Figure 5.13: View feedback System Sequence Diagram

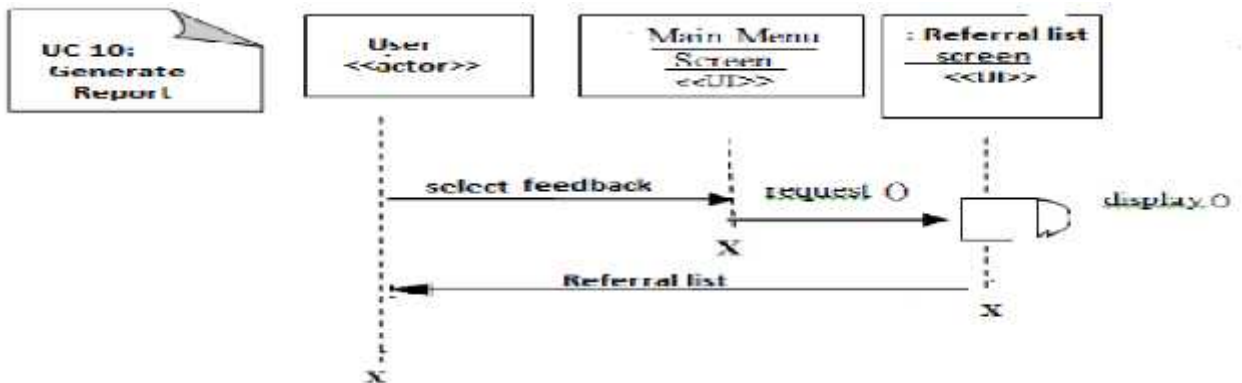


Figure 5.14: generate report System Sequence Diagram

5.12 Web-based Architecture for W C&RIMS

Applications in Web-based system are usually broken into logical chunk called "tiers", where every tier is assigned a role. Traditional applications consist of only 1 tier, which resides on the client machine, but web applications lend themselves to n-tiered approach by nature. Though many variations are possible, the most common structure is the three tiered application. In its most common form, the three tiers are called presentation, application and storage. In this study 3 tier architecture is applied for designing WC&RIMS. A web browser is the first tier (presentation), an engine using some dynamic web content technology (such as ASP (Active Server Page), CGI (Common Gateway Interface), COLD FUSION, PHP (Hypertext Preprocessor), Python and JSP/Java) is the middle tier (application logic), and a database is the third tier (storage). The web browser sends requests to the middle tier, which services them by making queries and updates against the database and generates a user interface. Fig.5.15 below shows a 3 tier application with application server that supports and runs JSP, JSF (Java Server Faces) files, with server engines and Enterprise Java Beans (EJBs), where the application server is connected to a database at the back end.

