INFORMATION MANAGEMENT WITHIN THE NURSING DEPARTMENT AT HAMAD MEDICAL CORPORATION (HMC), QATAR

by

Wasmiya Dalhem M.D Al -Kuwari

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Abstract

Hamad Medical Corporation, the main healthcare provider in the state of Qatar, sponsored this study to investigate the use of electronic records management as the basis for a novel information management system in its Nursing Department. To assess the viability of an electronic records management system a questionnaire survey of a representative sample of the staff and interviews with key post holders were under taken. Results obtained indicated a wide spread dissatisfaction with the existing manual system. However, introduction of any computer-based technology requires great care. To assist with identifying any issues with this technological change, Soft System Methodology (SSM) was employed to discern what changes could be made to improve the current problematic situation found in the Nursing Department. In fact the change archetypes uncovered (procedural, attitudinal, structural and cultural) formed an innovative input into obtaining a roadmap for development of the electronic staff records system. This roadmap was facilitated by the use of Nominal Group Technique (NGT) and Interpretive Structural Modelling (ISM): In fact the roadmap was an ISM intent structure. The roadmap suggested that change could be affected by having written policy documents and the top goal to be achieved reflected an improvement in manpower placing and budgetary forecasts.

The use of a multi-methods approach meant that as well as this study's main objectives being reached, the process encompassed some methodological innovations. This study is the first to use the output of SSM to facilitate the NGT and ISM interactions. Equally, it is the first study of its sort to be applied to the Nursing Department at HMC, Qatar, which is an example of a cross-cultural eastern philosophical tradition. The methods used here revealed some significant findings, and have helped in the development of an electronic records management system for use at HMC, Qatar.

Keywords: Nursing Department, Hamad Medical Corporation (HMC),Qatar, Personnel/Staff Records System, Soft System Methodology (SSM), Interpretive Structural Modelling (ISM), Nominal Group Technique (NGT) and Multi Methods Approach.

Dedication

To the loving memory of my father Dalhem M Dalhem Al-Kuwari

and

To the ones I love so deeply,

My mother Haya

My sister Bahiya

My brothers, Ateeq, Sultan, Mujali and Abdullah

Acknowledgment

In the name of Allah, the Most Gracious, Most Merciful.

Praise is to Allah who has given me the spirit, strength and enthusiasm to be able to complete this research.

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My sincere gratitude to my close friends in Qatar, Heila, Aisha and from Oman Khalsa, for their love, care and prayers. In addition, I can not forget my teacher, who taught me how to a use computer. I would also like to extend my thanks to all friends and people who supported me in this research formally and informally.

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Finally, my warmest appreciation to my beloved family, my mother, who's love, care and prayers made me strong, my only sister and my brothers who gave me invaluable care, support and encouragements, which made this dream come true. My eternal love, for their support and constant encouragements, my sisters-in law, my nieces especially Mona, Amna and my nephews. May Allah bless them all. Amin

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GLOSSARY OF THE ACRONYM

A / E	Accident and Emergency
A/AND	Acting Assistant Director of Nursing
A/HN	Assistant Head Nurse
ADN	Assistant Director of Nursing.
CM	Conceptual Model
CSH	Critical Systems Heuristics
DON	Director of Nursing.
ENT	Ear, Nose & Throat
ESR	Electronic Staff Records
ETHIC	Effective Technical and Human Implementation of Computer-based Systems
GCC	Gulf Countries Council
HGH	Hamad General Hospital.
HIS	Health Information System
HL7	Health Level 7
HMC	Hamad Medical Corporation
HN	Head Nurse.
HRMS	Human Resource Management System
I.D Card	Identification Donor Card
ICD	International Classification of Diseases
ICN	International Council of Nursing
ICT	Information Communication Technology
IM	Information Management
IMS	Information Management System
IP	Interactive Planning
ISAC	Information Systems Work and Analysis of Changes
ISM	Interpretive Structural Modelling
IT	Information Technology
IVF	An Assisted Conception Unit
JISC	Joint Information System Committee

JSD	Jackson Systems Development Approach
MA	Multiview Approach
MIS	Management Information System
MRI	Magnetic Resonance Image.
NARA	National Archives and Records Administration
ND	Nursing Department
NGT	Nominal Group Technique
NHS	National Health Services
NI	Nursing Informatics
NIS	Nursing Information System
NM	Nuclear Medicine
PC	Personnel Computer
RD	Root Definition
RH	Rumaillah Hospital.
RM	Records Management
RMS	Records Management Society
RP	Rich Picture
S/N 4	Staff Nurse Grade 4.
SAST	Strategic Assumption Surfacing and Testing Methods
SC	Staffing Co-ordinator
SD	System Dynamic
SNOMED	The Systematised Nomenclature of Human and Veterinary Medicine
SPSS	Statistical Package for Social Science.
Sr. ADN	Senior Assistant Director of Nursing.
SSADM	Structured Systems Analysis and Design Methodology
SSM	Soft System Methodology.
STRADIS	Gane and Sarson Structure Approach
TB	Tuberculosis
TSI	Total System Intervention
VSD	Viable System Diagnosis
WH	Women's Hospital.
WHO	World Health Organisation

Introduction

1.1 Background of Study

Information is very important to the life of any organisation and the rapid development of information technology in the field of healthcare has become a vital element for assuring and improving the quality of such care. It can, at the same time, help in reducing the cost of healthcare provision. It is often said that we are entering 'the information age' or that society is undergoing an "information revolution" (Mordue 1998, p.29).

Hamad Medical Corporation (HMC), the main governmental healthcare organisation in the State of Qatar, has decided to maximise the utilization of information technology to improve patient care. Currently, the Department of Nursing at Hamad Medical Corporation does not have a computerised Personnel Management System. This makes data capture and processing in a meaningful way, especially for the support of management decisions, extremely difficult. This in turn affects the operational efficiency of the department.

This study is based on the premise that it is difficult to access complete information about the nursing staff employed in the Department of Nursing. The usage of information systems for Nursing Services is multiple. Nursing personnel staff can easily store and quickly manage the data files that include appropriate information about nursing personnel. This information is related to their demographic data, their education, their history in the hospital, and all the valuable information that comprises their work profiles (Stamouli & Mantas 2001). This study, therefore, is aimed at helping the existing management of the personnel in the Department of Nursing.

At the time of this study, the computerisation effort at HMC was in its initial phase with the nursing modules being in the last phase of the programme. The

project started in October 2000 and was expected to take a minimum of five years to complete. It is hoped that this study will enable the researcher to apply nursing informatics to assist in personnel management in the Department of Nursing.

1.2 Hypotheses and Research Questions

This thesis will critically investigate the hypotheses that:

H1 Transferring all staff records of the Nursing Department at Hamad Medical Corporation (HMC) from a manual based system to an electronic based system will provide benefits in the form of:

- Greater understanding of the issues involved in change management practice;
- Improvement in all aspects of management Nursing staff records.

H2 Developing a system based conceptual model will provide benefits in the form of:

- Creating a rational 'road-map' to guide the introduction of an Information Technology (IT) based Nursing staff records system;
- Provide a set of elements which have a transitive relation "would help to achieve" that assists in knowledge mapping.

These hypotheses will be tested through the following research questions:

1. How can the use of an IT based staff records system assist Nursing management?
2. Will resource allocation be simpler to control after an IT electronic based records system is introduced?
3. Will the nursing staff information be accurate, easy to access, well maintained and adequately and appropriately stored by introducing an IT based records system?

1.2.2 The Objectives

The research programme which has formed the basis of this thesis was developed around the following objectives:-

1. To explore and critique the current trends in records management (RM).

2. To critically examine current theory and practice in staff and personnel records systems.

3. Using the outputs, from objective 1 and objective 2 to critically analyse current staff records system in the Nursing Department at HMC in terms of :

   - Staff attitudes towards the current/ existing staff records system at Nursing Department at HMC.
   - Identification of barriers to the computerisation of the records system within the Nursing Department at HMC.
   - Staff attitudes towards computerisation at HMC.

4. To propose a conceptual model from which a roadmap for development of the computerisation of the nursing staff records at the HMC in Qatar could be prepared.

1.3. Justification of the Study

There are many reasons why this study is considered significant. Firstly, there was no system for keeping records electronically for nursing staff employed in the Nursing Department, neither was there easy access to the vital information on staff members. Pertinent information on the staffing status of each unit was also not readily available. This study was intended to shed light on the best way to facilitate the provision of a systemised and computerised record keeping and processing procedure.

This study is also the first to be carried out on information management within Nursing Department at HMC and in the healthcare sector in the Gulf Co-operation Council (GCC) states. It will therefore have a social and economic impact on the population of the states that comprise the GCC. Again, this study addressed the problem faced in getting relevant information about the staff in the Nursing Department. Prior to this study, very little effort was put into addressing this problem.

This study suggested that solving the problem would increase the effectiveness of the Nursing Department and enhance its daily operations. As the Senior Assistant Director of Nursing in Qatar in charge of implementing and utilizing IT, this study fell within the area of responsibility and concern of the researcher. In addition, studying in the UK gave the researcher the opportunity to examine this issue and receive quality input from advanced UK healthcare organisations.

1.4 Organisation of the Thesis

The thesis is made up of eight chapters. Chapter One provides a general introduction to the study and highlights the research hypotheses, research questions and objectives, and the justification of the study.

In Chapter Two, a general background of the study is given. This chapter also provides an overview of the State of Qatar, healthcare in the State, the Nursing Department, and the existing staff records system in the Nursing Department.

In Chapter Three, a critical review of the relevant literature on the subject is presented. This chapter is divided into four sections. The first section provides definitions of RM, RM policy, benefits of the RM, the life cycle of records, application of RM, and the barriers to better RM. This chapter also provides definition of nursing informatics and the application of nursing informatics to nursing management were presented. The second section examines a definition of records, the contents of personnel records, the importance of these records, access

to the personnel records and the benefits of electronic staff records. The third section discusses the role of IT barriers and benefits. The fourth section provides an examination of staff attitudes to computerisation.

Chapter Four discusses the research philosophy and research design, the methods used in this study; questionnaire and interview design considerations. Soft Systems Methodology (SSM) was presented and its seven stages, also discussed the suitability and adoption of the Soft Systems Methodology and Interpretive Structural Modelling (ISM) to this study.

In Chapter Five, descriptive and analytical results of the data collected are presented and briefly discussed. Tables and figures of chosen variables in the questionnaire are presented. An analysis of the interviews is also presented.

Chapter Six discusses systems intervention in terms of the application of Soft Systems Methodology to the problem situation analysed by the data collected from the questionnaires and the interviews. The final section, discussed the application and the use of Interpretive Structural Modelling (ISM) to the study and the understanding of the elements that the model consists of and their order.

Chapter Seven discussed the main findings of the study related to strategy/policy element; human element; technology element; information management element and training element. The research contribution to the study was also discussed.

Finally, the main conclusions of the study based on the hypotheses; research questions and the objectives of the study; recommendations for change and further research were presented in Chapter Eight. Figure 1.1 below illustrates graphically the Research Structure.

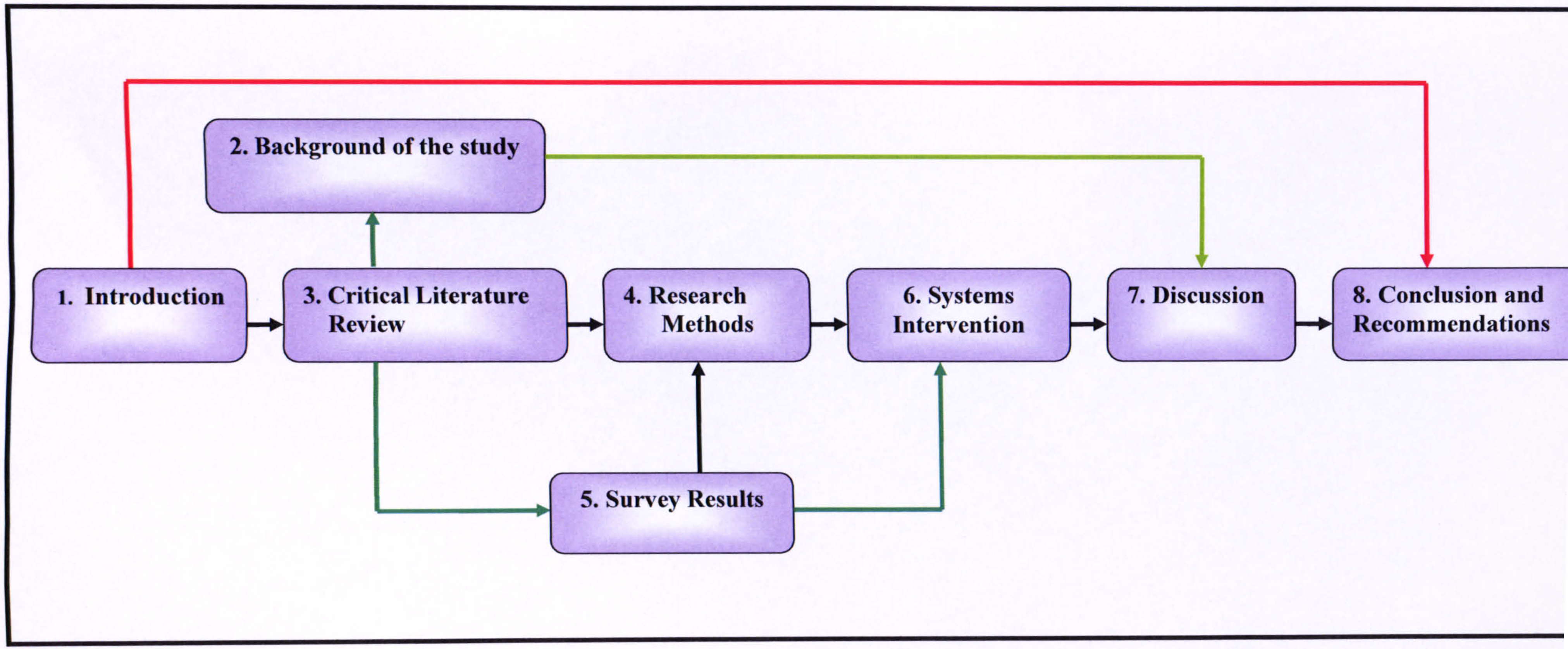


Figure 1.1.Research Structure

Context of Study

2.1 Introduction

This chapter aims to present a general overview of the study. Issues considered include information about the state of Qatar, healthcare in the state of Qatar, Nursing Department, and an overview of the existing system.

2.2. The State of QATAR

Qatar is an Arab state and lies half-way along the western cost of the Arabian Gulf. It is a Peninsula extending northward into the Gulf covering an area of 11,437 sq. Km., with total population estimated to be around 616.151 thousand in 2002. Qatar contains number of islands in its regional waters see Figure 2.1.

Qatar is bordered by the Kingdom of Saudi Arabia to the south, the United Arab Emirates to the southeast and the Kingdom of Bahrain to the west. The state of Qatar is administratively divided into nine municipalities. These are Doha, AL Rayyan, AL Wakrah, Um Salal, AL Khor, AL Shamal, AL Ghuwariyah, AL Gummayalah, Jerian AL Batnan and Um Said.

Doha is the capital as well as the commercial centre of the country. It is located midway along Qatar's eastern coast and has a modern airport and an important commercial port. Government Departments, Financial and Commercial Establishments are all situated in Doha. Um Said as the second important city is located in the eastern coast and is about 36 km south of Doha. It is a modern industrial city and has two main ports; one is commercial and the other is for oil exportation.

Qatar is characterised by a flat landscape except for some small hills and high ground to the northwest. There are no high areas in Qatar except few scattered

sandstone and limestone hills. The highest are those of the Dukhan (about 35m). The areas of vegetation are in the north, while the south is arid, covered by sand and salt flats.

Qatar is characterised by a hot summer starting from June till August or middle of September. Winter is warm, with little rainfall. It starts in December runs till the end of February. The weather is generally pleasant during March, April, May, October and November (Ministry of Foreign Affairs http://www.mofa.gov.qa and Ministry of Communication and Transport http://maxpages.com/arabianknight /qatar). The Australia-Arab Chamber of Commerce and Industry describes Qatar as *"The best kept secret of the Gulf"* www.austarab.com.au/Qatar/index.html.

The following are additional statistical data about the state of Qatar:

Local Name: al-Dawlat Qatar.
Religious Breakdown: Muslim- 95%. Other- 5%
Language: Arabic. English is commonly used as a second language.
Natural increase rate/1000 Population (17.8). Crude birth rate/1000 Population. (19.8). General fertility rate (15-49) years /1000 women in the same age group (102.0). Crude death rate/1000 Population. (2.0) .Infant mortality rate per 1000 live birth (8.7). Life Expectancy at birth: Male-74.4, Female-74.9 and Literacy: 86.4% (1997 est.) (Ministry of Public Health. Vital Statistics. Annual Report, August, 2002)
Independence: 3 September 1971 (from the United Kingdom)
Style of Government: Traditional Monarchy
Legislature: Unicameral-Majlis al-Shura (Advisory Council) 35 seats, appointed by Emir. Constitution calls for elections to this assembly every four years.
Executive: Chief of State-The Emir: H.H.Sheikh Hamad bin Khalifa al-Thani.
Heir Apparent, H.H Sheikh Tameem bin Hamad Al Thani.
Chief of Government-Prime Minister H.H Sheikh Abdullah bin Khalifa al-Thani.
Cabinet-Council of Ministers appointed by the Emir.

2.2.1 The Judicial System

The judicial system is based on Islamic law. Sharia courts are used for personal matters. The Emir has large discretionary rights by which he virtually controls the legal structure. There are a limited number of civil codes. There is a Court of Appeal, Labour Court, Lower Court, Lower and Higher Criminal Courts and Civil Courts. The death penalty is nominally in force.

2.3 Healthcare in the State of Qatar

The health services in Qatar have witnessed record modernisation and development in various aspects of cadres, establishments, curative as well as preventive medicine. The policy of the government is to provide the best health care for all the residents in the country based on primary care and a good referral system.

Health centres are geographically distributed all over the country and within the residential areas. This is aimed at facilitating and organising the patients' contacts and relation with the medical institutions, thereby enabling the institutions to provide quality and the best standard of reliable care. Most of the health service centres provide mainly medical services on an out-patient basis.

Medical services used to be provided on a free of charge basis for everyone until recently when some fees were introduced for medical services. However, minimal fees for non-Qatari patients are still cheaper in comparison to many other countries. A large segment of patients are seeking medical services from the public sector.

The Public Health Services sector is made up of three segments: Hamad Medical Corporation (HMC) hospitals which provide secondary and tertiary medical services, Primary Health Centres which provide primary medical services and Preventive Health Services provided by Ministry of Public Health (MOPH).

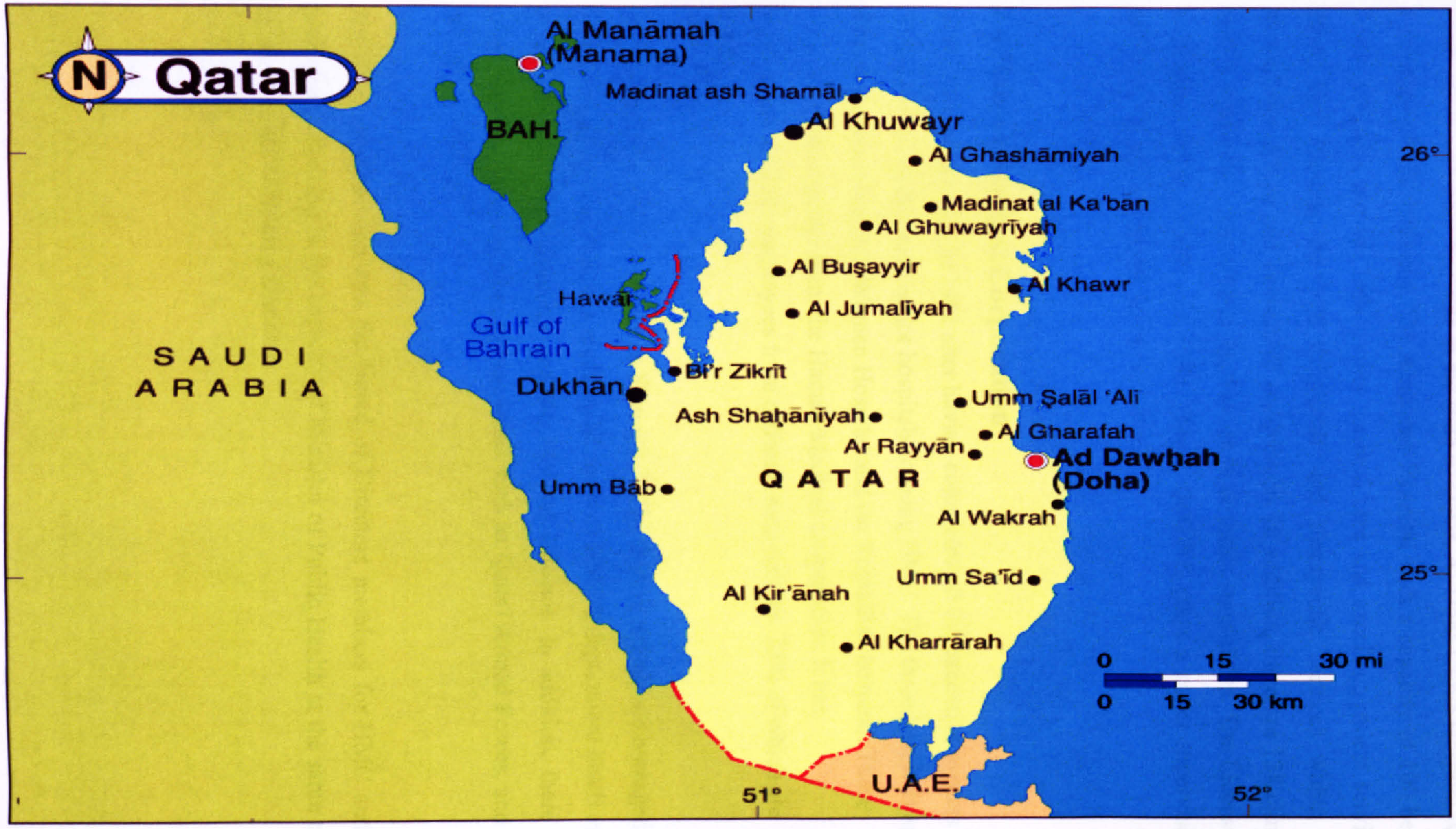


Figure 2.1 Map of the State of Qatar

There are two private hospitals in the state of Qatar, Al-Doha Clinic Hospital with a capacity of 120 beds and The American Hospital with a capacity of 100 beds. These hospitals provide high quality medical care and excellent patient service. Also, they provide the best diagnostic and therapeutic services within an atmosphere of care and concern of compassion. In addition, there are 128 clinics and 21 polyclinics that offer consultancies in different specialities. The Licensing Committee in the Ministry of Public Health (MOPH) plays a major supervisory role over the private health sector activities.

2.4 Hamad Medical Corporation

HMC was inaugurated in 1982 after having completed all the executive aspects for the merger of the three major hospitals forming HMC. The three hospitals are Hamad General Hospital, Women Hospital and the Rumaillah hospital. These three hospitals together form the Hamad Medical Corporation. It has approximately10642 employees from different nationalities, 23% of which are Qataris.

The structure of HMC is shown in Figure 2.2. The three hospitals are managed by a Board of Directors, which is made up of some of HMC's department heads such as the Administrative Director and the Medical Director. In addition, there are some representatives of other organisations such as Qatari Armed Forces, and the Ministry of Justice.

The Emir of Qatar appoints the Board of Directors members for HMC and its president is working in the capacity of Minister of Public Health at the same time he is the HMC Managing Director.

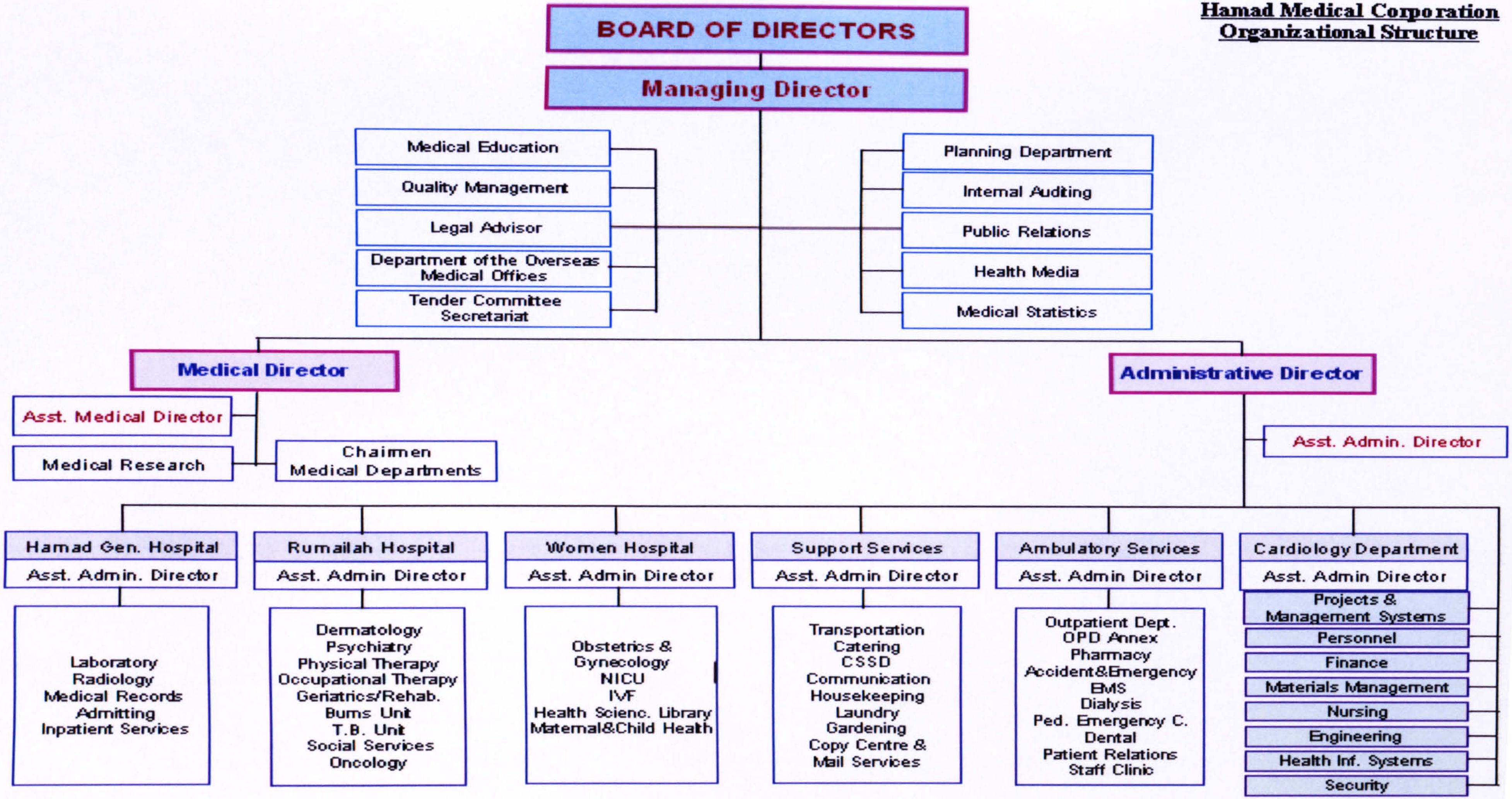


Figure 2.2 Hamad Medical Corporation Organisational Structure

The two main departmental heads (Administrative and Medical Directors) report to the Managing Director. Each hospital has its own staff who are in fact HMC staff, each hospital is run by an Assistant Hospital Director who reports to the Administrative Director and a Senior Assistant Director of Nursing who reports to Director of Nursing, while each head of Medical Department reports either to the Medical Director or to the Assistant Hospital Director according to the type of issue under consideration. All other administrative, Nursing, Engineering, Personnel, Finance, Security and many other medical departments are centralised in one location to serve all HMC patients, such as Accident and Emergency (A&E), Magnetic Resonance Image (MRI) and Nuclear Medicine (NM).

HMC has been structured to more than ten levels and it is supported by many committees and other departments that all report to the Managing Director. These include Quality Management, Tender Committee, Public Relations, Legal Advisor, Material Management and Internal Auditing. Recently in 2002, all 21 primary healthcare centres were brought together under the umbrella of Hamad Medical Corporation management with the aim to increase the efficiency of the staff and improve the service.

In Qatar, there are three government hospitals in accordance with international standards for secondary and tertiary care managed by one organization-Hamad Medical Organisation. During a relatively short period, HMC has flourished and gained an outstanding reputation for providing quality health care services for the community. The three hospitals coming under HMC offer specialised medical care in all the branches of medicine. With the various medical specialities available in the HMC, the number of patients sent abroad for specialised treatment has reduced.

As mentioned earlier, the three hospitals that formed HMC are Hamad General Hospital, Women's Hospital and Rumaillah Hospital. They have between them approximately 1357 beds for in-patient services and run more than 64 specialised clinics with a total number of 2417 nurses.

All these hospitals are well-equipped and staffed with specialised personnel from different nationalities. The Accident and Emergency section, Paediatric Urgent Care Centre, and Emergency in the Women's Hospital are open 24 hours to provide immediate care for injuries and emergency cases.

2.4.1 Hamad General Hospital

Hamad General Hospital (HGH) was opened in 1982. It has 621 beds and 1389 nurses. It offers surgical, medical and cardiology services with sub specialities, such as Dialysis and Lithotripsy units. It has eight operating theatres. The types of surgery performed include open heart, kidney transplant, total hip replacement, total knee replacement, and other minor and major surgeries. Bone marrow transplant is the latest to be introduced in the hospital.

2.4. 2 Women's Hospital

The Women's Hospital (WH) offers to all women in Qatar the opportunity to receive the best possible Obstetrics, Gynaecological and Neonatological care. It has 334 inpatient care beds and 556 nurses. In addition, it has an emergency room, labour and delivery suites and three operating theatres. In addition to women's health, the neonatal unit provides health care to newborn babies. An Assisted Conception Unit (IVF) for treatment of infertility was opened in 1993. The Special Care Baby Unit has been renamed the Neonatal Intensive Care Unit and has three areas: isolation, intermediate and intensive areas. It has 68 beds/incubators.

2.4. 3 Rumaillah Hospital

Rumaillah Hospital (RH) is Qatar's oldest health facility opened in 1957 as a 244-bed general hospital. With the opening of Hamad Hospital in 1982, Rumaillah Hospital was renovated into a rehabilitation centre for adults and children. The Children's Rehabilitation Unit cares for handicapped and developmentally disabled children. It has 361beds and 429 nurses.

Other services available at the hospital include:

- Physical Medicine (occupational therapy, physiotherapy and prosthetics /orothotics);
- Burns Unit;
- Pharmacy;
- Health Card registration;
- Dermatology Clinics;
- Dental Clinics;
- Geriatrics for both male and female elderly patients;
- Tuberculosis (TB)Unit;
- Plastic surgery Units;
- Ear, Nose & Throat (E.N.T) Units;
- Social Services;
- Mental Health Centre houses the Psychiatry Department, a 37-bed inpatient care facility and outpatient clinics which provides psychiatric diagnosis, hospital care and counselling.

2.4.4 New Projects

New health projects for MOPH are underway. This includes the provision of additional centres in different areas of the State and renovation of some other health centres through the introduction of new technology in some medical specialisations. New Projects for HMC are Medical Commission Building, Sara Haematology/Oncology Centre and the New North Hospital with capacity for 100 beds. All these projects were commissioned in October 2003. The New South Hospital with capacity of 100 beds will be commissioned in 2005. The computerisation of all HMC will be completed by the end of 2005. The Hamad Medical City will be handed over by early 2007. In the private sector, Al-Ahli Hospital will be opened in 2005.

2.4.5 Personnel Department

Mission Statement

In support of the Corporation's vision of integrated, quality patient care, the mission of the Personnel Department is to successfully attract to the Corporation the best qualified healthcare providers and support personnel available in the marketplace and to ensure an environment that provides an opportunity for personal growth and development. It offers competitive and equitable salaries and benefits, provides a safe and healthy workplace and guarantees fair and consistent treatment so that these individuals are retained by the Corporation for an acceptable length of time. The Personnel Department has seven sections; the human resources section, personnel administration section, personnel policies and procedures section, employee relation section, compensation and benefits section, training and development section, and services section. (Personnel Department, HMC) www.hmc.org.qa. The department has no electronic staff record system. Staff records are kept manually in paper files.

2.4.6 Health Information System (HIS)

Health Information System (HIS) at HMC started in 1982 with data and translation processing and few personal computers. In 1986, the charter of the department was modified. It looks after computerisation and automating the HMC organisation. New sections within the department were introduced; namely networking section; software development; user support and statistics. HIS is responsible for the new project of computerisation of all HMC departments and MOPH centres in the state of Qatar. The vision of HIS is to provide accessible decision support information that impacts positively on the management and delivery of health care using the latest technology to save time and effort.

HIS Goals are:

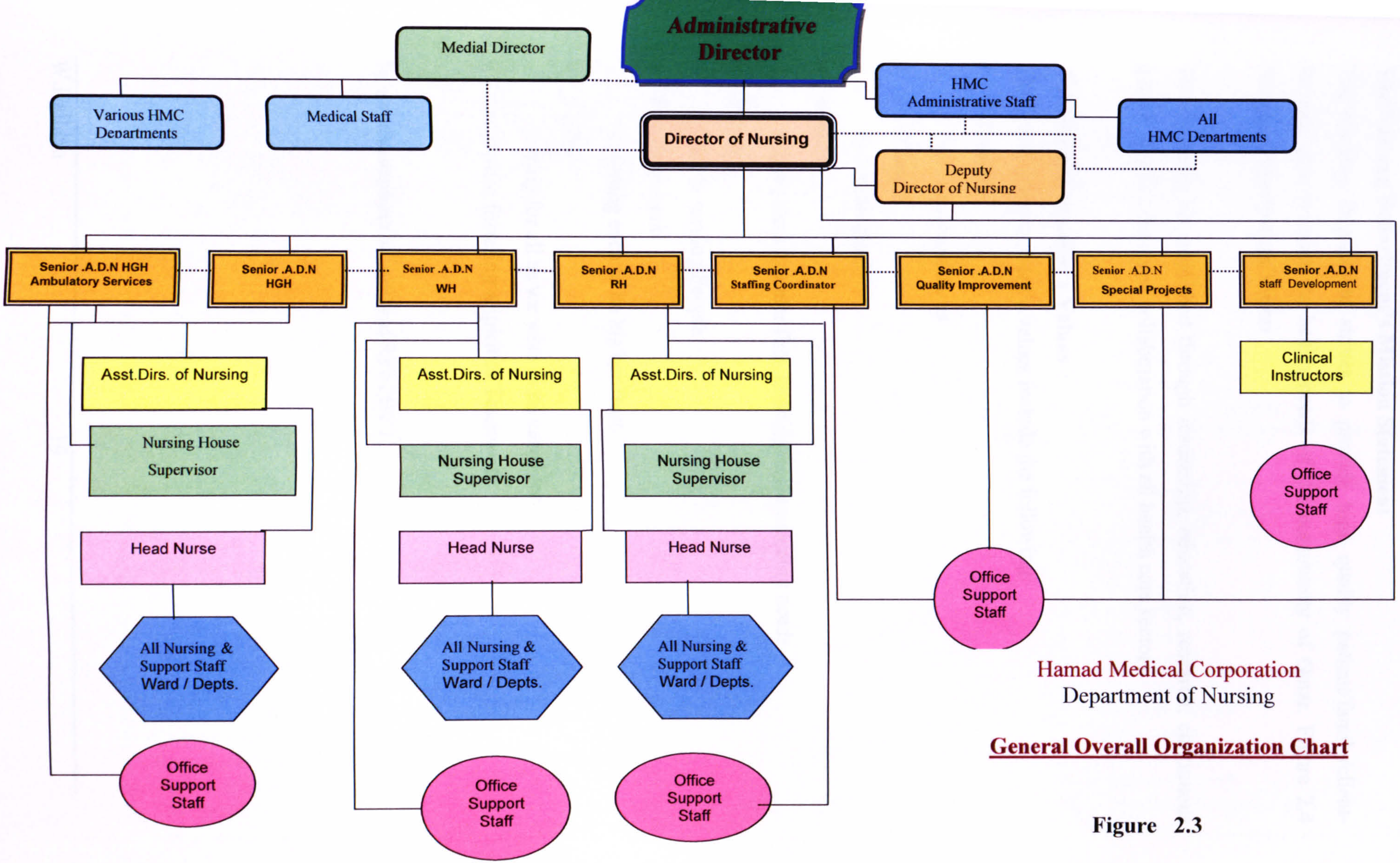
1. To identify Medical and Health quality issues to informatics solutions.
2. To promote the development and use of informatics solutions to improve Health Care.
3. To Promote and help users to use Medical Standards, such as the International Classification of Diseases (ICD Coding). The Systematised Nomenclature of Human and Veterinary Medicine (SNOMED) and Health Level 7 (HL7).

HIS Objectives are

To strengthen Health Information System in collaboration with other departments and help them to develop policies, strategies and procedures for health system management, health care delivery and decision-making based on studies and outcomes (HIS. HMC) www.hmc.org.qa

2.4.7 Nursing Department at HMC

The Nursing Department is the largest department at HMC. It has about 2800 staff from different nationalities and ethnic backgrounds, out of which Qatari nurses are approximately 14%. The Director of Nursing is the head of the department. Each Hospital has a Senior Assistant Director of Nursing and several Assistant Directors of Nursing; one for each speciality. This is illustrated in the Organisation Chart, shown in Figure 2.3



Hamad Medical Corporation
Department of Nursing

General Overall Organization Chart

Figure 2.3

The Nursing Department's Mission Statement

The Nursing Department strives to provide high quality patient/family/client-focused care to meet the health needs of the community of Qatar. Figure 2.4 Nursing Department's Vision

This is being accomplished through leadership, education, research, continuous quality improvement and collaboration with all health care sectors.

Nursing Department's Values

The Nursing Department's values include the following:

- **R**eliability

  You can count on us

- **E**xcellence

  Is our standard

- **S**ervice

  Putting the customer first, meeting and exceeding needs

- **P**eople

  People serving People

- **E**mpowerment

  Enabling each to be his/her Best

- **C**aring

  Caring for all as we wish to be cared for

- **T**eamwork fostering a spirit of Teamwork

In an atmosphere of mutual RESPECT.

PATIENT :
- *Patient/Family/Client-Focused Care*
- *Community*
- *Patient Rights*
- *Health Education and Training*
- *Quality Care*
- *Patient Satisfaction*
- *Caring*
- *Cultural Sensitivity*

STAFF :
- *Patient Advocates*
- *Responsive*
- *Clinical Expertise*
- *Professional Excellence*
- *Reliable, Loyal, Motivated*
- *Professional Growth and Development*
- *Professional Education and Training*
- *Staff Rights*
- *Cultural Diversity & Sensitivity*
- *Collaboration*
- *Career Path Options*

OUR VISION :

To be an Internationally Accredited World Class Centre Of Nursing Excellence

ORGANIZATION :
- *Continuum of Service*
- *Interdepartmental Collaboration*
- *Continuous Quality Improvement*
- *Ethics*
- *Adaptability to Ongoing Change*
- *Community Outreach*
- *Partnerships with Schools of Nursing*
- *Cultural Diversity/ Sensitivity*
- *Computerization*
- *Management by Objectives*
- *Decentralization*
- *Job Security*

METHOD :
- *Leadership and Management Skills*
- *Competency*
- *Education*
- *Research*
- *Teamwork*
- *Empowerment*
- *Change Agents*
- *Innovation*
- *Financial Skills*
- *Current Trends*
- *Conflict Management*
- *Technology*

Figure 2.4 Nursing Department Vision

Empowered and caring people who work as a team in an atmosphere of mutual respect provide reliable and excellent patient care (Nursing Department, HMC). www.hmc.org.qa

2.5 Overview of the Existing Staff Records System

Currently, the HMC does not have any integrated information system. There are, however, some scattered, isolated PCs in some management offices such as finance, personnel, nursing department, and some of the hospital's units and clinics with no electronic network connection between them. These PCs serve each department's own objectives by facilitating the storage and computing of employees' data. The methods of information collection are through papers and personal means such as telephones and face to face contact, and check ups of procedures for many functions are done by manual means.

At the Nursing Department, a basic database system developed in house [Fox Pro] was introduced by HIS a long time ago 1982.

Below are some of the interfaces captured from the existing staff records system. Figures 2.5 to 2.8.

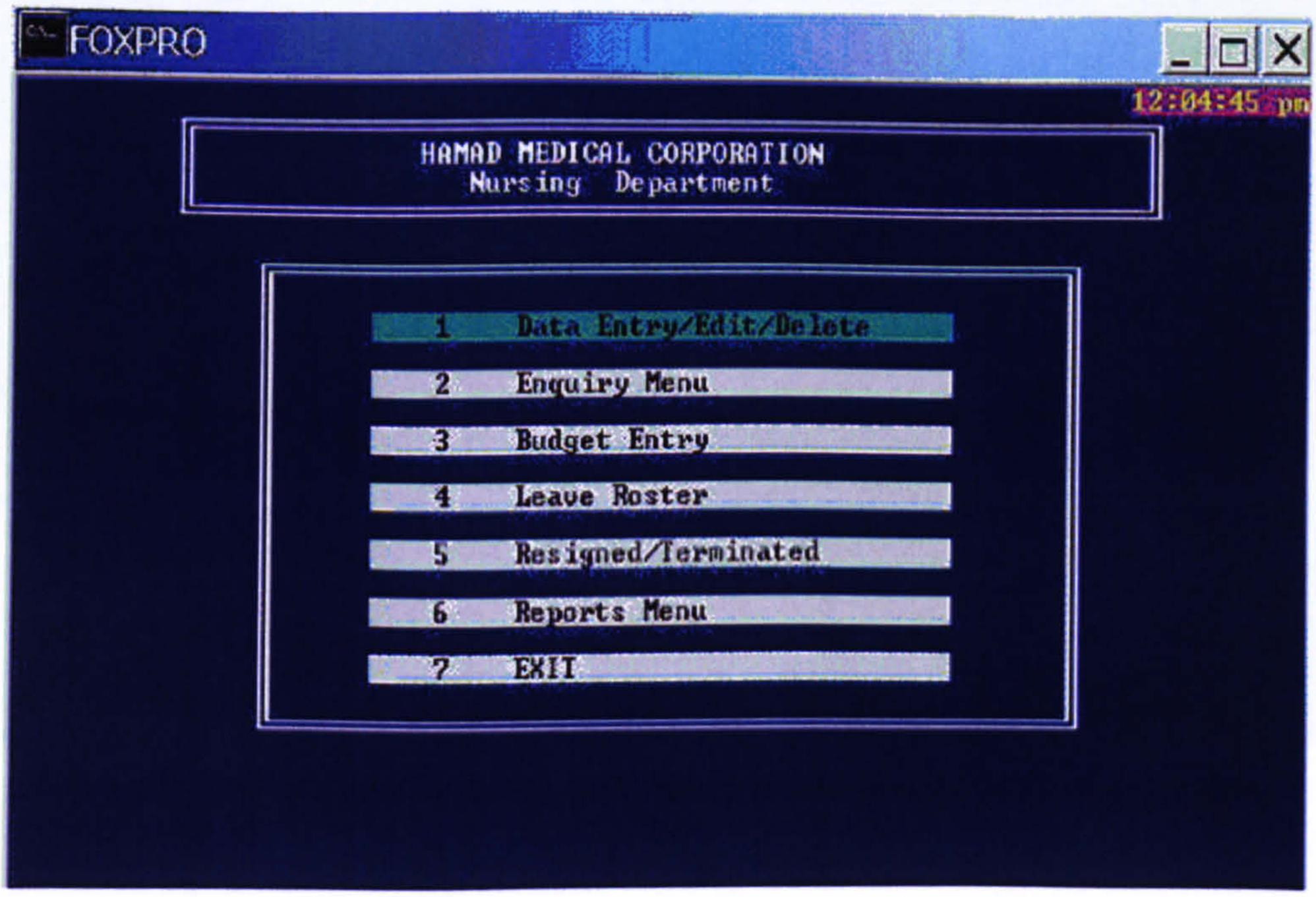


Figure 2.5 System's Main Menu

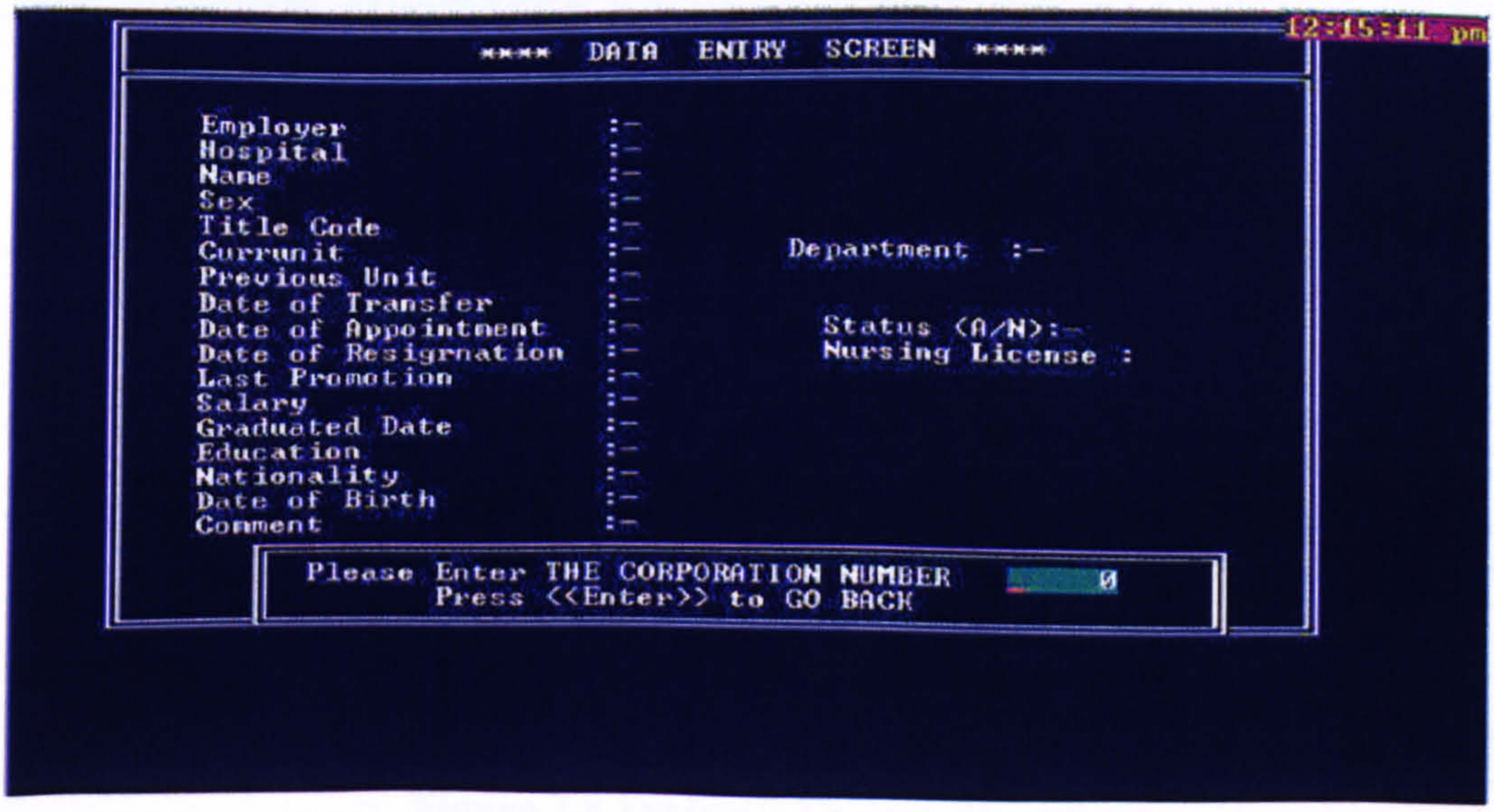


Figure 2.6 System's Main Data Entry Screen

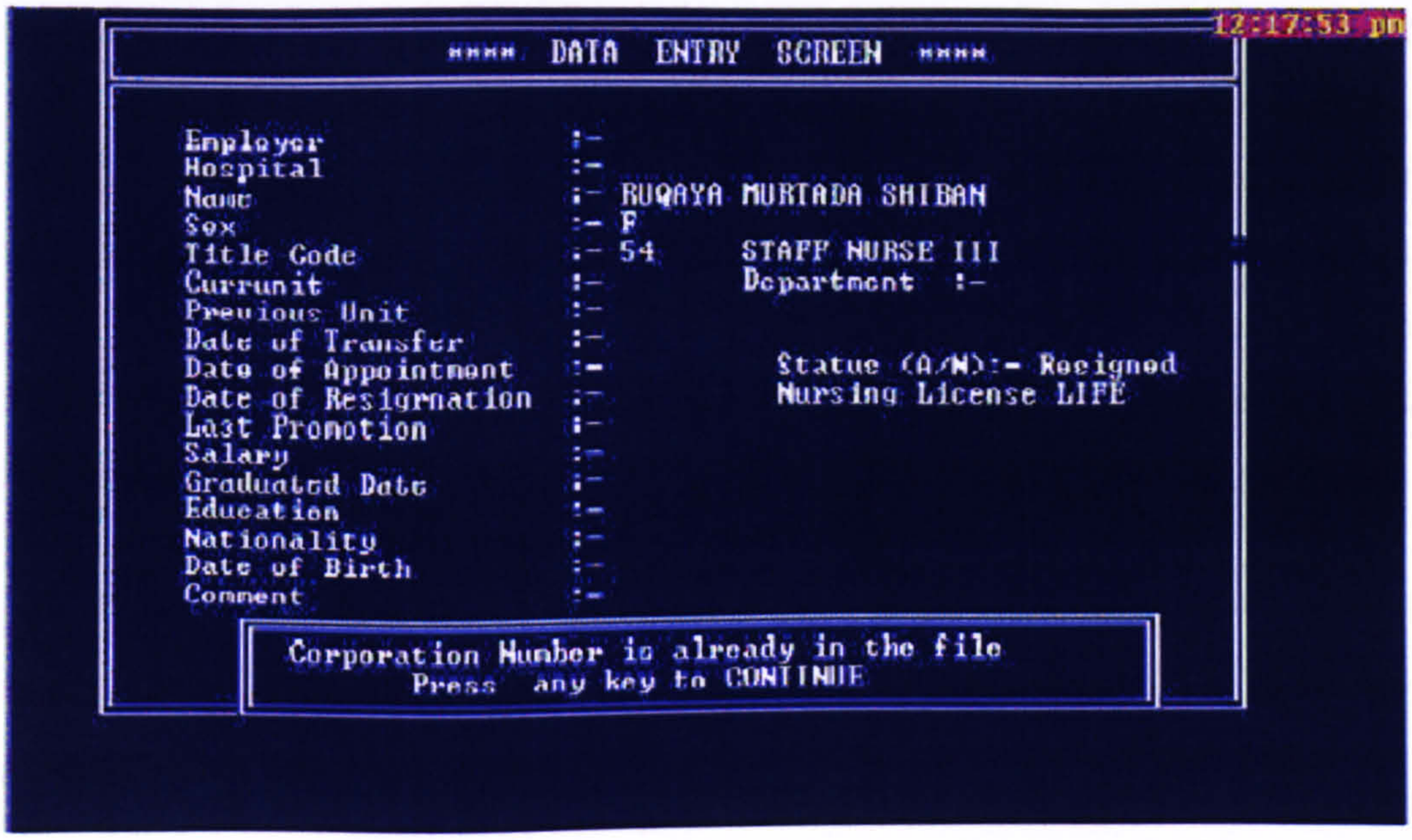


Figure 2.7 System's Main Data Entry Screen – with Data Validation

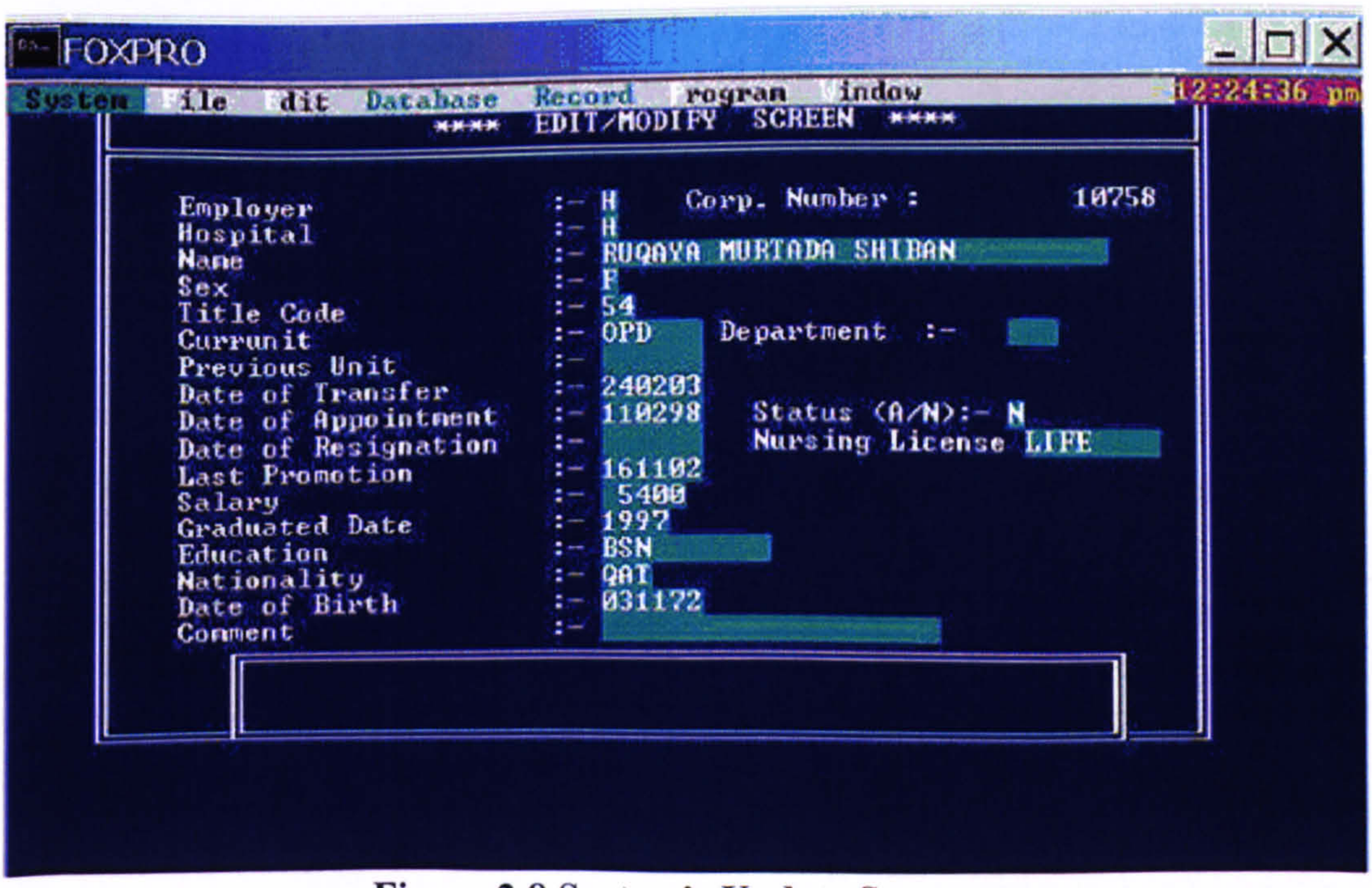


Figure 2.8 System's Update Screen

As a general observation, the interface is not that useful as far as the users are concerned. As indicated in the screen prints (figures, 2.5 to 2.8 refers, p. 22-23), it is a command-based system developed for use in the DOS environment. Technological development made such systems obsolete and sometimes difficult to use, particularly for general/occasional users. In essence, the interface is not 'User-friendly'. In addition, options should have been provided, especially on the data entry screen, to enable staff select an option from a list of options (such as M/F for male and female, status, etc , as opposed to actually entering such data. This could help in greatly reducing data entry errors.

The existing system has some advantages and disadvantages, and these are summarised in Table 2.1 below:

Advantages of this program	Disadvantages of this program
1. To print total number of nursing staff By title (total 24 different titles). By unit (total 88 units). By nationality (approximately 31 nationalities).	**1.** It allowed a single user only. It is stand alone
2. To print the number of budgeted nursing staff (approximately 2200). This print mainly helps to find the assignment of staff.	**2.** It can not be accessible from any other computer.
3. The total number of existing vacancies could be printed out for promotion and for recruitment.	**3.** The user can not use any options other than the ones on the menus.
	4. The user adds records the system interactive window only.
	5. It can not give you the total of staff resigned in a particular year, as per title, and nationality.
	6. It can not give you the number of staff hired in particular year.
	7. It can not give you the number of Qatari nursing staff graduated by year, higher education, with the year and university.
	8. It can not give non-Qatari nursing staff graduated from technical school of nursing and Qatar University.
	9. It can not give the vacancy as per the budgeted figure by title.
	10. No separate file (table) for each staff.
	11. The logon screen does not provide a password that secured entry to the application.
	12. It does not provide special security encryption capability to protect from unauthorised access to the application.
	13. It does not view the work hours of all the nursing staff.
	14. It does not view the vacation details for all the nursing staff.
	15. It does not give full details about terminated nursing staff.
	16. It is not connected to pay roll.

Table 2.1: Summary of Advantages and Disadvantages of the Existing System

Prior to this time, although the same situation still prevails now, all the information regarding the nursing staff such as full name, sex, title, current unit, date of appointment, education, graduation, license expiry date, nationality and date of resignation are collected and kept manually.

The following information is in the nurse's manual file at Nursing Department:

- The name, sex, date of birth, date of the appointment;
- Current nursing license;
- Nursing educational /experience certificates;
- Interview summary sheet;
- Conference or seminar attendance;
- Assignment letter;
- Letter of appreciation;
- Transfer request;
- Warning letter;
- Cautionary letter;
- Recommendation of employee of the month;
- Promotion letter;
- Yearly increment letter;
- Contract renewal letter.

2.5.1 New Record Creation

Prospective employees are expected to fulfil a list of requirements before their services are engaged by HMC. These requirements are then used as a guide on what kind of records are kept in each employees file. This section provides a brief overview of some of the requirements.

A. For Local Recruits

For local recruitment there is in existence a 16-stage process to be followed before an appointment is made. Each of the stages is listed below:

1. The candidate brings the Curriculum Vitae (CV) to Staffing Coordinator's office along with the following documents:
    - Current Nursing Council registration
    - References (3) from the current and previous employer
    - Nursing educational certificates
    - B.S.N/Diploma
    - Experience certificates
2. Staffing Coordinator reviews the documents.
3. A date and time is then scheduled for pre-employment examination with staff development
4. Information about the written nursing examination is given to the candidate by telephone.
5. On completion of pre-employment examination, the result of the examination is forwarded to Staffing Coordinator's office (min. score 70%).
6. The candidate is scheduled for an oral interview with the Nursing Interview Committee.
7. If found suitable, the Request for Recruitment form is completed and forwarded to Recruitment Section on approval from the Staffing Coordinator, concerned Sr. A.D.N. and Asst. Hospital Administrator.
8. Upon completion of the necessary formalities from the concerned authorities in Personnel Dept [Manpower Coordinator, Head of Recruitment, Director of Personnel, Immigration, Travel Section] the candidate will be called by the recruitment section. The candidate comes to Staffing Coordinator's office with the following documents given by the Recruitment Section:
    - Acknowledgment of Assuming Post
    - Pre-employment medical check up form
    - Bank Letter to open an account

- Personal Data form (to be filled and return to Personnel Dept)
- Identity Card

9. Acknowledgement of assuming post signed by the employee will be taken by the Nursing dept to be forwarded to Recruitment Section after signature from Staffing Coordinator and Department Head.
10. The successful staff will then be directed to the Staff Clinic to start medical check-up.
11. After, a successful medical examination, the new staff will be asked to open an account with any Bank in Qatar and return the form to Recruitment Section.
12. The staff will also be asked to go to the Laundry Dept to collect uniforms. An identity card will also be issued to him/her.
13. A memo will then be sent from Recruitment Head to Transport Dept & Cafeteria to provide Hospital transport and free meals for three days.
14. Accommodation will be arranged by the Housing Section-HMC.
15. The new staff will be asked to report to Staffing Coordinator's office in complete uniform as soon as the medical exam is completed (a maximum period of one week).
16. Finally, the new staff will be directed to report to the concerned Senior Assistant Director of Nursing with the letter of new assignment given by the staffing coordinator's office.

The following documents will be in the new file:

- Current Nursing Council registration
- References (3) from the current and previous employer
- Nursing educational certificates
- Bsc in Nursing/Diploma
- Experience certificates
- HMC Application form
- Copy of Assuming post.

B. For Overseas Recruits

1. Copies of the above papers will be taken from Personnel.
2. After the Pre-employment and oral interview, the secretary sends the request for recruitment form to personnel department. During that time, the documents listed below will be added to the above record:
    - Copy of Pre-employment exam,
    - Interview data form(duly filled and signed)
    - Copy of Recruitment form
3. The secretary keeps only copy of the documents in Nursing Department's file.
4. The clerk opens new file for the staff.
5. When the candidate joins duty after medicals, a copy of the accepted post kept in the file.
6. Performance Evaluation reports, warning letter, cautionary letter, any request from the staff such as bank loan, sponsorship change, transfer from assigned unit, transfer of bank a/c, resignation etc will be added to the file (only copies are kept in Nursing Department's file, the originals documents will be sent to Personnel Department.)
7. Director of Nursing, Senior Assistant Director Nursing, Staffing Coordinator and the Assistant Director Nursing will be responsible according to the nature of request/document.

One of the drawbacks of the manual system of records management is the huge challenge of managing records. For instance, the share volume of records to be kept might make the process chaotic with the result that the volume of records to be kept might exceed the space available to store them in an orderly fashion. Therefore, hundreds of employee files might either be incomplete, hold more than one person's documents in a folder, or might be missing entirely. Files might be kept untidily in filing cabinet or in boxes and the boxes might be kept outside the offices they are needed due to space constraints making it difficult to locate specific files when they were needed. At the moment, there was no policy that regulates the filling system, or the file contents.

2.6 Summary:

The chapter provides the necessary background to the study in terms of a general overview of State of Qatar, the provision of its health service. The chapter also provides introduction to the Hamad Medical Corporation (HMC) and the present situation of staff records at the Nursing Department. The next chapter, critical literature review, will examine theoretical debate as they relate to the issues raised in this chapter.

Critical Literature Review

3.1. Introduction

This chapter provides a critical analysis of the literature on the concepts that are considered relevant for this study. The main theme of this study cuts across a number of concepts such as records management, nursing informatics and nursing management. The discussion in this chapter is divided into four sections. The first section gives an insight into the definition records management (RM), RM policy, RM benefits, the life cycle of records and the barriers to better RM. It also defined nursing informatics and applications of nursing informatics to nursing management. Section two highlights the importance of staff records for effective organisational management. Section three presents the role of information technology (IT) in organisations, barriers to its introduction and benefits from IT application. Section four examines the staff attitudes to informatics.

3.2 Records Management (RM)

One of the biggest challenges facing all organisations, public or private, small or large, is the capacity to get the right information for the right person and at the right time. The only way to surmount this challenge is to have articulate records keeping policy and efficient RM. Therefore, central to the effective functioning of organisations today is sound a RM system. Perhaps, to really appreciate the centrality of RM to organisations, it might be useful to consider some of the definitions of RM

3.2.1 Definition of RM

There are many different definitions of RM. Each definition is influenced by either how particular organisations approach the issue of RM or by what RM entails in an organisation. The first definition to be examined is that of Records Management Society (RMS) in the United Kingdom. It views RM as a process

determined largely by the approach of particular organisations to it. Therefore, it defines RM as:

> "The process by which a company manages all the elements of records whether externally or internally generated and in any format or media type, from their inception/receipt, all the way through to their disposal." http://www.rms-gb.org.uk/about

While the definition above emphasises the procedural aspect of RM, the definition of RM by the United States National Archives and Records Administration (NARA) highlights the use to which RM could be put by organisations. It defines RM as:

> "the field of management responsible for the systematic control of the creation, maintenance, use, and disposition of records.... it is the planning, controlling, directing, organising, training, promoting, and other managerial activities involved in records creation, maintenance and use, and disposition in order to achieve adequate and proper documentation of the policies and transactions of the (organisation) and effective and economical management of operations" . www.archives.gov

Although the definition of RM above is more elaborate and therefore has wider applicability, it complements the definition offered by the RMS in the UK. Both represent the different perspectives from which RM could be examined and which are considered in the discussion of the policy of RM below.

3.3 RM Policy

There are general guidelines for developing and implementing a RM programme that will successfully create, keep, manage and finally dispose the records.

Creating a RM policy is one of these guidelines. When a RM programme is developed, two important elements will give the programme credibility and authority and help make it function more efficiently. These are: RM policy statement and RM advisory committee (Blount, 1984, pp.17-18).

While developing its RM policy, the National Archives of Scotland views RM policy as involving a number of processes described as follows:

- Prepare of a RM policy, with the support of senior management.
- Developing policy will require analysis of the business, looking at its core functions, its business needs, and statutory requirements. It will provide a framework for solutions to those problems identified in the review of current records management procedures, and will need to be integrated with related policies on topics such as data protection and information security. It should be endorsed by senior management and made available to all staff.
- The policy should include a statement about its purpose and scope, and cover issues including relevant legislation and regulations, the standards that will be met, staff training and responsibilities for RM or failures and to allow for future development.

3.4 Benefits of the RM

There are many benefits to be gained from having in place sound and efficient RM policies in organisations. The range of benefits includes business benefits and non-financial benefits. Again, the benefits of RM as conceptualised by organisations will be relied upon. The benefit of RM to particular organisations would also tend to be influenced by the way an organisation uses records. For example, the University of Edinburgh identifies the main benefits that the University hopes to gain by introducing and improving RM practices. These benefits are as indicated below:

3.4.1 Business Benefits

RM is viewed as the key driver in increasing organisational efficiency and offers significant business benefits.

1. RM improves the use of staff time by reducing the time spent looking for information. The reduction is achieved because information can be retrieved quickly and reliably. A number of organisations have tried to calculate how much staff time is spent retrieving information. One estimate from a consultancy firm is that 10% of administrative staff time is spent retrieving information of one sort or another (JISC InfoNet 2003). Another estimate from the Scottish Executive is that managing information better could save an individual half an hour a day (Scottish Executive, 2004).

2. RM facilitates the sharing of information. This enables staff to access the 'collective memory' which provides precedents for actions and should prevent the need to spend time and resources 're-inventing the wheel'. Better access to information also improves decision-making.

3. RM reduces the unnecessary duplication of information. By reducing the amount of unnecessary information held it is easier for individuals to concentrate on managing the necessary information for which they are responsible.

4. RM identifies how long records need to be kept before they can be destroyed, or transferred to the University Archive and by doing so it reduces the costs associated with retaining unnecessary information, such as storage costs, server costs and costs associated with servicing information requests for information that the University does not need to keep.

5. RM optimises the legal admissibility of records and by doing so will protect individuals and the University from malicious litigation, as UK society becomes increasingly litigious. Legal admissibility is optimised when it can demonstrate the authenticity of records. As electronic records are increasingly becoming the

'golden copy', and as records in this format present special challenges it is important that proper consideration is given to the legal admissibility of records.

6. RM identifies how long records are needed and by doing so identifies those records that are needed in the medium and long term. When those records are held in electronic format it is crucial that they are identified as soon as possible to protect them from loss. Electronic records are increasingly difficult to access over time because of hardware obsolescence, software updates and storage media failure. Records management identifies those records that need to be protected for future use and implements appropriate protection methods.

7. RM supports risk management and business continuity planning. RM identifies which records are vital to the running of the business and supports the business continuity or disaster plan. A disaster plan helps to reduce the risks of a disaster occurring but also ensures the ongoing operation of the business if a disaster does occur. The statistics demonstrate how important records are to business continuity and why it is crucial to identify which records need priority measures taken to protect and recover them.

In short, RM improves control over information assets, which has benefits in freeing up staff time and other resources, and will help protect individuals and the University from various risks. RM means that the University will not have to 'muddle through' hoping that all will be well, for example by placing too much reliance on the memories of a few individuals.

Another organisation in the UK, Cheshire County Council describes the benefits of RM in ways similar to that of the University of Edinburgh.

1. Information is available to support strategic decision-making. In order to be a well-managed organisation, decisions must be based on up to date and accurate information.

2. Information can be retrieved quickly and reliably when needed. There is no point in holding vast quantities of information if it cannot be accessed when needed.

3. Compliance with appropriate legislation and standards. This is often viewed as one of the most important benefits of the RM programme, as it is only with an effective RM programme that records can be kept in accordance with legal and regulatory needs. These are the Data Protection Act 1998 and the Freedom of Information Act 2000.

4. Effective use of space and storage facilities. An effective RM programme can often result in the number of storage facilities, duplicated and obsolete records, being reduced.

5. Streamline business processes. The RM programme often highlights instances where business processes can be simplified which not only aids the RM service but also helps individual workgroups.

The description of the benefits by the two organisations above bears some similarity in many ways. Both dwelt more on the application of RM to support other corporate or business goals of the organisation. For instance RM assist organisations to comply with legal regulations and to prepare the organisation's cases in different legal situations. It also helps organisations to manage better risk and business continuity plan and protects it against wastages by streamlining business procedures.

Other benefits of RM identified by both organisations are very specific to the uses of RM itself. For instance, RM reduces duplication of information, enhances time management and the sharing of information across different units in the organisation, as well as effective management of space through reduction of duplication of information.

There is no significant difference between the views of the two organisations on the benefits of RM except for the fact that the benefits identified by Edinburgh

University were more comprehensive. However, both organisations agreed on the fact that RM is useful in itself and in advancing other corporate and business goals of organisations while improving the day-to-day running of organisations. In addition to the business benefits of RM, there some non-financial benefits too.

3.4.2 Non-Financial Benefits

The Joint Information System Committee (JISC) in the UK stressed the non-financial benefits of RM which are summarised below:

Efficiency is a non- financial benefit of RM and its characterised by:

- Information can always be retrieved quickly and reliably;
- Information is available to support strategic decision making;
- Access to the collective memory of an institution provides precedents for actions, and should prevent the need to 're-invent the wheel';
- Streamlined business processes (functional analysis is a core part of a systematic RM programme);
- Reduced compliance and regulatory retrieval costs;
- Better utilisation of prime office space (characterised by reducing the number of filing cabinets full of obsolete paper in offices, and increasing people space);
- Reduced overhead costs of storage and retrieval of information.

Competitive Advantage is a further non-financial benefit of RM. The concept can be characterised as having the following aspects:

- Long-term management of physical assets;
- Improved public image by ability to respond quickly and appropriately to requests for information;
- Ability to respond quickly to new situations.

3.5 The Life Cycle of Records

RM addresses the life cycle of records. All records have a life cycle or a cycle of active life. According to Robek et al (1996, p.7) RM programme must apply appropriate controls to records during each of the five major stages of the life cycle records:

1. The creation stage, when information and records are produced in a wide variety of forms and formats using different equipment and technologies.
2. The distribution and use stage, when information and records are transmitted to those who need them, upon receipt, are used in the conduct of business.
3. The storage and maintenance stage, when information and records are filed or stored according to a logical scheme to permit subsequent retrieval, housed in some type of storage device, and protected and maintained so as to safeguard the integrity of the information. During this stage, the information is active; it is frequently referred to and is thus usually stored close to its users.
4. The retention and disposition stage, when information and records decline in value, become inactive, and are then removed from active storage in prime office space, are destroyed immediately if they have no further value, or are transferred to an inactive storage facility for the duration of their retention life.
5. The archival preservation stage, when few records that never lose their value are preserved permanently in an archive for ongoing historical reference or research purposes.

These stages in the life-cycle model can be seen diagrammatically in figure 3.1 below.

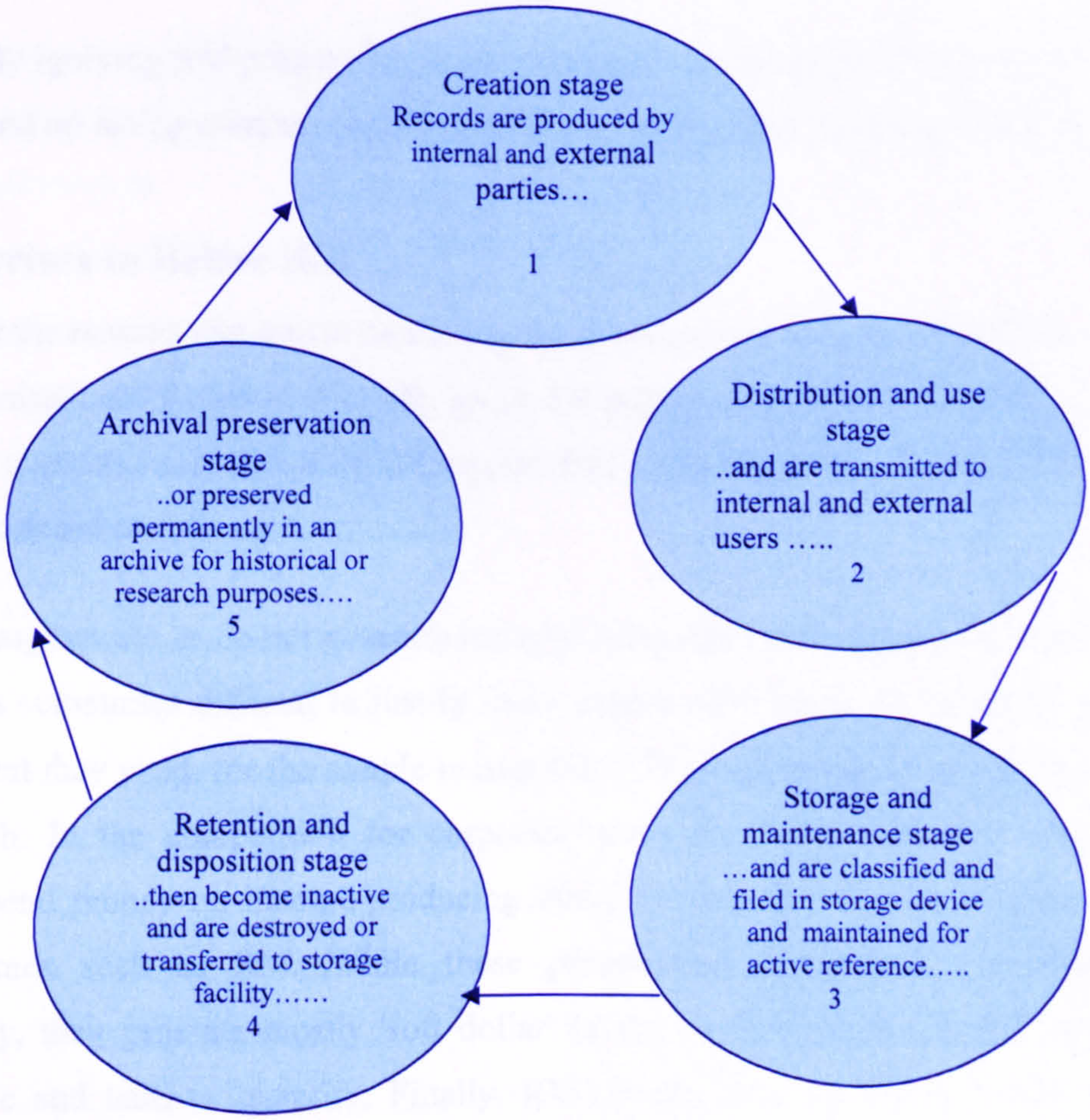


Figure 3.1 Five stages in the life cycle of a record.
Robek et al (1996, p.7)

3.6 Application of RM to Other Areas

As discussed earlier, in addition to the benefits derived from RM itself, it is also used to assist in other areas. Emery, (2005) stated that "Indeed RM crosses numerous disciplines For instance….

- Categorisation and indexing are two elements that are critical to the success of a RM programme. This is more like knowledge management.
- Vital records preservation is one of the key steps in developing a disaster recovery plan. This is also similar to infrastructure management.

- By ignoring RM policies employees and their companies can potentially end up facing criminal penalties. This also sounds like a legal profession.

3.7 Barriers to Better RM

What are the reasons that create barriers to the development of excellent RM in any organisations? Robek et al (1996, pp.15-16) put three major reasons why business executive sometimes do not support RM to the extent that they should. The reasons are as follows:

1. RM programmes as do not generate income. Although every organisation needs RM, it is sometimes difficult to justify these programmes based on the return on investment they yield, for the simple reason that RM programmes do not generate hard cash. In the competition for corporate resources, some executive would rather spend money on income-producing business units than on administrative programmes such as RM. While these programmes do improve operating efficiency, they generate mostly 'soft dollar' saving, and their benefits are often intangible and hard to quantify. Finally, RM programmes are often viewed as administrative overhead and are thus highly vulnerable to corporate or cost-containment initiatives, even though one of their main purposes is to help the organisation achieve cost-reduction goals.

2. RM is not the organisation's primary business. Organisations, and the people who run them seldom want to achieve excellence in RM. RM is not their primary business and is, therefore, often relegated to secondary status in the mind of senior decision makers. Further, while top executives often recognise the need for RM, they sometimes tend to see it as an administrative problem that is tangential to the over-all success of their business.

3. RM programmes are usually discretionary. Except in some government environment where formally organised RM programmes are mandate by statute, these programmes are always discretionary. Although best records do make a better business, organisations can be operated successfully without RM. Too

often, senior executives are content with mediocre RM, and they make RM a priority only when it becomes clear that poor RM adversely affects their business in some direct way.

The discussion above highlights the various ways an efficient and focused RM system is central to the effective functioning of organisations. The section that follows will explore how this could be enhanced further with the introduction of Nursing Informatics within the organisation.

As stressed in the preceding section, records management, if properly handled enhances the efficiency and effectiveness of organisations. The way records management is deployed to improve the way organisations function, however, depends on what system is adopted to keep and retrieve records. The use of information technology is now established as a more efficient method for records management compared to manual system. The section that follows examines the application of information technology, for records management in the Nursing Profession, which can be regarded as branch of Nursing Informatics.

3.8 Nursing Informatics (NI)

Most definitions seem to agree on NI as a combination of nursing science, computer science and information science. For instance, Grave & Corcoran (1989, pp. 227-231) stated that NI is

> "a combination of computer science, information science and nursing science designed to assist in the management and processing of nursing data, information and knowledge to support the practice of nursing and the delivery of nursing care".

Goossen (1996) defined NI in more detailed by focusing on four points of scientific methods central to NI.

"the multidisciplinary scientific endeavour of analysing, formalising and modelling how nurses collect and manage data, process data into information and knowledge, make knowledge-based decisions and inferences for patient care, and use this empirical and experiential knowledge in order to broaden the scope and enhance the quality of their professional practice. The scientific methods central to nursing informatics are focused on:
(1) using a discourse about motives for computerised systems,
(2) analysing, formalising and modelling nursing information processing and nursing knowledge for all components of nursing practice: clinical practice, management, education and research,
(3) investigating determinants, conditions, elements, models and processes in order to design and implement, as well as test, the effectiveness and efficiency of computerised information, (tele)communication and network systems for nursing practice, and
(4) studying the effects of these systems on nursing practice" .

Goossen (1996, pp. 187-195)

3.8.1 Current Development NI

The 21st Century is a new era for informatics and the process of gaining power through the data-information-knowledge triad. This is occurring in many disciplines, not just in nursing. As in other disciplines, the need for nurses to feel comfortable working with computerised data and information is increasing. Technology also facilitates creative processes in nursing, affording vehicles for patient education, teaching and learning, and providing information for the promotion and prevention of general health on a global scale. Nursing informatics is a new discipline and the application of it is still in the early stages in most countries, for example, in the UK, and Canada. However, in this continuum, the USA occupies a central position in relation to patient care, nursing education, nursing administration and nursing research. The USA is where the discipline is most advanced.

In respect of Nursing Informatics administration (management), a working group on nursing informatics management was proposed at the meeting, held in Washington 1999, to discuss the future strategic activities of the group. The group suggest that when addressing management issues there is a need to acknowledge the heterogeneity of issues. The initial ideas put forward by the group could be put into three broad categories:

1. Information Systems to support management practice: e.g. activities related to budgeting/accounting, resource utilization and personnel management of nurses.

2. Information systems to support clinical practice. These are systems used by nurses in the services and their nursing leaders: for example, clinical information systems and electronic patient records.

3. User-issues and organisational development to support/utilize new information systems: for example, people issues, consequences, and whether IT-systems should "dictate" certain practice models.

The Working Group also stresses that issues that can be developed to support good practice and the appropriate design, implementation and use of nursing informatics management systems include:

- Describing/defining systems that support nursing management and clinical practice;
- Specifying the data content of these systems;
- Identifying issues that contribute to failure to realise the benefits of systems;
- Features and usability of systems;
- Security of data;
- Primary and secondary usage of systems;
- Stakeholders' views and opinions;
- Leadership roles in nursing information management.

(The Nursing Informatics Management Working Group, 1999).

3.8.2 The Application of NI

NI is applied to all areas of nursing, including practice that helps deliver patient care; administration to help nurses administer a nursing department; education to help support nurses' education; and nursing research. "Automation offers many solutions for nursing issues that allow the nurses to work more efficiently, allocate resources more effectively, and improve client care" (Hebds & et al., 1998, p.3). Below, some examples are offered of how NI and computers are used to support the various areas of nursing see Figure 3.2

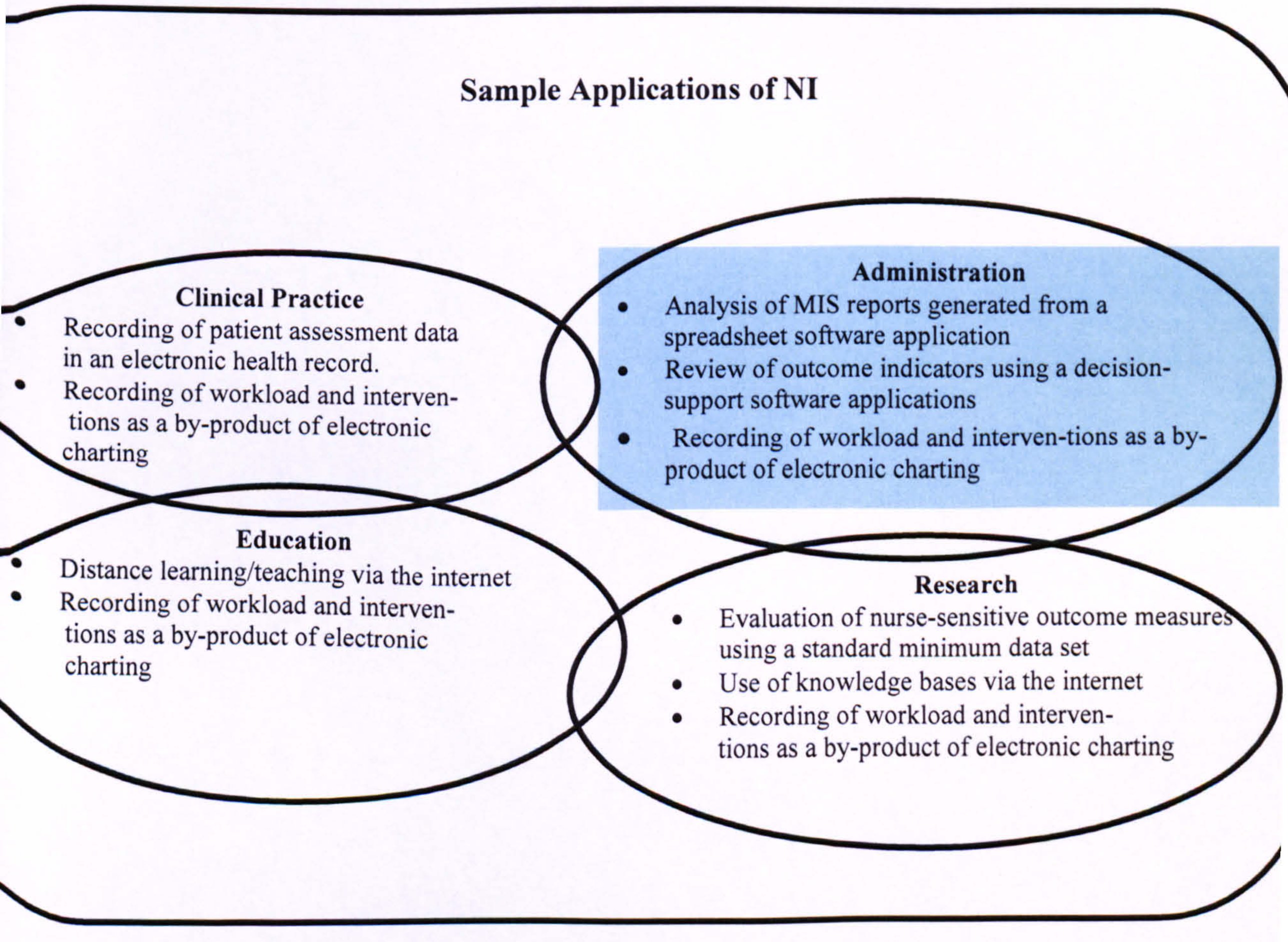


Figure 3.2 Nursing Informatics Applications

3.8.3 Nursing Administration Applications

Administrative uses of information were classified by Hannah (1999, p. 125) in two ways: those that provide nurse managers with information for decision-making and those that help nurse managers in communication decisions. Those administrative uses to help nurse managers in decision-making are called 'management information systems' while those applications in nursing administration that help nurse managers to communicate their decisions are called 'nursing office automation systems'.

Examples of the Application of Both Systems Include:

- Automated staff scheduling and computerised records keeping;
- Records that nurse administrators are required to keep on all personnel to ensure that their qualifications are current, their continuing education needs are being met and that their levels of expertise can be incorporated into the scheduling system;
- Electronic mail for improved communication;
- Word processing programs to improve the nurse administrators' communication efficiency;
- Cost analysis and trends for budget purposes;
- Spreadsheets for nurse managers who work with budgets;
- Cost estimates and cost-benefits calculations;
- Quality assurance and outcome analysis;
- Quality of care assurance.

In addition, to the above administrative application, Staff records tracking is another core administrative function utilize. (Moorhead & Delaney) stated that

> " this application tracks data on nursing employee demographics position control, salary and job classification, personnel information, professional education and skills, licensure, professional certification and dates for recertification,

> professional experience(which also documents career paths), as well as dates of annual performance evaluations and promotions. The staff tracking function also tracks annual in-service education sessions and continuing education."
>
> (Moorhead & Delaney (1998, p. 89)

It is clear from the literature that good reliable systems for management of nursing records are essential to the nursing management. The literature demonstrates a clear path of the use of NI within nursing records management.

3.9 STAFF RECORD

3.9.1 Definition of Records

Feather & Sturges (1997, p.546) defined a record as "a document arising from transaction that preserves an account of the fact of the matter in permanent and discrete form". Another definition of record by (Yusuf) as:

> "A record is recorded information produced or received in the initiation, conduct or completion of an institutional or individual activity that comprises content and structure sufficient to provide evidence of the activity. This concept of record is applicable regardless of the format and medium of recording" (Yusuf, 1998).

3.9.2 Definition of Staff Records

Employee or staff records maybe defined as

> "records that contain initial application forms, results of physical examinations, interviewers' notations, test scores, periodical appraisals, transfers and promotions, disciplinary action, releases and rehiring, wages, salaries, taxes paid, contribution and similar items"
>
> (Sovereign, 1984, p. 227)

3.9.3 Definition of Electronic Records

Dollar (1992) described electronic records as "recorded information that is communicated and maintained by means of electronic equipment in the course of conducting translation", while Saffady (1993, p.1) defined electronic records as "records which contain machine-readable, as opposed to human-readable, information".

Andrew Foster, director of human resources for the NHS in the UK, offered this definition of Electronic Staff Records (ESR):

> "ESR is a fundamental building block for developing our most important asset-our staff, which in turn will realise more improved and effective patient care. It will reduce the need for double handling of information allowing skilled staff to be able to devote more of their time to manage services." . www.esrsoultion.co.uk

Electronic Staff Records or Personnel Records are an important part of an organisation or department. Accurate records are needed to ensure proper pay, benefits and training, and to provide accurate, speedy data for administration purposes.

3.9.4 The Benefits of an Electronic Records System

An electronic records system can offer such benefits as improving the retrieval of information, allowing quicker and cheaper communication, and providing the ability to reuse the information within the corporation. The benefits of a computerised human resource information system were outlined by Armstrong (1999, p. 822) as follows:

- It enables the function to provide better services to line management;
- It provides a conduit to link personnel policies and processes throughout the organisation, thus facilitating the development of an integrated and coherent approach to personnel management;

- It provides essential data for strategic personnel decision-taking, enabling personnel to access and analyse information quickly to put their ideas and plans to the test. It helps in the identification of the benefits of personnel strategies in terms that the business can recognise, such as adding value, not just cutting costs;
- It helps in the process of empowering line managers to manage their own personnel affairs which, as Wheeler (1995, p.822) suggests, support the devolution of HR management to the line, not only ensuring that HR policies are complied with thorough validation procedures, but also by providing line managers with on-line advice and guidance;
- It helps to reduce the workload of the personnel function, eliminating low-value tasks while still enabling the function to provide efficient administrative services.

The electronic staff record (ESR) project team at the NHS in the UK divided the benefits of the ESR into national and local benefits. (www.esrsoultion.co.uk)

The main national benefits of the ESR as a solution are:

- Better quality of information that will enable better informed decisions to be made: for example, national plans for the education and recruitment of clinical staff;
- Enhanced capability to meet future needs, both internal changes within the NHS such as the Agenda for Change, and external changes such as the introduction of the Euro;

The local benefits of the ESR solution for NHS organisations are:

- Simpler administration processes as a result of the integration across HR and payroll processes and across the NHS as a whole;
- Easier production of information required nationally, at supra employer level and locally;
- Reduced time and paper associated with inter-authority transfers.

- Avoidance of duplication of effort and content as Information is entered only once
- Automation of some activities previously performed manually.

As the solution supports faster and more effective HR and payroll transactions, there are the following business performance benefits:

- More efficient payroll processing as more accurate information updates result in reduced adjustments;
- More effective career management due to easier access to all qualifications and competence information;
- Better employee information, as all necessary departments have access to required information;
- Improved training derived from a more streamlined administration and from having more information.

Also, organisations will be able to produce management reports at various levels and therefore will be able to make better policy and strategy decisions on HR related issues. The type and extent of these benefits will vary depending on the system already in use and the processes currently employed by the organisation.

The expressions 'staff records', 'personnel records'and 'employee file' are used interchangeably. As a result, Mnjama (2001, p.113) stated that some or all of the following information maybe included in an employee file:

- The employee's full name, address and telephone number;
- The employee's age and sex, nationality, ethnic origin, religion and membership of a trade union;
- Whether the employee is single or married and the number of his/her children;
- The full name and address of the employee's next of kin;
- The nature of the employment in which employee is engaged;
- The employer's wage rate and pay interval;
- The period of notice to be given in order to terminate the employee's contract of employment;

- The number of working days' leave with at least basic pay to which the employee is entitled in respect of 12 months' continuous employment;
- The number of days of paid sick leave to which the employee is entitled in any year;
- Particulars of employee's weekly rest period;
- The number of paid public holidays to which the employee is entitled in each year;
- The date on which employment (whether on probation or not) under the employee's contract of employment commenced;
- The data on which the employee's contract of employment terminated and the reason thereof;
- Particulars of all payments made to the employee by the employer on the termination of the employee's contract of employment (in respect of wages, payment in lieu of notice, leave with pay, severance benefit or otherwise);
- Particulars of the employee's wages in terms of his/her contract of employment specifying the aggregate of basic pay and each form of remuneration such as overtime payment, production bonuses, cost of living allowance and other special remuneration arising out of particular circumstances.

Ream (1984, pp. 111-120) suggests that the following additional information may also be found in personnel files:

- Education and qualifications: academic attainments, professional and other qualifications, special skills and aptitudes such as language, computer literacy, typing, First Aid etc;
- Medical history: serious illness or operations, disabilities or physical limitations, results of medical examinations, doctor's name;
- Training given during employment and comments on achievement, effectiveness etc;
- Performance: appraisal assessments and reports;

- Administrative records: leave records; loans and loan repayments; banker's name, address and account number etc;

As can be seen from the above list, the type of information in the personnel file varies greatly from general information to very confidential and sensitive information.

Cain (1999, pp. 110-120) argues that personnel records have several peculiar features that require attention. He observes that Personnel records:

- affect the individual employee and his/her family;
- are exceptionally sensitive;
- remain active for very long periods of time;
- are voluminous;
- can be linked to the payroll system.

3.9.5 The Importance of Staff or Personnel Records

To serve their purpose, personnel records must be accurate, up-to-date and easily accessible. Mnjama (2001, pp. 111-120) highlights the importance of personnel records. First, personnel records are created to serve the needs of the organisation that created them. These records provide a store of information about each employee, providing his/her personal employment history, career within the organisation, personal details of age, health, timekeeping and records of performance. Second, personnel records provide vital statistics regarding the labour force as a whole, including details such as labour turnover, age and sex distribution of employees, wages and salaries. Without these statistics it is virtually impossible for an organisation to plan ahead. Third, although personnel records are the property of the employee, certain laws and regulations require that specific information be provided from employee files. Sterling (1984, pp. 111-120) rightly observed: "one of the side effects of the considerable amount of industrial relations legislation now on the statute book has been the need to store detailed information about staff in order that their various rights and benefits can be applied when required".

While reinforcing the above listed importance of personnel records, Martin and Jackson (2005, p.69) stated that there are six main reasons why personnel records are important:

First, to satisfy legal requirements; keeping records of information on how many many people the orgainsation employ, what they are paid, what they have paid over a number of years and how many hours they have worked are useful.

Second, keeping personnel records is important to provide the organisation with information to make decisions. This is because knowledge and information are lifeblood of good decision-making for organisations. For individuals, access to accurate, factual and dependable information that can be used for arguments and influence is a vital factor in performance enhancement.

Third, record keeping is important for contractual arrangement and agreements. Agreements that are recorded are clearer and also easier to insist upon. It is not only a legal requirement to provide written particulars of employment, it is simply good practice to provide them. Employment problems are less likely to arise when all parties are clear about what has been agreed. Records are needed for reference purposes in the case of disputes and, for defence; if for example, claims are made to an employment tribunal.

Fourth, it is important to keep contact details of employees to process their payments and to provide relief cover at short notices.

Fifth, personnel record keeping is important to provide documentation in the event of a claim against the organisation. Employment protection rights demand that records should be kept to protect the employees, from claims that they have been discriminated against or unfairly dismissed. Health and safety legislation demands that records are kept of accidents, exposure to hazardous substances, and what health and safety training has been provided and much more.

Sixth, personnel records are important to provide information for consultation requirements. The information for consultation requirements which are likely to be placed on larger organisations by the information and consultation regulation, include: information on developments relating to employment within the organisation, for example, if employees might be made redundant, there is a need to consult them. The same thing applies to if they are to be transferred to another organisation. Information on alternative jobs, pay rates and skills needs as well as records of the consultations themselves will be important.