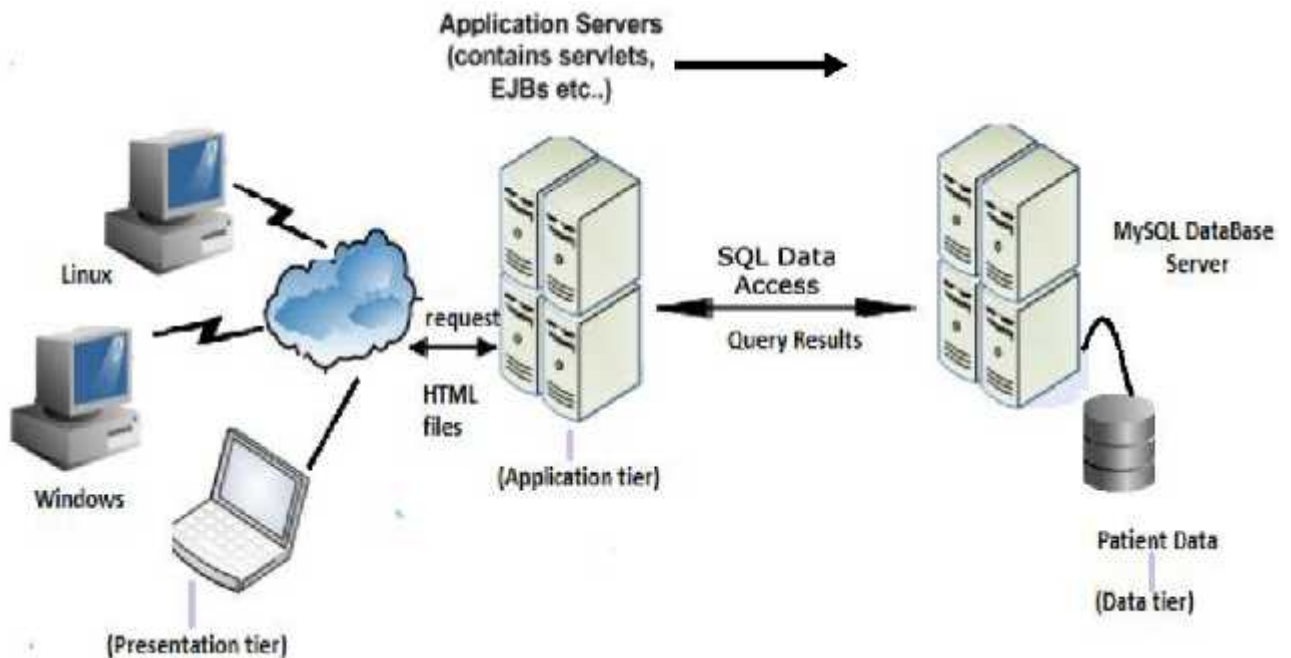


Figure 5.15 Three tier architecture for Web-based System Presentation tier

Presentation tier: provides user interface on clients 'browser and used to translate tasks and results to something the user can understand.

Application tier: sometimes called logic tier that coordinates the application, process commands, make logical decisions and evaluations, and performs calculations. It also moves and process data between the two surrounding tiers.

Data (storage) tier: store and retrieve information from database system. The information is then passed back to the application tier for processing and then eventually back to the user

5.13 User-Interface Flow Diagrams

UI flow diagrams are a diagram that describes major UI elements and how users transition between them in developed system. It also used to explore the high-level usability of a system and document the user interface of a WC&RIMS. It offers a high-level view of the interface of the system, software with which a user directly interacts. The consultation and referral user can quickly gain an understanding of how the system is expected to work using UI flow diagramming and puts the user in a position where the user can validate the overall flow of the application's user interface (Scott W.Ambler. 2004).

This study employed UI flow diagrams which contain important forms and screens depicted in fig. 5. 5 that let consultation/ referral/ users to navigate through the UI designed.

Firstly, model the interactions that users have with the software, as defined in a single use case.

Secondly, enable users to gain a high-level overview of the UI for WC&RIMS. This overview is effectively the combination of all the behavioral views derived from use cases.

5.14 Usability

An important issue to be considered in developing an essential UI for Web-based system is usability. As a result this study considers all usability issues to make it user-centric and applicable to the real system. In designing WC&RIMS. The study uses an easy and structured navigation, instructions to use the system and well-organized contents. For instance the designed system is accessible by any one in consultation/referral/ unit of service without detailed experience of users. There are five factors affecting the usability of software and also taking into consideration in developing WC&RIMS are access, efficacy, progression, support, context.

Figure 5.16 below shows overview architectural approach for system UI, the approach that enables to understand the complete UI flow diagramming for WC&RIMS.