Due to the importance of good record management to organisations, Martin and Jackson (2005) stress that "Good organisation of records is the key to efficiency and effectiveness" of organisations (Martin & Jackson, 2005, pp.69-70).

3.9.6 Access to Personnel Records

Access to personnel records must be based on a 'need to know basis', as Mnjama (2001, pp. 111-120) stated: this was the general agreement among archivists and records managers. Only authorised officers and managers who have a genuine right to see employee files ought to be granted access to these records. Although in the past this practice has worked well when most employees were unaware of their basic rights, today this practice cannot be allowed to continue. Mnjama (2000) noted that this means employees in an organisation have no access to information in their files and cannot know whether this information is accurate or not. Mnjama's contention (2001) is that employees have a legitimate right to ensure that the information held by their employer is accurate, complete and reliable and that they are given the opportunity to correct the information if it is inaccurate.

3.10 The Role of IT

Prior to delving into IT issue, it is essential to understand the basic definition of what is meant by IT, which in Arabic is called *ilm al-ma'lumat al-tiqaniyyah*. IT is essentially a composite word derived from the words of Information and Technology. Webster's Universal College Dictionary (1997, p.419) defines information as "knowledge communicated or received concerning a particular fact or circumstance" or "knowledge gained through study, communication, research, instruction etc". Technology on the other hand is defined as "the science of the application of knowledge to practical purposes". Juxtaposed together, the two terms refer to "the use of computers and telecommunication for processing and distribution of information in digital, audio, video, and other forms"(Morris 1992, p.1107).

3.10.1 The Barriers to IT and Nursing Management Information

There are many challenges to the introduction and implementation of IT in any organisation. These typically include cultural resistance to change, training issues, and technology barriers and records management awareness.

Hannah et al (1999, p.141) stated that "the major obstacles to more effective nursing management of information are the sheer volume of information, the lack of access to modern information handling techniques and equipment, and the inadequate information management infrastructure"

Kleinke (2004) report on a survey, which included hospital executives in the United States, the United Kingdom, Canada, Australia and New Zealand, found that the high start-up costs of implementing IT were overwhelmingly cited as the major barrier to increased hospital technology use.

Yousif (2000) added that another barrier to accessing and utilising IT is lack of financial resources. Such costs are relatively high. This includes the acquisition of hardware, development of software, provision of training, and maintenance.

3.10.2 The Benefits of IT

The technology has to offer clear benefits to the organisation members in order to be adopted. IT has to have a comparative advantage over previous practice used. There are some advantages in using IT in the view of a number of researchers such as Tornatzky & Klein, 1982; Rogers, 1983; Danziger & Kraemer 1986; Moore & Benbasat, 1991; Iacovau & et al, 1995 and Panizzolo, 1998. They summarised the benefits that might be anticipated from the use of computing in organisations. They classified the benefits into three categories. These are information benefits, efficiency benefits and effectiveness in serving the public. The information benefits were measured by gathering the assessments of end users regarding the extent to which IT had improved four aspect of their information environment: (a) the speed with which information can be obtained; (b) the ease of access to information; (c) the availability of new information; and (d) the timeliness of the information. The efficiency benefits were measured by assessing the extent to which IT had reduced departmental staff, had reduced the cost of departmental operations, and had enabled the department to increase its work volume without corresponding increases in cost. Lastly, effectiveness was measured by including end user evaluation of whether IT had improved the department's effectiveness in serving the public.

3.10.3 Information Policy

Information Policy defines the overall aims and objective of the organisation in relation to information. As Lytle, (1988, pp 9-16) notes: Information policies related to data, information processing equipment and software, information systems and services and staff roles and responsibilities. Formal development of information policies recognises information as a strategic organisational resource.

Hovenga, (1997, pp.119-125) stated that "in Australian the government hires nurses to help develop policies and strategies on IT". In addition, to the above, Hovenga (1997, pp.119-125) stated that: "in most countries that lack a national health informatics policy and computer technology and information science have been introduced haphazardly".

3.10.4 The Perception of the Value of the IT

Davis et al (1989, pp. 982-1003) developed the Technology Acceptance Model (TAM). This model isolates the factors which most affect the integration process and which, therefore, enable predictions of the extent of IT use. The model shows that the perceived usefulness of the system and its ease of use are the two main factors that have an influence on the intention to use a new system and on its actual utilization. According to the model's logic, by action on the factors that influence people's perception of the system, one can increase the probability that the system will be used and, therefore, the likelihood of successful implementation.

Legris et al (2002, pp. 59-69) suggested statements for measuring people's perception of the usefulness of the system, for example, "using the system will increase my productivity, using the system will increase my efficiency and on the whole, I believe that the system will be useful." Other statements for measuring people's perception of the ease of the use of the system include, for example, "learning to use the system will be easy for me", "I believe that will be easy for me to do what I want with the system", "I believe that the system is inflexible and not user friendly and on the whole", "I believe that the system will be easy to use".

3.11 Staff Attitudes Towards Computerisation

Mirkamali (2001, p.2) defined attitudes as "the positive or negative perceptions of a person toward him/herself, other people and phenomena, as evident in the beliefs, opinions and feelings that affect his/her behaviour". Nurses' attitudes towards computers and IT have been examined in great length (Krampf & Robinson, 1984; Brodt & Stronge, 1986; Shwirian et al., 1989; Sultana, 1990; Large, 1994; Simpson & Kenrick, 1997; Al-Zahrani, 2003; and Dalhem & Harrison, 2004).

Most of these studies were carried out in the UK and the USA, with a few studies being carried out in developing countries, for example Saudi Arabia and State of Qatar. In the literature it can be seen that, whether the study is looking at nurses as a group or is conducting a comparison of attitudes between groups, the overall studies about attitudes toward computers are positive. One exception to this rule is the studies carried out by Reznikoff et al. (1967) and Sultana (1990) which found that the general nurses' attitude towards computers tended to be negative.

Brodt and Stronge (1986, pp. 82-86) surveyed 185 nurses using a 20-item investigator instrument, developed by Brodt and Strong (1985). The total mean score was 70.8, which was interpreted as showing a slightly favourable attitude of nurses towards computers. The level of education was related to attitude, with registered nurses having a more favourable attitude ($p<0.001$) than licensed practical nurses. In addition, a more favourable attitude towards computerisation was found among nurse managers and rehabilitation paediatric nurses than among nurses from medical and surgical units ($p<0.001$). Also, they found that attitudes towards computers differ significantly ($p<0.01$) by years of nursing experience. Those with 21 years of experience or more had more favourable attitudes than those with less than 10 years' experience. There were no significant differences in attitudes towards computers when compared with nurses' age, the length of employment in their current position, and the presence of a computer terminal on the nursing units.

In 1997, Simpson & Kenrick (1997, pp. 37-42) conducted a study which was a replication of the study carried out by Brodt and Stronge (1986). This study was conducted in a British hospital as Sultana (1990) had done. A sample of 208 nursing staff was assessed using Brodt's & Stronge's (1985) questionnaire. The findings of the study revealed significant differences according to age. The number of years nurses had worked was also found to have a significant difference: the longer nurses had worked, the more negative their attitudes.

Another significant difference was found in the attitude of nurses: those who worked in elderly care units were more likely to have negative attitudes towards clinical computerisation. Also, the findings showed that no significant differences in attitude related to gender, previous experience with computers, or whether the respondents worked on day or night shifts. Simpson & Kenrick (1997) found differences in their results compared to the original findings of Brodt & Stronge (1986), pointing out that a significant length of time had elapsed since the original study was done and the use of IT had increased.

Scarpa et al. (1992, pp. 72-80) stated that: "the strong association of attitudes and learning new skills suggests that a first step in successfully introducing a computer system into the hospital setting for nurses' use is assessment of the attitudes of nurses toward computers." Several studies predicted that the quality of nursing care will improve with an increased use of computers and information technology (Leino-Kilpi, 1990; Burkes & Grassy, 1991; and Carter & Axford, 1993).

Negative attitudes toward computers may cause people to avoid using computerised systems (Jayasuriya & Caputi, 1996, pp. 340-345). Resistance, however, may not be entirely bad. It may, in fact, be constructive. Notably, it can be used to bring about some modification of the change, making it more acceptable to those affected (Lowry, 1993, pp. 242-245).

It is interesting to note that some studies, such as that of Simpson and Kenrick (1997) and others, for example, refer to and compare their studies with Brodt and

Stronge (1986). This is unusual as Brodt's and Stronge's study (1986) was carried out more than a decade before and this represents a different generation in the development of information technology and computers.

3.12 Summary

This chapter reviews the literatures relevant for this study. Section One discusses definitions of records management, RM policy, benefits of the RM, the life cycle of records, application of RM, and the barriers to better RM as well as definition of nursing informatics, application of nursing informatics to nursing management. Section Two highlights the important issues related to staff records, a definition of records, the contents of personnel records, the importance of these records, access to the personnel records and the benefits of electronic staff records. Section three presents the role of IT, the barriers and benefits of IT. Section four sheds light on nurses' attitudes towards computerisation.

From the literature review that has been undertaken, no evidence has been found that any research has been done on nursing informatics and staff records within the nursing specialty in the Nursing Department at HMC in the State of Qatar. This is the gap that this study aims to fill.

In addition to filling the research gap, this study will also offer an opportunity to raise the awareness of nurses about the new specialty NI and its application. It would also offer insights on how Qatar could benefit from the best practice around the world to establish a centre of excellence for research into nursing informatics application.

The next chapter, which examines the research methods, will present the methods chosen for this study and consider the use of SSM and ISM to investigate the human activity systems involved in this research.

Research Methods

4.1 Introduction

This chapter presents what is considered as the most appropriate research methods for this study. This is the use of survey questionnaire and interview technique of data collection. The use of questionnaires, its advantages and disadvantages, as well as the advantages and disadvantages of the interview are discussed. Moreover, the procedures adopted for data collation are described. The use of Soft System Methodology (SSM), the reasons for adopting the Soft System Methodology (SSM) and the use of Interpretive Structural Modelling for this study (ISM) are also discussed in greater detail. In addition, the limitations, strengths and considerations of the study are discussed and data preparation and analysis are presented. The figure below indicates (4.1) that the SSM is dependent on the richness of the information gathered that describes the 'problem situation unstructured' and to generate this information for stage one, a review of literature and an analysis of data collected from questionnaire and interviews both contributed to the study findings.

Methodology is the technique of conducting research through systematic collection and use of data relevant to a specific research question. The most fundamental principle in any research design is the selection of an appropriate methodology and it is always a difficult task. Ideally, a well-designed research phase must embrace a method and also include extensive planning of tactics to investigate, sample, and collect data that will be needed for the study (Bernard, 2000, p. 66). Whatever research method is adopted for any study is generally influenced by an understanding of the way the object of study relates with the environment. As stressed by Burrell & Morgan (1979, p.1), there are assumptions about the nature of the social world, both that of individuals and organisations, which influence the way they area investigated. This issue is generally covered under the research philosophy guiding a study.

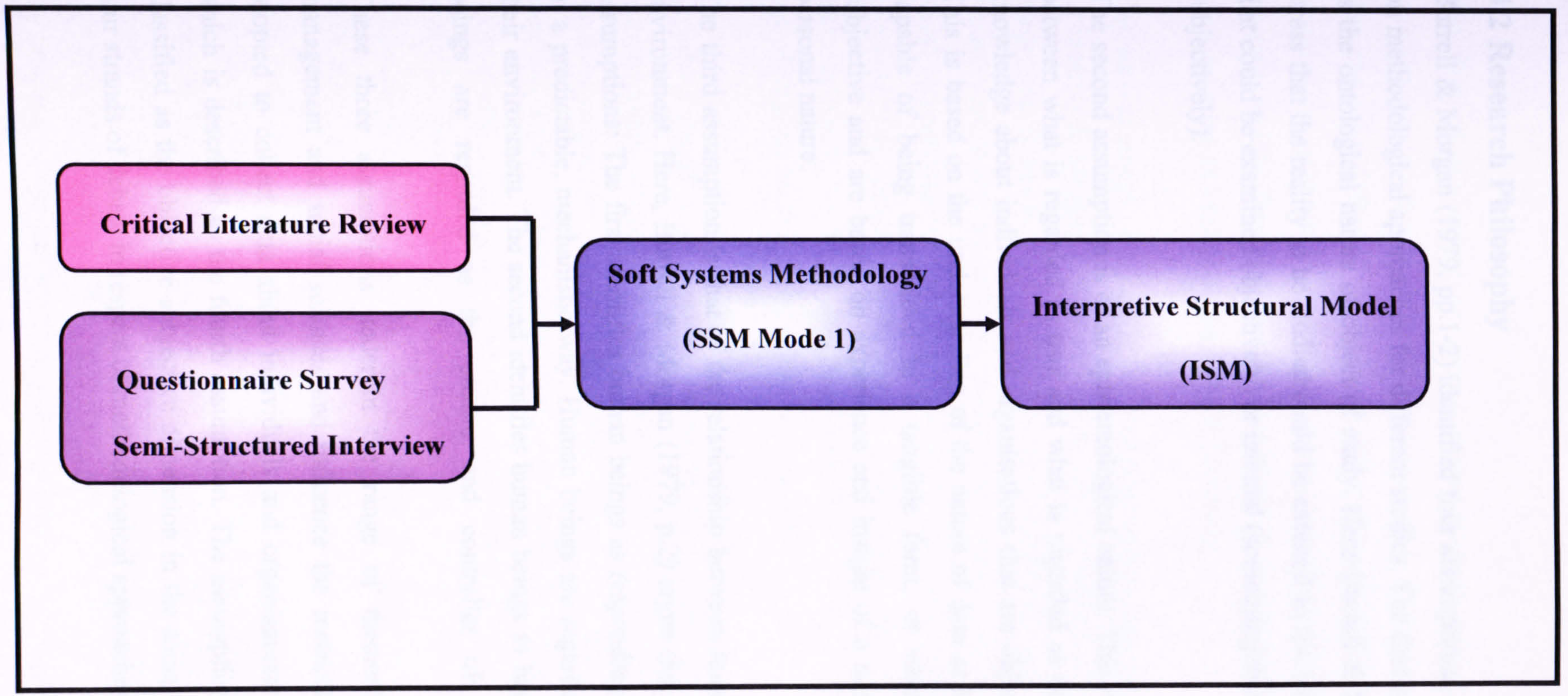


Figure 4.1 Research Methods

4.2 Research Philosophy

Burrell & Morgan (1979, pp.1-2) identified four assumptions, which have bearing on methodological approaches for different studies. The first of these assumptions is the ontological nature of object of study. Here Burrell & Morgan (1979, p.1) stress that the reality to be studied could be external to the researcher (something that could be examined objectively) or internal (something that could be examined subjectively).

The second assumption is of an epistemological nature. This refers to the division between what is regarded as true and what is regarded as false in the nature of knowledge about individuals and organisations that are objects of investigation. This is based on the understanding of the nature of data as being hard, real and capable of being transmitted in a tangible form, or whether they are soft, subjective and are based on experience and insight of a unique and essentially personal nature.

The third assumption is that of the relationship between human beings and their environment. Here, Burrell & Morgan (1979, p.2) argue that there are two basic assumptions: The first identifies human beings as responding to the environment in a predictable, mechanistic way. Human beings are regarded as the product of their environment. The second identifies human beings as being creative. Human beings are regarded as the creator and controller of their environment.

These three assumptions underpin the range of theoretical debates in the management and social sciences and influence the methodological approaches adopted to collect data about individuals and organisations being investigated, which is described as the fourth assumption. The assumptions, which have been classified as the objective-subjective dimension in the social science also, led to four strands of debate in respect of methodological approaches.

The first of this strand of debate is the nominalism-realism divide. In this category, reality is something within the control of people. It is not something they can control. Burrell & Morgan (1979, p.4) argue that nominalism is a social world made up of nothing more than names, concepts and labels which are used to structure reality. Realism, on the other hand, is a real world that is made up of hard, tangible and relatively immutable structures.

The second strand of debate is the positivism-anti-positivism divide. As stressed by Burrell & Morgan (1979, p.5), most the descriptions of positivism in current usage refer to one or more of the ontological, epistemological and methodological dimensions. Positivist seeks to explain and predict what happens in the social world by searching for regularities and causal relationships between its constituent elements. The epistemological nature of anti-positivism, on the other hand, may take various forms but is firmly set against the utility of a search for laws or underlying regularities in the world of social affairs.

The third strand is the voluntarism-determinism divide and its influence on the human nature debate. This debate according to Burrell & Morgan (1979, p.6) revolves around the issue of what model of man is reflected in any given social-scientific theory. At one extreme is a determinist view which regards man and his environment in which he is located. These assumptions are essential in social-scientific theories, since they defined, in broad terms, the nature of the relationships between man and the society in which he lives (Burrell & Morgan 1979, p.6).

The fourth strand of debate concerns the ideographic-nomothetic theory and its impact on the methodological debate. The Ideographic approach to social science is based on the view that one can only understand the social world by obtaining first hand knowledge of the subject under investigation. This approach emphasises the analysis of the subjective accounts which one generates by getting inside situations and involving oneself in everyday flow of life. The nomothetic

approach to social science lays emphasis on the importance of basing research upon systematic protocol and technique. Burrell & Morgan (1979, p.6) stress that

> "it is preoccupied with the construction of scientific tests and the use of quantitative techniques for the analysis of data. Surveys, questionnaires, personality tests and standardised research instruments of all kinds are prominent among the tools which comprise nomothetic methodology".

The extreme positions on each of the four strands are reflected in the two major intellectual traditions which have dominated social science over the last two hundred years. The first intellectual tradition is sociological positivism and its called scientific and hard approach. "In essence this reflects the attempt to apply models and methods derived from the natural science to the study of human affairs" (Burrell & Morgan 1979, p.7). It treats the social world as if it were the natural world, adopting a realist approach to ontology. This is backup by a positivist epistemology, relatively deterministic views of human nature and the use of nomothetic methodologies. Quantitative approach to research is believed to fall within this tradition.

The second intellectual tradition is German idealism. It called phenomenological paradigm; interpretive and soft approach. It is based upon the premise that the ultimate reality of the universe lies in spirit or idea rather that in the data of sense perception. It is nominalist to its approach to social reality. It is anti-positivist in epistemology, voluntarist with regard to human nature and it favours ideographic methods as foundation for social analysis. Burrell & Morgan (1979, p.7) stated that

"many sociologists and organisation theorists have been brought up with the tradition of sociological positivism, without exposure to the basic tenets of German idealism, however, over the last seventy years or so there has been an increasing interaction between these traditions, particularly at a socio-philosophical level".
Qualitative research approach falls within this tradition.

4.3 Research Approaches

There are basically two research approaches in the social sciences; these are quantitative and qualitative approaches. The difference between quantitative and qualitative research have been a subject of academic debates among researches in the past few decades (Bryman, 1988, p.93). Quantitative research uses statistical models to explain data, deals with numbers and is considered hard research. By contrast, qualitative research deals with interpreting social realities, avoids numbers and is considered soft research.

Bryman (1988, p.100) stressed that because quantitative research is deductive, researchers deal directly with operationalisation, the manipulation of empirical variables, prediction, and testing. Quantitative research therefore places great emphasis on methodology, procedure, and statistical measures of validity. On the other hand, the most fundamental characteristics of qualitative research is its express commitment to viewing events, action, norms, values, etc. from the perspective of the people being studied. This approach clearly involves a preparedness to emphatise with those being studied, but is also entails a capacity to penetrate the frames of meaning with which they operate. The basic message that qualitative researchers convey is that whatever the sphere in which data are being collected, we can understand events only when they are situated in the wider social and historical context. Dealing with human behaviour which is not predictable and which might need a not of observation to unravel the mysteries it covers up (Bryman 1988, p.104).

4.3.1 Quantitative-Qualitative Research Methods

Nature of Research

Bryman, (2001, p. 62) defined quantitative research as a distinctive research strategy that entails the "...collection of numerical data and exhibiting a view of the relationship between theory and research as deductive, a predilection for a natural science approach, and as having an objectivist conception of social reality".

In quantitative research method the main method of data collection is social survey. The survey's capacity to produce quantifiable data on large number of people who are selected to test theories or hypotheses has been one of its major attractions. The social survey approach contrasts with the principles of quantitative research in the sciences. The logic of experimental design in the latter is exposed to an experimental actuates the independent variable but the anther control group is not. Any difference in observation between the two groups is considered to be adequate to the independent variable alone. Surveys and experiments are probably the main method of quantitative research but three others are valuables. The analysis of previously collected data, secondly, structured observation with the researcher's records, observations with a predetermined schedule, the resulting data, displays many of discriminating qualities of quantitative research (Bryman 1988, p.11).

Quantitative research is an approach, which uses a method, which is analogous to scientist's remark about how they investigate the natural order variables, control, measurement and experiment. The logic and manner of natural sciences are taken to provide logical epistemic criterion against which empirical research in the social sciences should be estimated before it can be processed as veracious knowledge (Bryman 1988, p.12).

Qualitative research is defined by Preissle (2002)

> "... as a loosely defined category of research design or models, all of which elicit verbal, visual, tactile, olfactory, and gustatory data in form of descriptive narrative like field notes, recordings, or other transcriptions from audio-and videotapes and other written records and pictures or films".

In qualitative research the method of data collection is participant observation, which is mostly associated with the ethnography method. Most participant observers conduct interviews. Some qualitative researchers make use of an interview schedule but others operate with a loose collection of theme that they want to cover. Qualitative research is viewed in terms of its assumption about the study of social reality. The main rational undercurrents that tend to be viewed as providing qualitative research with separate the knowledge or theory is: phenomenology symbolic interactionism, naturalism and ethogenics. The nature of social reality is a specific meaning and relevant structure for the being that is living, acting, and thinking with the research in social reality (Bryman 1988, pp.45-46).

4.3.2 The Relationship Between Researcher and Subject

In quantitative research, the researcher's contact or lead with the people being studied is fairly transient or even nonexistent. The data collection style mostly extends over many months; the contact with each individual is generally brief. In any experiments before or after, the investigator returns to the subjects which he or she research for, but the level of contact or the degree is still fairly short-lived. Actually, the use of some methods associated with quantitative research may require no contact or deal with subjects under any circumstances, except in an indirect signification, for example, postal questionnaire surveys. In interview surveys, the main investigator may have few or no contact with respondents since hired staff frequently carries out many of the interviews.

By contrast, qualitative research stands much more to lean against or on contact, that when participant observation is the central method. The level or degree to which there is sustained contact within a particular study will change a better deal. In any case, the nature of the unstructured interview invariably requires a fairly close relationship between a researcher and subject, which are relatively rare in survey interviewing.

The central issue in the positivistic tradition concerns the relationship between that part of the world, which is the object of a particular study and the theoretical framework, which is constructed in order to explain the observations that are made on the world.

Non-positivist or phenomenological research represents a different and challenging way to conduct research. It is less structured and prescriptive than positivist research, and because of this potentially more difficult, particularly in analysis of such soft, rich data. However, potentially, it also offers a more complete and rich understanding of the behaviour that is being studied (Bryman 1988, pp.95-100).

There is no uniquely best approach to research, either in the natural or in the social sciences, and the best that can be done is to describe the ways in which research is carried in a variety of situations.

4.4 Research Design

The research design is the plan of doing research. Bowling, (1997, p. 125) stated that "...research design refers to the overall structure or plan of the research". It depends on the purpose of the research and the problems that the research intends to investigate. "It is an overall plan the researchers select to carry out their studies. The design must be both scientifically acceptable and practical enough to be manageable in the process of supplying useful information" (Sweeney, 1981, p. 119).

Burnard & Morrison (1994, p. 61) noted that research design is sometimes used to designate a particular approach to research. They identified three types of design, which are commonly used: 'survey, experiment and case study'. Various types of research methods have been used in the Information System (IS) field. Galliers (1992, p. 160-163) identified eight major methods that are currently being used. These are: 1) Laboratory Experiments, 2) Field experiments, 3) Case Studies,4) Forecasting and Futures 5)Research Simulation, 6) Phenomenological Studies, 7)Action Research and 8) Survey.

4.5 Selection of Research Method

This study uses two popular methods to fulfil its objectives. These methods are the survey method in the form of questionnaires and interviews. Another method adopted is action research in the form of SSM. This will be discussed in greater detail in the later stage of this chapter. After reviewing the various types of research methods available, the conclusion is that the most appropriate research method to achieve the objectives of this research was the coupling of quantitative (questionnaire) with qualitative (interviews) methods to achieve methodological pluralism (Ragsdell & Wilby 2001, p. 255). This will provide a richer data and stronger basis for analysing the research findings. The integration of the two methods will also provide a very effective mechanism for combining the complementary advantages of the quantitative and qualitative research approaches. Krueger (1994, p. 39) stated that "increasingly researchers are recognising the benefits of combining quantitative and qualitative procedures, resulting in greater methodological mixes that strengthen the research design". Churchill (1995, p. 99) stated, "the problem as finally defined will often suggest one approach over the others, but the researcher should recognise that the approaches often can be used most productively in combination". However, there is no single best way of collecting data; the method chosen depends on the nature of the research questions posed and the specific question the researcher wants to ask the respondents. The aim of all methods is to obtain valid and reliable data-

true answers to questions, not distorted by the methods of collection or prone to chance fluctuation (Wilson 1996, p. 98).

4.6 Survey Design: Techniques of Data Collection

Survey design is a way of collecting information about a range of phenomena. It usually involves asking respondents questions. It is, "the systematic gathering of information from a sample of people, events, literature records and so forth" (Burnard & Morrison 1994, p. 61). According to Bowling (1997, p. 174) the process of data collection is through "... a sample of population of interest, usually by personal interviews (face-to-face or telephone, postal or other self- completion questionnaire methods or diaries). The survey is distinct from a census, which is a complete enumeration and gathering of information, as distinct from partial enumeration associated with sample".

4.6.1 Questionnaire

A questionnaire is an instrument used to collect information by providing questions for the respondents to answer. The questionnaire is very often a technique used in the quantitative method. It can be described as a reformulated, predetermined written set of questions to which respondents put their answers, usually within defined alternatives Sekaran (1992, p.200). Questionnaires are also considered to be an efficient mechanism for gathering data when the researcher knows specifically what is required and how to measure the variables of interest and importance.

The Advantages and Disadvantages of the Questionnaire

Nachmias and Nachmias (1989), (Bryman 2001, pp. 129-132) and (Robson 2002, pp. 230-232) offer some of the advantages and disadvantages of questionnaires in research.

There are many advantages to be derived from using the question. The first advantage is the cost. It is cheaper than personal interviewing; it does not require a trained interviewer. All it needs is the cost of planning, sampling, duplicating, mailing, and providing stamped, self-addressed envelopes for the returns. The processing and analysis are usually also simpler and cheaper than those of the personal interview. The lower cost in administration of a questionnaire is particularly evident when the population under study is widely spread geographically. Another advantage of questionnaire is the reduction in biasing error. Questionnaire reduces the biasing errors that might result from the personal characteristics of the interviewers and from variability in their skills.

Questionnaires also make it possible to ensure confidentiality by maintaining the anonymity of the respondents. The assurance of anonymity with questionnaires is especially helpful when the survey deals with sensitive issues. The other advantages of questionnaires are accessibility and opportunity to cover wider geographic area at minimal cost and in situations where considered and contemplative answers rather than immediate answers are required.

However, in spite of its advantages discussed above, there are some disadvantages in using this technique of data collection. First, due to its informal nature, questionnaire requires simple questions to be asked. The questionnaire can be used as an instrument for data collection only when the questions are straightforward. Another disadvantage is that there is no opportunity to probe further. The answers have to be accepted as final, there is no opportunity to probe the given answer.

Questionnaires do not also allow the interviewer control over who fills in the questionnaire. Researchers have no control over the respondent's environment, thus they cannot be sure that the right person completes the questionnaire. There is also sometimes, low response rate to questionnaires. The final disadvantages of the questionnaires and it can be the most serious problem is that they often fail to obtain an adequate response rate.

4.6.2 Interview

An interview is a structured verbal exchange between the researcher and one or more of the respondents. Although interviewing is often regarded to be the best method of gathering information, its complexity can sometimes be underestimated. Robson (2002, p. 272) stated that "face to face interviews offer the possibility of modifying one's line of enquiry, following up interesting responses and investigating underlying motives in a way that postal and other self-administered questionnaire cannot". There are three types of interviews, structured interview, semi-structured, and unstructured interview. Most interviews are conducted on a one to one basis, between the interviewer and the interviewee.

The Advantages and Disadvantages of the Interview

Nachmias & Nachmias (1989), (Bryman, 2001, p.143) and (Robson, 2002, pp. 272-273) offer some of the advantages and disadvantages of interviews.

The first advantage of interviews is its flexibility. Interviews allow for greater flexibility in the questioning process. The interview allows the interviewer to determine the wording of the questions, to clarify terms that are not clear, to control the order in which the questions are presented, and to probe for additional and more detailed information.

Interviews also make it possible to control interview situation. This is a major advantage because it allows greater control over the interviewing situation. An interviewer can ensure that the interviewee answer the questions in the appropriate sequence.

Another advantage of the interview is the high response rate. The personal interview results in a higher response rate than the mail questionnaire. Respondents who normally would not respond to a mail questionnaire can be more easily reached and interviewed.

Finally, in interviews collection of supplementary information is possible. An interviewer can collect supplementary information about the respondent. This may include background information about the respondents' personal characteristics and their environment that aid the researcher in the interpretation of the results. Moreover, an interview situation often yields spontaneous reactions that the interviewer can record and that might be useful in the data analysis stage.

In spite of its advantages there are some obvious disadvantages of the interview technique. The first disadvantage is the high cost. The cost of interview studies is significantly higher than that of mail survey. There are costs involved in the organisation required for selecting, training, and supervising interviewers, in paying them, and in the travel time required to conduct interviews.

Another disadvantage is interviewer bias. The interview allows for greater flexibility, which is its chief advantage. However, sometimes this leaves room for personal influence and bias of the interviewer

In interviews, there is also lack of respondent's anonymity. The interview lacks anonymity, which the questionnaire typically provides. Often the interviewer knows all or many potential respondents (or at least their names, address, and telephone number). Thus, the respondent may feel threatened or intimidated by the interviewer, especially when the topic or some of the questions are of a sensitive nature.

Bell (1995, p.6) stated that classifying an approach as qualitative or quantitative, ethnographic, survey, action research or whatever, does not mean that once an approach has been selected, the researcher may not move from the methods normally associated with that style. Each approach has its strengths and weaknesses, and is particularly suitable for a particular context. Yet there are occasions when qualitative researchers draw on quantitative techniques and vice versa, therefore they could be used interchangeably. Both qualitative and quantitative methods of data collection were adopted for this study. Both methods have advantages for particular parts of the research. It was therefore decided to use both approaches.

4.7 The Sampling Process

After clearly identifying and selecting the appropriate research data collection instruments, the next step is to select the elements, the sample frame from which the information will be gathered. Sekaran (1992, p. 227) stated, "It would be practically impossible to collect data from, to test or to examine every element. Even if it were possible, it would be prohibitive in terms of time, cost and other human resource". Churchill (1995, p.496) and Diamantopoulos and Schlegelmilch (1997, pp. 10-11) also suggest that studying a sample rather than the entire population is also likely to lead to more reliable result, mostly because there will be less fatigue, and hence fewer errors in collecting data.

To draw a representative sample of the population for this research, certain steps were followed. This process was adapted from Churchill (1999, p. 498). The sampling process adopted consists of six steps. Each step is described briefly below to show how it was adapted in this study as shown in Figure 4.2 below.

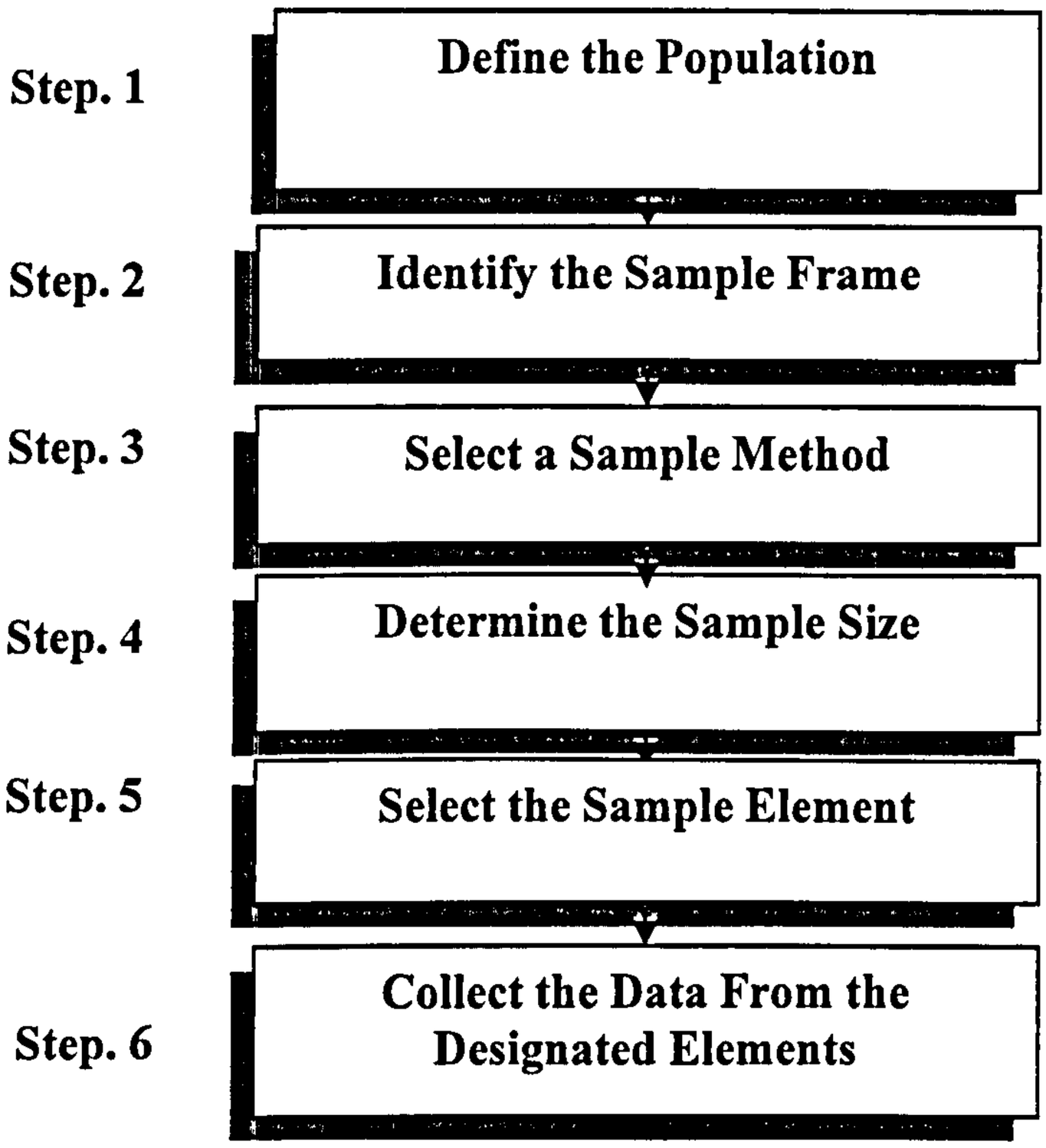


Figure 4.2 The six –step process for drawing a sample Process Adopted from Churchill (1999)

Step 1: Define the population: Churchill (1999, p. 496) defined the population as "The totality of cases that conform to designated specifications. The specifications define the elements that belong to the target group and those that are to be excluded".

Step 2: Identify the sampling frame: The second step in the sample selection process of identifying the sampling frame is the list of the elements from which the actual sample will be drawn. In other words it is a list of the population elements, (Diamantopoulos & Schlegelmilch 1997, p. 14).

Step 3: Select the sample: The third step is the specification of exactly how the sample member will be selected. Churchill (1995, p. 105) called this "approach the experience survey". This method attempts to tap the knowledge and of those familiar with subject being investigated.

Step 4: Determine the sample size: The fourth step is to determine the number of the sample selected.

Step 5: Select the sample elements: The fifth step indicates that the researcher needs to actually pick the elements that will be included in the study.

Step 6: Collect the data: finally the researcher needs to collect data from the designated respondents, which will be described later.

4.8 The Research Population and Sampling Frame

The population was defined as all of the nursing staff working at HMC and at PHC in the State of Qatar. This includes the Administrative Director of HMC, Director of Health Information System, Assistant Medical Director for Administrative Affairs, and Director of Personnel.

Sample Frame

For the sampling frame, a list was constructed of the names of all nursing staff working at HMC and PHC. The list was obtained from the Nursing Departments with permission from the Directors of Nursing at HMC and PHC.

Type of Sampling

Purposeful sampling was used in the research within this approach, criterion sampling was closer as the most appropriate for use with the sample population. The sample for the research was all nurses working as first and middle line management working at HMC and PHC, first line, staff nurses grade 4, acting head

nurses and head nurses. The middle line management were, acting assistants' director of nursing, and assistants' director of nursing. The criteria for the sample was identified as, the first line and middle line management nursing staff. They have staff responsibilities within their units.

Senior management nursing staff at HMC and PHC were senior assistants' director of nursing, staffing coordinator and the directors of nursing. In addition to Departmental Directors at HMC for the interviews. It was envisaged that this type of sample would be suitable for getting genuine responses. In addition, it was assumed that the Administrative Director of HMC, Director of Personnel and the Assistant Medical Director for Administrative Affairs (the was director of nursing for more than 15 years at HMC) would had more access to more information regarding the current and future organisational strategies for HMC and PHC, the Director of Health Information System would possess sufficient organisation and technical knowledge regarding IT to be included as an expert knowledge.

Research Sample

How big should a sample be? A review of the literature indicates that it is not an easy question to answer. Bryman (2001, p. 93) stated that "the decision about sample size is not a straightforward one: it depends on a number of considerations and there is no one definitive answer".

The sample size for this study was 314 the total number of Nursing Staff working in first and middle line management at Nursing Department at HMC and PHC for the questionnaire. Total of 11 senior management staff were chosen for the interviews, 7 Nursing Staff, the Administrative Director and 3 Departmental Directors at HMC and PHC as subjects.

4.9 Procedures for Data Collation

4.9.1Questionnaire Design

In deriving a final version of the questionnaire, a great effort was made to keep the questionnaire short, unambiguous, easy for the respondent to complete, and easy to analyse. The resultant questionnaire is listed in Appendix (1).

The questionnaire was structured into four sections, each encompassing a different theme, as follows:

- **Section A.** Demographic Data: This section comprises of questions gathering profile information about the respondents. The respondents were asked for, their gender, age, nationality, highest qualification, experience, etc.

- **Section B.** Nursing Staff Records System. This section consists of questions getting more information about the staff record system in used at their units, respondents were asked about, for example, number of staff working in the unit, do they have a record for each staff, type of documents in staff records, where the nurses records are kept at present, etc.

- **Section C.** Use of Computer (Computer usage).This section comprises of questions related to computer usage. Respondents were asked about the use of computers at work, how much they use a computer at work, how often do they use it, what do they use computer at work for, have they undertaken any computer courses, etc.

- **Section D.** Staff Attitude Towards Computers. This section comprises of one question. Respondents were asked 21different statements to get their attitude towards computers in relation to health care sector.

Validity and Reliability

Saunders & et al (2000, p.205) stated that "validity and reliability of the data collected, enables the researcher to obtain some assessment of the questions".

Whatever procedure for data collections selected, it should be examined to evaluate to what degree it is reliable and valid. Reliability is the extent to which a test produces similar results under constant conditions on all occasions, hence, if a question produces one answer on one occasion, but a different answer on another it is not reliable.

Validity is about whether an item measure or describes what it is supposed to measure or describe. An item or procedure could be reliable but not valid, for example, it could be produce the same responses on all occasions, but not measure what it is supposed to measure. However, an unreliable procedure is also not valid. A number of questions used in this study were adopted from a previous research, because they shown a high degree of reliability and validity from Cassidy & Eachus (2001). Other questions however, were developed specifically to meet the needs of this study.

4.9.2 Pre-testing Questionnaire (Pilot Study)

Once the initial questionnaire construction has been completed, it is wise to try out the result. Pre-testing fulfils the role of a dress rehearsal and is useful for obtaining experience of how the question will be understood (Stone & Harris , 1984, p.37).

Moser & Kalton (1985, pp.50-51) argue that a pre-testing before the main survey provides an indication of suitability of the questions and of any hidden problems in carrying out the main survey. Furthermore, it is the researcher's last safeguard against the possibility that the main survey maybe inefficient.

Reynolds & et al (1993, pp.171-182). Stated that "when the sample (for pilot study) is discussed in the literature it is generally small, ranging from 5-10, 50-100 depending on the researcher concerned and the type of respondents". Therefore, the pilot study was essential for testing the instruments. On 27th of November 2001 the researcher met with eight nurses from first and middle line management at HMC and PHC and explained the purpose of the doing the pilot study of this research.

Six questionnaires were returned. Generally, there were no major comments about the pilot questionnaire except for minor recommendation concerning the English wording and the layout of the questionnaire. This pilot study gave the researcher and added confidence that the questions were appropriate. According to the result from the questionnaires a few modifications were introduced.

The Questionnaire

All questionnaires were sent out with an accompanying letter. In constructing this, the suggestions by (Stone, 1984, p38) & (DeVaus, 1996, pp.116-117) were followed:

1 The identity of the organisation conducting the study. You may also include details of the funding body and the identity of the researchers involved if you wish

2 The purpose of the study and its usefulness. This may include details of expected uses of the data and from of publication

3 Explain why the respondent is important by simply describing the way he or she was chosen

4 Describe the degree of confidentiality which the respondent can expect and explain the purpose of the identification number

5 The respondent should be told who to contact if he or she has any enquiries. A phone number should be included

6 Thank the respondents for their co-operation.

4.9.3 Questionnaires Distribution Techniques

On the 8th of November 2001 an official letter from the researcher's supervisor was sent to the Administrative Director of HMC in the State of Qatar requesting his approval for the researcher to do the fieldwork within HMC and PHC. Appendix (2).

On the 19th of November 2001 the Administrative Director met with the researcher. The researcher answered all the questions been asked related to her study and explained about the purpose of the survey. Following the interview approval was obtained. Due the Holy month of Ramadan, Eid, Christmas and New Year holidays it was decided that the questionnaires would be distributed at the beginning of the following year.

On the 9th of January, 2002 a meeting was held between the senior assistants' directors of nursing at HMC and PHC and the researcher. The researcher explained the purpose of the survey and sought their cooperation. Each of the senior assistants' directors of nursing was given questionnaires to be distributed to each of their staff. A list of the number of nursing staff working at level first and middle line management was obtained from the nursing office with permission of the directors of nursing at HMC and PHC. A total of 314 questionnaires were distributed. Table 4.1 shows how the number of questionnaire that were distributed in each hospital.

Institutions	HGH	WH	RH	PHC	Total
Number of Questionnaires Distributed	183	62	58	56	314

Table 4.1 Total Number of Questionnaires Distributed in each Hospital

The questionnaires were distributed to Assistant Directors of Nursing, Acting Assistant Directors of Nursing as middle line management nursing staff, and to head nurses, acting head nurses, and staff nurses grade 4 as first line management nursing staff. Table 4.2 shows the distribution of questionnaires by position.

Position	HMC	PHC	Total
First Line Management Staff	247	47	294
Middle Line Management Staff	11	9	20
Total	258	56	314

Table 4.2 Distribution of Questionnaires by Position

A copy of a letter was attached to each questionnaire advising the nursing staff, when and where the questionnaires should be returned.

The questionnaire was distributed on the 12th of January 2002 and retuned on the 26th of the same month.

On the 22nd of January 2002 telephone calls were made by the researcher to the senior assistants' director of nursing reminding them about the questionnaire survey. When conducting the questionnaire survey, the recommendation of (Stone, 1984, p.38) and (DeVaus, 1996, p.118) were followed:

- Number each questionnaire and keep a record of numbers and corresponding names or addresses so reminder can be sent out
- Post all questionnaires at the same time, if possible
- Enclose stamped addressed envelopes, if necessary
- Specify a date by which a reply would be appreciated
- Send a reminder letter to respondents who have not replied after a given time and enclose a second questionnaire.

4.10 The Interview

Patton (2002, p. 51) stated that "the purpose of the interview is to find out what is in and on someone else's mind and to gather their stories".

The second stage of data collection was carried out via semi-structured interview.

4.10.1 Pre Testing the Interview (pilot study)

Pre-testing interviews aimed to examine what would happen when the interviews took place with the respondents. The following points stated by (Kvale, 1996, pp. 133-135) were observed:

- The interview schedule should be followed, but it can be used informally;
- The interview should be conducted in informal and relaxed atmosphere, and the interviewer should avoid creating the impression that what is occurring is a cross- examination or quiz;
- The questions should be asked exactly as worded in the questionnaire;
- Questions should be presented in the same order as in the questionnaire;
- Questions that are misinterpreted or misunderstood should be repeated and clarified. In most cases respondents should not have any problem in interpreting or understanding a question.

For the Pre-testing interview (pilot study) two senior assistants director of nursing at HMC and one at PHC were interviewed, the researcher met with the three senior assistants' director of nursing and explained the purpose of the pilot study. The researcher followed the guidelines from Kvale, (1996).

The interview took place separately in each senior assistants director of nursing office, each interview lasted between 15-20 minutes. The interview questions can be found in Appendix (3).

Following the pre-testing, minor recommendations concerning the English wording were the final wording was established to avoid ambiguities and lack of clarity.

4.10.2 Semi-Structured Interview Techniques

Eleven of the senior management staff were chosen for interview, from HMC and PHC in order to get the richest possible picture of the current situation of the nursing staff record system (see table 4.3).

Senior management nursing staff at HMC and PHC consisted of the senior assistants' director of nursing, staffing coordinator and the directors of nursing; it is anticipated by interviewing the senior management nursing staff more information regarding the current staff record system and the future strategies for nursing department would be gained. In addition, three Departmental Directors and Assistant Medical Director for Administrative Affaires at HMC were selected as an appropriate representative sample as interviewees for the research. It was envisaged that this type of sample would be suitable for giving genuine responses. These Directors would have in-depth knowledge of current and future organisational strategies. Therefore, interviews were planned to be carried out with these individuals to bring "rich data" to the research and to obtain the respondents' opinions, expectations and feelings. A telephone call to the interviewee requesting their co-operation for the interview was made then followed by a visit to them in their work place. Appointments were made with each one of them, on the date and the time and the place which was agreeable. The Interview was carried out in the respondents' offices. The interview started on the 12th of February 2002 and took a week to conduct and it was agreed to do two interviews per day. The interviews were recorded. Each interview lasted 15-20 minutes and permission for recording was obtained beforehand.

Position	HMC	PHC	Total
Administrative Director	1	-	1
Personnel Director	1	-	1
Health Information System Director	1	-	1
Assistant Medical Director for Administrative Affaires.	1	-	1
Directors of Nursing	1	1	2
Senior Assistant Director of Nursing	3	1	4
Staffing Co-ordinator	1		1
Total	9	2	11

Table 4.3 Position of the interviewees

In conducting interviews, there are a number of steps that a researcher would be required to follow to make the data collection systematic and methodical. This study adapted the guidelines for interviewing provided by Patton (1987, pp.119-134) and (Mason 1996, pp.43-46). This involves following a number of steps in the collection of interview data.

One of the first steps is to make sure that throughout the interviewing process, from planning through data collection to analysis, it is important that the purpose of the investigation is kept central. The purpose has to guide the interviewing process. In addition, the fundamental principle of qualitative interviewing is to

provide a framework within which respondents can express their own understandings in their own terms. Therefore, it is essential that the questions must be clear and logically ordered, using understandable and appropriate language. Adopting this approach presupposes that one question must be asked at a time, while probes and follow-up questions should be used to solicit more detail. Similarly, a personal rapport and sense of mutual interest should be established with the interviewee.

Further, neutrality toward the specific content of responses must be maintained. The interviewer is there to collect information, not to make judgments about the person. Hence, the interviewer should observe while interviewing and be aware of and sensitive to how the interviewee is affected by and responds to different questions.

Also, where possible interviews should be tape-recorded to capture full and exact quotations for analysis and reporting. As soon as possible after the interview recording should be checked for malfunctions, notes reviewed for clarity, elaborated where necessary, and observations recorded. It is necessary that whatever steps are appropriate and necessary should be taken to gather valid and reliable information.

Finally, the person being interviewed should be treated with respect. It should be kept in mind that it is a privilege and responsibility to peer into another person's experience. Again, it is important to bear in mind that interviewing needs to be practiced in order to develop the necessary skills.

4.11 Action Research

Action research is a growing field and contains a great number of research methodologies. Flood & Jackson (1999) pointed out seven types of Soft Systems Methodologies that are assumed to be classified under the umbrella of the action research paradigm. These encompass the Strategic Assumption Surfacing and Testing Methods (SAST); Viable System Diagnosis (VSD); System Dynamic (SD); Interactive Planning (IP); Soft Systems Methodology (SSM); Critical Systems Heuristics (CSH); and Total System Intervention (TSI). In addition, Avison & Fitzgerald (1995,p.275) identified a number of information system methodologies including the Gane and Sarson Structure Approach (STRADIS); Structured Systems Analysis and Design Methodology (SSADM); the Jackson Systems Development Approach (JSD); Information Systems Work and Analysis of Changes (ISAC); Effective Technical and Human Implementation of Computer-based Systems (ETHICS); Soft Systems Methodology (SSM); and the Multiview Approach (MA).

The term action research is popularly attributed to Kurt Lewin 1946. According to O'Brien (2001) action research is known by the many other names, including participatory research, collaborative inquiry, emancipatory research, action learning and cotextural action research, but all are variations on a theme. Put simply, action research is 'learning by doing' a group of people identified a problem, do something to solve it, see how successful their efforts were, and if not satisfied, try again. A more succinct action research defined by Gilmore et al (1986, p.161)

> "Action research ...aims to contribute both to the practical concerns of people in an immediate problematic situation and further the goal of social science simultaneously. Thus, there is a dual commitment in action research to study a system and concurrently to collaborate with members of the system in changing it in what is together regarded as a desirable direction. Accomplishing this twin goal requires the active collaboration

> of researcher and client, and thus it stresses the importance of co-learning as a primary aspect of the research process".

Action research is a method that may enable researchers to gain a better understanding of social systems and, at same time, to bring about potential improvement to the situation under investigation. Action research can depend on questionnaires, interviews, observations or content analysis as sources of data collection. The strength of this technique is that gives professionals more chance to take advantage of their practice as a research opportunity (Dick 2001).

It allows researchers, through its recycling steps, to redefine the problem being investigated, together with its hypotheses, which may lead to changing and re-evaluating the research strategies.

The limitations of this technique are that the different perceptions of researchers will inevitably lead to different interpretations; the results generated by researchers cannot be generalised (Birley & Moreland 1998, p. 34) and the lack of control over individual variables will affect any attempts to differentiate between cause and affect (Dick 2001).

4.11.1 Choice of Action Research

The researcher feels that action research methodology is the most appropriate method in undertaking this project and the justifications for adopting this approach as follows:

- Action research aims to achieve two significant objectives: 'research' and 'action'. The aim of research is to augment knowledge and understanding of the researcher's clientele. Action derived from debating and negotiating with all actors, including the researcher, is likely to lead to change or improvement. (Dick, 2001).

- Action research is an educative approach that gives researchers the opportunity to explore, identify, learn and tackle problems in their real situations. This makes the method and its results more realistic and authentic.
- Myers (1997, pp. 258-259) stated that "action research enables researchers to carry out rigorous research that is relevant to their practice, particularly when supported by perspectives such as critical".
- Action research is the technique best able to ascertain the probability of, or conditions which will be necessary to bring about, change in behaviour or attitudes within a certain social group, therefore, it is more useful than other types of research methodology based on 'inductive' inference, that is, those derived from past actions, and 'deductive' inference, those which may occur in specific future instances.
- Action research or interpretive analysis is a collaborative and participative technique that requires the researcher to invite and encourage all actors or stakeholders involved in the situation to take part in all stages of the research. It considers their perceptions on order to debate and to bring about a desirable change or improvement.

4.12 Soft System Methodology (SSM)

SSM has attracted considerable attention and has been used successfully in several fields; for example, in industry, management, and in the healthcare field. It was natural to look for industrial applications of the idea since the original group developing the approach came from a department of Systems Engineering at Lancaster University in the UK in the 1960s.

SSM has been applied to different kinds of studies or situations. Al Hasan (1992) stated that many studies have not been published because they are consultancy projects for organisations and companies. Therefore, a lot of studies are not formally written up and are grey literature only.

SSM has had a practical application in organisational analysis. Checkland & Scholes (1990) used SSM in the industrial sector, Kurbanoglu (1992) used SSM to investigate co-operation network activities among Turkish information units, Bustard et al. (2000) used SSM for system modelling in business to examine the potential gain from using this technique and Chilvers (2000) used SSM to examine the issues facing information professionals attempting long-term management of digital data objects in the UK.

In the Middle East, Al Hasan (1992) used SSM to examine personnel management problems in Kuwait libraries and Suhaimi (2001) used SSM to investigate an ill-structured problem in the public library sector in Brunei.

In the healthcare field, Brember (1985, pp. 59-74) chose SSM as a way of relating the evidence of a user survey to the practical problems of medical library management while Le Fevre & Pattison (1986, pp. 180-185) described the importance of planning for the introduction of information systems into hospitals and healthcare under the aegis of the Health Department of Western Australia.

SSM was used as the main tool for description with Le Fevre & Pattison (1986) also discussing the potential advantages of SSM in various aspects of information planning, namely the in-depth analysis of internal and external environmental factors impacting on the problem.

Checkland & Scholes (1990, pp. 89-114) applied SSM at community level within the NHS in the UK. Also, Smallwood (1990) used SSM to address problems concerning the transfer of patient information and communication patterns amongst nurses.

Macias-Chapula (1992) used SSM to investigate information problems at the structural level of health care in Mexico. Macias-Chapula (1995,pp. 283-288) presented a case report of a health care system where SSM was used to identify the value, impact and barriers to information access and use, as related to the

quality of health care. The research was based on 36 regional co-coordinators for Biomedical Education and Research at Mexico's Social Security Institute.

Also in the healthcare field, Hernando (1997, p. 116) applied SSM and carried out a research study to investigate the importance of basing health care decision-making on research evidence. Hernando found that: "there are many current initiatives to disseminate information on evidence-based practice, but only a small proportion relate to nursing intervention or to care outside the setting of the district general hospital". The main criticism of the argument is that healthcare professionals are governed by strict rules of compliance as they deal with the health of human beings.

Kirkham (2000, pp. 249-53) discussed the work being carried out by a Healthcare Trust at Hereford Health Authority in the UK, which is taking a systemic approach to the implementation of Integrated Care Pathways. Kirkham (2000) starts her work by examining the context of recent thinking and practice in knowledge management and examines both the technical and socio-cultural aspects of knowledge management. She also considers the current cultural climate of the NHS and outlines the research undertaken.

In nursing, Mathiassen & Nielsen (1995) adapted SSM (Mode 2) in nursing and explored a number of potentially relevant systems. These included the provision of a professional and efficient surgical service for the community; the reorganisation of a surgery into one unit; the preservation and development of nursing skills and values; obtaining resources for the unit; supporting sections and the coordination between them; and communication between sections.

In addition, Hernando (1997, pp. 105-119) adapted SSM to look at the use of library and information services by nurses for patients care purposes and found that a small proportion of all categories of qualified staff were library users. In nursing informatics education, Kokol (1999) presented a new nursing informatics

curriculum and the process of its development based on Checkland's Soft Systems Methodology.

Furthermore, Stokes & Lewin (2004, pp. 47-54) used SSM to explore the information -seeking behaviour of nursing teachers in a school of health studies: a soft systems analysis. SSM was used as a theoretical model both to derive deeper insights into survey data and suggest enhancements to this aspect of teacher activity. SSM identified several features related to the information seeking behaviour of lectures that has resulted in an improved training programme and promoted enhancements to school's current awareness service and library Internet pages.

Fennessy (2001, pp. 4-7) described how knowledge management problems arising in evidence-based practice can be explored using SSM and action research. A health information centre working exclusively in evidence-based practice is used as a case study to explore how work teams and systems can be better utilised to provide clinically effective information for healthcare practitioners.

Connell (2000, pp. 150-160) used SSM to help in the design of an information system for health service users providing care in the community in a part of the South and West Health Region in the UK while Al-Zahrani (2001) used SSM to investigate the needs for the provision of the infrastructure required for a computer network system to enable Saudi University Hospitals to exchange data, information and knowledge. Also, O'Neill (2001, pp.1074-1075) used SSM on clinical governance to examine how systems awareness encourages a broader view of how organisations actually work, and why things go wrong.

Iles & Sutherland (2001, pp. 34-38) describe SSM as a method for examining complex social processes in a participatory way that allows different views of the world situation be expressed, brought to light, challenged and tested. They describe the value of the rich picture in that it expresses quite simply the complex relations and how these influence the situation.

Shapiro & Shapiro (2003) discuss the application of SSM in the NHS in the UK in the context of 'soft OR'. The debate about the boundaries of soft approaches to operational research was acknowledged by all that SSM resides within it. Regarding the application of SSM, Shapiro & Shapiro (2003) stated that: "Soft systems methodology is particularly appropriate for tackling healthcare problems, where conceptual understanding of an interactive system may be more important than devising a quick fix solution (Shapiro & Shapiro, 2003, p. 247). However, in terms of using SSM in nursing informatics management and its application in nursing staff records systems, no studies have been identified.

4.13 The Concept of the Soft System Methodology (SSM)

This study makes use of Checkland's Soft Systems Methodology (SSM) and the reasons behind the adopting SSM are discussed within the following section. However, before elaborating on SSM, it is crucial to assimilate some fundamental key concepts that will facilitate overall understanding of the ideas behind SSM. These concepts are systems, systems thinking and 'soft' and 'hard' approaches.

4.13.1 Definition of System

The word system is perceived and defined in a different of ways; (Maier & Rechtin 2000, p.8) define a system as "a collection of different things which together produce results unachievable by elements alone". However, (Checkland, 1991, pp. 317-318) describes a system as

> "A model of a whole entity; when applied to human activity, the model is characterised fundamentally in terms of hierarchical structure, emergent properties, communication, and control. An observer may choose to relate this model to real-world activity. When applied to natural or man-made entities, the crucial characteristic is the emergent properties of the whole".

Yet (Bocij & et al.1999, p.25) "consider a system as a set of elements, such as people and things that are related to achieve goals". In this sense, human body can be viewed as a system; it consists of sub-system, such as digestive system, nervous system, etc.

4.13.2 Systems Thinking

O'Connor & McDermott (1997, P. 255) defined systems thinking as "a way of thinking that focuses on the relationships between parts, forming a connected whole for a purpose". System thinking is a holistic, analytic and pragmatic framework of thoughts and ideas that can be used in tackling complexity by methodological means. It can assist in determining certain rules that can help in predicting the future, preparing to meet its challenges, and will, then, lead to a greater level of control over it. The systems thinking approach replaces the mechanistic traditional thinking approach that involves breaking a problem into components, then studying each part autonomously, drawing conclusions about the whole is the final stage. Systems thinking is "a conceptual framework. Rather than viewing an organisation as driven by a set of 'factors', most of them external, we represent it as the continuous interplay of the interactions between elements because the behaviour of a system is largely generated by those interactions between its elements" (Balle, 1994, P. 36). Systems thinking, on the other hand, expand its view to focus and study the interrelationships between all elements within systems in order to explain complex social phenomena (Aronson, 1996).

4.13.3 Distinction Between Hard and Soft Problems

In selecting a methodology for problem solving, a distinction between hard and soft problem is very important. (Checkland 1999, p. A10) stated that "in the literature it is often stated that the hard system thinking is appropriate in well-defined technical problems and Soft system thinking is more appreciate in fuzzy ill-defined situations involving human beings and cultural considerations". Checkland (1999, p. A10) argued that distinctions between 'hard' and 'soft' systems thinking is a cornerstone in understanding Soft Systems Methodology. He

further noted that hard systems thinking is built on a belief that the 'holon' is rooted in the perceived world, while soft systems thinking is based on the idea that the 'holon' can be formulated in the methodology, M, the process of enquiry. In terms of perceiving the world, the hard approach is defined as systemic, while the methodology (M) can be systematic.

The soft approach on the other hand perceives the world as problematic, while the methodology (M) can be systemic. Flood and Jackson advocate that:

> "The hard view regards problems as real and solvable, assuming that ends are easily and objectively definable. The primary concern of hard methodologies, therefore, is how we should reach predefined ends, what are the best means available, or how should we do it? SSM, by contrast, believes that problem situations arise when people have contrasting viewpoints and consequently acceptance of many "relevant problems" emerges. SSM, therefore, rejects the means-end approach. The much more interesting questions concern the ends themselves: "What should be done?" becomes the main focus of SSM. To answer this question SSM attempts to draw in and explore a diversity of viewpoints as part of the decision-making and intervention process".
>
> (Flood & Jackson, 1999, P. 169).

Peter Checkland and his colleagues in the 1960s at the University of Lancaster, UK, developed Soft System Methodology (SSM). It has been described as a broad approach to examining problem situation in away which would lead to decision on action at the level of both 'what' and 'how'. (Checkland & Scholes, 1991).
Checkland's Soft System Methodology presents an approach to solve problems by using the system ideas in apparently unstructured soft problems.

SSM deals with problem formulation at the strategic level. It partly aims to structure previously unstructured situations, rather than to solve well-structured problems. It deals with 'fuzzy' problem situations-situations where people are viewed not as passive objects, but as active subjects, where objectives are unclear or where multiple objectives may exist, (Rosenhead, 1989, p. 19).

The methodology is based on building conceptual model following certain guidelines. The conceptual model or the guidelines can then be compared with the real world or with current situation. SSM has attracted considerable attention and it has been used successfully in several fields; for example, in industry, management, and in the healthcare field. It was natural to look for industrial applications of the idea, the original group of people developing the approach came from a Department of Systems Engineering at Lancaster University.

4.13.4 Reasons for Adopting of the SSM for this Study

The important reasons stand behind the decision for selecting SSM as a framework for this study. These can be explained as follows:

- Since this research is not concerned with the hardware and software technology side of the problem of the nursing staff records, a research methodology which deals with human activities and system approach was needed
- The methodology is mixture of theory and practice. It has its own terminology and it is structured in clear stages. Moreover, the methodology tackles real-world problem situations in an attempt to improve them
- SSM has been implemented successfully in various projects including issues related to health care services, agriculture, government services, industry, management, information systems, performance evaluation, businesses telecommunication, communication applications, education, and library and information services

- SSM approach was developed through action research to allow the learning process to take place and to be clearly understood and managed. It can also be used as a guidance framework for learning and to understand information and its management
- SSM is the most appropriate approach for studying and tackling complex problems that are characterised as vague, such as in this study, the investigation of the process of transferring all staff records in the Nursing Department at HMC from manual based system to an electronic based system. The uses of SSM reflect on the relationships between people, machines and information technology
- The nature of the methodology is to invite all actors interested in the situation under examination to engage voluntarily, and to work collaboratively, in identifying what seems to be the problem and to use systems ideas to design the ideal system framework by debating and negotiating. This will eventually lead to taking appropriate action to improve the problem situation. All of these factors make SSM one of the leading approaches in integrating theory and practice, and enhancing the knowledge of both the analyst and the participant
- SSM is an approach that starts like a cycle with a general idea associated with the problem under analysis, and then develops it accordingly in more detail. Furthermore, these cyclic iterations provide the investigator with flexibility to shift freely forward and backward from one stage to another so as to ensure validity and accuracy of the analysis of each stage and to avoid any shortcomings and deficiencies
- Each stage of SSM has been specified and elucidated exhaustively to offer step-by-step guidance to the analyst throughout his/her investigation. This significantly contributes to greater confidence and better control and management over the investigation as a whole
- SSM uses the perceptions, views and feedback of stakeholders as regular points of reference; it also consults agents in suggesting the appropriate course of action. This process means that the system that is

designed is based on the views of those who will, in the end, work with it

- Although SSM was developed in the West and which presumably was designed specifically to meet the needs of management organisations in dealing with problems that encompass human activities in western society, but it seems to be a universal approach in nature since it has been used in many countries world-wide
- Goossen (2000, pp. 42-54) Stated that "Basically nursing informatics should assist in solving problems in nursing information management. Simple questions here are "What is the problem exactly?" and: "whose problem is it anyway?" the soft system theory by Checkland (1984) could be applied to find out what the problems are for whom, and to tackle them on different based on different models of reality. Furthermore, this approach is especially relevant because of the fact that any information system used in a caring environment, including a computerised nursing records system or electronic patient records, represent a model of reality.
- Also, to demonstrate the growing acceptability of SSM, a group of 15 people experts in nursing informatics met during the International Nursing Informatics 2000 conference in Auckland, New Zealand, and agreed that nursing informatics researchers can adopt some methods from other disciplines in reference to SSM, but the major difference between nursing informatics research and nursing research lies in the subject areas of the study and the research problems to be addressed. Often these research problems have both a human and a technological aspect (Goossen 2000, p. 42 -54).

4.13.5 Development of Soft System Methodology (Seven Stages)

SSM is an evolving methodology; it is not static. It has been developed and modified over a period of time to deal with a wide variety of complex problem situations that face numerous managerial systems. Today, two modes of Soft

Systems Methodology are now available: the conventional Seven-Stage version and the Two-Stream version (Wilson 1990, pp. 69-70)

Checkland & Scholes (1990, pp. 280-284) describe two routes through the methodology, simply known as "Mode 1"and "Mode 2". The first is a structured methodology described by (Checkland, 1980, p.163); it comprises seven sequential and iterative stages. Mode 2 is embellishment of the first process and uses case study history in its design.

SSM (Mode 1), or the conventional seven-stages, will be applied in this study as this approach represents the problem under investigation at Nursing Department. The SSM, mode 1, the 'problem situation unstructured' can be drawn from the questionnaire and the interviews of the stakeholders.

The Conventional Seven-Stage (Mode 1)

The main steps in SSM are illustrated in (Figure 4.3). The diagram is divided into two parts. The upper parts (stages 1, 2, 5, 6, 7) are activities take place in "Real world" and therefore, should involve people in the problem situation. The bottom part (stages3, 4a, 4b) are 'system thinking' activities which are carried out in languages of the system and may or may not involve people in the problem situation, depending on the circumstances of the study.

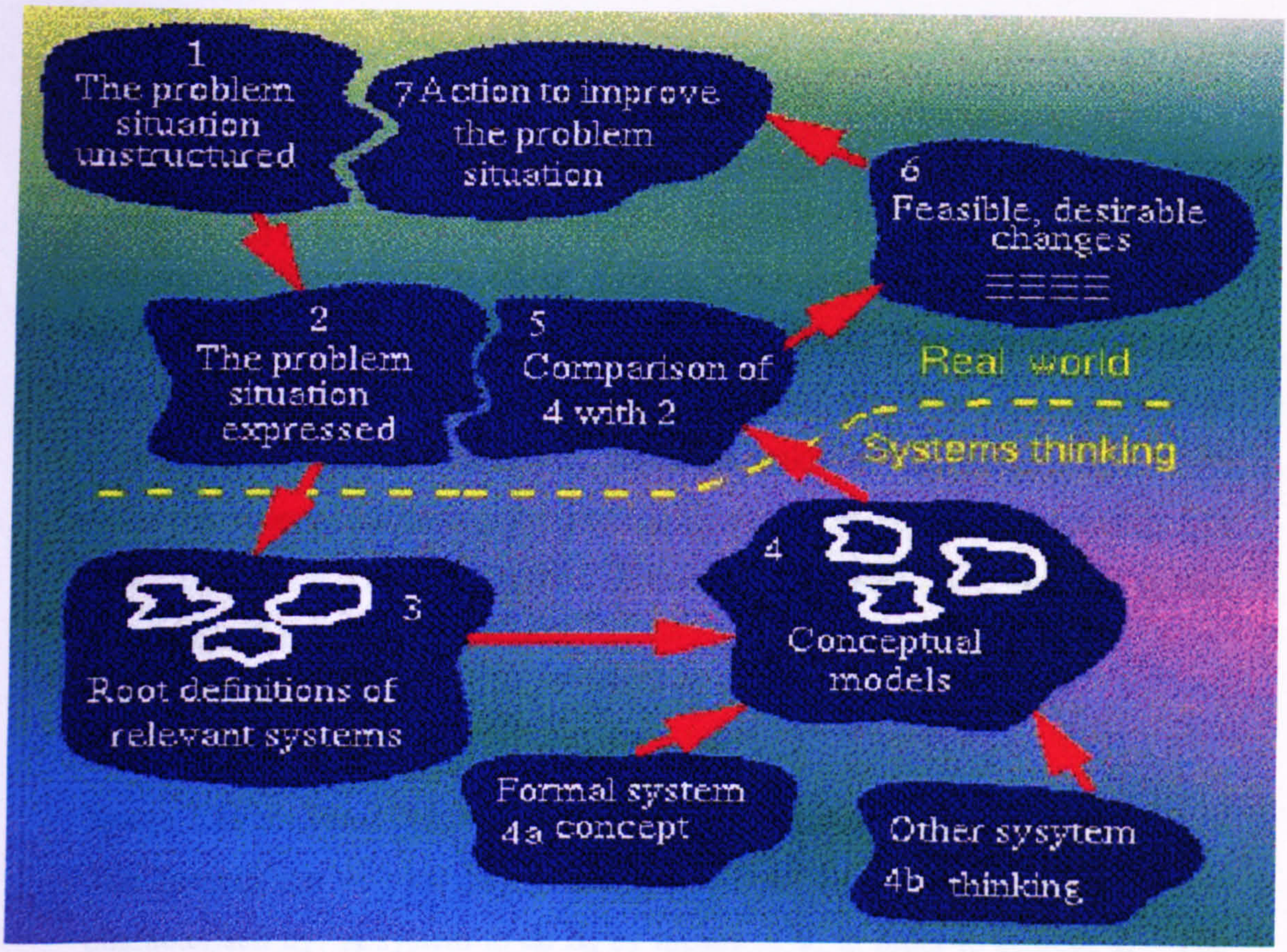


Figure 4.3 Soft System Methodology Stages. (Adapted from Checkland 1990

The Description of the Seven Stages is as Follows:

Stage One: The Problem Situation Unstructured.

Finding out about the problem, 'problem situation unstructured' this is basic research into the problem area. Who are the key players? How the process work now? The focuses on the general description of the problem and understanding the process in the organisation.

Stage Two: The Problem Situation Expressed

The 'problem situation expressed' helps to structure and express information from Stage 1. Its procedure involves four analyses. First, the analysis of the intervention focuses on the client, problem solver and problem owner. Next, the social and cultural analysis has roles, norms and values. Then, political analysis surrounds the concepts for defining the internal politics of the organisation, how power is expressed and structured, and what makes an individual powerful. As with any type of diagram, more knowledge can be communicated visually. The rich picture is like a child's drawing and does not require syntax checking (Checkland 1981, p.165).

Stage Three: Root Definition of Relevant System

The formulation of root definitions (RDs); these have a formulaic expression characterised by "A system to do **X**, by means of **Y**, in order to achieve **Z**". The "A system to do **X**" defines what the system would accomplish. The "by means of **Y**" defines the general framework on how the system can be completed. The "in order to achieve **Z**" defines why the system is required. Selecting how to view the situation and producing root definitions. From what different perspectives can we look at this problem situation? Root definition can be defined as "a concise, tightly constructed description of human activity system, which states what the system is root definition is the crux of the methodology" Checkland (1991, p.164). In order to know whether the root definition regarding the relevant system is complete, it is necessary to use a set of six criteria identified as mnemonic **CATWOE.**

- **Customer:** everyone who stands to gain benefits from a system is considered as a customer of the system. If the system involves sacrifices such as lay offs, then those victims must also be counted as customers.

- **Actor:** The actors perform the activities defined in the system.

- **Transformation process:** This is shown as the conversion of input to output. Checkland & Scholes (1999, p. A 25) suggest five **'E's'** as criteria for judging the extent of the success of the transformation **T**:

  Efficacy, i.e. whether **T** or the means chosen work in producing the desired output;

  Efficiency, i.e. the amount of output divided by amount of resources used;

  Effectiveness, i.e. whether T meets the longer term aim;

  Ethicality, i.e. whether the transformation is morally right; and,

  Elegance, i.e. whether it is aesthetically pleasing.

- **Weltanschauung:** The German expression for worldview. This worldview makes the transformation process meaningful in context.

- **Owner:** Every system has some proprietor, who has the power to start up and shut down the system.

- **Environmental constraints:** External elements exist outside the system which it takes as given. These constraints include organisational policies as well as legal and ethical matters.

Stage Four: Conceptual Models

This stage defines a conceptual model (CM) that helps to characterise the core of the relevant system. In particular, it is a human activity model describing how each operational activity is carried out through the process, as defined in the root definition. The number of activities covered in this stage ranges typically from five to nine, and each activity contains a verb. During the system monitoring, performance can be measured using efficacy, efficiency and effectiveness (Checkland, 1981, p.169). Building conceptual models of what the system must

do for each root definitions Checkland, (1981, p.313) defined a conceptual model as "a system account of a human activity system built on the basis of the system's root definition. Usually in the form of a structure set of verbs in the imperative mood".

Stage Five: Comparing Conceptual Model with the Reality

Comparison of the conceptual models (ideas generated in Stage 4) with the real world ideas (the problem situation expressed in Stage 2). Compare the results from stage 4 and 2 and see where they differ and are similar. In addition, they can take constructive action and make necessary changes to the model (Checkland 1981, p. 177).

Stages Six: Identify Feasible and Desirable Changes

Stage Six is based on the costs and benefits identified in the previous stages; this stage defines the feasible and desirable changes which can lead to positive outcomes. For example, two types of change are structural and procedural change.

Stage Seven: Taking the Action to Improve the Problem Situation

This stage proposes actions to implement the change identified in Stage 6. Yet, the introduction of the actions may change the situation, leading to the birth of a new problem (Checkland 1981, p.180).

4.13.6 The Advantages and Disadvantages of the SSM

The soft system approach is used to take action to improve aspects of the problem situation. This approach is been used because of the advantages it gives to the understanding of the problem situation Checkland (1981,1999), Checkland & Scholes (1990), Smallwood (1990), Al-Hasan (1992), Maciaschapula

(1992,1995),Holland (1995), and Dix et al (1998) they summarised the advantages as follows:

1. SSM is a mixture of theory and practice. It has its own terminology and it is structured in clear stages for tackling unstructured problems

2. The soft system approach is helpful in the context of developing quality assurance. The iteration between different stages of the methodology can become part of an on-going quality assurance process

3. In soft systems methodology, cultural factors are incorporated quite clearly for applying to the real world of human affairs

4. Flexibility of the methodology makes it adaptable, and so able to accommodate a wide range of study topics

5. SSM is a learning tool which is related to the nature of human activity system, that is, the root definition is only one way of describing the actual human activity

6. The soft system methodology is a way of understanding these activities; it is a way of exploring the process of managing information.

Some disadvantages of SSM are also covered in the literature by researchers such Davies & Ledington 1991, p.68-71; Jarvis 1997; Checkland & Scholes 1999, p. 31- 34; Al-Humaidan & Rossiter, 2001 and Shehata & Bowen 2001. They summarised the disadvantages as follows:

1. Problems are not structured but are 'fuzzy' and subject to change because people are involved. Improvements to the problem situation emerge from discussion and bargaining processes

2. It is an open-ended methodology. Any changes that are suggested could possibly lead to a new problem situation that would need to be tackled. Iterations may be never-ending
3. It produces models of system activity that are largely informal and therefore may be subject to misunderstanding.
4. SSM does not actually instruct the participants how to build the system that is required. Requirements emerge from the discussion and the bargaining process.
5. SSM does not support the other elements of the hard approach such as data, events and designing interfaces.

4.14 Interpretive Structural Modelling (ISM)

Interpretive Structural Modelling (ISM) is a management decision-making tool that links ideas to facilitate through understanding of complex situation. ISM can tackle, explore and invoke general issues and problems. Warfield (1987, p. 2575) stated that "it is a general system methodology in that its application is not confined to any discipline, but rather can be used to explore general issues and problems".

Warfield developed the Interpretive Structural Modelling (ISM) in 1973 as an effective method for understanding complex situations and finding solutions to complex problems in the Battelle Institute, USA. Christakis (1985) stated that:

> "ISM is a method for creating a 'road-map' of complex situation where there are many issues or options to consider. It is often used to provide fundamental understanding of complex situations, as well as to put together a course of action for solving problems, and has been used worldwide by many prestigious organisation including NASA" (Christakis, 1985, pp. 925-933).

Warfield's (1987, pp. 2575-2580) brainstorming approach has been adopted as a means of generating ideas in situations such as group-based decision-making processes. Janes (1988) stated that among the selection criteria for group members, they should have knowledge about the subject at hand and be aware of the tools and techniques to be employed.

The facilitator is a person who is very skilled in helping groups work together, but this is only one requirement that the facilitator must satisfy. According to Warfield (1982, p.160), the facilitator must be skilful in motivating groups to work together to ensure the achievement of common objectives. However, familiarity with the ISM process and being knowledgeable about the organisation's business processes are fundamental for the decision-making purpose. However, the success of the ISM process relies heavily on the capability of a facilitator. Janes (1988) supported the importance of a trained facilitator to enable various opinions to be drawn out from among group members and to guide them to achieve the intended mission.

Warfield (1982b) described ISM as a computer-assisted learning process that enables an individual or a group of users to develop a structure or map showing interrelations among previously determined elements according to a selected contextual relationship. The process of ISM forces the user to select the elements of importance in the issue being explored and to state explicitly the interrelations between them according to a specific contextual relation. The resultant ISM is a user-created visual model showing elements and relations as a multi-level digraph. The user may be an individual or a group and the process may be done manually, which can be laborious, or with a computer equipped with ISM software. However, the full potential of the methodology is best realised in a group context with a computer.

Waller (1983) described ISM as context free in that it can be used in any complex situation, irrespective of the content of the situation, provided that a set of

elements can be identified and an appropriate contextual relation defined. Furthermore, the elements may be qualitative or quantitative, permitting items to be included which are not measurable on anything other than ordinal scales of measurement. In this sense, ISM is much more flexible than many conventional quantitative modelling approaches which require variables to be measurable on ratio scales. ISM thus offers a qualitative modelling language for structuring complexity and enables a group of users to map their thinking on an issue by building an agreed structural model.

4.14.1 Application of ISM

ISM has been applied professionally within a range of UK organisations including the Metropolitan Police, Hertfordshire County Institution of Engineering Industry Training Board, the Institute of Mechanical Engineers, the Royal Navy, and City University.

4.14.2 Benefits of ISM

A number of benefits from using ISM are outlined by Janes (1988, p. 153) including that they "focus debate and clarify thinking, group learning and team building. In addition, there is an emphasis on clarifying terms and clear specification of relations so that the user-created visual models are easily understood".

4.14.3 Reasons for Adopting ISM

ISM untangles a complex issue by allowing the user to focus on only two ides at a time. These ideas and their relationships are analysed within the framework of the issue being studied. The researcher will use ISM software and a group of five

senior staff at HMC, to keep track of the relationships, to ensure that all the ideas are dealt with methodically, and also, use this information to create the visual relationship map. ISM will be used in this study to convert the outcomes of SSM into a concrete action plan for decision-making to the senior management staff at HMC.

There are three components for managing complex issues (See Figure 4.4.). Essentially, each member of the participant group has his/her own perceptions regarding the issue to be investigated. The facilitator has competence in the use of the tools available for consensus decision-making via interactive management. The tools comprise of idea-writing, nominal group technique (NGT) and interpretive structural modelling (ISM) (Janes 1988). To investigate the issue, the NGT and ISM software tools were used in this study.

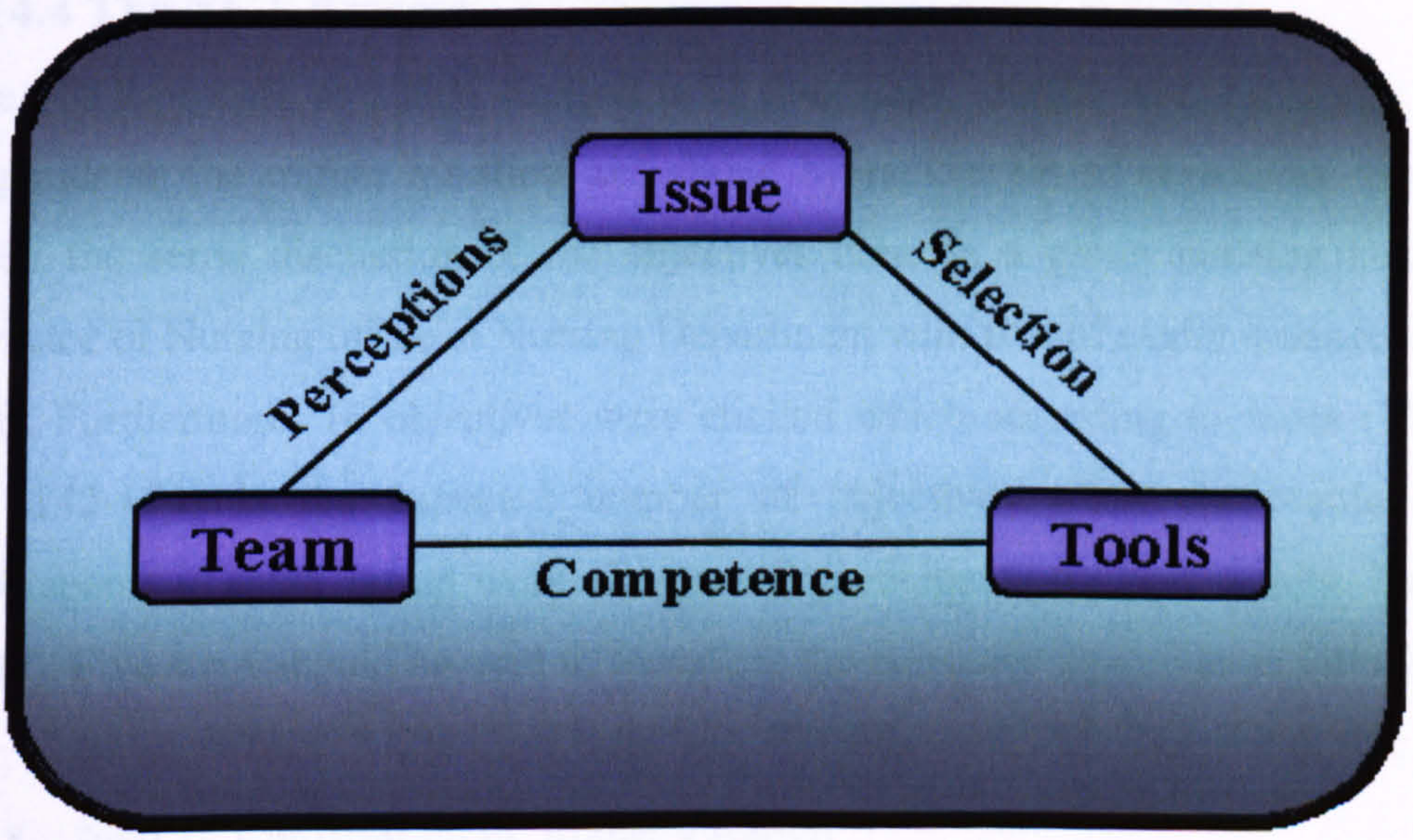


Figure 4.4 Managing Complex Issues. from Janes, 1988

ISM technique can be applied also by using paper and pencil. (Janes 1988, p.147) stated that "the user may be an individual or group and the process may be done manually, which can be laborious, or with computer equipped with ISM software. However, the full potential of the methodology is best realised in a group context with a computer".

Most complex problems involves several groups of people, for this reason, the search for an effective solution needs to involve the people affected. The facilitator is important to guide the participants group through the process been used. A trigger question should be formulated and ideas or objectives that respond to this question are recorded, the group participating should be in the same place to help interaction between individuals which will help to enhance the interpretation of various responses. The methodological tools adopted to enable the team to explore the issue may be many and varied. Warfield (1976, p.146) has described the interaction between the issue, team and methodology as a "fundamental triangle of societal problem solving".

4.14.4 The NGT Process

The NGT process as stated comprises of five steps, started with by asking the respondents the trigger question and ended by ranked set of objectives. In this study the serial discussion of the objectives done in a group meeting held at Director of Nursing office at Nursing Department with five of senior management staff. Furthermore, 16 objectives were elicited which according to Janes (1988, pp. 145-154) is the expected number of objectives when the number of participants is small group work ($3 < n < 9$ participants for best results; Janes, 1988). Five steps should be used to formulate the elements/objectives as followed:

- Step 1: Clarification of trigger question
- Step 2: Silently generate ideas / objectives
- Step 3: Round-robin recording of ideas / objectives
- Step 4: Prepare objectives for ISM

- Step 5: Voting to obtain a preliminary ranking of ideas in terms of importance.

4.14.5 The ISM Process

To build up an Interpretive Structural Modelling, its involves a number of activities which is the 7 stage process of ISM and they are as follows: Figure 4.5.

1. Identify issue to be studied.
2. Decide on type of ISM to constructed
3. Select participant group and facilitator.
4. Generate the element set (objectives by NGT)
5. Complete matrix of element interactions
6. Display the ISM
7. Discuss structure and amend if necessary.

Figure 4.5 ISM Process

ISM studies the complex issues which are usually needed a decision-making. It will be demonstrated throughout the study under investigation. Once the issue has been identified, it is important to decide on the type of ISM which is 'intent structure'. The transitive relationship 'would help to achieve', the format of the intent structure model is:

"Would

[element 1]

Help to achieve

[element 2]

Over the next three years? "

This relationship will be explained in more detail in Chapter Six.

4.14.6 The Advantages of ISM

Warfield (1982, p. 155) asserted that the participants gain benefits in the form of the learning that takes place as a consequence of the use of the developed applications. In this instance, the participants are apparently enable to explain and carry out various actions or take various decisions as a consequence of having taken part in the process of application development.

Janes (1988, pp.153-154) agreed with the number of benefits that may be accrued from the use of ISM include the following: focused debate; the clarification of thinking among group members; group learning experience; and team building. In addition, there is an emphasis on clarifying terms and clearly specifying relations so that the user-created visual models are easily understood. Furthermore, he suggested that ISM is applicable in many varied situations. It is a particularly meaningful method to use when a participant group wishes to gain a better understanding of a complex issue.

Warfield (1987, p. 2578) suggested that empirical evidence proves that the productivity of groups dealing with complex issues by applying consensus methodologies can be increased very significantly. This can be achieved further with the guidance of an effective facilitator. In addition, by using consensus methodologies, ISM can be used as an effective strategic planning tool for an organisation, through which all common requirements of an organisation can be achieved. Moreover, ISM is also considered to be an effective tool for research planning. In an educational context, for instance, ISM can be used to develop education policy, the curriculum, and to provide a tool for learning processes in the classroom; such an approach has been adopted effectively in Japan (Warfield 1987, p. 2579).

Warfield (1982, p. 193) asserted that the essential factors in determining the success of the ISM process rely mainly on the skills of the facilitator of the process and the knowledge and attitudes of the participants. If, however, the process is deemed a failure, Warfield suggests that the primary reason for this often lies in the insensitivity of the person who was attempting to facilitate the process.

Malone (1975, p. 401) asserted that in term of time required to process the ISM structure-two to four hours for the manual approach, five to ten minutes for the use of ISM software and in reduce requirements for methodological knowledge, the computer performs all the necessary computations.

4.14.7 Disadvantages of ISM

Warfield (1982, pp. 194-195) suggests that the origin of these limitations of the ISM does not lie in the ISM process itself, but the limitations are imposed by the nature of the human being and by the way in which information flows within the process. He adds that the most effective way of dealing with such limitations is to build into any modelling process a means of compensating for their impact.

Another limitation of the ISM process is time consuming. Warfield (1982, pp. 194-195) stated that, it is not possible to judge in advance how long will be required to complete the use of the ISM process. Furthermore, it is not even possible to accurately judge the amount of time required to produce an initial primary map.

The consensus method will be more effective if all participants can get together in generating ideas. However, more often than not, it is very difficult to achieve active participation, particularly among senior personnel at the helm of policy making (Sharma, Gupta & Sushil 1995). Without the commitment of such figures

to the outcomes of the process, progress and development of any project will certainly be affected.

ISM can be applied to any organisation to improve quality; to strategic planning; to educational and research planning.

4.15 Limitations, Strengths and Considerations

This study has some limitations which might have influenced the outcome of study. The first limitation is that the researcher was not able to undertake the interview with the Administrative Director as he was on official mission abroad during that time. The second limitation was what might be perceived as the study bias. As a member of staff in the Department of Nursing at HMC, the researcher is known to most respondents. This might have biased some answers. Some respondents may not have been honest or reflected the actual situation.

In spite of the above limitations, some of the strong points of this study will make up for the limitation. For instance, one of the strengths of this study was the use of semi-structured interviews and a questionnaire which included a number of open-ended questions. This allowed for deeper questions and obtained unanticipated perspectives on issues. Finally, the researcher received a full support from the majority of the staff working at HMC and staff working at PHC during the study period, which might not have been available to an outsider.

4.16 Data Preparation and Analysis

Since the questionnaires were designed for coding, the coding process was done directly on the questionnaires and then entered by the researcher into the Statistical Package for the Social Science (SPSS) for statistical measure, such as frequency, percentage, chi-square and cross tabulation. Excel was used to present the Figures in clustered column with 3-D visual effect. The data collected from the interviews were recorded and transcribed manually.

4.17 Summary

This chapter has provided an overview of research methods used in the study. It considered a range of methods suitable for collecting and analysing the relevant data for this study. The justification for the methods selected was provided through an examination of underlying debates about philosophical basis of research approaches in the social sciences. While combining insights from both qualitative and quantitative research approaches, the methods selected include questionnaire survey, semi-structured interview, action research as well as an in-depth discussion of the use of Checkland's SSM and Warfield's ISM. The remaining chapters present the findings as well as discussions of combination of these methodological techniques. The findings in Chapter Six on the result of Systems Intervention will present the application of SSM and ISM to the problem situation at Nursing Department. The purpose of the next chapter is to present the data from the major findings of the questionnaire and the interviews which will be used to generate the data set from which problem issues can be drawn. The data set will help in providing the information on which 'problem situation unstructured' which is the first stage of SSM is based.

Survey Results

5.1 Introduction

The focus of this chapter is to present the findings of the questionnaire survey and the semi-structured interviews undertaken during the period from November 2001 to January 2002 at Nursing Department, HMC and PHC, Ministry of Public Health in the state of Qatar. This chapter is divided into two sections. The first section presents questionnaire survey results and the second section presents semi-structured interview results. Figure 5.1 illustrates graphically the survey results.

5.2 Questionnaire Survey: Results

This research is a descriptive survey in which no attempt is made to manipulate the variables. Descriptive statistics defined by Antonius (2003, p.288) as

> "any treatment of data which aims at summarising it and presenting it in a way that facilitates its interpretation. Descriptive statistics does not involve generalisations. It includes measures of central tendency, measures of variation, measures of position, measures of association, frequency tables, and various graphical representations, as well as measures of skewness and kurtosis".

Therefore, descriptive analysis makes it possible to identify and establish a regular pattern among the variables being tested among the respondents. This approach provides rich data on which to build the SSM and ISM. Hence, to present the data in an understandable and less complex way, the data obtained from the returned questionnaires were described by calculating frequencies and preparing cross-tabulations of chosen variables and visualising the results by producing frequency histograms and tables of cross-tabulations. The results of the questionnaires are

demonstrated by simple percentage graphs indicating the demographics, use of the Nursing staff records system, use of computers and staff attitudes towards computerisation. A chi-square test (χ^2) was used to test the significance of the statistical independence of the cross-tabulations (Pallant, 2001, p.257).

The analysis of the responses was coded and carried out on Personal Computer using the Statistical Package for Social Science (SPSS -12.0) and Excel was used to present the Figures in clustered column with 3-D visual effect. As is shown in Chapter Four, the number of questionnaires distributed was 314 for the study. The number of questionnaires returned was 262. This gave an excellent, response rate of 83.4%. This response rate was achieved by using systematic methods of distribution; a dedicated covering letter indicating the importance of the research was written by the Administrative Director of HMC and sent out with the questionnaire. Frequent reminders via phone calls were directed to respondents to encourage a high response rate and support for the researcher was also given by colleagues in the Nursing Department for distribution and collection.

Questionnaire Analysis (262) (83.4%)

A. Demographic Data
B. Nursing Staff Records
C. Use of Computer
D. Staff Attitudes Toward Computers

Interview Analysis (10)

1. Description of the Current System
2. Documents, Policy and Accessibility of the Records
3. Problems of the Present System and the Barriers of the New System
4. Expectations and Involvement of the New System

Stage 1
SSM
Problem Situation Unstructured

Figure 5.1 Survey Results

A. Demographic Data

In the first section of the questionnaire, questions were asked about personal data of the respondents. Respondents were asked to specify their gender. The majority (82%) of the respondents were female nurses, and 16% of the respondents were male nurses. The distribution of the interviews showed that the female senior nursing staffs were 7 out of 10 interviews carried out. The differences reflect two facts; firstly, there have always been a high percentage of female nurses working in the state of Qatar. Secondly, the majority of the female nursing staff were in senior positions at HMC and at PHC, and, hence, that explains the high percentage of female nurses in this study.

The first section of the questionnaire, questions were about personal data of the respondents. Respondents were asked to specify their gender. Figuer 5.2 shows that 215(82%) of the respondents are female nurses, and 42(16%) of the respondents are male nurses.