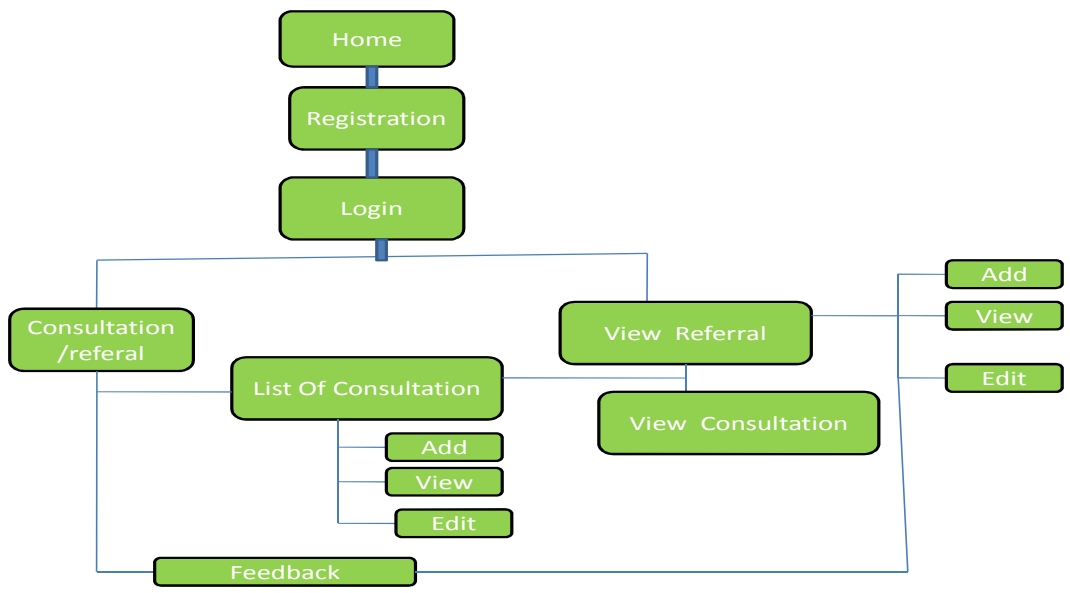


Figure 5.16 User Interface flow diagrams for WC&RIMS

5.15 User Interface Designing/Prototyping/

The UI is the portion of software with which a user of consultation/referral/ system directly interacts. It models UI requirements; requirements evolved through analysis and design to result in the final UI for the system. It introduces technology to prototyping efforts that is most likely made a design decision about the implementation technology. The following parts shows UI prototype in developing W C&RIMS. Tools used to design prototype Macromedia, dream waver, Xamp, Php, Html, JavaScript Visio and Photoshop.

Home

The first page displayed when the user need to access consultation and referral Information system. It provides a link to login page.



Welcome To Tikur Anbessa Consultation And Referring Portal



Sign Up

It's free, and always will be

First Name	Song
Last Name	awata
Username	songawata
Password	*****
Repeat Password	*****
Address	
Contact Number	44
Email	songawata@mail.com
Gender	Female
Birth Day	04/10/2014
Select Department	Cardiac (CV) (1)
Profession	General Practitioner
<input type="button" value="Sign Up"/>	



Figure 5.19 log in page

Welcome to consultation portal

[Adult Emergency](#)
[Cardiac Center](#)
[Diabetic Center](#)
[Dermology](#)
[Ent](#)
[Gynaecology](#)
[Internal Medicine](#)
[Neurology](#)
[Obstetric Gynaecology](#)
[Oncology](#)
[Otolaryngology](#)
[Pediatric Emergency](#)

User Name:
Password:
Confirm Password:
Request:

Figure 5.20 request writing page

Please Type Your Recommendation

Enter Request Title

Enter Your Department

Enter Receptant Departement

Send Request

5.16 Evaluation of user Inter face Prototype

Usability is the extent to which users can use a computer system to achieve specified Goals effectively and efficiently while promoting feelings of satisfaction in a given context of use. Usability evaluation (UE) consists of methodologies for measuring the usability aspects of a system's user interface (UI) and identifying specific problems. (Alan 2006).Heuristic evaluation is a usability inspection method that asks usability practitioners and other stakeholders to evaluate a user interface based on a set of principles or commonsense rules. This method was originally conceived as a discount usability method that could be used to find problems early using wireframes, prototypes, and working products. A side benefit of the method is that evaluators learn about the principles that support good usability (Chauncey, 2014).