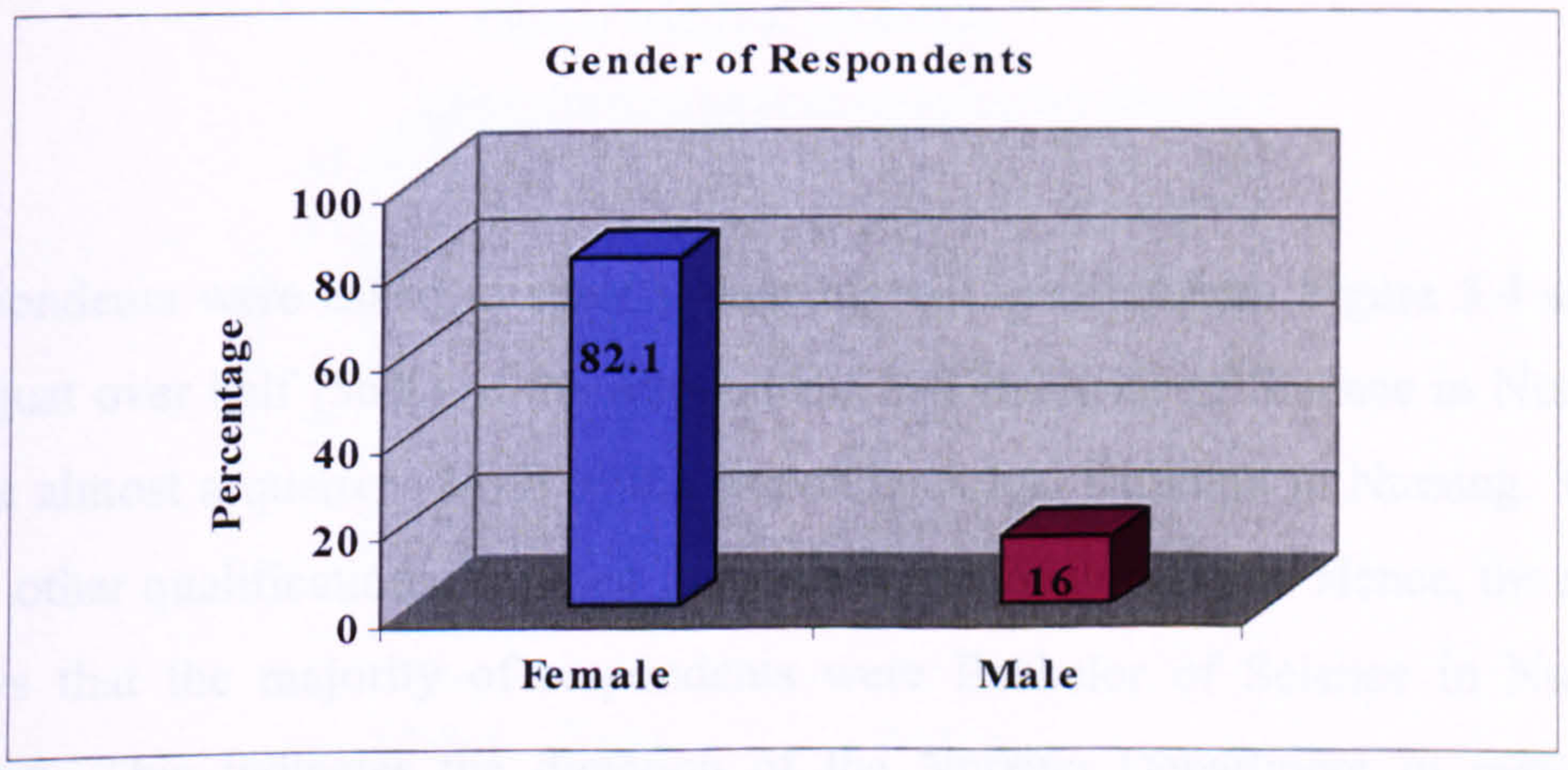


Figure 5.2 Gender of Respondents

In order to know the age of the respondents, they were asked to specify their age group. As it can be seen in Figure 5.3, exactly half (50%) of the respondents were aged between 41-50 years old, and about one third (33.6%) were aged between 31-40 years old. The differences indicated that most of the senior nursing staff members were in the 40- 60 years range. Also, most of the interviewees were of the same age range.

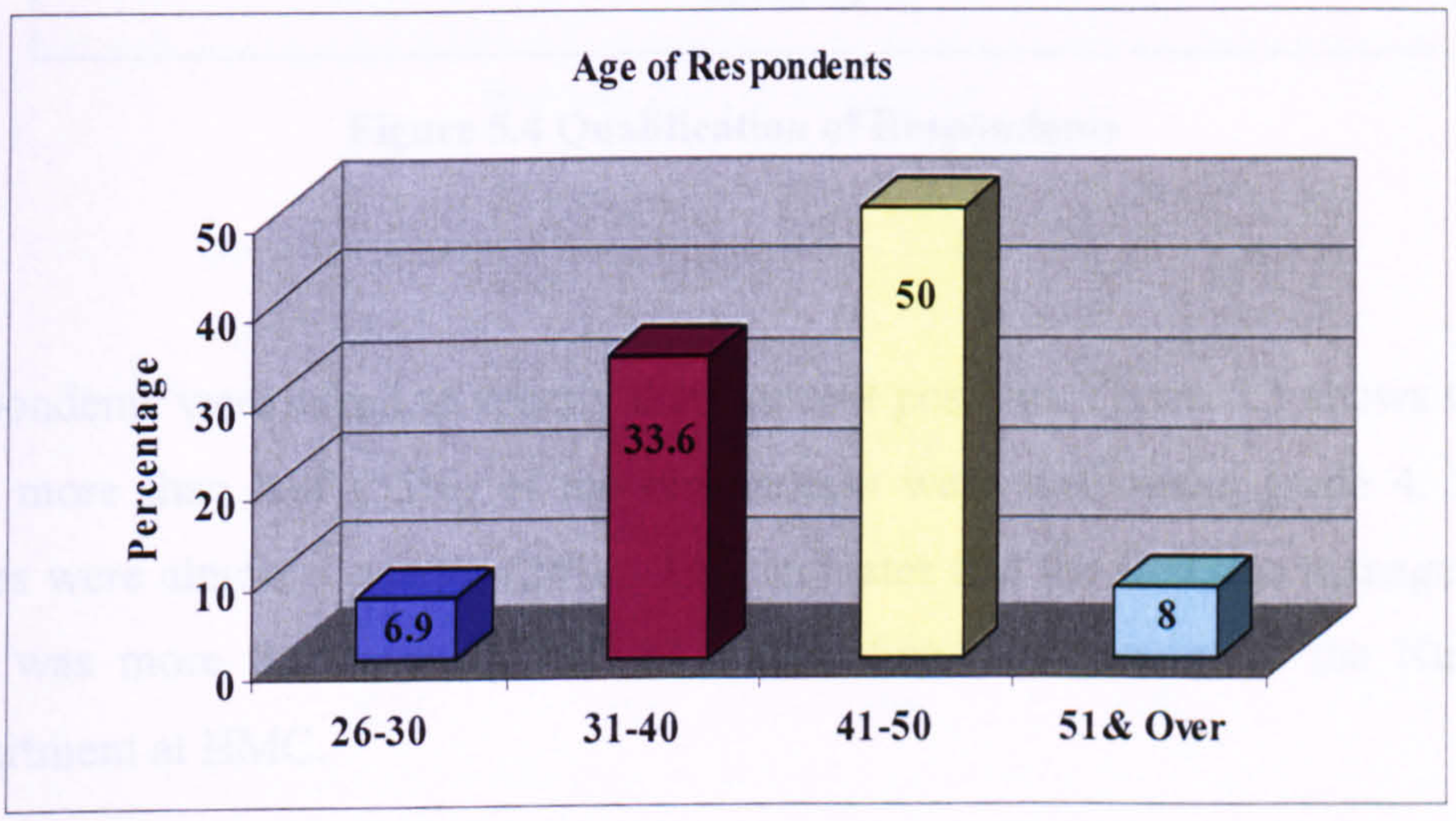


Figure 5.3 Age of the Respondents

Respondents were asked to specify their highest qualification. Figure 5.4 shows that just over half (56%) of the respondents had Bachelor of Science in Nursing, while almost a quarter (24%) of the respondents had Diploma in Nursing. There were other qualifications, but their numbers were not significant. Hence, the result shows that the majority of respondents were Bachelor of Science in Nursing holders. This indicates the direction of the Nursing Department in recruiting highly qualified nurses.

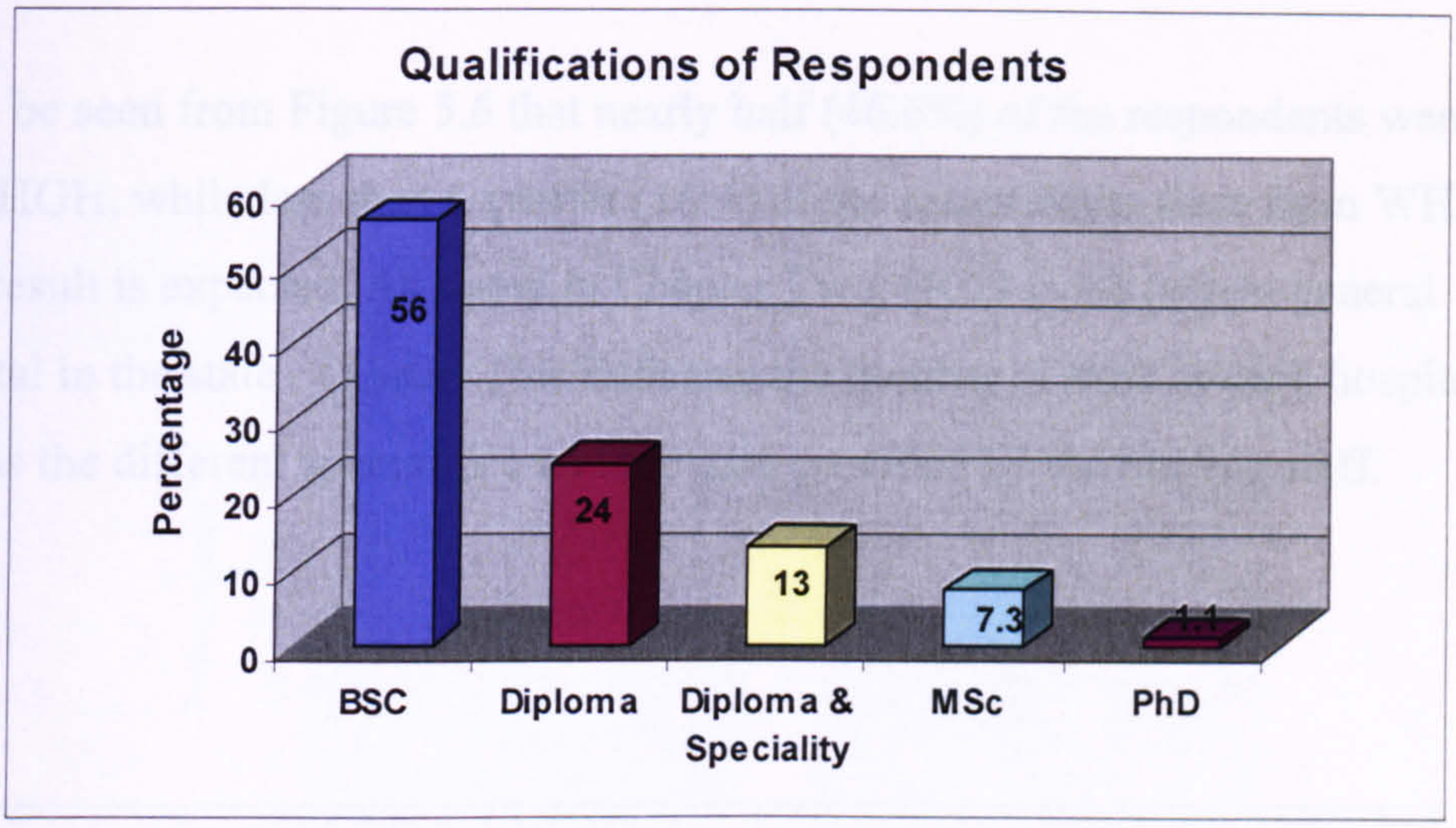


Figure 5.4 Qualification of Respondents

Respondents were asked to specify their current position. Figure 5.5 shows that a little more than half (55%) of the respondents were staff nurse grade 4. Head nurses were almost a quarter (24%). This indicates that the first line management staff was more than nursing staff at middle line management in the Nursing Department at HMC.

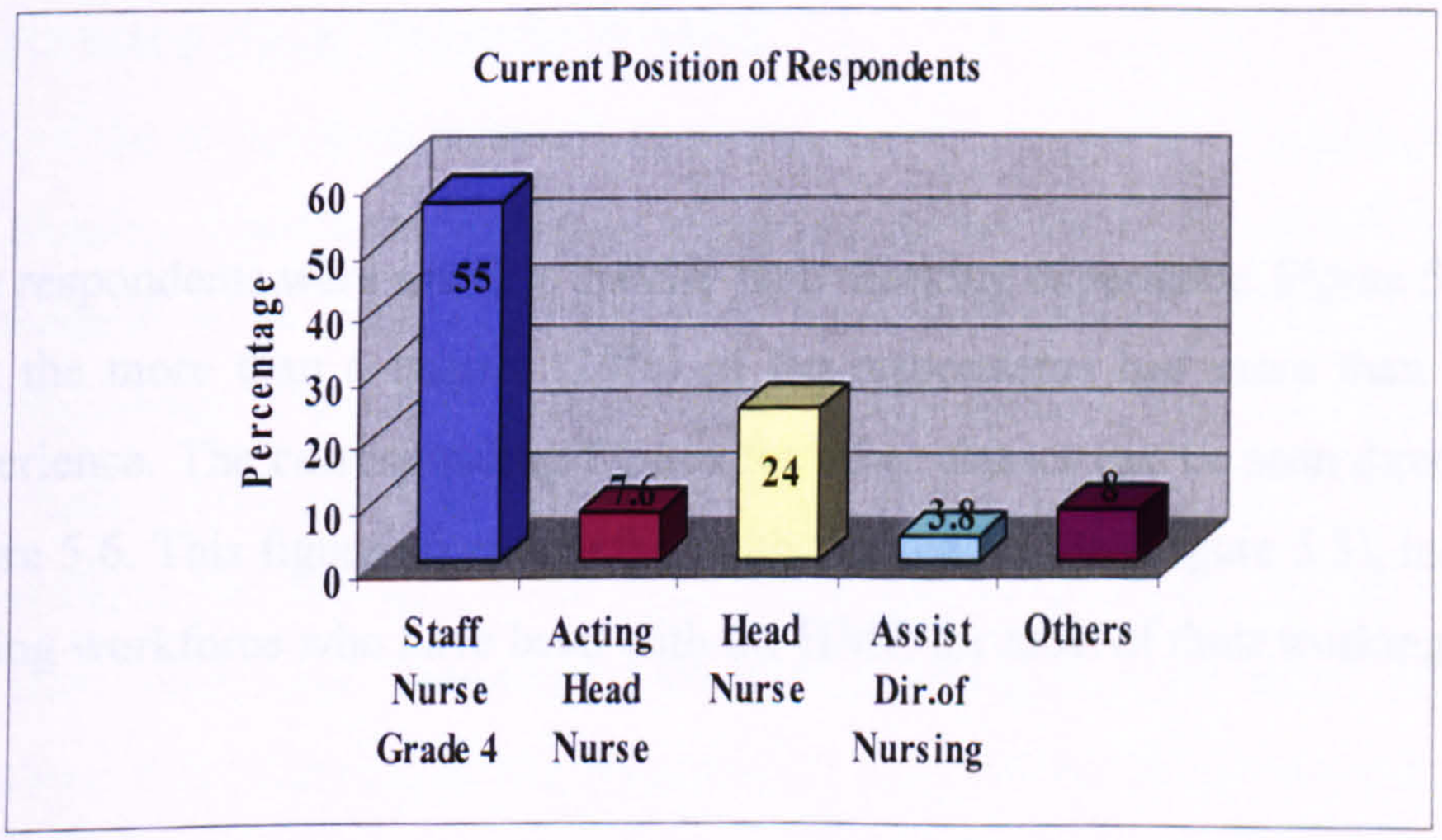


Figure 5.5 Current Position of Respondents

It can be seen from Figure 5.6 that nearly half (46.6%) of the respondents were from HGH, while less than a quarter (16%) of the respondents were from WH. This result is expected. As stated in Chapter Two, HGH is the largest general hospital in the state of Qatar. This indicates the number of beds in each hospital as well as the different specialities and the care provided by the nursing staff.

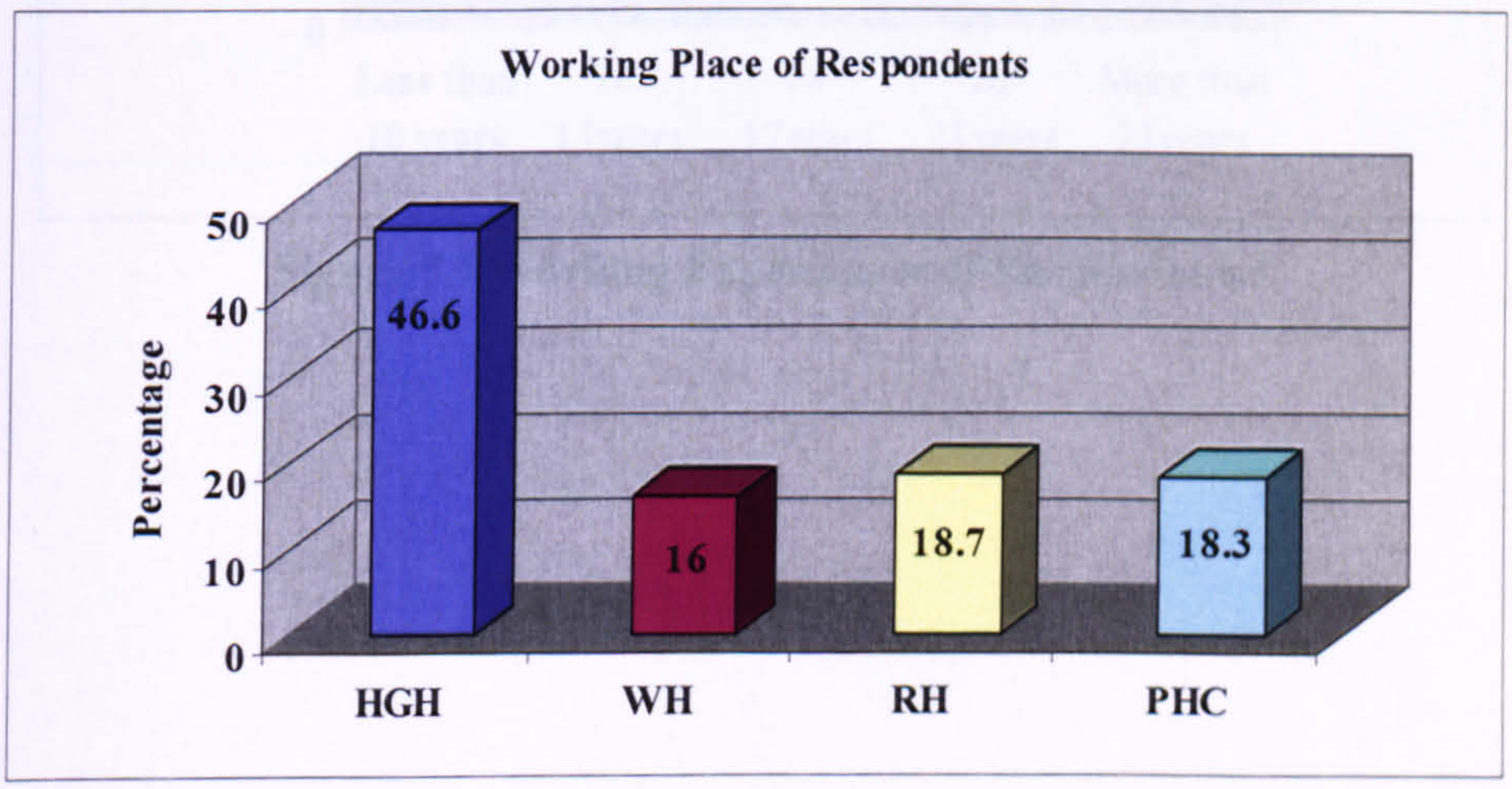


Figure 5.6 Working Place of Respondents

The respondents were asked to specify their working experience. Figure 5.7 shows that the more than a quarter (29%) of the respondents had more than 22 years experience. The corresponding figures for other classes can be seen directly from figure 5.6. This figure taken together with the age profile (Figure 5.3), indicate an ageing workforce who have been with the HMC for most of their working lives.

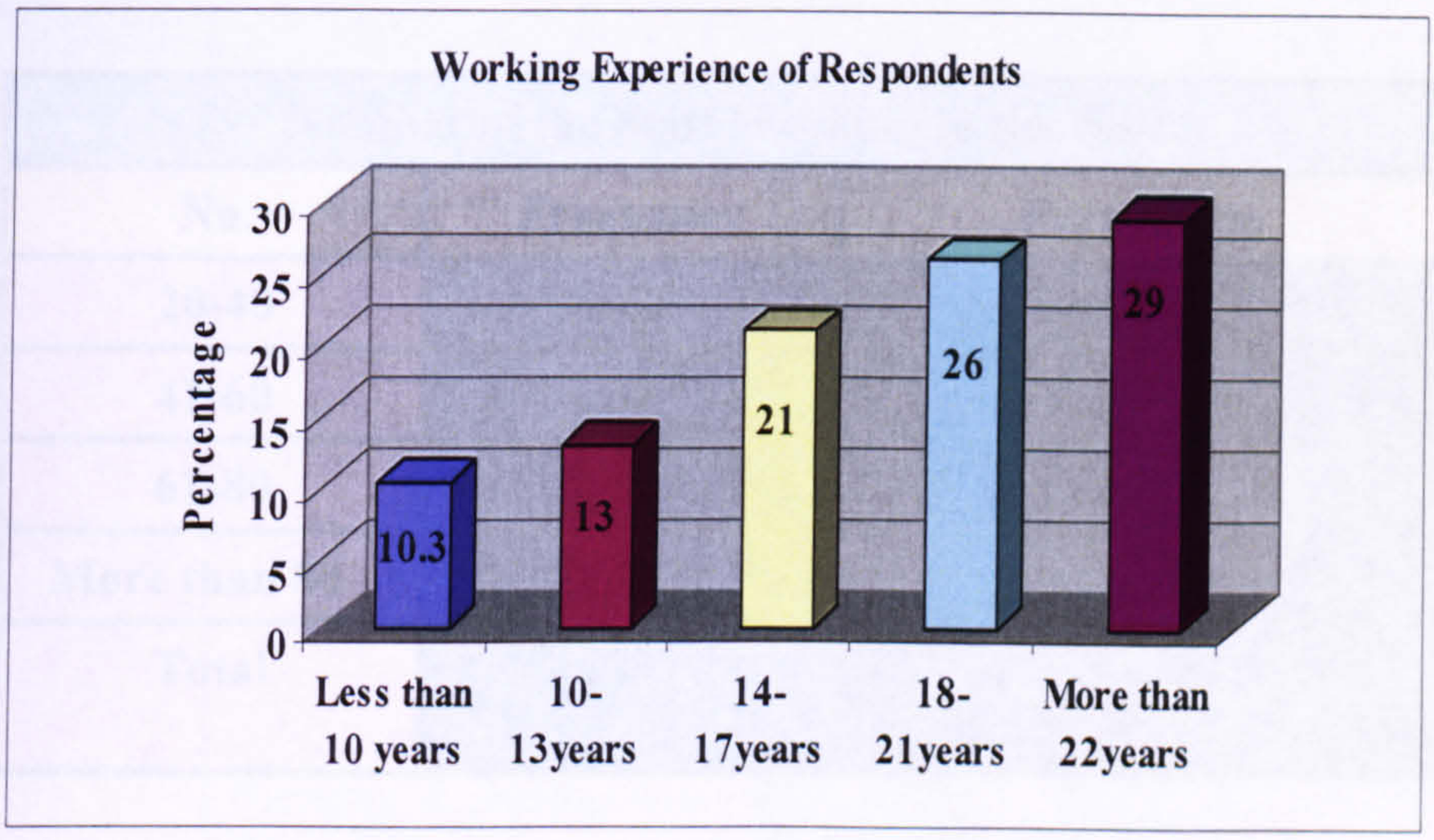


Figure 5.7 Working Experiences of Respondents.

B. Nursing Staff Records System

One of the research objectives was to analyse the current staff records system in the Nursing Department at HMC. In the second section of the questionnaire, the respondents were asked questions about the present practice of the nursing staff records system. Respondents were asked to specify how many members of staff they have working in their units. Table 5.1 shows that over half (58.4%) of the respondents had between 20-40 staff. While, an insignificant number (1.9%) of the respondents had between 61-80 staff working in their units. The results indicated that majority of the respondents have 20-40 nurses working in their units.

Number of the Staff Working in the Unit		
No.	**Frequency**	**Percentage**
20-40	**153**	**58.4**
41-60	**31**	**11.8**
61-80	**5**	**1.9**
More than 80	**24**	**9.2**
Total	**213**	**81.3**

Table 5.1 Number of the Staff Working in the Unit.

In order to know if the nursing staff in charge in the units hold records for their staff, respondents were asked to specify if they hold a record for each of the staff working in their units. Table 5.2 shows that an overwhelming majority (81.6%) of the respondents indicated yes that they do have a personnel record for each staff member working in their unit, while 18.4% of the respondents indicated no. To investigate more about staff records held in the units and current position of the staff Table 5.2 shows the responses cross-tabulated.

Do you have a record for each staff member working in your unit				
		Yes	No	Total
Current Position		Frequency		
	Staff Nurse Grade 4	115	23	138
	Head Nurses & Acting Head Nurses	61	18	79
	Assistant Director of Nursing & Acting Ass. Dir. of Nursing.	27	3	30
	Total	203	44	247

Table 5.2 Staff Record keeping in the Unit v. Current Position

A χ^2 test was preformed to test the significance of relationship between the data in Table 5.2, where null hypothesis (H_0) stated that there was no difference in responses of the respondents to the question do you have a record for each staff working in your unit and the current position of the respondents. An alternate hypothesis (H_1) stated that there was a difference in responses of the respondents to the question do you have a record for each staff working in your unit and the current position of the respondents. The χ^2 statistic (2.709, df = 2, P >0.05). Thus, we can not reject H_0 as it was not significant differences between to the question do you have a record for each staff working in your unit and the current position of the respondents. Nursing Department does not support having staff records in the units and that indicate the need for policy about where staff records should be kept.

To investigate the type of document held in each staff record, first and middle line nursing management staff were asked to list all of the documents in the staff records. As can be seen from Table 5.3, over a quarter (28.6 %) of the respondents have no bio-data for their staff. In comparison, close to half (43.5%) did have bio-data. It shows that a little more than half (51.1%) of the respondents have no action card, while less than a quarter (21%) of the respondents said yes they have action card. As indicated earlier in Chapter Two, all of these documents were copies of the original document. In existence, there is a retention policy required specifying the right documents to be held in staff records.

List of All Documents in Staff Records		
	Yes	**No**
Percentage		
Bio – Data	**43. 5**	**28. 6**
In-Service Education	**40. 5**	**31.7**
Evaluation	**40. 1**	**32. 1**
Certificates	**35. 9**	**36. 3**
Action Card	**21**	**51. 1**

Table 5.3. List of Documents in Staff Records

The staff nurses have the right to look at their records at any time to ensure that all the information held about them are correct and up to date. To investigate this the respondents were asked to specify whether a nurse could look at her/his records at any time. Table 5.4 shows that more than half (52.7%) of the respondents indicated no. Just over one third (36.6%) of the respondents indicated yes. A χ^2 test was preformed to test the significance of relationship between the question can the nurse look at her/his records at any time and current position. While H_0 indicated that there was no difference in the responses of the respondents on the

questions can the nurse look at her/his records at any time and current position H_1 on the other hand indicated that there was a difference in the responses of the respondents to the questions can the nurse look at her/his records at any time and current position. The χ^2 statistic (4.073, df = 2, P >0.05). Thus, we can not reject H_0, as it was not significant differences responses to the questions that can the nurse look at her/his records at any time and current position. There is a need for a policy specifying the right of the staff to look at their records when it is needed.

Access to Staff Records Held in The Unit		
	Yes	No
	Percentage	
Can The Nurse Look at Her/His Records at Any Time	36. 6	52.7
Do You Have to be Present at that Time	38. 9	8. 8

Table 5. 4 Staff Records Held in the Unit

It can be seen from Table 5.4 that over one third (38.9%) of respondents indicated yes at the time that staff look to their record. Once again the Nursing Department do not have a policy regulating the right of staff in this regard.

To investigate first and middle line management nursing staff willingness to have staff records in their units. The respondents were asked to specify if they would like to have the nurses' records in their units. Table 5.5 shows the responses to the question cross-tabulated with respondents' age. A χ^2 test was preformed to test the significance of relationship between staff willingness to have staff records in their units and age and to know which age group were willing to have a staff records in their units. Where H_0 stated that there was no difference in the responses of the respondents' to staff willingness to have staff records in their units and age; H_1 stated that there was a difference in the responses of the respondents' to staff willingness to have staff records in their units and age.

The χ^2 statistic (2.212, df = 1, P >0.05). Thus, we can not reject H_0 as it was not significant differences respondents to the questions willingness to have staff records in their units and age. These results showed that the majority of the staff, age from 41-51 years old and over, were willing to have staff records in their units more than 26-40 years old staff.

Would You Prefer to Have the Nurses Records in Your Unit				
Age		Yes	No	Total
	26-40 years	Frequency		
		80	10	90
	41-51 years & over	132	8	140
	Total	212	18	230

Table 5.5 Would You Prefer to Have the Nurses Records in Your Unit

To investigate if the respondents know how to access their staff records, the respondents were asked to specify how they can access their staff records at present. Table 5.6 shows that about one third (31.3%) of the respondents responded directly while others responded through others (such as through secretaries), while 10.7% responded through staffing co-ordinator. The results indicated the confusion that the respondents have when they want to access their staff records in the Nursing Department, again due to lack of policy. These findings are important for the underlying thesis and it forms an important contribution to stage 1 of the SSM. Stage one and two of SSM are concerned with finding out as much as possible about the problem situation from the respondents.

How to Access Staff Records at Present		
	Frequency	**Percentage**
Others (Secretary)	**82**	**31.3**
Via Asst. Dir. of Nursing	**80**	**30.5**
Via Sr. Asst. Dir. of Nursing	**33**	**12.6**
Via Staff. Co-ordinator	**28**	**10.7**

Table 5. 6 Access to Staff Records

In order to know if the first and middle line nursing management staff were familiar with the type of staff records system in use in the Nursing Department, respondents were asked to specify if they know what type of staff records system the nursing department uses. Table 5.7 shows that nearly half (48.9%) of respondents said manual, while about (2.3%) of the respondents stated none. The results indicated the unfamiliarity with the staff records system in use in the Nursing Department at present.

Type of Staff Records System in Used		
	Frequency	**Percentage**
Manual	**128**	**48. 9**
Electronic	**10**	**3. 8**
Both	**75**	**28.6**
Do not Know	**29**	**11.1**
None	**6**	**2.3**
Total	**248**	**94.7**

Table .5.7 Type of Staff Records System Used

C. Use of Computer

In the third section of the questionnaire, questions were asked about the use of computer. In order to investigate the staff uses of computer in the units a number of questions were asked; for example, the uses of computer at work, what do they use computer in the unit for, and have they taken any computer courses and where they have taken them.

The respondents were asked to specify if they use computer at work. Table 5.8 shows that more than two thirds (77.5%) of the respondents do not use computer at work, where as, less than a quarter (16%) of the respondents use computer at work. These data were investigated by using χ^2 test to test the significance of association between the questions do you use computer at work and the qualification of the respondents. Where H_0 indicated that there was no difference in the responses of the respondents' between do you use computer at work and the qualification of the respondents; H_1 stated that there was a difference in responses of the respondents between do you use computer at work and the qualification of the respondents.

The χ^2 statistic (7.398, df = 2, $P < 0.05$). Thus, the H_1 was accepted, as there was a difference between the respondents' responses to 'do you use computer at work' and the qualification of the respondents. This result showed that the use of computer at work is very limited by diploma; diploma and speciality; Bsc; Masters; and PhD nurses.

Do You Use Computer at Work		
	Frequency	**Percentage**
Yes	**42**	**16**
No	**203**	**77.5**
Total	**245**	**93. 5**

Table 5.8 Current Use of Computer at Work

To identify the existing use of computer at work, respondents were asked to specify how often they use computer at work. Of the 20.2% of the respondents 14.9% of them do use computers daily, 3.1% of the respondents use computer in between 2-3 days in the week. 1.9% of the respondents use computer 4-5 days in the week and 0.4% of the respondents use computer 6-7 days in the week. The results indicated that 20.2% of the total respondents use computer and they use it at different frequencies, while the rest of the respondents do not use computer, or did not respond to the question. These results suggest lack of computers in the units, lack of access to computer programs and lack of computer training.

The respondents were asked to specify what they use computer at work for.

The respondents' responses to this question were 11.8% of the total of the respondents use computer for Word Processing, while 4.2% of the respondents use computer for Statistics. The results showed that the use of word processing at work is the must popular computer program used. This is despite the fact that the use of the computer by the nursing staff were very limited, as indicated earlier.

The results shown that nurses do not use computers for most part in their daily work. This suggests that there are not enough computers in the units, and no computer training. These findings are important contribution to stage 1 of the SSM.

Training is one of the most important aspects of an organisation and to investigate the limited use of computers in the units, respondents were asked to specify if they have undertaken any computer courses. Table 5.9 shows the responses to the question cross-tabulated with respondents' current position. A χ^2 test was performed to test the significance of relationship between did you take any computer courses and current position of the respondents. Where H_0 stated that there was no difference in the responses between did you take any computer courses and current position of the respondents; H_1 stated that there was a difference in responses of the respondents' between did you take any computer courses and current position of the respondents.

The χ^2 statistic (1.062, df = 2, P > 0.05). Thus, we can not reject H_0 it was not significant difference between the respondents' responses to the question did you take any computer courses and current position of the respondents. HMC did offer computer courses for 5 days for the first line management nursing staff for short time.

		Did You Take Any Computer Courses		
		Yes	No	Total
		Frequency		
Current Position	Staff Nurse Grade 4	55	83	138
	Head Nurses & Acting Head Nurses	24	49	73
	Assistant Director of Nursing & Acting Ass. Dir. of Nursing.	12	18	30
	Total	91	150	241

Table 5. 9 Did You Take Any Computer Courses

The purpose of the question was to know where the computers courses were being taken. To go deeper and more precise, it is important to know if the HMC was providing enough computer training for the nursing staff or not. In response to the question about the name of the institution, it can be seen from Table 5.10 that HMC offered computer courses for 6.5% the respondents, while universities offered 1.6% computer courses. The results indicated that the computer courses were less than what was expected. It is recommended that HMC should provide more computer courses so that can attain these important competencies.

Name of The Institutions Where Computer Courses Were Taken		
	Frequency	**Percentage**
External Companies	**24**	**9.3**
In HMC	**17**	**6.5**
In Home Country	**13**	**4.2**
Universities	**4**	**1.6**

Table 5.10 Name of the Institution

D. Staff Attitudes Towards Computers

In the fourth section of the questionnaire, questions were asked about the staff attitudes towards computers. Staff attitudes were examined through positive and negative statements using Likert scale. A Likert scale measures the extent to which a person agrees or disagree with the question and it mostly used in measuring people's attitude. The most common scale is 1 to 5. Which is, agree strongly, agree, not certain, disagree and disagree strongly. Likert scores table for this section's question can be seen in Appendix (5).

As can be seen, Figure 5.8 shows that a clear majority (62.6%) of the respondents strongly agreed with statement that "the computer is a powerful enabling tool" and 0.8% of the respondents disagree strongly. With the above statement giving a Likert Score of 4.58. This result showed that the majority of the respondents have an idea how powerful the computer is.

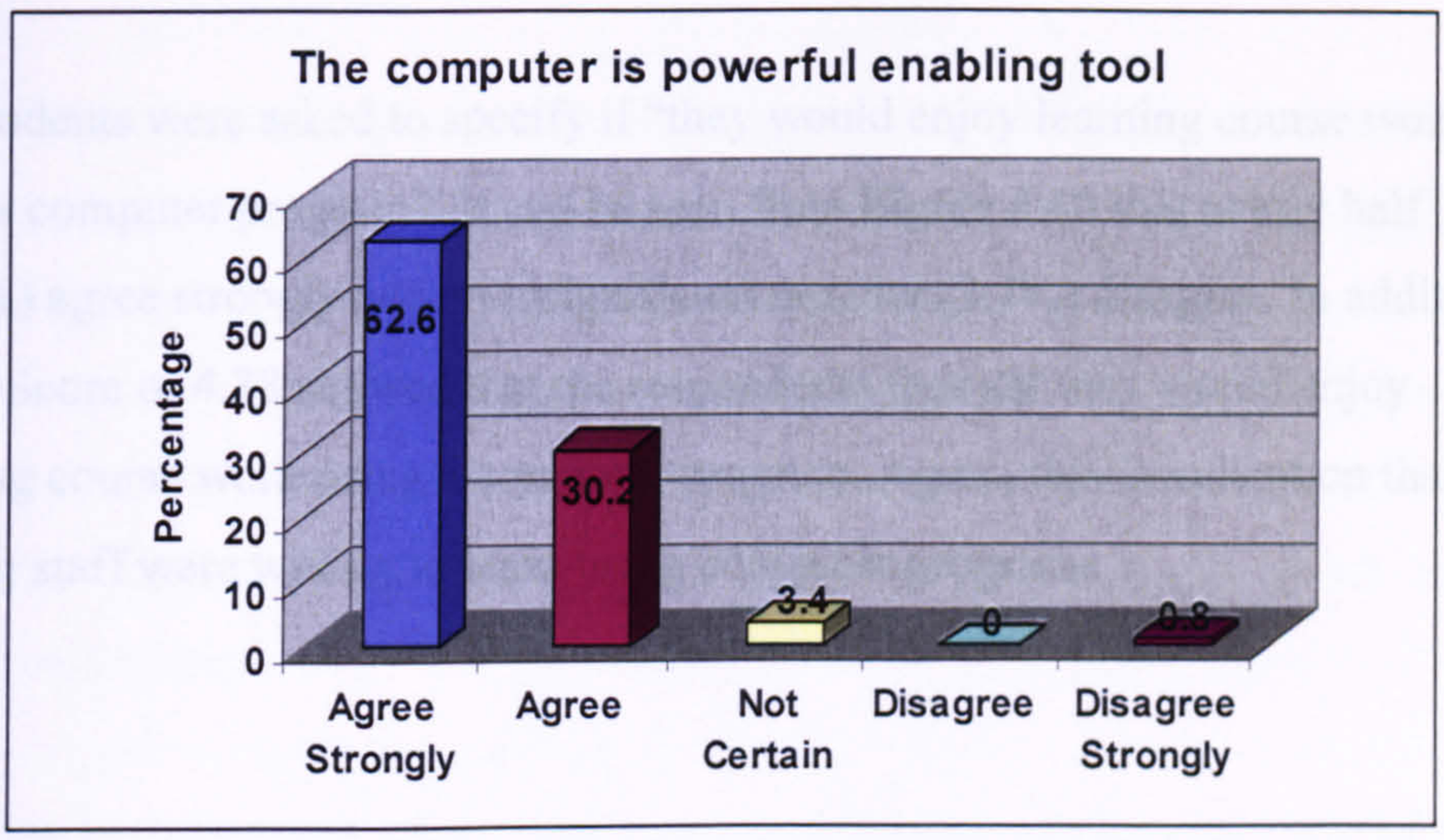


Figure 5.8 The Computer is Powerful Enabling Tool.

Respondents were asked to indicate if, "in healthcare, computers could save a lot of paperwork". Figure 5.9 shows that a clear majority (61.1%) agree strongly, While 0.8% disagree strongly. This attracted a Likert Score of 4.57. This score indicated that the respondents thought that computers could save a lot of paperwork, this finding indicates that nursing staff would use computers for their daily work.

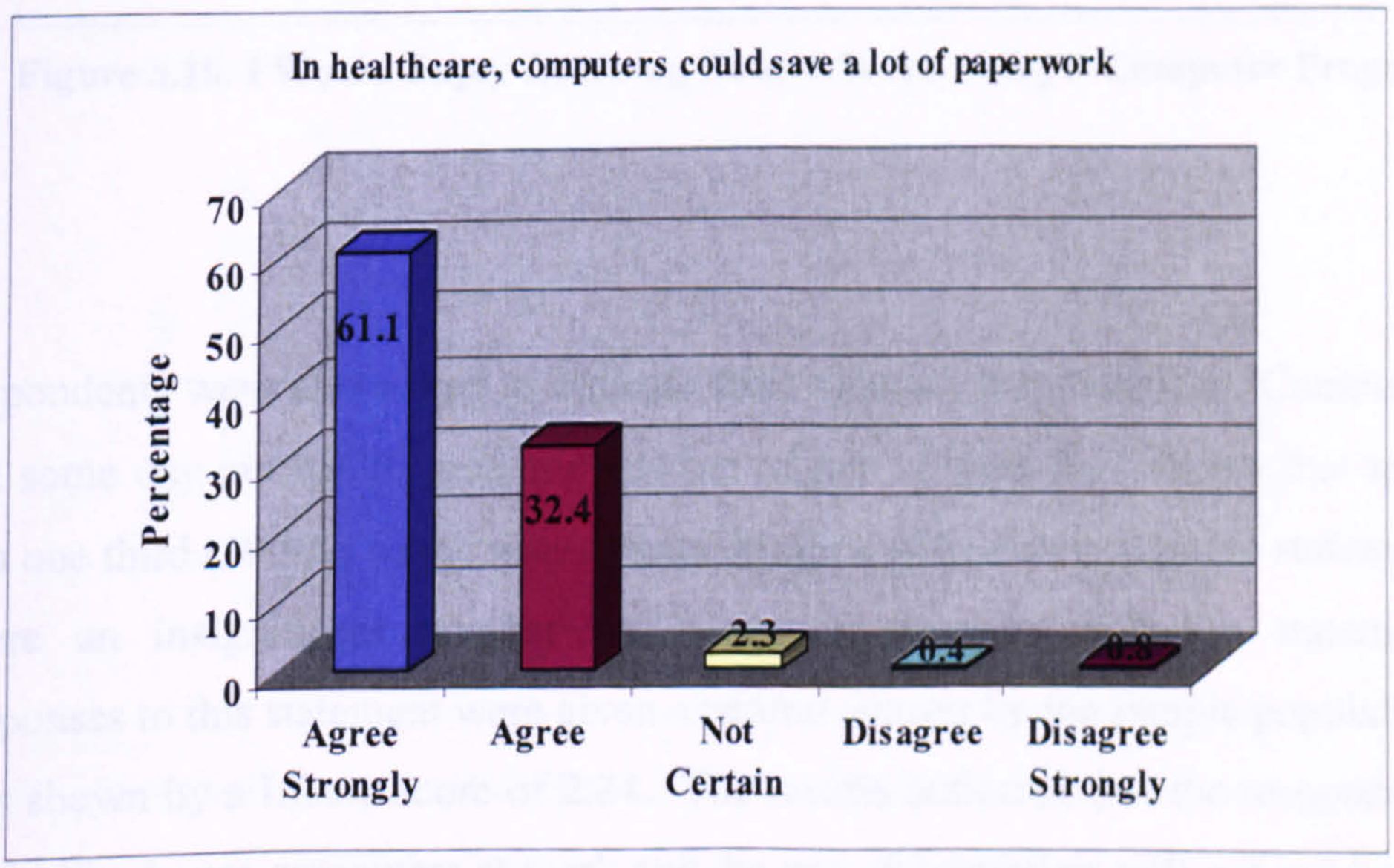


Figure 5.9 In Health Care, Computers Could Save a Lot of Paperwork

Respondents were asked to specify if "they would enjoy learning course work using a computer program". It can be seen from Figure 5.10 that nearly half (47.3%) agree strongly and an insignificant number (2.7%) disagree. In addition, Likert Score of 4.38 showed that the respondents thought they would enjoy learning course work using a computer program. Again, this is indication that the nursing staff were willing to learn using computer programs.

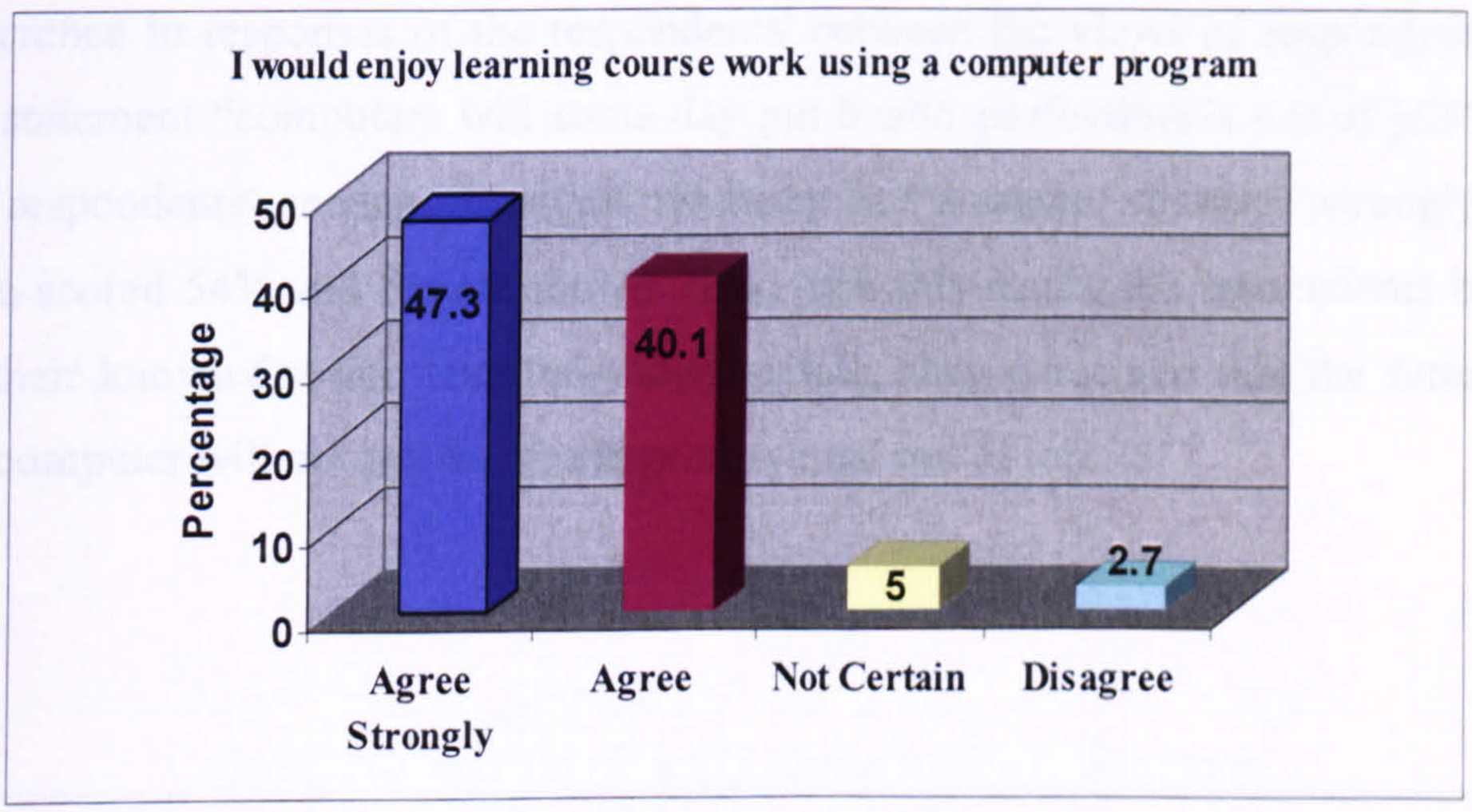


Figure 5.10. I Would Enjoy Learning Course Work Using a Computer Program

Respondents were also asked to indicate their view on the statement "Computers will some day put health professionals out of job". Figure 5.11 shows that more than one third (39.3%) of the respondents disagree with above negative statement, where an insignificant number (4.2%) agree strongly with the statement. Responses to this statement were given a neutral answer by the sample population, as is shown by a Likert Score of 2.24. The results indicated that the respondents would like to use computers at work and the use of computers will not put health professionals out of job.

A χ^2 test was preformed to test the significance of relationship between views on the statement computers will some day put health professionals out of job and gender. Where H_0 stated that there was no significance difference in the responses between the above attitude statement and the respondents' gender; H_1 stated that there was a difference in responses of the respondents' between the view on the statement computers will some day put health professionals out of job and the respondents' gender.

The χ^2 statistic (13.057, df = 2, $P < 0.05$). Thus, the H_1 was accepted as there was difference in responses of the respondents' between the views of respondents on the statement "computers will some day put health professionals out of job" and the respondents' gender. Strongest tendency in "disagree/ disagree strongly" as male scored 54% and female scored 72%, with this result, the respondents based on their knowledge and level of understanding, they perceived that the future of the computer will not put the health professional out of job.

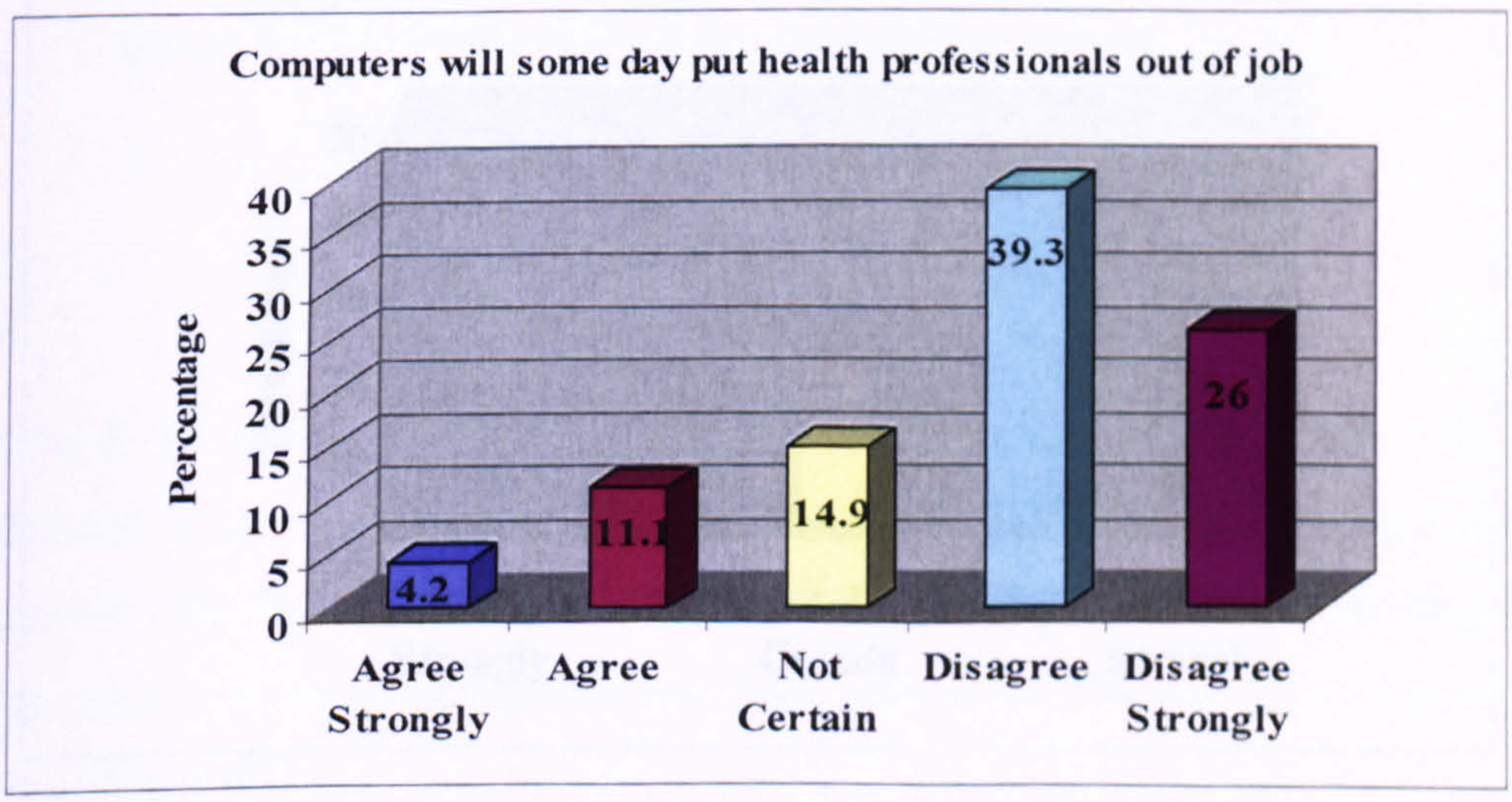


Figure.5.11. Computers Will Some Day Put Health Professionals Out of Job

It can be seen from Figure 5.12 that more than one third (40.8%) of the respondents disagree with the statement that "computers in healthcare will create more work for nurses" while 8% agree strongly. However, the Likert Score of 2.72 indicates a neutral answer. The results showed that the majority of the respondents disagreed with above statement, and also suggested that the nursing staff were encouraging the use of computers by healthcare providers.

A χ^2 test was performed to test the significance of relationship between the view on the statement "computers in healthcare will create more work for nurses" and qualification. Where H_0 stated that there was no difference in responses between the above view on the statement and the respondents' qualification; H_1 stated that there was a difference in the respondents' responses between the view on the statement computers in healthcare will create more work for nurses and qualification. The χ^2 statistic (7.268, df = 2, P > 0.05). Thus, we can not reject H_0 as it was not significant difference in the respondents' responses between the respondents' views on the above statements and qualifications.

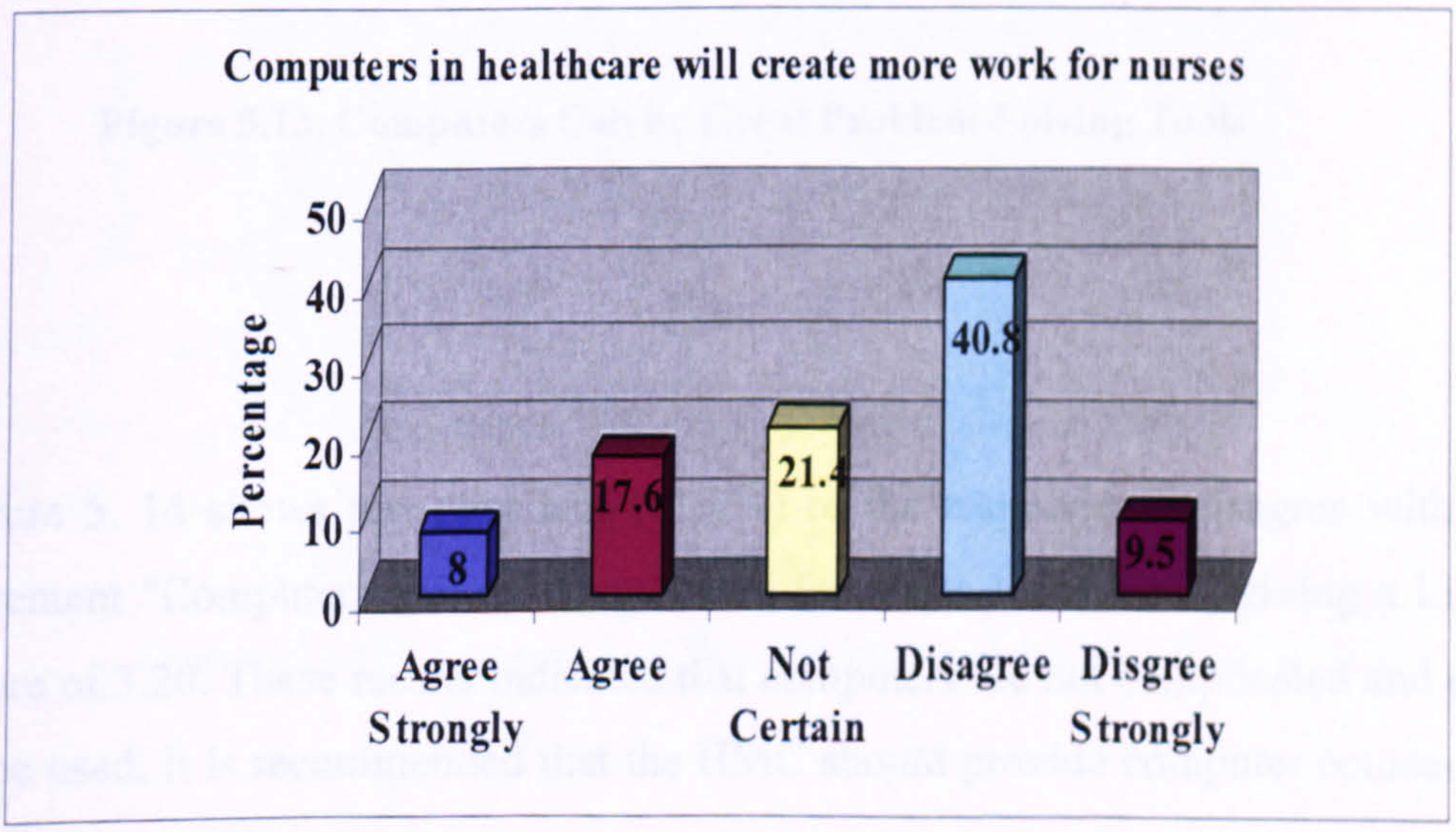


Figure 5.12. Computers in HealthCare Will Create More Work for Nurses.

Regarding respondents view on the statement, "Computers can be great problem-solving tools", Figure 5.13 shows that the agreed responses to this statement from the sample population were over half of the respondents (60%), while 10% disagree with it. Moreover, there was a Likert Score of 3.79 from the sample population. The respondents perceived that the computers can solve most of their problems that was indicated by the result of question. It showed also that the respondents had a positive attitude towards computers.

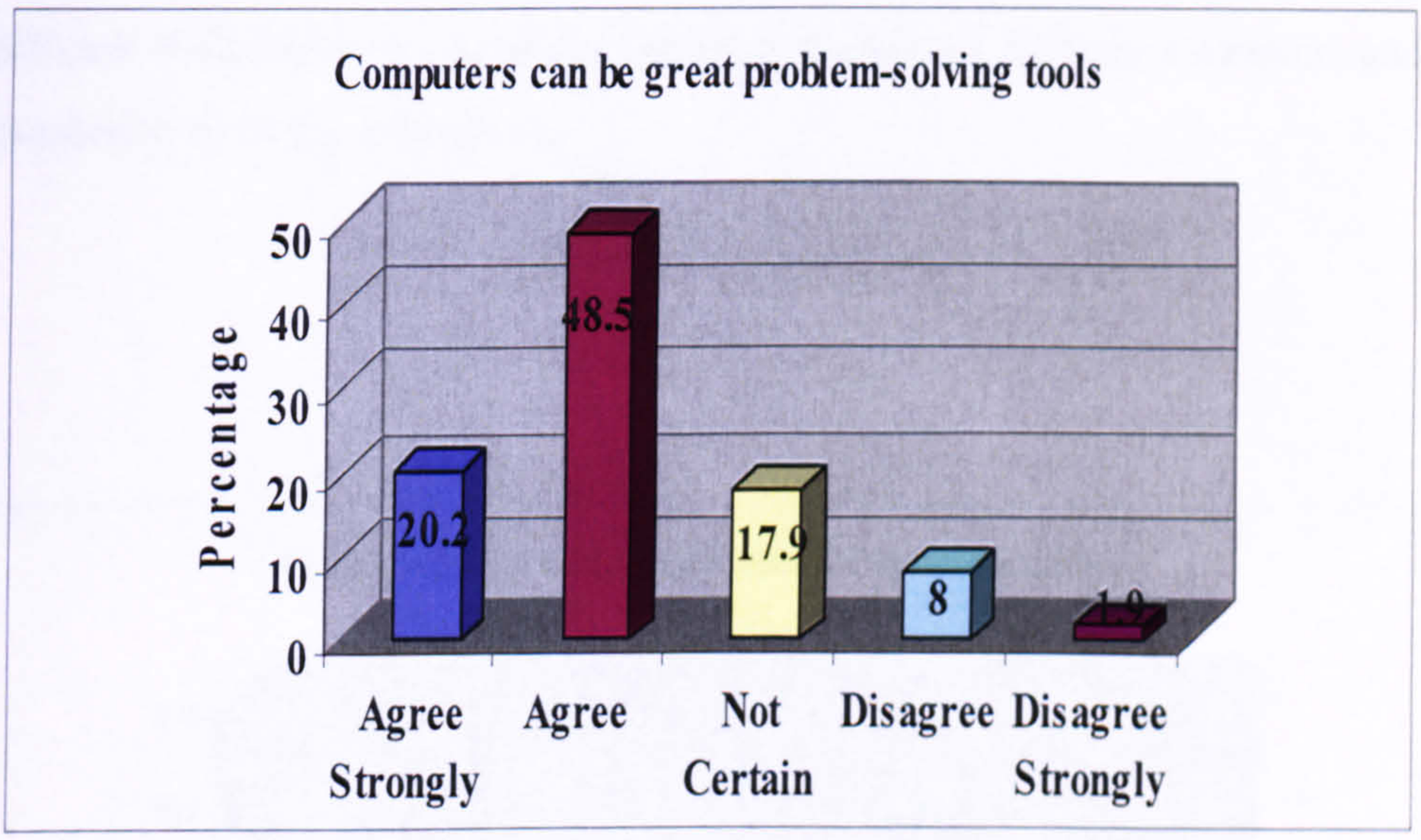
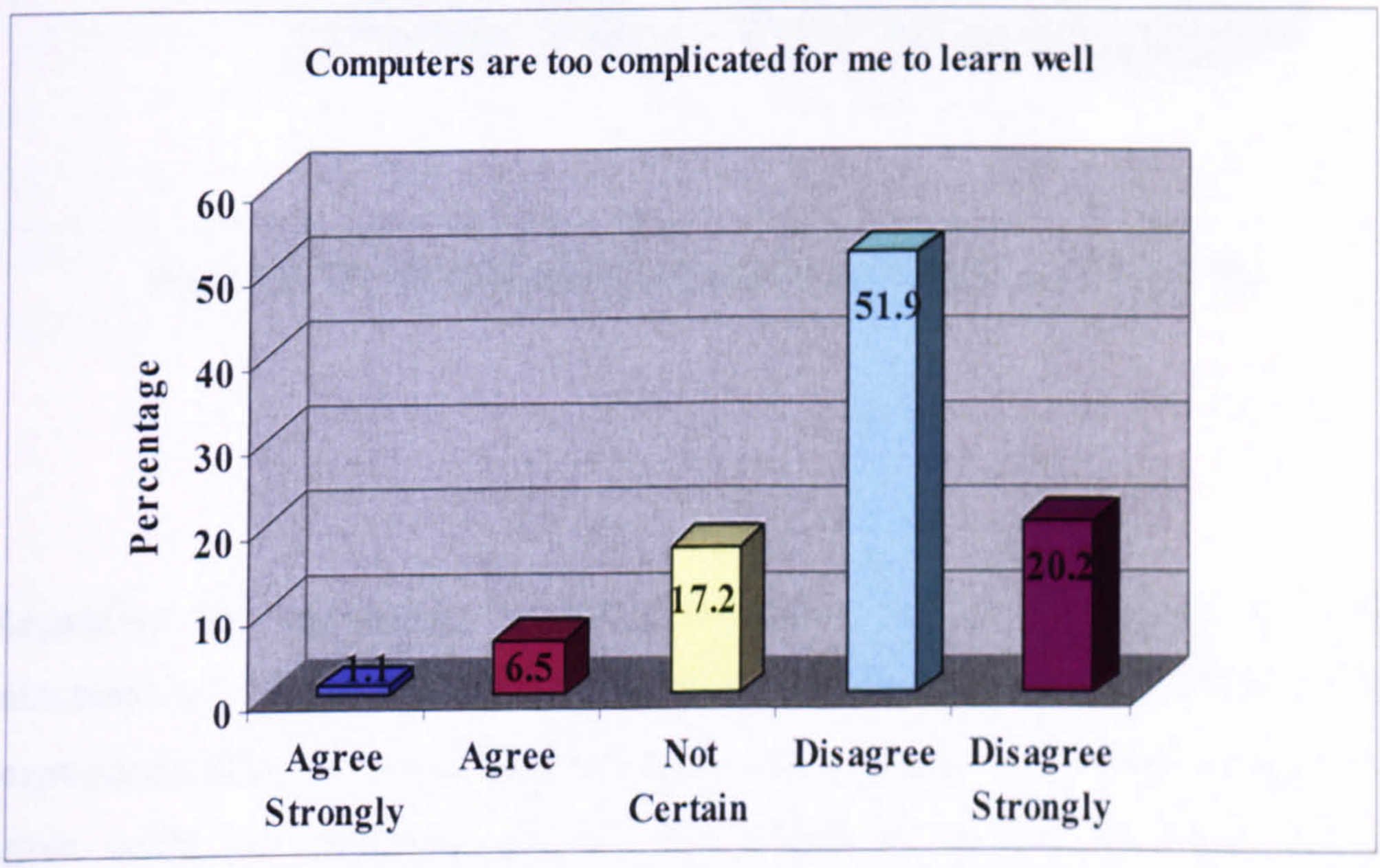


Figure 5.13. Computers Can be Great Problem-Solving Tools

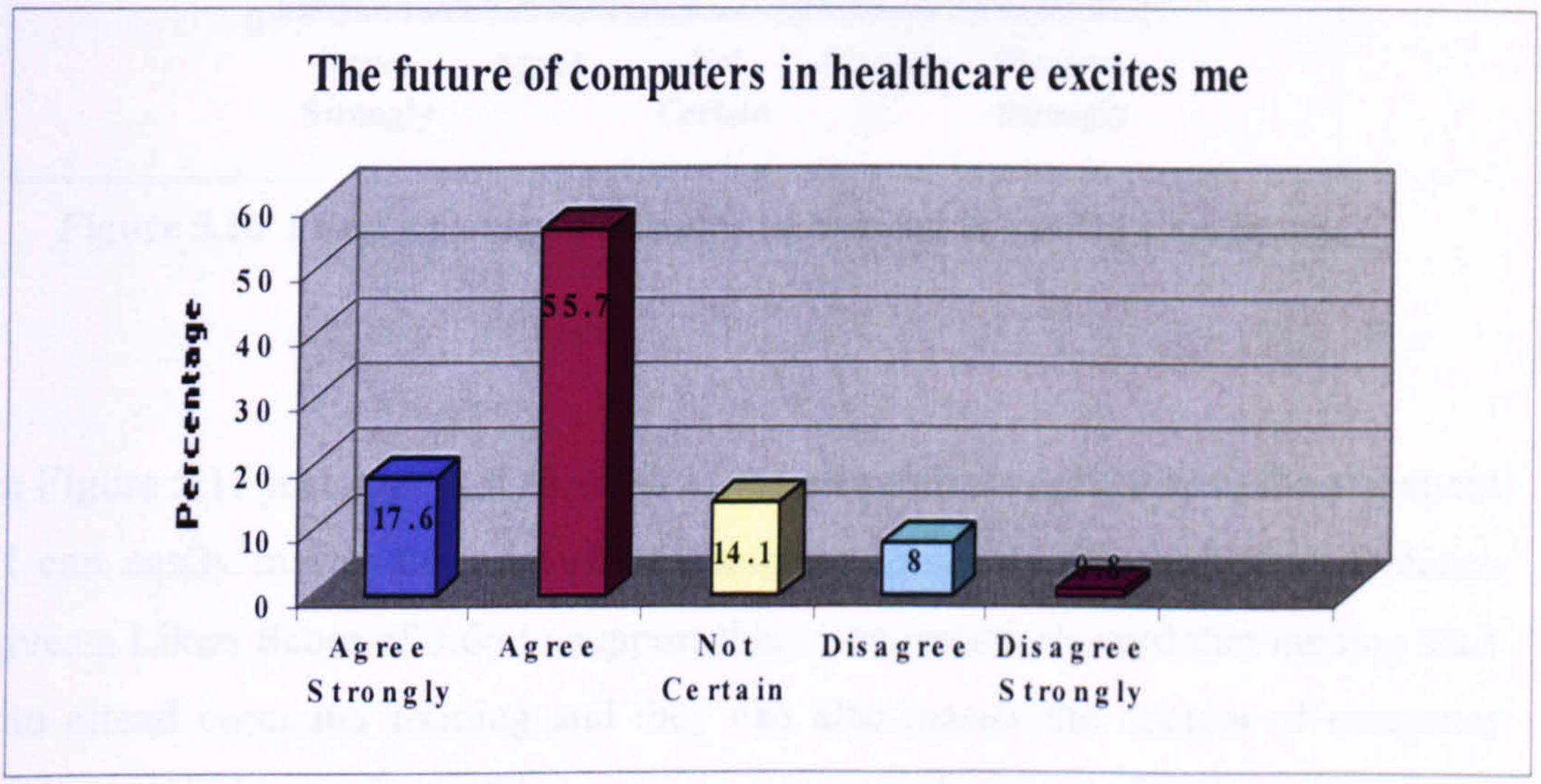
Figure 5. 14 shows just over half (51.9%) of the respondents disagree with the statement "Computers are too complicated for me to learn well", giving a Likert Score of 3.20. These results indicated that computers are not complicated and easy to be used. It is recommended that the HMC should provide computer courses for the nursing staff.

A χ^2 test was preformed to test the significance of relationship between respondents view on the statement "computers are too complicated for me to learn well" and the work experience of the respondents. Where H_0 stated that there was no difference in responses between the above view on the statement and the respondents' work experience; H_1 stated that there was a difference in the responses of the respondents' between the view on the statement computers are too complicated for me to learn well and work experience of the respondents. The χ^2 statistic (1.837, df = 4, P > 0.05). Thus, we can not reject H_0 as it was not significant difference in responses between the above attitude statement and the respondents' working experience.



Figures 5.14.Computers Are Too Complicated for Me to Learn Well

In respect of the responses to the statement "The future promise of computer in healthcare excites me", Figure 5.15 shows over half (58.7%) of the respondents agreed with the above statement giving a Likert Score of 3. 84. Another evidence from the results of the above statement about the future of the computers usages in healthcare and for care-givers.



Figure, 5. 15. The Future of Computers in HealthCare Excites Me

Regarding the statement, "I feel a computer course in nursing is totally unnecessary", Figure 5.16 shows that an overwhelming majority (85.1%) of the respondents disagree and disagree strongly and just about 4.5% agree strongly and agree with the statement above. The responses to this statement in the questionnaire from the sample population gave a Likert Score of 1.74 thus, indicating a strong desire to make computing courses available for nurses. Computer training is highly recommended for the nursing staff and it is supported by the results of the negative statement that computer course in nursing is totally unnecessary.

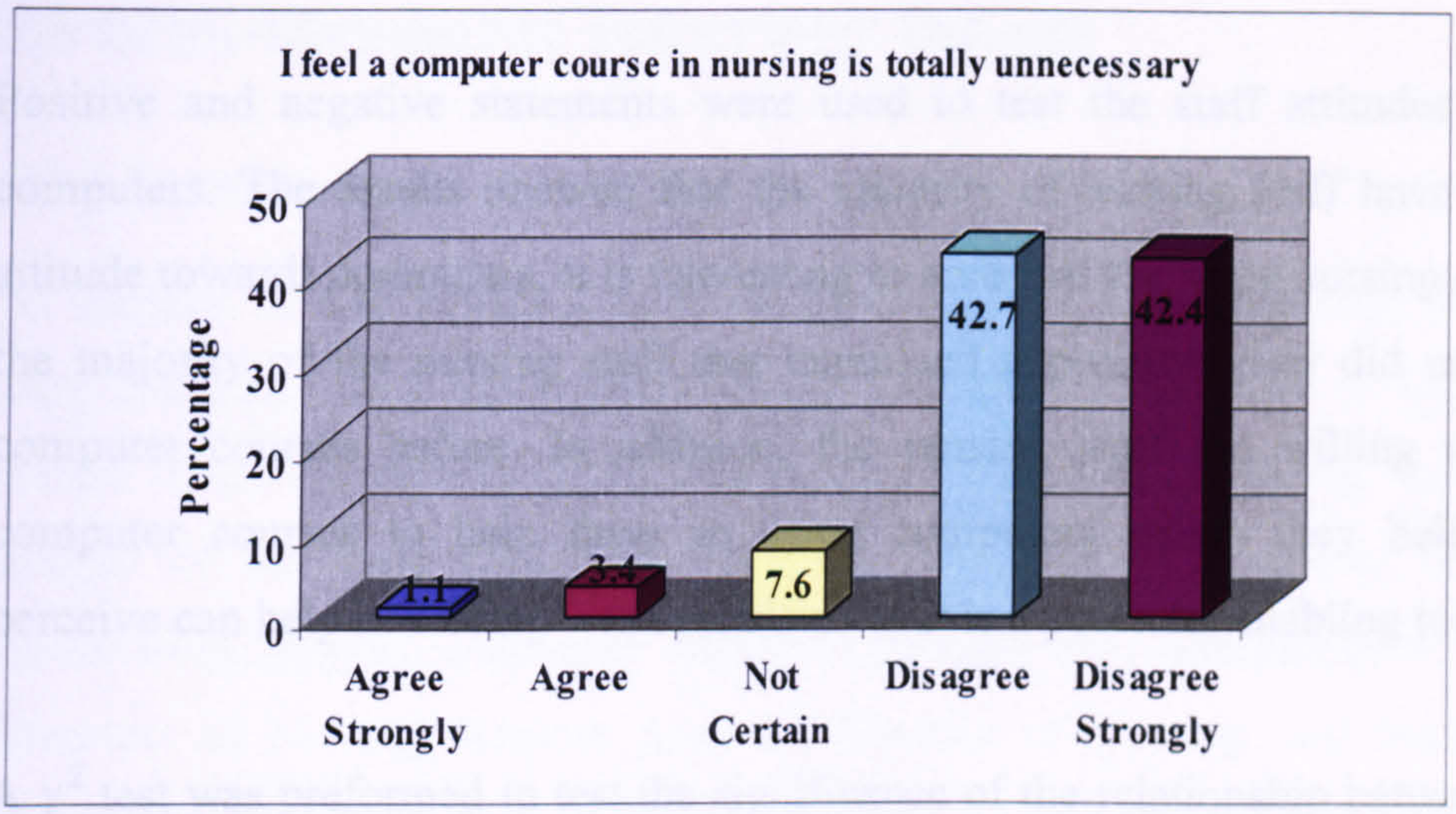


Figure 5.16 I Feel a Computer Course in Nursing is Totally Unecessary

In Figure 5.17 just over half (53.8%) of the respondents agreed with the statement "I can easily master the content of computer lessons". The statistical evidence gives a Likert Score of 3.66 to support this. The results showed that nursing staff can attend computer training and they can also master the content of computer easily and without fear. This seems to be an invitation to HMC to encourage nursing staff to attend computer courses by providing these courses.

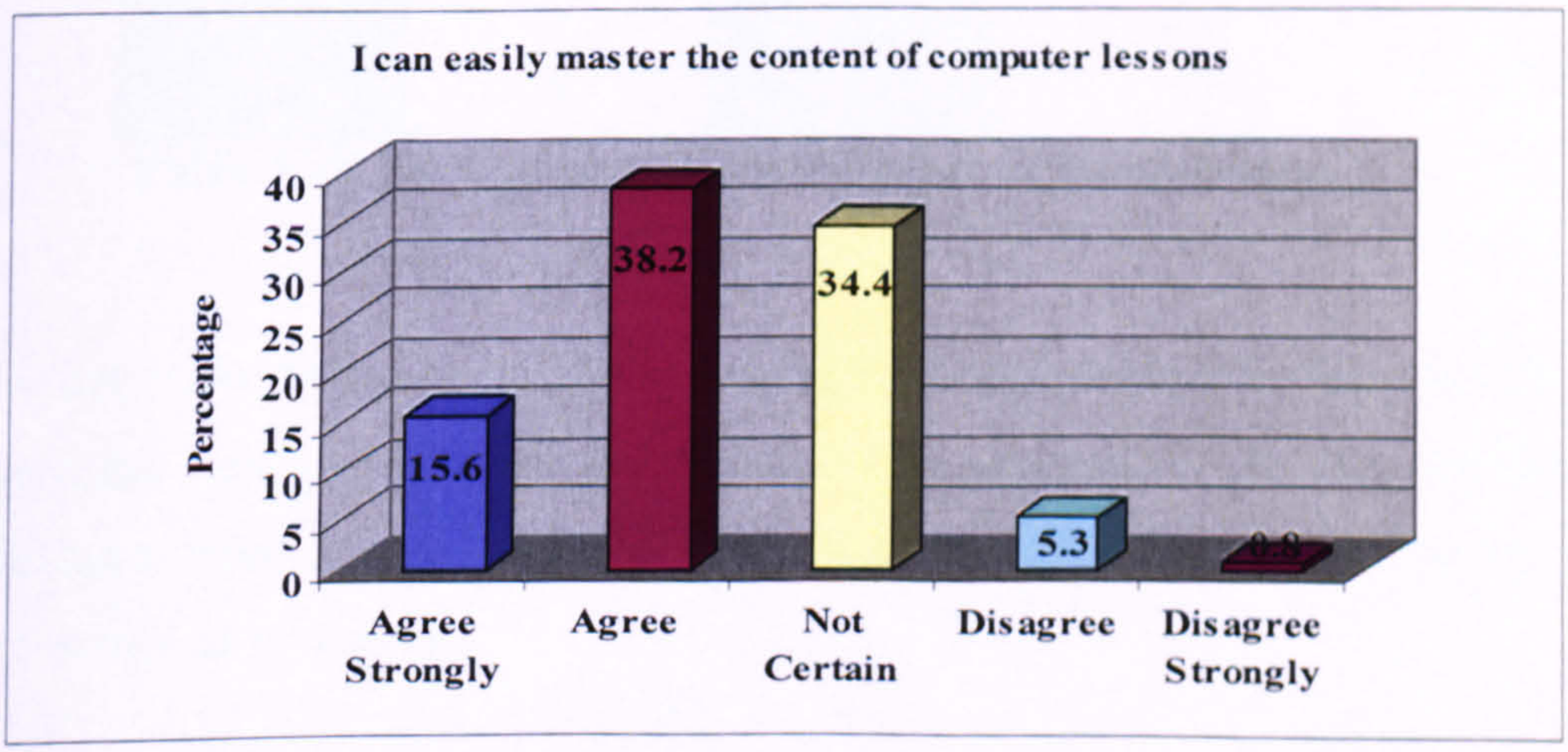


Figure 5.17. I Can Easily Master the Content of Computer Lessons

Positive and negative statements were used to test the staff attitudes towards computers. The results showed that the majority of nursing staff have positive attitude towards computers, it is interesting to note that the same nursing staff that the majority of the nursing staff that expressed a positive view did not attend computer courses before. In addition, the nursing staff are willing to attend computer courses to help them in using computers which they believe and perceive can help in solving work problems as it is a powerful enabling tool.

A χ^2 test was preformed to test the significance of the relationship between some of the attitude statements presented in this section and gender; qualification and work experience of the respondents. The majority of the nursing staff disagree totally with the statements that computers will create more work for the nurses and computers will put the healthcare professionals out of jobs. They also disagree that computer course in nursing is totally unnecessary. This information will find its way to stage 1 of SSM as unstructured problem situation, which is going to be discussed further in Chapter Six.

5.3 Semi-Structured Interview: Results

5.3.1 Introduction

In addition to data collected from the questionnaire, semi-structured interviews were conducted with senior management staff at HMC in order to get a better picture of the situation at HMC. The scope of the interview survey was a small sample of the total population, Director of Personnel, Director of Health Information System, Assistant Medical Director for Administrative Affairs, Directors of Nursing, Seniors Assistant Director of Nursing, and Staffing Co-coordinator all are working at HMC and PHC. As discussed in the methodology chapter, a total of ten interviews were carried out. One interview did not take place with the Administrative Director as he was on an official mission abroad.

In terms of gender, the sample included three males and seven females. A graphic view of these data is presented in Table 5.12 below. Most of the interviewees were in the age range of 40-60 years old.

The Gender and the Number of the Interviewee			
Gender	HMC	PHC	Total
Male	3	-	3
Female	5	2	7
Total	8	2	10

Table 5.11 The Gender and the Number of the Interviewee

The list of the interview questions was included as Appendix 3. Some follow-up questions were posed at the interviews, when appropriate. As semi-structured questions were adopted in interviews, the responses included a variety of comments, opinions, etc.

Thematic analysis was adopted in presenting the result of the interviews. The interview results presented in this chapter described the interviewee's

understanding of the problem under investigation. All interviewees were asked the same questions and in order to structure the interview responses to reflect the research aims and objectives, four main categories were initiated to examine the current situation and problem generated as follows:

- **Description of the current system.**
- **Documents, policy and accessibility of the records.**
- **Problems of the present system and the barriers of the news system.**
- **Expectation and the involvement of the new system.**

5.3.2 Description of the Current System.

In order to know the current staff records system in use at the Nursing Department and how long this system had been in use, the interviewees were asked to describe the current staff record system.

Respondents were asked to describe the current system of staff records in Nursing Department.

The responses of the interviewees to this question could be categorised into two. In the first instance, there were suggestions that there were two types of filing system. These were the manual based system and the computerised based system. Both systems were being used simultaneously. However, the manual system was being used more than the computerised system as indicated in the excerpts below:

"We have two kinds of files, one the old system, which is manual, then there is the computerised one, which you can just get the basic information on the individual."

"Actually we have two ways of staff records, the computerised system for staff records is not much but the mostly is the manual records, the details, the more details in the manual filing."

In using the two systems of filing (manual and computerised), the interviewees further indicated that they do not follow an established procedure for keeping staff records. Hence, it was more of following a haphasard procedure that tend to create a lot of problems, some of which were identified in the excerpts below:

"I can call it a duplication of papers, Nursing Department, Senior Assistant Director of Nursing, Assistant Director of Nursing and the Head Nurses all of them have a record about their staff."

"I can't describe it first because we don't have a record system. We depend on gathering some data about nurses and it's all with personnel department it's not with nursing department."

In response to the question how long they have used same system.

The interviewees were not sure how long the system had been in used, but they agreed it was for a long time. The majority of the respondents agreed that the system had been in existence and in use since 1982.

5.3.3 Documents, Policy and Accessibility of the Staff Records System.

Policy is an important issue to regulate the use of the staff records system at Nursing Department and HMC, but there is a lack of policy related to the type of documents held in staff records; there is no retention policy, furthermore, there is no policy on who have the authority to access staff records. To know more about the policies the interviewees were asked the following questions:

Interviewees were asked about the type of document they keep in the staff records.

The great majority of the interviewees agreed on the type of the document kept in staff records. Some of the documents kept in staff records included official materials

such as the staff, name, age, qualifications, etc., any official communication with the employee, anything related to the employee, leave, warnings, officials mentions, employees contract, any document related to the benefits, salary and promotion, all has to be documented in the files. Other sundry documents kept in the staff records were information regarding sick leave, leave, incidents if they have, any disciplines, any interviews they had and any educational programmes they undertake.

The second part of category two about how long do they keep the staff records and if they have a policy regarding this.

Interviewees were asked how long they keep staff records.

The views expressed by the interviewees regarding how long staff records were kept were wide-ranging. The divergent views expressed by the interviewees underscores the point raised earlier about the lack of an official policy or principle guiding the management of staff records. For instance, one interviewee suggested that the files were normally kept as long as necessary, "... *we don't destroy them. It's kept actually. If a nurse came even after 10 years we have this document available". "Usually we do not transfer them we just keep them. We have a store for those who resign we have to keep them in a store in a box and seal it for whatever purposes in the future. So we have to do that."*

On the other hand, some other interviewees suggested that it could be kept for only very few years. Among the views expressed were: *"I think one year, because the files are big, but if we have a new system where the data can be summarised and kept there, if it can be stored, it would be more straightforward."* "We *don't have any specific date for that, but each is done according to their administration, some like to keep it for 3 years then after that we don't need the files". "In the nursing department I don't know but in the Woman's Hospital as soon as the staff resigns, we do not keep them."*

The interviewees were asked if they have retention policy for staff records.

All interviewees agreed that they have no retention policy. However, the responses could be categorised into two. In the first category were those who suggested that although there was no written policy, efforts were being put into putting one in place. In the second category were those who suggested that there was no policy and there were no suggestions of efforts to put one in place.

The third part of the second category is the accessibility of the staff records.

Interviewees were asked about whom do they think have the right to access the staff records.

In response to the first part, a great majority agreed that the Directors and Senior staff from Personnel Department and Nursing Department should have the right to access staff records. Typical responses were as follows:

"In nursing, actually 3 departments, I think it's important for them to access. In Nursing Administration Office: Director of Nursing; Staffing coordinator; the Senior ADN, and personnel department, but no policy on that."

"I think the director should be having direct access, all the deputy but not less than that because some incidents happen you know because if any nurse had access to her own file even lots of problem will come up because in that file there must be some incidence reports, files, some secret records, some detriment that the nurse should not see herself or other people see it. She might have it seen by her colleagues, which is wrong; we need a policy for that."

In the second part of question on accessibility, the interviewees were asked if they can access staff records from their offices.

The present (the stand-alone, Fox.Pro.) staff records system cannot be accessed from any computers within HMC, which is a disadvantage as stated by one the interviewees. All the interviewees stated that they can not access the staff records from their offices. One of the interviewees attributed this problem to the manual system of keeping records. In the words of one of the interviewees:

"No. Our record system is manual and here only. It's a big disadvantage. I wish I had all this on the computer, so I could get access to any records necessary."

5.3.4 Problems of the Present System and the Barriers of the New System.

The interviewees were asked if they have problems with staff record system at present.

The main problems and obstacles of the present staff records system were related to space, big files, computers, time consuming, difficult access to staff information, the old system, etc. The majority of the interviewees agreed that they have problems with staff records system, especially if they have to wade through so many records of long serving staff members. Typical responses are as follows:

"Big files taking space, and most of the information not there. Delay in getting information about the staff."

"Yes. Because of maintaining a manual staff record system, handling and access to the information is time consuming."

"No computers, every time we request they say ok, but we did not see any thing yet, budget allocation."

"Yes we do. I feel it is an old system, it's not organised, also I feel that it is maybe not, certainly some of the staff are not qualified to organise these kind of filing, maybe if people had an idea of just filing, just stuff it in the file, so I think the ideas not well understood by the others."

One of the interviewees summed up the problems with the present system as:

"Really, it's very expensive, it's time consuming, un accurate system, can not get help to retrieve any record, you have to go through every single file, at HMC the majority of nursing staff are expatriate and you have more than 30-31 nationalities, someone says why do you have big files, sometimes it gets lost."

Interviewees were asked about the barriers to computerisation of the staff records by the Nursing Department

It is not surprising that the senior management staff recognised the main barriers to computerisation of staff records as lack of budget (funding), lack of trained staff, lack of staff training, lack of equipment, for example, computers, hardware and software, etc. It was suggested that attention should be given to the barriers of the computerisation to improve the problem situation. Most interviewees agreed that there were some of the barriers in relation to staff records computerisation. The quotations below illustrated this point:

"Actually you cannot computerise all the staff files. We planned the new system as much as we could but more information in the computer system but you cannot just computerise everything. Budget problem and infrastructure"

"No computers in our offices, no experience staff, no computer courses, and no budget for that"

"The staff are one of the barriers. If the staff can't use the computers they will not be able to access the system itself, if it is in the computer. No expert staff on the

field, for example, technical staff and nursing informatics staff and no strategic planning before implementation.

"Staff need the knowledge of the computer because most of the staff don't know, even the basic computer they don't know, and special software. Infrastructure should be check and funding"

Interviewees' response to supplementary questions, what about the future.

The interviewees were also asked to make suggestions on what they think about the future.

"Maybe what we are thinking, is that like what they do copying the files and store them on a disk and then you can just look, this is one way to talk about it."

"Well, I think no-one has brought this up, or made a proposal, no strategic planning. When I was Director of nursing, Companies representative have put a proposal, but unfortunately they didn't do it before, but one of the companies told me that for us to give them what we want and they would make one for us what we want, and very costly to have this and not actually in our area. The nursing department would have this system."

5.3.5 Interviewees response to expectations of the new staff records system

The senior management staff have a very good expectation of the new staff records system. The most important thing they expect is that the new system is going to solve the problems that they are facing now with the old system.

Interviewees were asked about their expectation of the new staff records system.

All of the interviewees answered the question positively. However, their views were wide ranging. For instance it was expected that computerisation would make their work easier, save time and space. It was also considered that it would be very easy to access and people would not have to wait for long hours for requests for information to be honoured. Other views were expressed as contained in the excerpts below:

"Nursing record will be more updated and will be better than now. The nurses' files will be more accurate and minimise the work for them."

"Well advantages, having the records in one room. You need to develop a lot of this information in the computer so we can use the room for something else. The second thing the time that is used to go through any records of a case could be used for something else and the cost- it's very expensive but in the long run it will be very cheap, quick and accurate information, then excellent. That's what I think will be involved."

"Of course, safety information about the staff, secret and not anybody can see it and password for each one."

5.4 Summary:

Chapter Five has indicated the findings of the questionnaire survey and the interview survey results. These data were collected and analysed will form the basis for soft system methodology; stage one, which is the problem situation unstructured. The next chapter is systems intervention.

Systems Intervention

6.1 Introduction

The previous chapter corresponds to stage one in the Soft System Methodology. The surveys have highlighted the current situation and difficulties of Nursing Staff Records System at the Department of Nursing at Hamad Medical Corporation in the State of Qatar. This study will attempt to work simultaneously, at different levels of detail on several stages, since any change in any one stage affected all the others as they are interdependent.

In this chapter, the intention is to shed light on the current issues and situations which will be discussed in order to analyse the data collected via application of the Soft System Methodology, the data will be presented in a logical sequence, starting with stage 1, of the SSM (the problem situation unstructured). Stage 2, of the SSM is the problem situation structured represented by a Rich picture which is drawn to highlight the issues raised in a structured way.

Relevant systems are identified and three themes are then put forward for further system enquiry. Stage 3 of the SSM is the root definition of all the three relevant systems are formulated and tested using CATWOE analysis. Stage 4 of the SSM is the Conceptual model for each of the root definition. Stage 5 of the SSM is the comparison between stage 2 and stage 4.This is comparison between real world and the conceptual models. The comparison termed the agenda for change identifies the elements that can be gained in terms of systemic desirability and cultural feasibility is Stage 6 of the SSM. Stage 7 is the last stage of SSM, which is the action to improve the problem situation, the action based on the changes recommended to improve the problem situation outlined in stage 6 of the SSM.

The methodology contains two kinds of activity. Stage 1, 2, 5, 6 and 7 are real-world activity necessarily involving people in the problem situation, stage 3, 4, 4a

and 4b are system thinking activities which may or may not involve those in the problem situation, depending up on the individual circumstances of the study (Chekland & Scholes, 1990, p.160).

6.2 Stage One of SSM: Problem Situation (unstructured)

The SSM begins with soft and unstructured expression of a real world problem situation (perceiving). Stage one is the initial Stage of the SSM and according to the SSM, Stage One and Stage Two are concerned with finding out as much as possible about the problem situation from as many perspectives as possible so as to build up the richest possible picture.

The most useful guideline here has been found to be that the analysis should be done by recording elements of slow-to-change structure within the situation and elements of continuously changing process that relate to each other within the situation being investigated. Checkland (1981, p.166) calls this relationship "climate". Elements of structure are defined as those features related to physical layout, power hierarchy, reporting structure, and pattern of formal and informal communications. Process is related to the on-going activities of conversion of raw material into products, monitoring, decision-making and controlling (Checkland, 1981, p.164).

In the analysis of questionnaires and the interpretation of the interviews, a number of issues were identified. The issues were classified into three subject areas: process, people and organisational issues as shown in Figure 6.1. These issues were then sub-divided into a number of sub-issues, which were arranged accordingly, based on their relationship. These issues will be discussed in more detail in the next section.

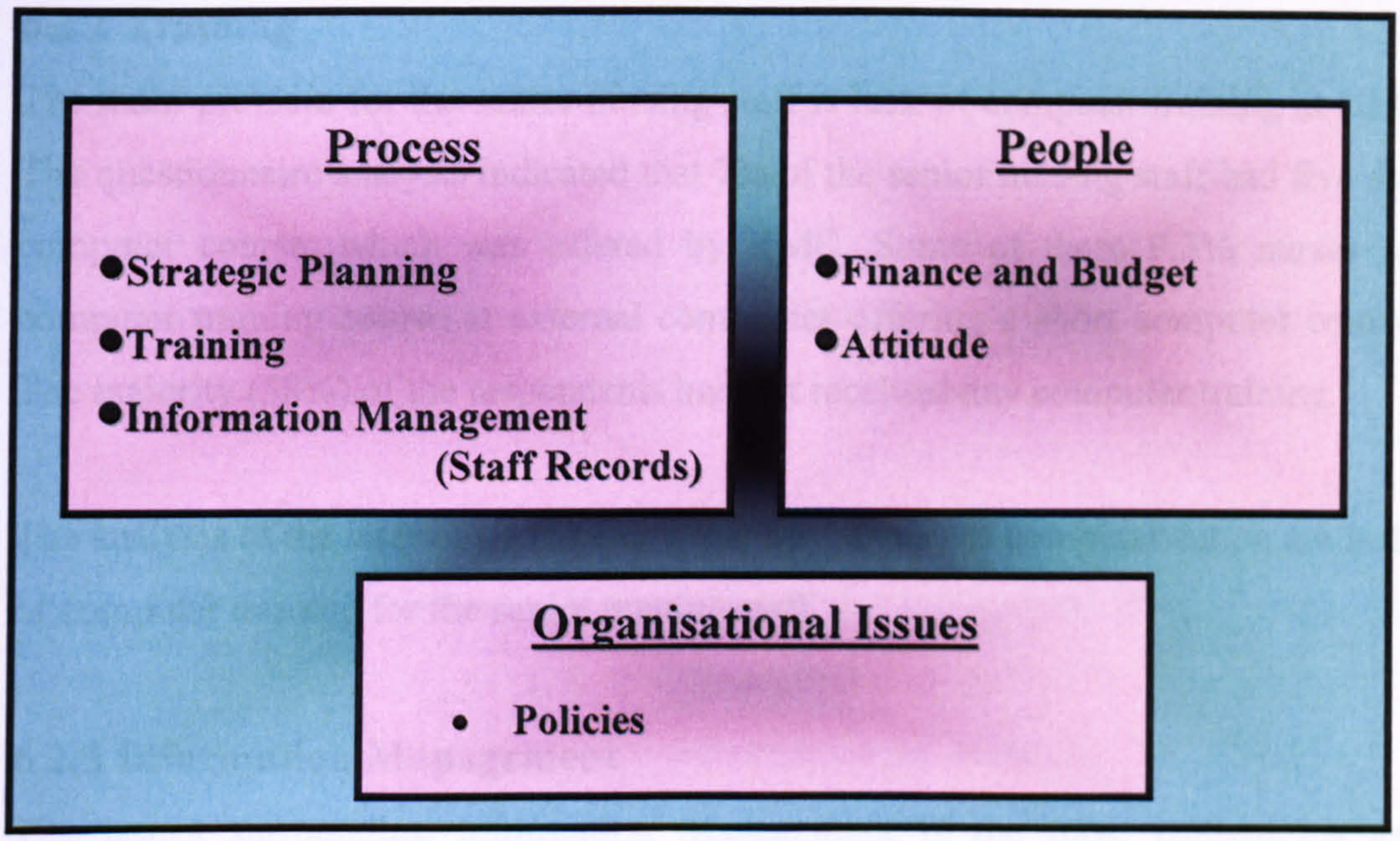


Figure 6.1 Inputs to Stage 1 of the SSM from analysis of Questionnaire and Interviews.

6.2.1 Process

Strategic Planning

Strategic Planning is an area of great concern for the Director of Nursing and the Senior Nursing Staff at HMC. The majority of the interviewees admitted that they have had no strategic planning for the Nursing Service in the past to introduce IT to the Department. It is also of concern that there is no Strategic Planning for the electronic nursing staff records, no strategic planning for the training of the nursing staff to use the computers and no strategic planning to get expertise in the field to help establish the new system.

To develop a strategy for the 21st century for ESR within the Nursing Department.

As mentioned in Chapter Five, the Nursing Department has strategies for some activities within the Department, but it does not have strategic planning to train nursing staff to use computers nor strategic planning to establish ESR for the workforce in the Nursing Department.