During evaluating the interface of a system the users should be representative of the typical user of that application and the number should be of optimal size for the anticipated evaluation results. The tasks should represent a whole user task and will allow assessment of the interface for consistency between user's conceptual models of the tasks. The usability tests should be performed on real products or working prototypes (Chauncey, 2014).

For sample selection the study used simple random sampling techniques. Healthcare provider in TAH selected randomly because tasks in consultation and referral in health care institution are the same procedure and selected samples were representative in all consultation and referral system. This staff performed the system testing in accordance with the test plan and test implementation guide and user acceptance testing.

Evaluation Result

The newly designed system in comparison to the previously existing paper based manual system can be made interoperable to minimize the various time and resource consuming business process that are found in health care institutions. The registration of the different diagnosis and treatments are made easily accessible and standardized in the newly developed system. And health care provider test the system report that it is good if it is implemented it can solve the current problem patient wait many times for communicate with health care provider .and also report that save time and money t the patient and decrease repetition of patient history and medication problem.

CHAPTER SIX: SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Summaries

This project contains the introduction highlights a backdrop of the project work. It provides a background on health care referral and consultation system. It then highlights the statement of the problem for this project. It also shows the research questions, general and specific objectives followed by the scope and significance of the project. Provides general conceptions and related research works on referral and consultation system. It also highlights the health care system, health information system, health care service quality, patient flow, factors affecting referrals and consultation system. The methods employed for this project work that comprises the qualitative quantitative and object oriented methodology. All of the variables that were generated from the raw data are summarized. It also presents the quantitative analysis and interpretation of results complemented by qualitative results that specifically address the research objectives. Summary of main findings in this study we found that delay in communication, coordination of way of communication, problem with tools of communication, late response of specialist, poor feedback mechanism and too long waiting time was observed .to hamper the smooth functioning of the consultation and referral system.

Document analysis and interview in addition to the data gathering techniques employed above and the analysis carried out together with document analysis including forms such as consultation and referral slip, register book forms, protocols, standards, way of communication, patient allocation guides identified catchment areas and other referring institution are identified. requirements analysis of the existing system, use cases, use case description for essential use case modeling, object-oriented analysis, conceptual modeling, conceptual class association, data modeling, user-interface flow diagrams, usability, sequence diagram user interface designing/prototyping diagrams' are used for design prototype soft ware.

6.2 Conclusion

Patients referred to TAH hospital from lower level health facilities both from other regions and from Addis Abba are suffering from delay in care and associated costs. Delay in care puts patients who were already sick for a longer time at risk of complications and death because of delay. Furthermore, the lack of feedback to referring facility will sustain the patient load and delay in care at TAH as referring facilities do not learn from the referral process. The referral system at TAH is lacking a system that can help the smooth running of the referral system. To fill the gap humanizing the current consultation and referral system through using designed WC&RIMS and to solve the problem identified during analysis the project. The designed project can reduce problem that occur during consultation and referral process by coordinating way of communications occur in the hospital and help for patient to get feedback properly at the end of care at the nearest health facility.

Health care provider can reduce patient waiting time by using the designed system prior referral of patient can communicate or consult each other and treat patient at the referring health facility. The specialist can follow the patient health by using the designed W C&RIMS prior to consultation.

WC&RIMS Macromedia dream waver, Xampp, Php, Html, JavaScript, Visio and Photoshop soft ware's are used were used to design the software. Proto types were demonstrated and evaluated by health care provider .W C&RIMS helps the researcher to rely on users' requirement to develop the new system, which directly contributes to achieve usability.