6.2.2 Training

The main problem for the senior nursing staff is lack of computer training at HMC. The questionnaire analysis indicated that 7% of the senior nursing staff had five days computer course, which was offered by HMC. Some of these 9.3% nurses had computer training course at external companies offering a short computer courses. The majority (58%) of the respondents had not received any computer training.

The analysis of the interviews indicated that the barriers to computerisation are lack of computer training for the senior nursing staff.

6.2.3 Information Management

The issues surrounding Information Management is the most contentious area discovered during the research survey. The use of computers in the information handling and management activities is still not widespread amongst the respondents. The majority of the interviewees stated that the problems with the present system are as follows:

Accuracy of Information

The inaccuracy of staff records can cause wrong decision making and miscalculation which maybe due to carelessness and ignorance of the personnel working in the Nursing Department and because they are not trained in proper filling methods.

Currency of Information

The information must be current if it is to be of any use. The inability to obtain up - to date information about the staff and unreliability of information about the staff may lead to delays in decision-making.

Editing of Information

A number of issues on information editing caused a great deal of confusion in the processing of personnel information. The issues of information insertion and deletion are basically related to the way records and listings are amended when processing the staff information. The current practice of updating the information is mainly

done manually, and sometimes by using the stand alone system (Fox pro system). There is no consistency of practice in editing information.

Availability of Information

Adequate information should be made readily available in order for decision-making and subsequent action to be made effectively. However, the current staff information resources are prone to be lost or misplaced.

Information Retrieval

Information retrieval and indexes are linked to the approach of storing, classifying, indexing and numbering of information sources that are referred and processed. Currently resources are inefficiently retrieved due to unavailability of indexes. In addition, manual retrieval is seen as a contributing factor to the system's inefficiency. The FoxPro system the stand alone system holds only a very simple information for example, name, date of hiring, etc. The Nursing Department can not depend on one system, so they have to use the manual and stand alone system (Fox Pro system) together.

Information Accessibility

Information accessibility is impossible via (Fox Pro system) the stand alone system in the Nursing Department from any computer within HMC. Only one clerk can work with it and access it. All the interviewees agreed that they cannot access the system from their offices or from other computers at HMC. Questionnaire results also showed that 95% of the respondents do not use computer to access nursing staff records.

Information Storage System

Another problem is lack of physical storage space. The filling cabinets are so full that files are stacked up on the top of filling cabinets; on the shelves and on the floor. The filling staff have to make do without file divider and have to compress files into already packed filling cabinets'. Frequent incidence of the staff taking out records or

files without notifying responsible staff and abandonment of inactive files are among the main problems of the current records storage system.

The current issues at Nursing Department are clearly defined in the comparison stage of the SSM and its far-reaching improvements to both the process of retrieval, storage, communication /dissemination and updating are vital to managing the Nursing Department information.

6.2.4 People

6.2.4.1 Finance and Budget

Decision Makers

Financial Resources Towards ESR

Interview analysis indicated that the barriers to computerisation at Nursing Department were Budget (insufficient money); not enough computers and software; insufficient training for staff, and no trained staff. The financial restriction imposed by the decision makers and budget committee members at HMC on Nursing Department have created a management vacuum that has depressed the Department's development. This may be due to lack of awareness of the importance of having an ESR on the part of the decision makers and budget committee members.

Financial Resources for Staffing, Staff Development and Training:

The questionnaire and interview analysis indicated that there is no financial support from the decision maker and budget committee members, for new staffing; staff development (in-service education), training of the present staff and recruiting experts in the field. Nursing Department would need to justify the importance of the ESR to the decision maker and the budget committee members, and its impact on the function of Nursing Department in decision-making in relation to staffing.

6.2.4.2 Staff Attitudes Towards Computerisation

Resistance to technology and especially to computers is known and acknowledged among the senior nursing staff at HMC. The questionnaire analysis shows that 71.2% of the senior nursing staff members have a positive attitude to computers as they believe that computers can be great problem- solving tools. From the 71.2%, 16% senior nursing staff currently use a computer in their work; for example, for laboratory and x-Rays reporting. Additionally, it was noted that 74% of the senior nursing staff have positive attitude to the future of the computers in the healthcare. It is interesting to note that 58% of the senior nursing staff did not take any external computer courses, 7% of the them attended a 5 days course provided in house by HMC and 73% of the senior nursing had no previous experience of computer use.

These points of views were confirmed by questionnaire results. The questionnaire analysis shows that 26% of the respondents have negative attitudes towards computerisation as they consider the use of computers in healthcare will create more work for nurses. Of these 21.4% staff were not certain if the computers in healthcare will create more work for nurses. However, it shows that the negative attitude of the senior nursing staff was not strong as expected.

6.2.5. Organisational Issues: Policies

The issue that caused most confusion amongst the senior nursing staff was the retention of staff records: how long should they keep the nurses records; where should they keep them? All of the interviewees agreed that there is no policy to regulate the retention of the nursing staff records, when the staff leave the nursing profession; when they are either terminated or retried or they leave the country for good.

In relation to the documents held in staff records, there is no policy indicating which documents should be in each nursing staff records. The analysis of the questionnaire and the interviews indicated that there is no policy, but there is a common understanding about which documents should be in the nursing staff records.

Furthermore, there is no policy stating that nursing staff can look at their records at any time. The questionnaire result shows that 53% of the respondents said "no" the nursing staff cannot look at their records at any time. In addition to that the results indicated that 39% of the respondents said " yes" they have to be present when the nursing staff look at their own records, while 9% of the respondents said " no" they should not be present and 52.3% of the responders did not respond to the question. This indicates that there is no formally agreed policy for this part of the records management section.

The result of the interviews showed that all interviewees agreed that there is no policy for the existing nursing staff records at Nursing Department.

6.3 Stage Two of SSM: Problem Situation Structured

This is the stage where the problem situation is expressed in order to get the richest possible picture, questionnaires were distributed and semi-structured interviews with senior management staff within Nursing Department and senior management staff at HMC were carried out (Chapter Four & Five). During the analysis stage the starting point is thinking about the "problem content" and "problem-solving" system. The role of "problem-solver" here explains the problem content system and then applies SSM to take action to solve the problem or to explain it again on behalf of the problem owner. The relationship between the problem solving and problem-content system is depicted in Figure 6.2.

The Problem - Solving System

The problem-solving system contains the "role of problem solver" (The Author). Other key roles include: the supervisor, occupied by Mrs Janet Harrison who contributes her experience with methodology, information science, and health informatics. Professor Checkland contributed his experience with SSM in his continuing writings.

The "problem solving" system has resources such as the combined experience of the participants, full time work for three years by the author as a "problem-solver" and evidence from the survey. The constraints on the "problems-solver" include satisfaction of the requirement of higher study (PhD), and the submission of the thesis with in a time limit.

The Problem Content System

Problem Content System is presented here to have Rich Picture (RP) of the problem situation without imposing a particulate picture on it. Checkland (1981, p. 164) stated that the "the problem-content system has three elements which, structure, process and climate". Questions can be put based on the determination of these elements, for example:

Problem Owner

- Nursing Department, Senior Management Staff, HMC. State of Qatar.

Structure

- Nursing Department, HMC, MOPH, Information Suppliers and Users.

Process

Facilitate the use of information.

- To seek information,
- To receive information,
- To organise information,
- To store information,
- To retrieve information,
- To use information,
- To disseminate information,
- To inform the users,
- To train the users.

Climate

- Nursing Department is situated at the Administration suite at Women Hospital. Serving all the Nursing Staff at HMC and PHC.
- Professionals, Senior Nursing Management Staff and nursing staff
- Information is an important resource.

The Rich Picture (R P) Expression

At this stage the researcher will convert what has been gathered in stage one into a more systematic and structure form. According to Checkland & Scholes (1990, pp. 156-157) the emphasis is that a rich picture:

> "is an efficacious way of recording the finding-out phase because relationship and interactions are more briskly captured in pictures than in linear prose. However, the fundamental requirement is to gain a discussible appreciation of a problem situation; pictorial representation is simply one means of doing that, which has been found useful. But it is not an axiomatic requirement".

In this study, data collected via different methods e.g questionnaire and interviews are presented in rich picture and a summary of the problem situation that increases its understanding. Drawing the RP has proved to be a particularly effective way of representing issues concerning the problem under investigation at Nursing Department, HMC. Elliott & Starkings (1998, p. 132) believe that there is no universal set of symbols and any picture that seems to be appropriate can be used. RP is expressed here in pictorial form, Figure (6.3). The simple picture in this representation provides an illustration of the holistic view taken of the system of interest.

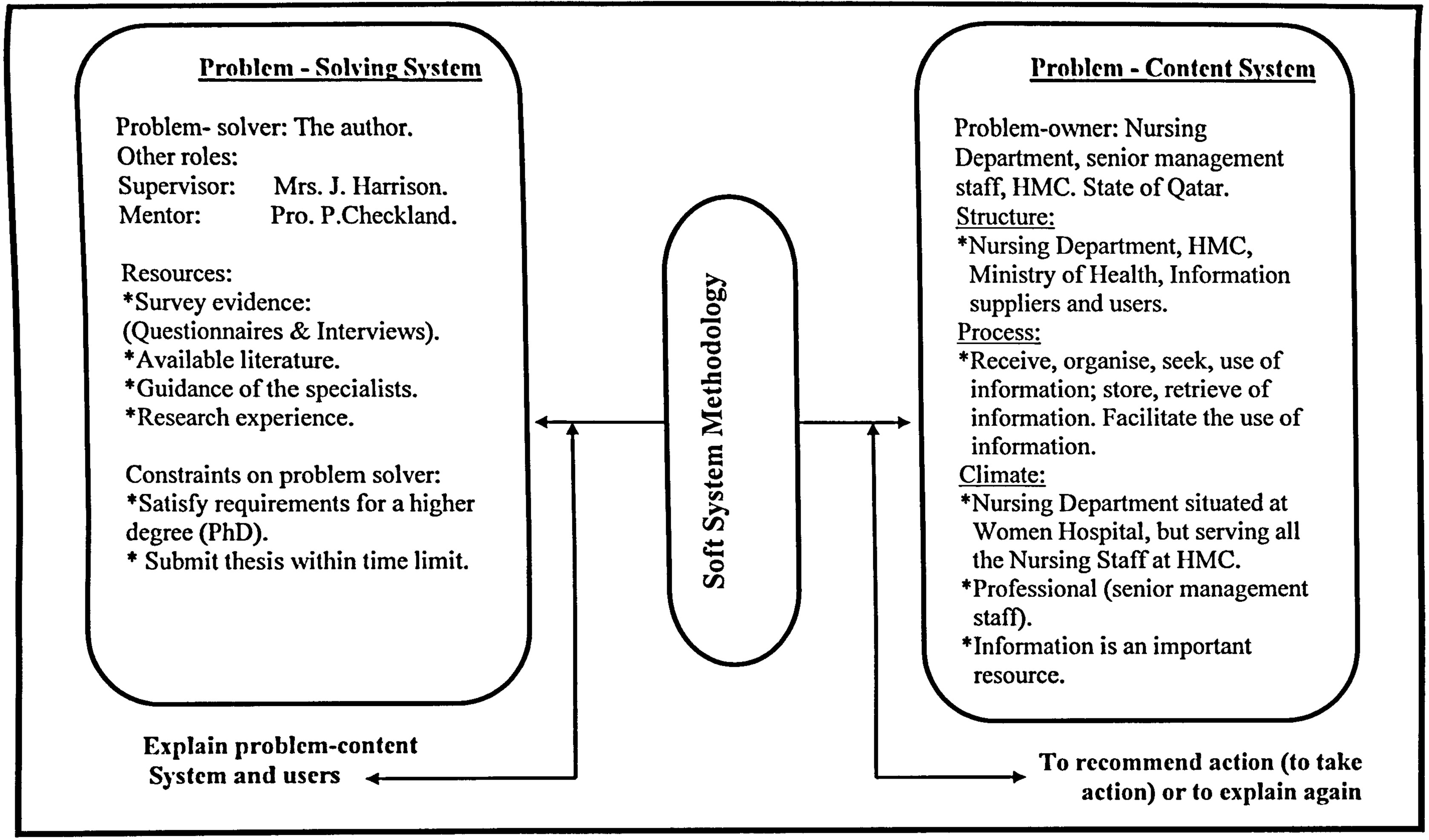


Figure 6.2.The relationship between the problem-solving system and the problem –content system
Adapted from: Brember, 1985, figure 3, p.64

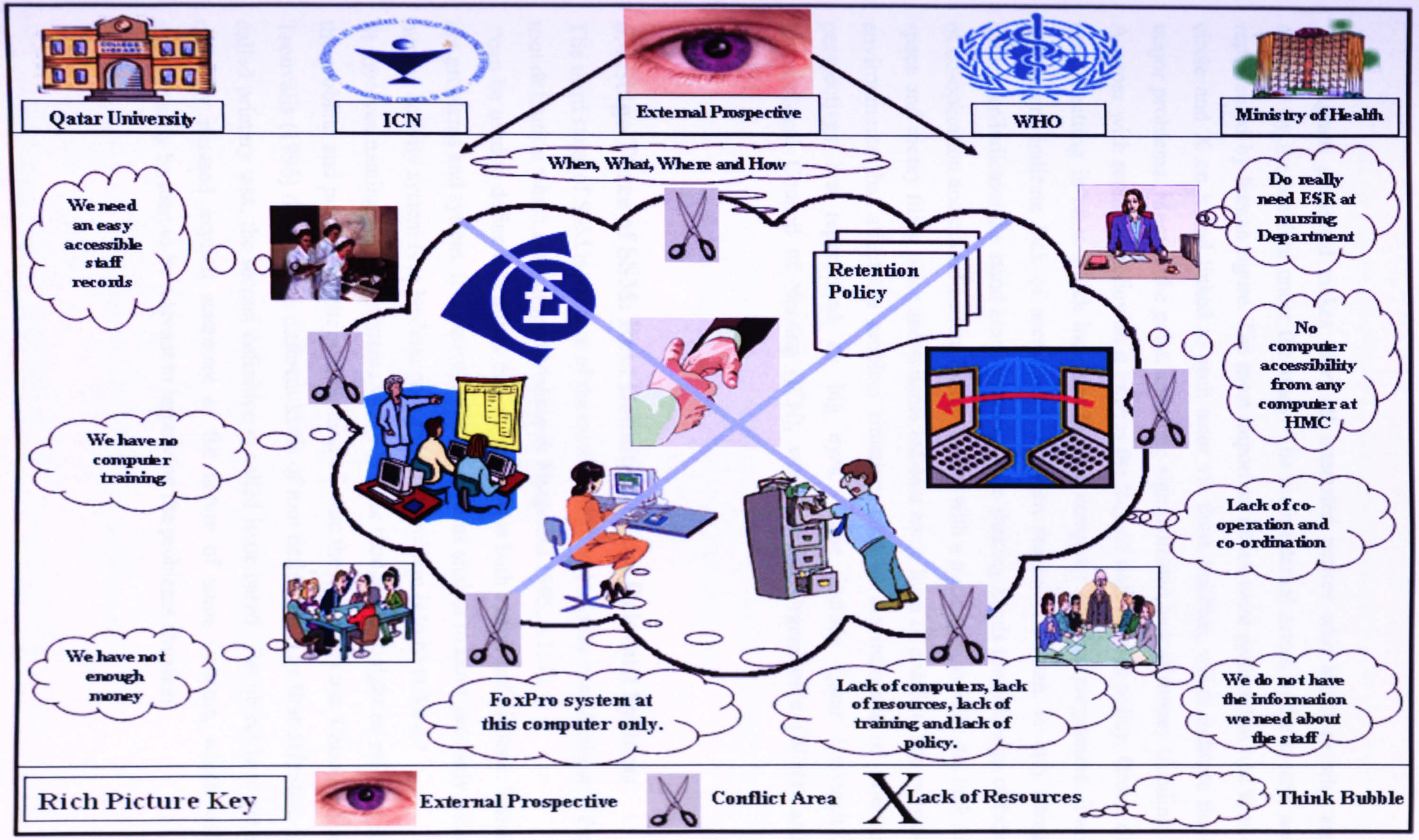


Figure 6.3 Rich Picture

The diagram presented makes clear all interested parties who affect or who are affected by the problem under the study. The main internal actors in the system are represented by human figure. The most important issues were gathered in one semi-circle and X on it and linked to each actor via think bubbles, which indicate their major problems. More to the point, a sterling sign indicated lack of money (funding). A paper with retention policy on it implies the lack of staff records policy. Group of people sitting in class which indicates lack of computer training programme. Two computers indicate lack of accessibility between the two of them. A lady using computer indicates the stand alone system, while shaking hands towards sign of lack of co-operation and co-ordination. Filing cabinet with a pushing man indicates lack of space and messy filing place and scissors indicate some form of conflict. The outside environments that affect the problem situation, such as the influence of external perspectives are represented by big eyes. These include Qatar University, International Council of Nursing (ICN), world Health Organisation (WHO) and MOPH.

6.4 Stage Three of SSM: Root Definition of the Relevant Systems

The third stage of SSM is the core of the methodology and it is the specification of the root definition which according to (Avison & Fitzgerald 1995, p.117)

"can be used to define two things that are other wise both vague and difficult. These are problems and system. It is essential for the systems analyst to know precisely what human activity system is to be dealt with and what problem is to be tackled."

It involves naming some of systems which look as though they might be relevant to the problem and preparing concise definition of what these systems are. Checkland & Tsouvalis (1996) defined two different kinds of root definition. The first definition is called primary task, the second definition is called issue based. The object is to get a carefully phrased explicit statement of the nature of some systems, which will subsequently be seen to be relevant to improving the problems situation.

In other words, to propose a particular definition is to assert that, in the view of the analyst, taking "this" to be a relevant system, making a conceptual model of the system, and comparing it with the present realities is likely to lead to illumination of the problems and hence to their solution or alleviation (Checkland 1981, p .167).
A relevant system is not a system to solve the problems inherent in the situation from which it stems, nor it is a system that will be designed and implemented in the real world, in fact, its function is to provide an alterative way of seeing the problem situation which, when develop further, will provide the analyst with a way to improve the problem situation. In essence, "the root definition should thus be a concise description of a human activity system which captures a particular view of it" (Checkland 1981, p. 167).

6.4.1 Problem Theme

The first step in Stage Three of SSM is to identify problem themes in the situation to be analysed, allowing relevant system to be distinguished for the situation. From the RP the problem themes at Nursing Department can be identified as:

- ESR facilities
- ESR awareness
- Resource-base for ESR development
- ESR training
- ESR infrastructure
- Perception of the value of information management
- Perception of the value of nursing staff.
- Co-operation among Nursing Departments in the GCC.

The eight relevant systems identified above these can be combined into three problem themes, as indicated below.

Problem Theme 1: Value System of Information Professionals

- ESR awareness
- ESR training

- Perception of the value of nursing staff

Problem Theme 2: Technology

- ESR facilities
- ESR technical infrastructure

Problem Theme 3: Information Management (IM)

- Resource-base for ESR development
- Perception of the value of IM
- Co-operation among Nursing Departments in the GCC

The mapping of relevant systems to problem themes was facilitated by colleagues in the Nursing Department in HMC.

6.4.2 Root Definition

Appropriate root definitions (RDs) can be constructed from the above problem themes.

Problem Theme 1: Value System of Information Professionals.

The formulation of the root definition for the value issues system can be identified in the following statement:

"HMC owned value system to enhance the awareness and attitude of high level administration and finance personnel to information skills by means of increasing the awareness of the benefits of the ESR in order to improve perception of the value system of the information professional".

For this proposed relevant system the CATWOE components can be outlined as follows:

C: Senior Nursing Staff and Staff Nurses

A: Senior Nursing Staff

T: Transform ineffective, inefficient, unreliable infrastructure skills of Senior

Nursing Staff to effective, efficient and reliable information skills

W: Decision-makers, budget committee members' senior nursing staff. Value towards ESR or and/ information professinals helpful in strategic planning, decision making for ESR and to perception

O: HMC

E: Awareness, cultural and social attitude, tradition, religion, technology changes, and organisational changes.

Thus, the value system issues root definition can be seen to be well constructed.

Problem Theme 2: Technology

The root definition of the technology issues system can be identified in the following statement:

"DON and HMC owned technology system to improve ESR capability by means of increase of awareness, staff training, facilities, and infrastructure and resource base in order to achieve improved access to staff records and improved decision making"

For this proposed relevant system CATWOE components can be outline as follows:

C: Senior nursing staff, staff nurses

A: Senior nursing staff and administrative staff

T: From ineffective use of technology that facilitates ESR to effective use of technology

W: ESR is helpful in gaining information for better access to staff records and better for decision making

O: Director of Nursing (DON) and HMC

E: The existing information technology, technical human resources, funding and financial situation, cultural and social attitude, rules, regulations and policies.

Thus, the technology system issues root definition is well constructed.

Problem Theme 3: Information Management System

The formulation of the root definition for the Information Management Issues can be identified in the following statement:

"DON owned information management system to transform ineffective, inefficient and unreliable information workflow practices to effective, efficient and reliable practice by means of making good use of the ESR in order to achieve a well managed Nursing Department".

The CATWOE definition of the information management issues relevant system is as follows:

C: Nursing Department, senior nursing staff, the staff nurses, senior management staff HMC

A: Senior nursing staff, staff nurses, senior management staff HMC

T: Transform ineffective, inefficient, and unreliable, information workflow practices to effective, efficient, and reliable information workflow practices

W: Effective, efficient and reliable information is vital for HMC

O: DON

E: Resources constraints, cultural, attitudinal, and moral aspects.

Thus, the Information Management System (IMS) Issues root definition system is proved to be effectively constructed.

6.5 Stage Four: Building Conceptual Model

The definition is an account of what the system "is"; the conceptual model is an account of the activities, which the system must "do" in order to "be" the system named in the definition (Checkland 1981, p. 170). The definitions are formulated without thinking: "this system ought to be engineered". The resulting model when it is completed not a state description of any actual human activity system. It is in no sense

of a description of any part of the real world; it is simply the structure set of activities, which requires in national system which is to be that defined in the root definition. According to (Davies & Ledington 1991, p.25) "the forming of conceptual model related only to the root definition and logic of the formal systems to gain completeness, no activities are imported from the thinking about the real world of the problem situation". This stage is, modelling becomes a question of asking: what activities, in what sequence, have to occur in order to do the transfer? (Checkland 1981, p. 172). The model displays the activities expressed as verbs and connected in a logic based order. The basic activities selected for each root definition in this study are as follow:

A. The Value System: Figure 6.4.

- ***To benchmark*** information skills of professionals in Nursing Department,
- ***To increase*** the value of information professional within Nursing Department,
- ***To enhance*** the awareness & attitude of high level admin. & finance officers to information skills,
- ***To increase*** awareness of decision-maker, budget committee members towards ESR,
- ***To provide*** training for information professional,
- ***To review*** attitude of senior nursing staff, decision- makers, and budget committee members towards ESR,
- ***To value*** the information professional.

B. The Technology System: Figure 6.5.

- ***To manage*** ESR resource base,
- ***To increase*** ESR awareness ,
- ***To increase*** ESR training ,
- ***To manage*** ESR infrastructure,
- ***To improve*** ESR capability,
- ***To use*** technology-based intervention in decision-making ,

- ***To improve*** access to staff records,
- ***To improve*** Human Resource Management (HRM) within Nursing Department.

C. The Information Management System (IMS): Figure 6.6.

- ***To audit*** work practices,
- ***To audit*** existing skills base,
- ***To establish*** a workflow system,
- ***To embed*** ESR within IM policy,
- ***To deliver*** IM system for 21st century Nursing,
- ***To achieve*** a well managed Nursing Department.

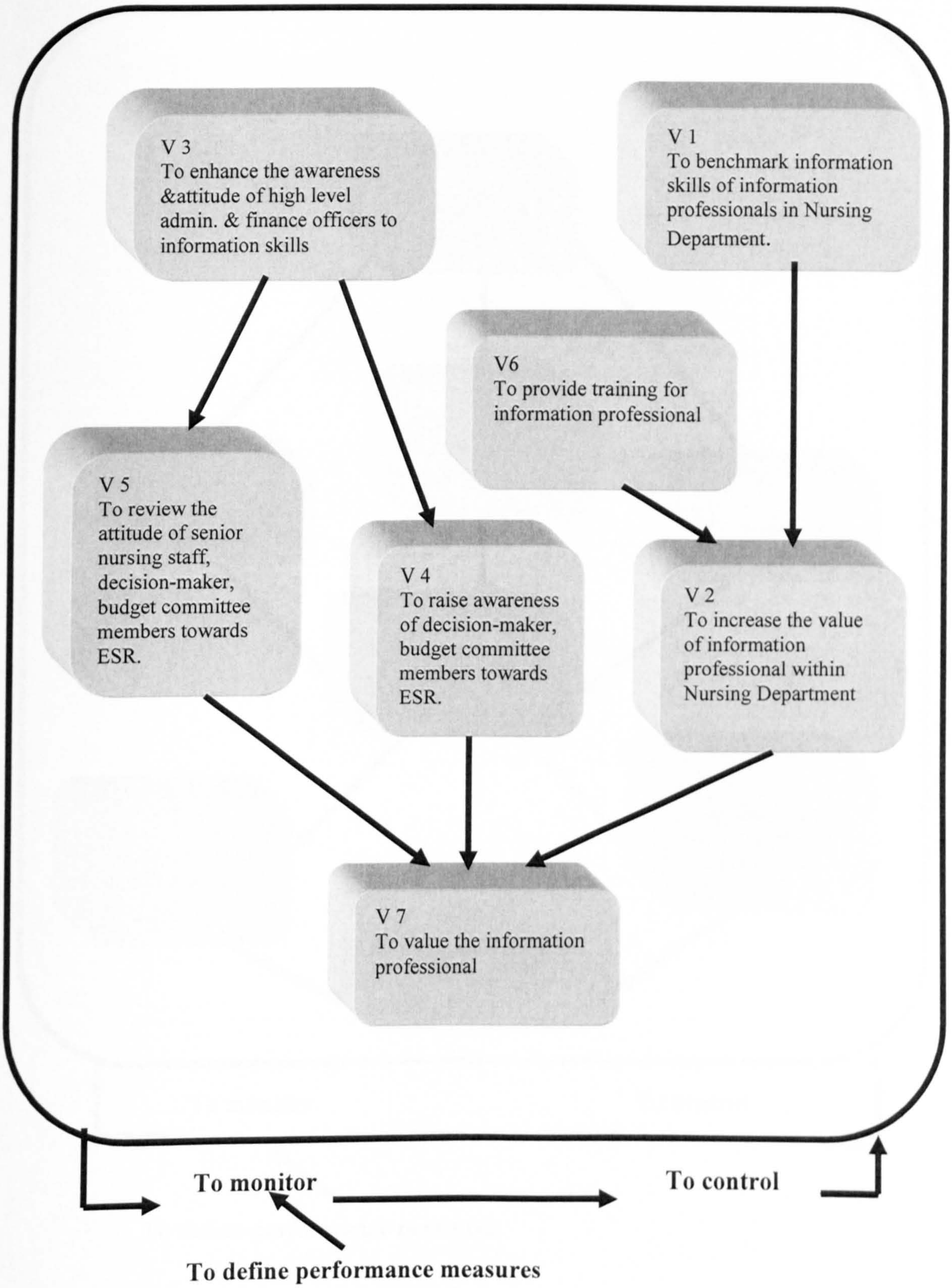


Figure 6.4 Conceptual Model for Value System

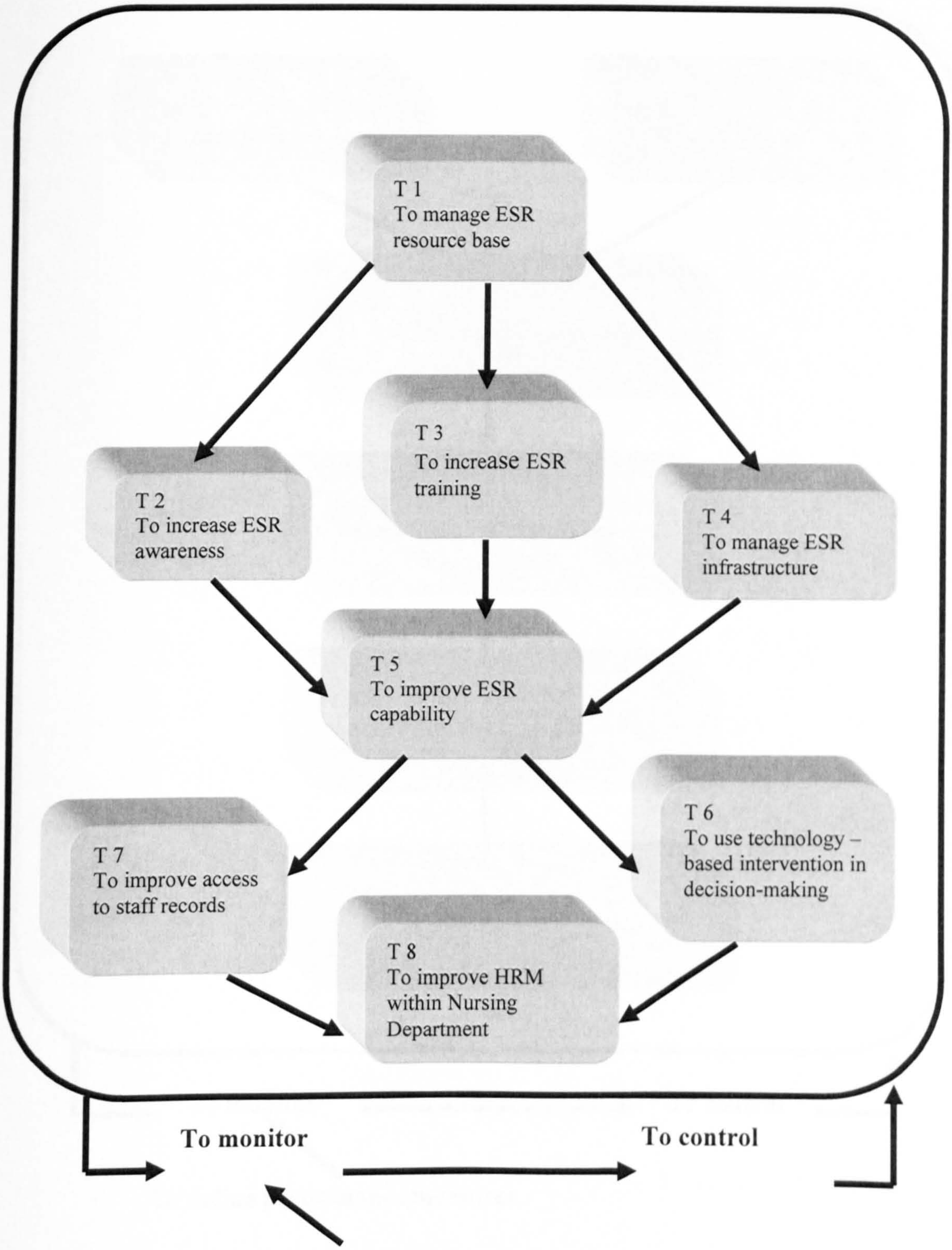


Figure 6. 5 Conceptual Models for Technology System

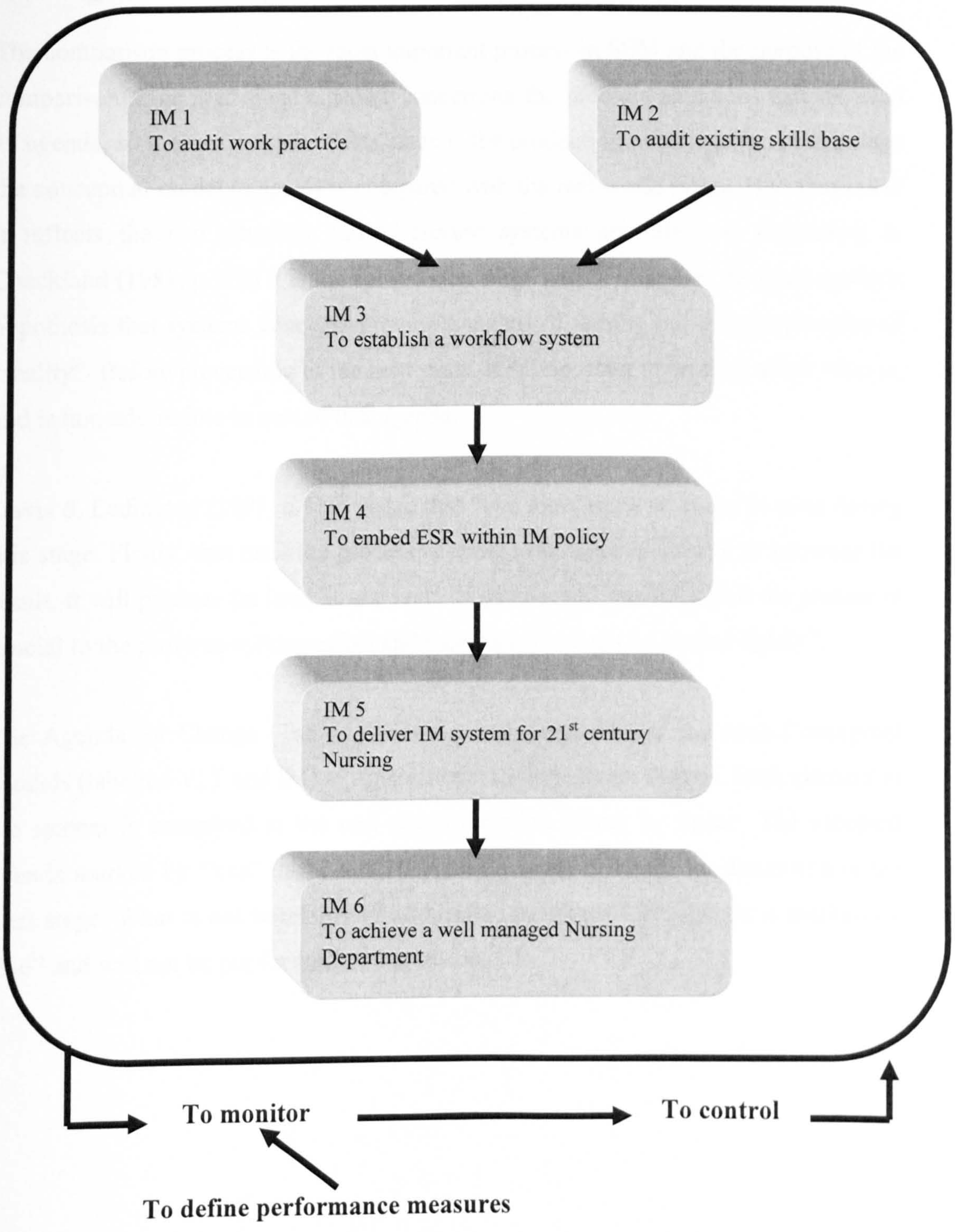


Figure 6.6 Conceptual Model for Information Management System

6.6 Stage Five: Comparison the Conceptual Model and Real World

The comparison process is the most important process in SSM and the purpose of the comparison stage is to stage a debate concerning the problem situations that we need an agenda, so the final output of this stage is the production of an agenda. In this stage the conceptual model (stage 4) is compared with the real world (stage 2) to find out if it reflects the real situation and if current systems are effective. According to Checkland (1981, p.178) it is the comparison stage which embodies the basic systems hypothesis that systems concepts provide a means of teasing out the complexities of "reality". Before proceeding to the next stage, it is important to be clear about what is, and is not, admissible as part of this agenda.

Davis & Ledington (1991, p.110) stated that "two ideas must be borne in mind during this stage. Firstly, that until the process is carried out there is no way of knowing the result, it will produce (at least at any level of detail), and secondly, that the process is crucial to the problem solving effort and therefore, must not be treated lightly".

The Agenda for Change (Table.1) shows that the elements of the three Conceptual Models (labelled V, T and IM) to represent the three problem themes. Each element in the system is compared to the real world situation theme by theme. The accepted agenda marked by "Yes" in the table provides a series of topics for discussion in the next stage. What is not necessary or admissible as apart of the agenda is marked by "No" and will not be put for further discussion.

TABLE 6.1: Agenda for Change

Activity in the conceptual model (stage 4)	Present in the real world situation (stage 2)	Comments on real world situation (stage 2)	Add to agenda
V 1. To benchmark information skills of information professionals in Nursing Department	Partially	Benchmark information skills of professional are very important element of transferring the information to the users.	Yes
V 2. To increase the value of information professional within Nursing Department	No	It is essential to raise awareness of the decision-makers, budget committee members and senior nursing staff of the value of the information professional. It is necessary for this group to gain an understanding of the importantance of the information professional. This will have an impact on the planning and decision making which is going to be taken in the future.	Yes
V 3. To enhance the awareness & attitude of high level administration & finance officers to information skills.	Partially	It important to enhance the awareness & attitude of the high level administration & finance officers to information skills about ESR.	Yes

V 4. To raise awareness of decision- makers and budget committee members towards ESR.	No	The decision about having ESR in nursing department comes from the senior nursing staff, decision-makers and budget committee members, hence ,their awareness of the important of the ESR for the nursing department will be impact on their decision to improve the ESR resources .	Yes
V 5. To review attitudes of senior nursing staff, decision-makers, and budget members towards ESR	No	Positive attitude towards ESR will help in strategic planning, budget and employment of expert in ESR.	Yes
V 6 To provide training for information professional	No	To have ESR at the Nursing Department, it is important to have trained staff in the use of computer. Training is the key to any successful change in the workplace.	Yes
V 7 To value the information professional	No	Value system is needed to improve both attitudes and the awareness of the senior staff at the Nursing Department. These will have an important impact on the planning, resources and performance of the Nursing Department.	Yes

T 1. To manage ESR resource base	Partially	ESR resources are the main tools to improve the Nursing Department Service, to meet the need and satisfaction of the users and to improve decision making which leads to good nursing care.	Yes
T 2. To increase ESR awareness.	Incompletely	Decision-makers, budget committee members and senior nursing staff are aware of the impact of IT on the corporation's work. It is essential to raise awareness for ESR to ensure that the necessary budget is allocated , for example: Computers, hardware and soft ware, Staff training program, Recruiting an expert in the same field, and Developing a strategic planning for the use of ESR at Nursing Department.	Yes
T 3. To increase ESR training	Partially	Within Nursing Department, Staff Development has their own training courses for different specialties, but not computer training which will enable the staff to use ESR. Short and long term strategic planning to meet the demand for using ESR and for the fast expanding IT environment.	Yes
T 4. To manage ESR infrastructure,	Incompletely	Infrastructure must be the priority of the decision –makers, budget committee members to establish ESR.The present infrastructure facilities (network) must be able to co-up with the new ESR demands.	Yes
T 5. To improve ESR capability	Partially	Good infrastructure facilities. Increase the ESR awareness, Short and long strategic training plan will improve ESR capabilities.	Yes

T 6. To use technology-based intervention in decision-making.	Partially	The application of ESR requires changes in the attitude of all nursing staff and decision- maker staff.	Yes
T 7. To improve access to staff records	Partially	Gaining access to staff records will help in decision-making and save a lot of time in getting staff information.	Yes
T 8. To improve Human Resource Management (HRM)	Partially	Managed HRM will help in getting the accurate and right staff information, at the right time and by the right staff, also, it helps in decision- making and helps for further planning.	Yes

IM 1. To audit work practices	Partially	In order to know the staff readiness, staff arrangement, and the use of information management at Nursing Department, an inspecting system to audit work practices is recommended to be done.	Yes
IM 2. To audit existing skills base.	No	Listing the competences and skills base is the starting point for future. Auditing is normally attempts to assess the skills and competence gaps in order to achieve the long term Nursing Department goals and short terms results of the Department.	Yes
IM 3. To establish a workflow system	No	Improving work coordination within Nursing Department, Nursing hospitals units and HMC by reducing the amount of paper documents and accelerate document processing and by reducing the cycle time and increase throughput.	Yes

IM 4. To use ESR embedded within IM policy	No	IM Policy is essential and ESR policy is part of it. It important to improve understanding of all stakeholders and also, comply with national and international laws.	Yes
IM 5. To deliver IM system for 21st century Nursing	No	IT changes rapidly, hence, the decision-makers within HMC should have a strategic plan to modernise and improve Nursing Department work activities to meet the users' needs for the 21st century.	Yes
IM 6. To achieve a well managed Nursing Department.	Partially	The appliance of IM provides important advantages in the administration of the nursing staff's data, contributing to the improvement of the operating effectiveness of nursing service.	Yes

6.7 Stage Six of SSM: Change Identified

Stage six of SSM is the debate about how change is carried out in the real world of the problem with "concerned actors". This stage aims at defining changes which meet two criteria (Checkland 1981, p.181): they must be arguably systemically "desirable, "as a result of the insight gained from selection of root definition and conceptual model building; and they must also be culturally "feasible "given the characteristics of the situation, the people in it, their shared experiences, and their prejudices. "Systemically desirable" means that the suggested changes must harmonise with how the system aims to function, while "Culturally feasible" relates to discovering exactly whether or not such change is recognised and contradict the actors' potential, (Checkland 1981, p.181). In addition, and according to Checkland (1981, p. 181), the former relates to the insight gained from the selection of root definitions and the building of the conceptual model; the latter refers to the given cultural characteristics of the problem situation, the people within it, their shared experiences, and their prejudices.

Possible changes or future plan will be discussed in terms of feasible and desirable. Once the changes have been agreed they can be implemented and may give rise to a new set of problems.

Tables below (6.2 to 6.4) shows the activities on the agenda for change indicate whether each activity is systemically desirable and culturally feasible

Activities in conceptual models in the agenda for change	**Systemically Desirable**	**Culturally Feasible**
V1.To benchmark information skills of information professionals in Nursing Department	Yes	Yes
V2.To increase the value of information professionals within Nursing Department	Yes	Yes
V 3. To enhance the awareness & attitude of high level administration& finance to information skills	Yes	Yes
V 4.To raise awareness of decision-makers, and budget committee members towards ESR	Yes	No
V 5. To review attitude of senior nursing staff, decision- makers, and budget committee members towards ESR.	Yes	No
V 6. To provide training for information professional	Yes	No
V 7. To value the information professional	Yes	Yes

Table 6.2 The debate result regarding change for the Value System.

Value System Changes: Systemically Desirable

The goal of the value system is to value the information professionals for ESR within the Nursing Department. The need for staff information service provision must be recognised by all stakeholders. The value of information professionals in their interventions with ESR users should be recognised. Finally, it is important to increase the use of nursing staff within Nursing Department; they should be encouraged to make full use of any staff training and development that is available in Staff Development or within HMC.

Value System Changes: Culturally Feasible

The main difficulty in the value system change is there is no ESR champion at a high level and decision-makers have no knowledge among themselves about ESR. In addition, they are unaware of how ESR can affect the decision making within Nursing Department. The fear of change among the decision-makers who are unaware of what is happening in nursing information management system, for example, the decision-makers are not aware of the upsurge of professional information.

Activities in conceptual models in the agenda for change	**Systemically Desirable**	**Culturally Feasible**
T 1. To manage ESR resource base	Yes	Yes
T 2 .To increase ESR awareness	Yes	No
T 3. To increase ESR training	Yes	Yes
T 3. To manage ESR infrastructure	Yes	Yes
T 4 .To improve ESR capability	Yes	Yes
T 5. To use technology-based intervention in decision-making	Yes	No
T 6 .To improve access to staff records	Yes	Yes
T 7 .To improve Human Resource Management (HRM) within Nursing Department.	Yes	Yes

Table 6. 3 The debate result regarding change for Technology System.

Technology System Changes: Systemically Desirable

The most important systemically desirable changes for the technology system are to improve ESR capability and to manage the ESR infrastructure to provide the technological backdrop necessary to build successful, up-to-date ESR in Nursing Department and to take maximum advantage of the ESR infrastructure. All users must be trained to use the technological systems efficiently, effectively, and with efficacy to improve HRM within Nursing Department.

Technology System Changes: Culturally Feasible

As we are entering the information era, the State of Qatar has adopted a policy for IT by supporting and encouraging modernisation of the country. The Emir of Qatar has issued a decree to form a high level committee for the IT in the country, and the good example is the e.governgment and smart card projects. It is known that there is no budget problem. The problems seem to lie with the planning and with personnel who do not appreciate the needs and the value of ESR to Nursing Department. There is no high-level champion for allocating resources to ESR in budget committee. There is a lack of trained information professionals to give an educated opinion of what is needed; this exposes an underlying root cause, which is the lack of value given to the use of information. As a result, providing budget resources to have ESR at Nursing Department is a problem at HMC. Consequently, there is no one to raise user expectation by developing special classes to show what information is available and how it can benefit to Nursing Department in decision-making.

Activities in conceptual models in the agenda for change	**Systemically Desirable**	**Culturally Feasible**
IM 1. To audit work practices	Yes	Yes
IM 2. To audit existing skills base	Yes	Yes
IM 3. To establish a workflow system	Yes	Yes
IM 4. To use ESR embedded within IM policy	Yes	No
IM 5.To deliver IM system for 21st century Nursing	Yes	No
IM 6. To achieve a well managed Nursing Department	Yes	Yes

Table 6. 4 The debate result regarding change for the Information Management System

The Information Management System Changes: Systemically Desirable

The goal for the Information Management System Changes is to achieve a well-organised Nursing Department. The need for auditing the work practice within Nursing Department must be recognised. The audit of existing skills base of nursing staff and their interventions with the use of ESR should be acknowledged and encouraged. Ultimately, it is important to increase the use of ESR by all the senior nursing staff and they should be encouraged to make full use of any staff training and staff development that is offered to them by Staff Development or by HMC.

The Information Management System Changes: Culturally Feasible

The main obstacle for the Information Management System Changes is the issue of the strategy for the 21st century and policy for IM decision-makers'. They have no ESR knowledge between themselves and they have no champion at a high level. As a result they are unaware of how ESR is going to affect staff information and Nursing Department.

6.8 Stage Seven of SSM: Action to Improve the Problem Situation

The last stage of SSM involves taking action based on stage six, to improve the problem situation. Skelton (2000, p .322) stated that "action is recommended to solve or improve the problem situation". A plan of action to improve problem situation is one result of this research. An action plan to overcome the problem situation was designed including the three main themes,

Value System Change

Technology System Change

Information Management System Change

According to Checkland (1981, p.180) changes of three kinds are possible. Structual changes may be to organisational groupings, reporting structures, or structures of functional responsibility. Procedural changes are changes to the dynamic elements:

the processes of reporting and informing, verbally or on paper, all the activities which go on within the (relatively) static structures. Changes in the third kind are changes in attitude.

Cultural change contains many aspects of organisation including, structural technological, strategic and management change. "The phrase cultural change is useful catch-all incorporating abroad aspect of organisation, including control, commitment, socialisation, manipulation (looking at groups and individuals) and structure, design and corporate performance"(Bate 1994, p.12). Change is concerned with making things happen. MacDonald (1998, p.38) stated that

> "Change is associated with progress, though it is not synonymous with progress. Change may indeed be required for progress, but change does not necessarily bring progress, except in the purely pedestrian sense of progression to a succeeding state. Progress in the sense of betterment of something or someone is not an inevitable consequence of change Thins sometimes have been better in the past and there is no justification for seeing change and innovations inherently good"

6.8.1 Change in Structure

- Nursing Department should make changes to fit in the new system ESR, for example, to update information to alert staff managers effectively by allowing each Senior Assistant Director of Nursing, Assistant Director of Nursing and the Head Nurses to log in to their staff records from any computer within HMC using their own password.
- Within HMC an IT committee should be formed. It is important that a Senior Nursing Staff is a member of that committee.
- Budget committee structure should allow Director of Nursing to be a member of that committee to represent Nursing Department.
- Computer training room should be established within Staff Development-Nursing Department section for nursing staff training.
- Help line service between the HIS and Nursing Department should be created to help 24 hours the Nursing Staff when they require this.