6.3 Recommendations:

Based on the findings of the project, the following recommendations were made to TAH, all concerned stakeholders of health care service on consultation and referral system and Addis Ababa University

1. Referral system must improve its way of communication by giving training to referring and accepting facility to have common understanding about referral system to decrease challenge with referral like delay in communications, hospital over loading, and more waiting time in hospital.
2. Strengthen and coordinate referral communication and consultation system by adopting web based Central system over all the country.
3. Improve timely response to consulting requests between departments.
4. Hospitals should coordinate the consultation and referral communication process and also facilitate in patient consultation to reduce late response of specialist.
5. Feedback must be sent back to the referring facility.
6. Where seniors involve in the referral system by communicating or consulting before patient referral to retain patient from referring health institutions and to solve patient case, time and money.
7. To expand and implement of designed WC&RIMS all hospital, FMOH, Addis Ababa University must support with necessary expenditure.
8. Further research on consultation and referral system and their challenge on patient

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ANNEX: RESPONDENT'S BACKGROUND

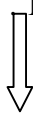
Introduction and Consent

Hello, Good morning/afternoon? My name is _____. I am working temporarily as a data collector for the study of an investigation of referral and consultation system in TAH which will help in facilitating a smooth referral system. The objective of this interview is to describe current referral and consultation process and to develop conceptual frame work for TAH. No personal identifiers will be attached/ recorded to the questionnaire. All the data obtained will be kept strictly confidential by using only code numbers and will be stored in locked file cabinet to be accessed only by the principal investigator. Your participation in the study is upon purely voluntary basis. What we learn from this study will be used to generate necessary information for the planning to improve referral and consultation process in TAH. Your honest and genuine participation in responding to the questions prepared is very important and highly appreciated. If you agree to participate in this study I will conduct an interview with you at a time and location of your choice. The interview will involve questions about the title mentioned above. It would last about half an hour. With your permission, I will take notes during the interview. If you don't wish to continue, you can stop the interview at any time. Would you be willing to participate? If yes, proceed. If no, thank and stop here

Name and signature of interviewer certifying that respondent has given informed consent

Name _____ Signature _____

Respondent agrees to be interviewed. 1 respondent does not agree to be interviewed . . . 2 end



The Study participant's

Signature _____

Date _____

Contact address: Destaljo Mob. 0934446564

Annex II:Health professionals' socio-demography information sheet for health workers participating in the in-depth interview at TikurAnbessa Hospital.

1:- Socio-demographic and practice information of health care profession with referral and consultation process for facility heads and managers.

Date of interview	of department	Profession	sex	Work experience	Current position
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1. How is the referral system functioning?
2. Can we talk about your role in the referral system?
3. What are the challenges you have faced in the referral system?
4. Can you tell me a success story related to referrals?
5. Can you tell me a story which you do not forget and that makes you sad/uncomfortable/about the outcomes related to referrals?
6. What are the items that you recommend to be changed in referral system?
7. If you asked to design the referral /health information/system how you do it?
8. What if professionals from accepting health facility go down to the referring facility and Retain patient there?
9. How is the consultation system functioning?
10. What are the challenges you have faced in the consultation system?
11. Can you tell me a success story related to consultation?
12. Can you tell me worries/bad/ story related to consultation?
13. What are the items that you recommend to be changed in consultation system?

Thank you for your time and cooperation!!

Annex 2 Adopted Questioners of observation check list for document analysis

If the question of response yes circle =1, if no circle =2

no	Question of Standard	Response	code	Other comment
		yes	1	
		no	2	
d1	Central triage	1	2	
d2	Emergency triage	1	2	
d3	There are personnel trained on triage process working both in emergency and central triage	1	2	
d4	Outpatient system in place			
d5	Referral format	1	2	
d6	consultation format	1	2	
d7	liaison and referral officer has been assigned			
d8	Feedback to initiating facility on appropriateness of referral	1	2	
d9	The mechanisms used for making and tracking referrals	1	2	
d10	Referral& consultation registers to monitor and gather statistics	1	2	
d11	referral management center or other major triage systems	1	2	
d12	payment systems	1	2	
d13	return of inappropriate referrals	1	2	
d14	The existence and application of written protocols and guidelines of referral patient to and from hospital	1	2	
d15	There is referral directory listing which facility that hospital can receive from and refer patient to	1	2	
d16	Utilization of health information technology in patient referral and consultation?	1	2	
d17	The hospital has liaison and referral service that			
	Manage bed occupancy	1	2	
	Facilitate emergency and elective admission	1	2	
	Receives referral and send referral in the referral network	1	2	

Annex 3:Socio Demographic Characteristics of the Study Subject for patient

no	Questions	Responses	Code	skip
1	record time	Morning	1	
		Evening	2	
2	Sex	male	1	
		female	2	
3	Age in year			
4	Educational status	Illiterate	1	
		Primary(1-8)	2	
		Secondary (9-12)	3	
		Diploma	4	
		Degree &above	5	
5	Marital status	Single/never married /	1	
		married	2	
		Divorced	3	
		Widowed	4	
6	Are you in employment	yes	1	7
		no	2	
7	Types of employment	government	1	
		Non-government	2	
		Self-business	3	
		farmer	4	
		other	5	
9	language of respondent	Afan Oromo	1	
		Amharic	2	
		Tigrigna	3	
		Other	4	
10	translator used	yes	1	
		no	2	

2. Structured interview question related to referral and consultations process for patient. If the question of response yes circle =1, if no circle =2, if not sure=3

NO	Questions	response	Code	skip
			1=yes 2=no 3=not sure	
p1	Referred from health facility	Referred	1 2 3	

	or self	self	1	2	3	
p2	Reason for referral	For better treatment and diagnosis(1)	1	2	3	
		Self-interest(2)	1	2	3	
		Family hospital staff(3)	1	2	3	
		Catchment area(4)	1	2	3	
		Referrer health facility has not well utilized(5)	1	2	3	
p3	What are barriers you face to attend treatment during referral process?	Cost of service	1	2	3	
		Transportation distance	1	2	3	
		Poly pharmacy time	1	2	3	
P4	What problems you face with referral paper?	Referral paper lost	1	2	3	
		Inappropriate referral	1	2	3	
		Miss place	1	2	3	
		Miss information	1	2	3	
P5	How you explain referral acceptance of the hospital?	Well-coordinated	1	2	3	
		Not Well coordinated	1	2	3	
		Too long waiting time	1	2	3	
		Difficult to obtain information	1	2	3	
P6	Do you think current referral way of communication has effect on your care		1	2	3	P10
P7	What kind of effect you face?	Communication too late	1	2	3	
		un coordinated care	1	2	3	
		Waste time and money	1	2	3	
		Poor healthcare decision	1	2	3	
		Poor quality of care	1	2	3	
P8	Do you think current consultation way of communication has effect on your care		1	2	3	P12
P9	If yes for question no 1p11 what kind of effect you face?	Communication too late	1	2	3	
		Not coordinated	1	2	3	
		Waste time and money	1	2	3	
		Poor diction	1	2	3	
		Poor care	1	2	3	
P10	Do you need feedback to your nearest health facility at the end of care		1	2	3	P14
P11	Which tools you prefer	Mail	1	2	3	
		phone	1	2	3	
		paper	1	2	3	
		fax	1	2	3	
P12	Do you have worries about the consultation processes?		1	2	3	P16
P13	you worries due to	cost	1	2	3	

	distance	1	2	3	
	Poor communications				
	waiting time	1	2	3	
	Late response of specialist	1	2	3	
p14	which way of consultation	paper	1	2	3
	communication you prefer	mail	1	2	3
	to empower your self	phone	1	2	3
		fax	1	2	3
P15	Distance from u come in kms				
P16	Days to arrive the hospital				
P17	How much money will you have spent to come here and return to your home on in ETB?				
P18	How much time did you spend waiting before being seen by the health worker?				

Evaluation of Functionality and Interface Questionnaire questionnaires of system designed

1. What makes the new developed system performance different from the previous system?
2. What has to be done to solve the problems in using the new designed system?
3. It was clear to access the different options menus
4. Overall, the system provided adequate functions for registration and data retrieval
5. Overall, the interface was pleasing and easy to use

Thank you for your time and cooperation!