- Departmental policies for access; retrieve and use of staff records to be developed, information need to be changed in order to promote its uses.
- The existing filing system needs to be changed. Instructive manuals need to be revised and modified in order to provide an adequate channel or pathway to the staff records.

6.8.2 Change in Procedure

- The allocation of resources needs to be adjusted, dictated, and prioritised according to the existing need rather than to prescriptive norms. To achieve this is to give senior nursing staff the authority to determine their ESR requirements;
- Project management team should be created to set up the mission, policies, and priorities and to secure the necessary funding to the project;
- There is a need for Nursing Department to enter into collaborative relationship with other organisations engaged in a similar project, to take advantage of their experience, for example ESR projects in NHS, UK;
- An effective management and more applicable training programmes are needed to exploit computer and related technology effectively;
- Different ways of training techniques and methods, such as Computer Assisted Learning (CAL); distribution of leaflets; seminars; individual tutorials, are needed to encourage nursing staff to use the available technology;
- Receive, organise and provide information for teaching and research;
- Existing manuals should be changed accordingly.

In addition, to the above points developing strategic planning is one way of change in procedure:

- Senior nursing staff at Nursing Department should start thinking seriously of developing strategic planning to meet the demands for the changes for IT;
- An ad-hoc committee consisting of members of Nursing Department, HIS and Personnel Department should be formed to put in place a strategic plan for the

training of the nursing staff and for providing ESR within the Nursing Department;

- There is also a need for strategic plan to have an expert for the training of nursing staff and for the new ESR system. Plans for training should be added to the main strategic plan of the Nursing Department, incorporating all the present nursing staff; new nursing staff; continuing education; and providing a starting and finishing date of each of the training;
- Strategies for providing ESR in the Nursing Department should be added to the main strategic plan of the Department. The starting and the accomplishing date of the project should be stated too;
- The Nursing Department should advertise for expertise in the field to establish the new proposed system with the help of HIS at HMC;
- Strategic plan for recognising the importance of quality information for making sound nursing decision should be added to the main strategic plan of the Nursing Department. This strategy can be formulated by members from Nursing Department and HIS.

Training can be added as change in procedure. Computer training should be one of the strategic planning objectives of the Nursing Department. It will benefit the senior nursing staff and the staff nurses in the future to be computer literate to complete their staff records by entering the staff information data; storing them; retrieving them, and for their daily use when IT will be introduced to the hospitals unites.

To achieve proper and adequate training for nursing staff few steps should be taken as follows:

Training Programmes

- The training sessions must be systematically organised and precisely controlled, these training sessions should be done by an expert in the field;
- Training sessions should include word processor documents; email messages; spreadsheets; scanned documents; presentation and increasingly, hypertext; multimedia documents, digital; audio and video, and dynamically interlinked

documents. These training sessions will be help the senior nursing staff to use ESR adequately and accurately. These courses can be done as follows:

- In house short computer courses for the present senior nursing staff;
- For the new senior nursing staff IT training should be added to induction course.

The Continuing training should be supported by:

- A refresher course and seminars that should be given from time to time;
- Staff development section at HMC should develop pamphlets and leaflets and it should be given as a reference;
- On screen training-computer based should be offered to the senior nursing staff;
- A list of frequency asked questions (FAQ) should be available for help;
- Live demo presentation;
- 24 hours help line in case of emergency.

Introduction of any computer based technology requires policies to regulate its activities. Forming a committee to establish developing policies is another way of change in procedure. The proposed ESR system requires specific policies that will provide a sustainable basis for all its activities. The policies must formed and carried out in order to maintain its credibility, its adequacy and its efficiency, therefore, a committee should be formed by members from Nursing Department, HIS and Personnel Department to draft these policies.

These policies can be summarised as below:

- Policy concerning the sources of information about all nursing staff
- Policy regarding the types of information that should be in the ESR about each staff
- Policy regarding the relation between Nursing Department and Personnel Department in relation to staff records.
- policy for the proposed system ESR and its accessibility by senior nursing staff and Personnel Department

- Policy to maintain the system and to ensure individual security, integrity and confidentiality
- Retention policies to define the periods of time for which records are to be maintained and how and when such records are disposed
- All of these policies should be in compliance with operational, legal, archival requirements and in support of ongoing functions of HMC.

In addition to the above the senior nursing staff and decision-maker should be aware of what ESR is going to offer. To review awareness of what ESR is going to offer:

The present manual records system within the Nursing Department can be described as an out of date system, with the problem it has for example, duplication of records/files; an accurate data, and the quality and the quantity of data about the staff are not correct.

The senior nursing staff, decision-makers should be aware of what the new ESR is going to offer. The new system is a system that will reduce duplication, improve the quality and quantity of data of workforce at Nursing Department. Furthermore, it will provide accurate and up-to-date information to underpin workforce planning, enabling employers to analyse skills gaps and recruit staff more effectively. Workshops and talks for senior management staff would have to be organised by the specialists of the selected venders to explain the benefits of the new ESR for the Nursing Department and live demo presentation by the specialists of the selected vendor might help too.

6.8.3 Change in Attitude

To achieve effective implementation of the proposed ESR and information system to ensure mutual interaction with people involved, whether they are decision-makers, or budget committee members, the senior nursing staff have to convince them of the value and benefits of the ESR.

This is can be achieved by:

- Providing the educational training programmes to promote and improve knowledge and understanding of the proposed project;
- Allowing them to participate actively in accomplishing the aims and objectives of the proposed project;
- Involving them in the implementation process perhaps in system testing, report design or training other users;
- The decision-makers, budget committee members should be aware of the impact of having IM system, which will help to achieve an easy access to staff records and a well-managed Nursing Department.
- Encouraging the senior nursing staff and decision-makers to attend computer and ESR seminars; training sessions and workshops;
- Visiting organisations using ESR in their Departments for example, NHS in the UK;
- Meeting/forum with computer and ESR professionals to give the senior staff the opportunity to share their perception and experience;
- Doing a survey questionnaire for the senior management staff at HMC about their attitudes towards computerisation and ESR;
- Using information audits which might involve the use of surveys, focus group and one-on-one interviews to determine the flow and utilization of information.

6.8.4 Change in Culture

There is a need to effect changes in culture towards ESR. This can be achieved by:

- Value the capabilities and skills of the information professionals;
- Value of staff information as an asset to the Nursing Department and to HMC;
- Updating the systems to provide 21st century ESR application for nursing and valuing Nursing Department as a resource for the provision of the accurate nursing staff information.

In addition to the above, few points need to be considered to correct the problems with the Information Management in the Nursing Department and to improve the situation these points can be achieved by:

- Information is currently recorded in a paper-based format such records, reports, letters, and an electronic-based format via computer diskette or memory format. According to Wallace& et al (1992,p.2) "Records are the memory of an organisation, the document information for management decisions, provide litigation support, show compliance with government regulation, supply a historical reference of transactions and events"

- For information to be truly effective, it must be recorded in some form, stored in an appropriate system, and retrieved in an efficient manner. Each transition is in the form of records. The automated records management system can be configured on any type of computers. A number of off shelf software packages are available for this system, but some organisation prefer to develop their own software to manage their records based on their specific requirements. However, according to Robek & et al (1992, p. 227)

> "The most important precursor to applying this technology is that the organisation must have a good manual records management system and programs in place before attempting to install records management software. Otherwise, the new system is likely to be riddled with errors that user confidences in its performance will soon deteriate, and the integrity of the system may be virtually impossible to restore. Assuming a high-quality manual system exists, the records managers should then conduct a requirements analysis to determine the organisation's precise needs for records management software."

From the above, it is clear that the present system at Nursing Department has no proper record-keeping, no proper information retrieval and indexing, and in addition, no proper information storage system which will help to have an automated records system within the Nursing Department.

The researcher would like to recommend two models that have been used before:

- The first one is the model used by Stamouli, M (2001) in Greece in Peripheral General Hospital of Athens. The software was called Personal Oracle for Winds. According to Stamouli "This tool was the most appropriate because it can be used with the most popular computer operating system the Microsoft Windows, providing the same functionality that exists in Oracle Universal Server and the Oracle Workgroup server that are designed for highly scalable platforms".

- The second model that has been selected is the one being used by the NHS in the UK. The test run of the model started at University Hospital Birmingham NHS Trust and by late 2004 every NHS organisation adopted the Oracle HRMS (Human Resource Management System) running on IBM latest e-server. With modern IT system it was possible for the NHS to analyse skills gaps, recruit staff, work proactively by adopting flexible work schedules which has improved the work environment and make it possible to attract the best people. Oracle's HRMS includes the option of Internet type technologies for e- recruitment, e-learning and employee self-restoring (www.doh.gov.uk/sharedservices/esr/esr_project.ntm#esr_project). From the two models exist, HMC will need to create /design a bespoke system for use.

6.9 Interpretive Structural Modelling (ISM)

As stated earlier in Chapter Four, ISM was developed by Warfield in 1973 in the USA. (ISM refers, see p.105). ISM is an important tool that allows decision makers, either individuals or group to analyse the relationship between different elements/ objectives and display these relationship as a map (ISM Model). This model helps the users to understand, develop solutions and make decisions. In this section, the study investigates the process of transferring all staff records in the Nursing Department at HMC from manual based system to an electronic based system using the ISM software to structure and describe the action which was identified in stage seven of the SSM of this thesis.

6.9.1 Interpretive Structural Modelling (ISM) Choice

Currently, there are no previous models that identify the issues and provide solutions for the Nursing Department at HMC. The seven steps method of the ISM helps to develop organise and prioritise the elements/objectives, which was generated from the five seniors' staff working at HMC, which in turn helps to develop and create an action plan for the problem under investigation.

6.9.2 Application of ISM for This Study

ISM software was used to describe the solution for the process of transferring all staff records in the Nursing Department HMC from manual based system to electronic based system. The method, as outlined in Chapter Three and Chapter Four, **the steps followed indicated below:**

- **Step One: Identifying the Issue to be Studied**

The issue was to investigate the process of transferring all staff records in the Nursing Department at HMC from manual based system to an electronic based system.

- **Step Two: Deciding on Type of ISM to be Constructed**

It is important to decide on the type of structure which is to be produced during the ISM session, this also, will help to determine the form in which the elements are

generated. An intent structure was used to show the interrelations between a set of elements/ objectives. The intent structure used the transitive inference or relationship, which is "**would help to achieve**". Transitive relation is often described as, If one item relates to a second, and the second to a third, then the first relates to the third in the same manner, for example, A equals B, and B equals to C then A also equals C.

- **Step Three: Selecting Participants Group and Facilitator**

It is essential that participants have the necessary content knowledge relevant to the issue. The issue of investigating electronic staff records at Nursing Department. All participants had the full knowledge of the issue under investigation. A group of five senior staff at HMC (participants) met with the facilitator, who is the author at Director of Nursing' office at Nursing Department at HMC on 8th of January 2004.

The group names are:

- Dr.Nabila Al- Meer, Director of Nursing Department,HMC
- Mrs.Heila Salem, Senior Assistant Director of Nursing of Women Hospital
- Mrs Aisha Said, Staffing coordinator for Nursing Department.
- Mrs.Suja Mathew, Senior Secretary at Nursing Department.
- Mr.Mohammed Al-Noimi, Director of HIS.

- **Step Four: Generating the Element Set**

In order to achieve a consensus of the issues, a trigger question should be generated. The trigger question was **"What are the issues associated with a change from manual nursing record system to an electronic staff record system for the next three (3) years?"**

A set of elements or objectives generated by the group can be seen in Appendix 4. In fact the element set was derived from the NGT process from which 28 objectives emerged. In the final stage of the NGT, only 16 of the original 28 objectives received votes; it is these 16 objectives that form the element set considered here. From the objectives generated the matrix could be as follows: "**would** (objective 5) "To have all

the required information with regards to statistics, budget, staffing, reports, etc, could be prepared in an accurate way" "**Help to achieve** (objective 7) "To ensure that information is share interdepartmental and intradepartmental i.e. staffing issues, budget."

The three years time was used as the strategic plan for the computing resources at HMC.

- **Step Five: Completing a Matrix of Element Interactions**

The author introduced an innovation to the study which is the use of the Concept Star 3.1 software for ISM www.sorach.com . The set of elements to be structured were entered in to computer by the author (facilitator).The group were asked to respond to a series of questions put by computer, by yes or no under the guidance of the author (facilitator) and at the end of this process, it led to the construction of the reachability matrix. Use of a computer allows facilitators to concentrate on the human aspects of the problem solving activity, reduce the chance of human error, and shortens the overall process considerably (Lee.D.M 1999, p. 9).

- **Step Six: Displaying the ISM**

All the questions were been answered by the group and the reachability matrix constructed, the computer extracted a multi level digraph or a map from the matrix by linking the dependencies of the elements interaction, figure (6.7).

- **Step Seven: Discussing and Amending the Structure**

To draw a good understanding for the situation, and to find the most important objectives that will help to overcome the problems, the author took the group through a discussion of the ISM and the purpose of this was to explain the structure to the group so they can understand how to interpret it and allow them to express their views on it. Hence, the group may suggest amendments should be made to the structure, at this stage no amendments were suggested by the group. Furthermore, it can be seen from the figure that element 3 "produce an ESR policy" will help to achieve all other elements in the model except element 14 "provide and design of software", as there is no link between policy and provide and design software to suit the proposed system.

All the elements help to achieve the top element 13, which is "To help improve manpower planning and budget requirements forecasting." From the ISM structure, it seems that element 5 "to have all the required information with regards to statistics, budget, staffing, reports, etc, could be prepared in an accurate way" is the important to the future development of the ESR at the Nursing Department.

6.9.3 ISM Interpretation

ISM output should be used for planning and strategic purposes by Nursing Department senior staff. As expected, policy/strategy is the first thing Nursing Department has to have or develop, a policy which should be written on how and what to enter, what to delete from the system, who will be authorised to view any documents, at the same time software should be provided and designed to suit the system as both of these elements are important. Martensen (1997, pp.172-180) stated that "the organisational issues and policy are often of importance when decisions to update or replace the existing system". The policy/strategy base leads to resource base before the infrastructure base, once the infrastructure base is in place; it leads to resource again, which in turns leads to planning and resource. Planning base leads to the first goal, which is "To make sure data will be kept in the best manner with regards to

confidentiality, safety, security, protection, etc". The resource based (element 5 is the link between all the elements) leads to the main goal which is "to improve manpower planning and budget requirement forecasting". Once the accurate information is in place, it leads to improve information resources and quality that allow improvement of the Nursing staff records.

The 3 years period time frame to achieve these changes are subject to strategic planning of the Nursing Department and for the Nursing senior staff themselves to direct the process forward so these changes that can be managed and achieved.

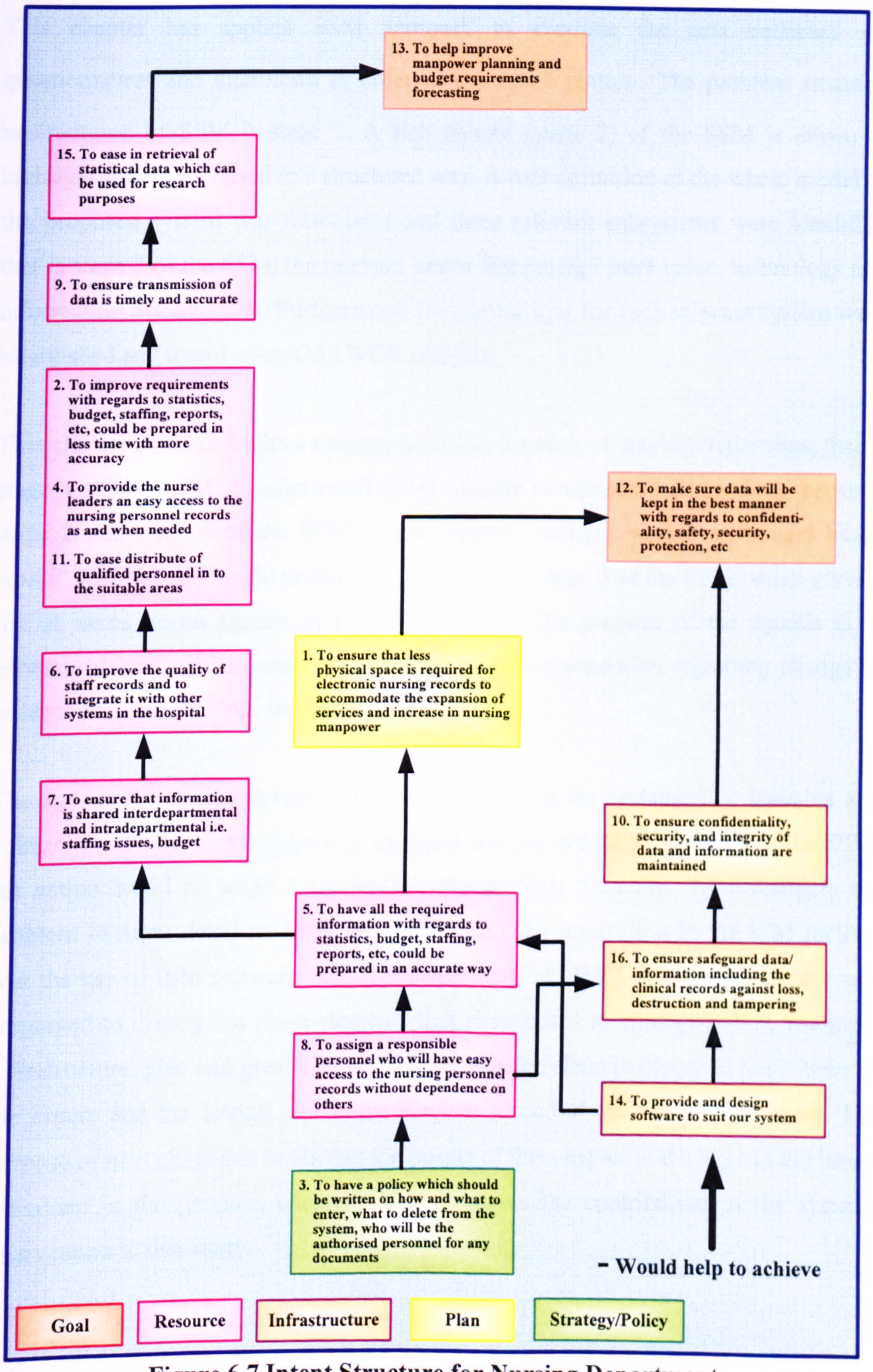


Figure 6.7 Intent Structure for Nursing Department

6.10 Summary

This chapter has applied SSM approach to examine the data collected via questionnaires and interviews in order to get a rich picture. The problem situation unstructured of SSM is stage 1. A rich picture (stage 2) of the SSM is drawn to highlight the issues raised in a structured way. A root definition of the whole model of the proposed system was formulated and three relevant subsystems were identified that is stage 3 of the SSM, the relevant issues that emerge were value, technology and information management. Furthermore, root definitions for each relevant system were established and tested using CATWOE analysis.

This chapter continued with a conceptual model for each of the root definitions, that is stage 4 of the SSM. Fundamentally, this chapter comprises a comparison between stage 2 and stage 4 of the SSM of the "system thinking world" or "model based world" with the real world problem situation that is stage 5 of the SSM which gives a list of items on an agenda of possible changes. The purpose of the agenda is to generate debate, which could lead to a set of recommendation regarding change in order to help the problem situation.

The agenda for change devised, identified from those are systemically desirable and culturally feasible, that is stage 6 of the SSM and the last stage is stage 7 of the SSM, the action based on stage 6 to improve the problem situation. To investigate the problem in more detail an ISM was developed. The innovation in the ISM method was the use of ISM software with five senior staff at HMC. An intent structure was employed to distinguish those elements that contributed to strategy/policy, resource, infrastructure, plan and goal. The key objective is the element placed at the bottom of the Figure and the overall aim is the element placed at the top of the Figure. The purpose of next chapter is to discuss the results of this chapter in the light of the issues examined in the previous chapters, also discusses the contribution of the systems intervention to this study.

Discussion

7.1 Introduction

This chapter discusses the results of the systems intervention in the light of the issues examined in the previous chapters. As mentioned earlier, from the analysis of questionnaire and interview surveys, problem issues arise from stage one of the SSM. In addition as discussed earlier, five elements have influenced the effectiveness of the nursing staff records system in the Nursing Department of HMC. These are the policy/strategy element, the human element, the technology element, the information management element and training element. This chapter will discuss these five elements in more detail. Finally, the discussion concludes with the contribution of the systems intervention to this study. Figure 7.1 below illustrates the research discussion road map.

7.2 Policy / Strategy

Information management has developed out of the perception that information is crucially important to the success of any department or organization. It is assumed that Hamad Medical Corporation (HMC) as an organisation should have an information policy defining the overall aims and objectives of the organisation in relation to information. As Lytle (1988) previously suggested in Chapter Three, having an information policy is central to the effective management of data; information processing equipment and software; information systems and services, and; staff and responsibilities. Therefore, it is expected that the information policy of HMC would aim to provide access to staff data on line. However, the findings indicate that HMC in general and the Nursing Department in particular do not have information policy and strategy for the management of data.

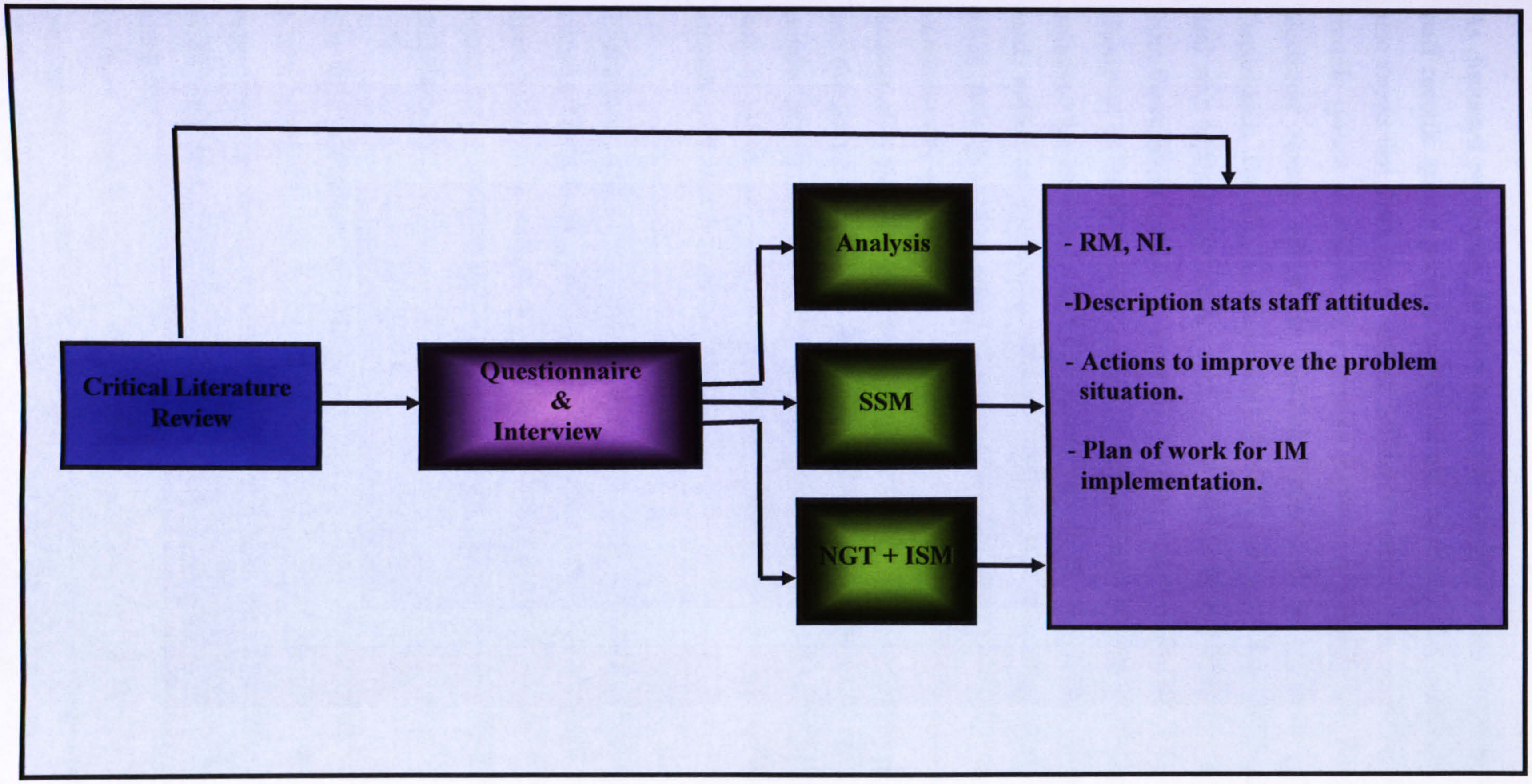


Figure 7.1 Research Discussion Road map

As discussed previously, decision makers within HMC have failed to introduce staff records system policies and guidelines. In chapter five, interview analysis also shows that there are no written policies and procedures for the existing staff records system as well as for a strategy for the implementation of the proposed electronic system within the Nursing Department or within the Personnel Department. The Nursing Department also lacks on up to date policy on how to deal with technological change such as the introduction of ESR. As was evident from the result of the interview survey, the main reason is the lack of an expert or champion in the field of NI or IMS. In the literature review, Martensen (1997) indicated the importance of policy issues when decisions to update or replace are made within an organisation. Blount (1984) stressed on two important elements when developing RM policy to make it function more efficiently, RM policy statement and a RM advisory committee. Also, Hovenga (1997) indicated that a number of hospitals and healthcare agencies offer positions in nursing informatics and the government hires nurses to help develop policies on IT. Other factors besides lack of policy are lack of qualified staff to write policy for ESR and IMS, lack of policy for staff records system within HMC, lack of national policy towards staff records system.

Furthermore, there is no strategic planning towards ESR implementation within Nursing Department and HMC, however, information strategy deals with how these policy aims are to be accomplished. Strategic planning is necessary to define policy and related strategies to financial, personnel and other resources of the organisation.

The SSM demonstrates the absence of policy in the Nursing Department, whereas, policy/ strategy is a prominent element in ISM intent structure (Figure 6.7 refers. see p 199). The ISM element "To have a policy which should be written" is placed as the first point in the "Strategy/ Policy" category. This means that the policy is important to be placed before any element (for instance, the relationship "help to achieve" is transitive), once this has been achieved, the policy helps to achieve the next element "To assign responsible personnel" which in turn help to achieve the

top element, "To help improve manpower planning and budget requirement forecasting". It is recommended that those measures should be taken to appoint a committee of professionals and experienced staff to write up the information strategy and information policy for the corporation with special attention paid to ESR policy for Nursing Department.

7.3 Human Element

As discussed earlier in the literature review, the level of education is an important factor in the attitude of nurses to computerisation. Brodt and Stronge (1986) indicated from their study that the level of education of nurses was related to their attitude to computerisation with registered nurses having a more favourable attitude. In addition, a more favourable attitude towards computerisation was found among nurse managers and rehabilitation paediatric nurses. These findings by Brodt and Stronge (1986) reinforced the findings primary data collected in this study. Most of the respondents to the questionnaire suggest, although for various reasons, that computerisation is a good development for nursing. Some of the given reasons were: "computer is a powerful enabling tool", "computers could save a lot of paper work", and "computers can be great problem-solving tools" (figure 5.13, refers, see, p.138). Perhaps the positive attitude to the introduction of IT could be attributed to the developments that have taken place at HMC over the past few years and the plan for the computerisation of HMC as discussed earlier. In addition, Scarpa et al (1992) indicated that strong association of attitude and learning new skills suggest that a first step in successfully introducing a computer system into a hospital setting for nurses' use is assessment of the attitude of nurses towards computers, which is also one of the core findings of this study.

One of the problem themes in the SSM was related to the value of information professionals. The RD of the value system is to enhance the awareness/attitude of senior staff by increasing the benefits of the ESR. As mentioned earlier, Wheeler (1995) and Armstrong (1999) outline the benefits of ESR. Furthermore, the Director of HR for the NHS in the UK and member of the project team for ESR in

the UK divided the benefits of ESR into national and local benefits. As was evident from the results of the questionnaire and interview surveys, the positive response about the benefits of ESR indicated the need for computer training, which will help the nursing staff use the ESR. In chapter three, Robek et al (1996) put three reasons why business executive sometimes do not support RM to the extent that they should. Therefore, to ensure a successful approval/ implementation, it is important to obtain the support of the decision-makers and other managers within HMC, so that communication or perception about the new system ESR will be predominantly positive and that the benefits will be clearly understood and consistently presented across the HMC.

Another factor to consider is the value of information as well as the value of nursing staff and staff working at Nursing Department. The administrative uses of information were classified by Hannah (1999) into two, those to help nurse managers in decision-making are called "management information systems", while those applications in nursing administration to help nurse managers to communicate their decision are called "Nursing office automation system". To instil this value system in the Nursing Department requires activities, for example, increase in the skills base of the senior nursing staff will help to provide accurate information about the nursing staff and also help in transfer of the technology. NI and knowledge from the developed countries will aid the nurse managers to provide the right information at the right time in the designated place.

The primary data sources from the questionnaire and the interviews enforced the importance of the value of the information in each of the staff records, although as indicted previously there was no policy indicating the information in staff records in the Nursing Department. The type of information in staff records varies from general information to very confidential and sensitive information. In the literature review chapter, Ream (1984); Cain (1999) and Mnjama (2001) produce a list of information that should be in each staff record and why it should be there. This reinforces the value of the information in the staff records.

As stated earlier by Jayasuriya & Caputi (1996), a negative attitude towards computers may result in people avoiding the use of computerised systems. The negative opinions and attitudes of decision-makers may be due to fear of change / loss of power and absence of an obvious personal benefit may also be a sufficient ground for rejection / lack of familiarity of IT and negative attitude of decision makers due to lack of awareness of the benefits' ESR to Nursing Department. The negative attitude has a serious impact on introducing an ESR implementation and it might block any progress in introducing IT to Nursing Department. Decision-makers in high levels of HMC organisational structure control budget, strategies and policies. Their attitude therefore might bear negatively on the introduction of computers and the effectiveness of the policy when it is introduced. Other factors which might contribute to a negative attitude of decision-makers include, among others, that some managers are placed in a position not related to their qualification or their experience. It is recommended that change of attitude is a priority before taking any decision regarding introducing ESR to Nursing Department with decision-makers. In addition, to an IT knowledgeable younger generation can take up the senior positions.

Factors related to human elements system that stem from the interviews and SSM analysis can be summarised as follow:

- No NI and ESR champion at the highest level in the HMC, to take on the task of arguing for resources, negotiating and restructuring and, otherwise, setting the scene for the attainment of the policy and discussing it with budget committee;
- Lack of experts NI and ESR throughout HMC;
- Lack of technical support in the Nursing Department;
- Lack of qualified and trained staff (Nursing Staff or secretaries) to establish and prepare for ESR in the Nursing Department.

The results of this study suggest that more effort should be put into addressing staff records issues in HMC and its Nursing Department in particular. These

findings are consistent with other studies Mnjama (2001); Sterling (1984) and Martin & Jackson (2005) on the importance of staff records in any department.

The discussion above highlights the role that non-computer factors play in the effective implementation of the computer systems in the HMC for the management of the nursing staff record. For instance, more important than the program itself is a clear organisational policy as well as strategies to guide the effective implementation of the computer system. Important as policy as strategies are to the implementation, getting qualified staff to drive the changes is also very important. As indicated in the findings from previous studies as well as this study, the knowledge of basic skills required for the implementation of computer programs is a crucial factor in implementation and effectiveness.

7. 4 Technology element

In this study, the questionnaire survey indicated that 95% of the respondents do not use computers to access staff records from their units or from their offices. This view is supported by the vast majority of interviewee's that they do not access staff records and the records are not accessible from any computers within HMC.

The main reasons for not being able to access staff records from any computer within HMC is due to the use of stand- alone system which have been in use for a long time. This legacy system is called Fox-Pro, due to shortage and untrained staff and due to lack of networking between Nursing Department Units, Personnel Department and HIS at HMC. This represents an obstacle towards staff records accessibility as illustrated by the rich picture of the SSM study (Figure 6.3 refers, see p.164).

Other factors related to access to staff records as indicated in the questionnaire and interview survey include, first and middle line management nursing staff have no right to access their records and the seniors nursing staff have to go to Nursing

Department to access their nursing staff records manually. As discussed earlier in the literature review, Mnjama's contention (2001) is that the employees have the legitimate right to ensure that the information held by their employer is accurate, complete and reliable and they are given the opportunity to correct the information if it is inaccurate.

Furthermore, the questionnaire survey shows that 31.3% of respondents stated that they access their staff records via others (secretary); 30.5% access their staff records via the Assistant Director of Nursing; 12.6% of the respondents stated that they access their staff records via Senior Assistant Director of Nursing; and 10.7% via the Staffing Co-ordinator. This variation is indicated in the lack of policy guideline on how to access staff records.

Access, privacy and security of the staff records were the concern of the senior nursing staff interviewee. The interview survey shows that only authorised senior nursing staff and staff from Personnel Department have the right to access staff records. This reinforced what Mnjama (2001) stated about the authorisation to access staff records. The State of Qatar does not have a Data Protection Act, which is the legal basis for the protection of personal data in computer files and manual files. The Data Protection Act typically provides the citizens with the basis for ensuring that such personal information was accurate and are protected from misuse. For example, they can refer to Data Protection Act in the UK.

The technology issues problem theme (SSM) that emerged from the rich picture eventually led to a conceptual model (Figure 6.5 refers, see p.173). From the ISM element, two elements emerged that show the importance of staff records accessibility. The first element "To assign responsible personnel who will have easy access to the nursing personnel records without dependence on others" is placed as a second element of the ISM and the first element in the Resource category. The second element is "To provide the nurse leaders an easy access to the nursing personnel records as and when needed" is placed at the top in the Resource category.

The interview survey reveals a lack of space and staff records storage problems within the Nursing Department. The SSM demonstrates the lack of space and records storage in Nursing Department, whereas space is an important element in the ISM intent structure (Figure 6.7 refers, see p.199) The ISM elements "To ensure that less physical space is required for electronic nursing records to accommodate the expansion of service and increase of nursing manpower" the second ISM element "To improve the quality of staff records and to integrate it with other systems in the hospital". As discussed earlier the benefits of the use of electronic staff records, will increase staff ability to provide records in a timely manner and also make it easily accessible. The use of digital system greatly reduces the amount of physical space required to store paper records. However, due to the fact that electronic records technology is changing rapidly it is advisable that Nursing Department should provide the "best practice" in the market for storing staff records electronically. The major principle in staff records storage is the ease in which it can be retrieved.

ESR technical infrastructure is essential to create a productive and working environment. The results from both the survey and SSM study indicated that the current ESR technical infrastructure does not seem to cope well with access needs expressed. Therefore, ESR technical infrastructure should be included in the Nursing Department strategic plan. To achieve an efficient Information Communication Technology (ICT) network with Nursing Department and other Departments within HMC requires an acknowledgement of this at the appropriate place in the HMC strategic plan. The technical and hardware requirements for ESR should be included in the information technology strategy from the earliest stage of the ESR project. At present; the survey indicated that the existing ICT infrastructure is absent.

As stated earlier, the State of Qatar is relatively new to IT and e-government and smart card projects are good examples of that, hence, there is no excuse for not

establishing ESR at Nursing Department. The decision-makers have a vital role to play in updating and introducing the new ESR to the Nursing Department. They are the decision-makers for the ESR budget, ESR purchasing for example, software; hardware; and computers, and staff employment and staff development. ESR budget suffers due to two factors, there is no ESR champion on the budget committee from Nursing Department and the budget is controlled centrally which needs permission to provide resources.

7.5 Information Management Element

The primary data sources (questionnaire and interview surveys) reveal that ESR resource base development has a number of issues that need to be addressed. There is a lack of technically-minded culture in the Department, leading to a shortfall in infrastructure support, funding for essential technical items, and appropriate training facilities. Investigation of the human resource issues indicates either no strategies or those that exist are very dated, together with their policy implementations. In addition, the absence of an identified "techno" champion has meant that there are few technical educators and computer programmers. From the perspective of issues associated with technology, the lack of funding has led to the dependence on legacy systems that have outgrown their usefulness and in some cases are not compatible with, nor have sufficient memory to run state of the art computer programs. The number of computers stations that can provide useful resources is thus very limited, leading to a severely restricted access time for nursing staff who have a real need to use the system. The above findings are consistent with those of Hannah (1999) who registered the obstacles of IT in the development and implementation of Nursing Information Management Systems (NMIS).

The SSM intervention demonstrates the absence of the resource base development for ESR in the Nursing Department and HMC, as indicated earlier, policy and strategy issues, whereas the policy is important element in the ISM intent structure (Figure 6.7 refers, see p.199). The ISM element "To have a policy which should

be written on how and what to enter, what to delete from the system, who will be the authorised personnel for any documents" is placed at the starting point in the policy and strategy category. This means that the element related to policy needs to be put before technology issues and human resource issues and infrastructure (remember, the relationship 'help to achieve' is transitive, see.pp.195-196). Once this has been achieved, policy and strategy helps to achieve the resource (personnel and software elements) all these elements help to achieve the top element 'To help improve manpower planning and budget requirements forecasting'.

One of the problem themes in the SSM was related to information management system, whereas, the questionnaire and interview survey indicated the lack of dissemination or flow of staff information: for the information to be adequately used it needs to be shared with first and middle line management nursing staff and not by the senior nursing staff only. The first and middle line management nursing staff can use this information for their management decisions and they can help the person collecting information to draw meaning and use out of it for management purposes.

It is essential to have standards for profiling and organising the staff records system; the evidence from the SSM and the interviews suggest a contrary view. The staff records system is disorganised, as there is no consistent naming for categories, either conventions for naming documents or typographical conventions (for example, abbreviations for staff records, consistent date formats). The easy retrieval of staff information and reliability of the information depends on how well the information is organised. In the critical review literature chapter, JISC infoNet (2003) indicated the benefits of organised RM by reducing 10% of the time spent looking for information. Another estimate from Scottish Executive (2004) is that managing information better could save an individual half an hour a day. Staff records system should be well organised before the transfer to the electronic staff records system in the Nursing Department.

The key element of establishing ESR in the Nursing Department is to have adequate and skilled human resources. The results of the interview survey indicated that lack of the right software and qualified professional records staff, an analyst who has a thorough understanding of the business processes to be involved as well as technical specialist. These implementations are at risk as the user and records requirements have not been studied and integrated in the implementation process. The available resources should be assessed realistically and an appropriate strategy should be adopted.

The primary data sources (questionnaire survey and interview) also reveal a lack of staff training. Many organisations downplay the importance of training and see the associated time and expense as luxury items, and some either underestimate their needs or do not study at all. The support for training affects the proficiency with which staff use the system. More importantly, the training approach will dictate the quality of the intervention with the system, hence, the training needs should be studied and implemented before the implementation of the new system ESR.

As mentioned in Chapter Three, Kleinke (2004) reported that the high start-up costs of implementing IT were overwhelmingly cited as the major barrier to increased hospital technology use. This finding is with line with the interview survey as indicated by lack of funding to the cost of recruitment of qualified staff, equipment (for example, computers, software, hardware); and the cost for training (for example, to have an expert in the same field) and also, for continuing education for present staff and for the new staff. A nursing champion should be recognised and be a member at the budget committee to argue for the need to have ESR in Nursing Department.

The usefulness of the system and the ease of the use are factors helping to predict the perception of any staff accepting the new system which is the use of computers in the Nursing Department and in the nursing units. For the usefulness of the new system, the questionnaire survey indicated that the vast majority

(92.6%) of the nursing staff had agreed that the computer is a powerful enabling tool. Furthermore, it is indicated by the same questionnaire that even a greater majority (93.5%) of nursing staff (respondents) agreed with the statement that in healthcare, computers could save a lot of paperwork. In addition, computers can be great problem-solving tools, agreed by 68.7% of the respondents to the above statement to test or measure the attitude and the perception to the use of computers. This is consistent with Legris (2002) statement to measure people's perception towards the new system.

The questionnaire survey revealed that for the ease of the use of the new system which is the computer, the majority of the respondents 87.4% agreed to the statement that "I would enjoy learning course work using computer program". Also, the majority (73.3%) of the respondents agreed to the statement that "The future of computers in health care excites me", and to the ease of the use of the new system, a majority (53.8%) of respondents agreed to the statement that "I can easily master the content of computer lessons". The findings by Legris et al., (2002) & Davis & et al., (1989) reinforced the findings of the primary data collected in this study.

The results of the interview reveal that the expectation of senior nursing staff towards the new staff records system ESR are very positive, easy access of the staff records, it saves time, nursing staff records will be more updated, in addition, it will release a lot of space which can be used, for example as an offices.

The technology system change suggested by the SSM in Chapter Six indicated that Nursing Department should run seminars in Staff Development section for all nursing staff in the use of computer; NI; workshops and they should invite speakers from developed countries to deliver seminars in related topics. The senior management staff can visit the site to learn from others experience. For example, the NHS in the UK, hence the senior management staff will gain new knowledge and they will improve their professional efficiency, which will help in improving the HRM within Nursing Department.

Evan the most careful system analysis will fail if the staff who use ESR to create and maintain records are not prepared to handle new formats of records. If staff are not convinced of the stability, authenticity, or ease of use of the ESR, training for all the staff in the maintenance of ESR and the implementation of the systematic procedures the staff records filling; retrieval; maintenance and storage may help staff overcome fears and concerns.

The continuing professional development for the nursing staff has become more important than ever in the era of information, due to continuous changing of hardware and software. The NI; IM and ICT training for nursing staff is non or lacking, typified by lack of qualified staff in same field; lack of practical training; and lack of adequate training facilities.

NI is a new specialty to nursing profession in the state of Qatar at HMC. It is recommended that NI studies be integrated into basic nursing programmes; promote continuing education/organisational in-service in NI; and initiate demonstration projects that show the benefits of NI/IM and ICT use to nursing staff and their consumers. Ongoing training is a must following completion of the implementation of the ESR in the Nursing Department, new staff members will join the department and others will leave. As well, procedures might change and new tools might be implemented. Therefore, it is crucial that the department plans for ongoing training for the NI/IM and ICT.

All of nursing domains must be able to ethically use and understand the evolving terminologies, decision support systems, electronic communication methods, and information technology in order to build knowledge structures, network and disseminate their work. This is crucial to developing new understandings and expanding nursing knowledge especially in this global society within which we live and work.

7.6 Training Elements

Training is the key to any successful change in the workplace. Training can improve individual performance that will reflect in overall organisational performance improvement. Furthermore, training should meet workplace needs.

The findings from the questionnaire and interviews survey indicated that computer use issues, which is the use of computers in hospitals units by the nursing staff is limited and the computers training for nursing staff is insufficient to prepare them use the computer in their workplace.

Computer training is essential in introducing successful change to workplace.It improves the nursing staff performance and helps easy access to staff records, which in turn will reflect in an overall Nursing Department performance improvement, in addition to, the training strategy should meet the workplace needs. "Maryland University's School of Nursing was the first university to establish the specialisation in nursing informatics" (Abbott, 2001). Newbold, (2004) reported that 1000 nurses have been certified as informatics nurses since November 1995 in the USA . All of the former results are contrary to Newbold (2004) and Abbott (2001) findings on their studies regarding nurses and nursing informatics training

Another factor related to training is the use of computers at work. It was examined in this research study. This study shows that the majority (77.5%) of nursing staff do not use computers at work, while 16% of the nursing staff do use computers. The respondents 11.8% do use computers for word processing. These results indicated the lack of adequate computers training programmes within the department and within HMC. This indicates the importance of the computers training in helping the nursing staff to do their work with the use of computers not only word processing, but other computer applications too.

The questionnaire result shows that the majority (58%) of the respondents at nursing units at HMC did not take or attend computer training course, whereas

35.5% of the respondents had computer training. In addition, 6.5% of the respondents attended a 5 days in-house computer training offered by HMC for first and middle line management nursing staff. 9.3% of the respondents attended computer training with external companies. The evidence from the questionnaire suggests that HMC can achieve in-house computer and ICT training for the all nursing staff by the co-operation and co-ordination of the HIS Department. The emphasis should be put on the computer training for the Qatari senior nursing staff as they are holding the seniors position (from the interview) in Nursing Department and they can be send for further study in NI in developed countries where NI specialty study is offered.

As stated earlier, training is the key in any system development or implementation. To achieve progress, a multiperspective appreciation of the value that training brings to an organisation is needed. This view is expanded in the value system change identified as a part of the SSM study. The organisation should include training in computers / ICT and NI professionals from the early stages in the project team. A set of information-based skills that should attain as a minimum for the professional staff who is going to do the training. These skills include the following:

- Conduct user needs analysis for training;
- Develop appropriate materials for both the policies and procedures;
- Hold regular information sessions;
- Provide class-room training on the tool and on policies and procedures;
- Group users according to their level of comfort with technology.

7.7 The Contribution of the Systems Intervention to the study

This research study provides the first systems intervention for ESR in the Nursing Department within HMC in the state of Qatar. It draws on similar studies applied to information management within Nursing in parts of the developed world. The use of multimethodology allowed not only understanding the issues, but also led to the provision of a proposed system to improve the existing problem situation.

The multimethodology comprised Checkland's Soft System Methodology (SSM) and Warfield's Interpretive Structural Model (ISM). This type of study has been used in different sectors, including health (Mingers & Gill, 1997; Munro & Mingers 2002). Mingers & Gill, (1997) provided the initial impetus on multimethodological thinking, whose result was the emergence of what Jackson calls "creative holism", (Jackson, 2003, p. 302).

The use of SSM in conjunction with more generic systems approaches were discussed at length in Chapter Three. The information gathered during the fieldwork was presented as stage one of the SSM. Three perspectives were taken as a set of problem issues, process, people and organisational issues. Stage two of the SSM, the rich picture, reflected on the real life situation in the Nursing Department in a pictorial form. In Chapter Six, more detail about the eight relevant systems originally identified is given. These eight systems were reclassified to three, Value System Issues Relevant System; Technology System Issues Relevant System; and Information Management System Issues Relevant System. Stage four of the SSM, the conceptual models helped to identify the activities of the model.

The important part of the SSM is the comparisons process between the conceptual models and real world, which is stage five of the SSM. This comparison helped to explore the debate concerning the problem situation. The main outcome of the SSM application is related to the improvement of the problem situation and the change identified through the implementation of an action plan, both within Nursing Department. The action plan consists of change in structure, change in procedures, change in attitude, and change in culture.

In addition to the above, the use of Multi-Methods brining together a complete SSM intervention with NGT and ISM intent structure. The way that the change archetypes have been used to inform the NGT is novel addressed by using the suggested changes as input to a focus group to brainstorm a trigger question.

Using NGT, 28 objectives emerged from which 16 were voted upon and used in the ISM. The resultant intent structure is shown in (figure 6.7, p.199).

ISM provided a structured approach to change. From the SSM, the changes were known as systemically desirable and culturally feasible. The combination of the interactive management techniques (NGT and ISM) form a set of ordered objectives. The intent structure used formed the relationship that "would help to achieve", the root node is the first to be tackled at any agenda for change, and the top node is the objective to strive for. In this study, the ISM intent structure comprised 16 elements, these elements were grouped into five classes. The root node, "To have a policy which should be written on how and what to enter, what to delete from the system, who will be the authorised personnel for any documents", help to achieve all the elements including the goal which is "To help improve manpower planning and budget requirements forecasting". The use of a multimethodology, SSM and ISM because there was no rich methodology or methodologies that can help to improve and solve the problem under investigation.

The application was also novel, first study of its type applied to the Nursing Department at HMC in the state of Qatar. Significantly the SSM, NGT and ISM were exposed to a cross cultural mix of eastern philosophical influences. Equally, the application was a novel test for Concept Star, V3.2 (SORACH), the software used to develop the ISM intent structure.

Finally, because no similar study to this can be identified, this study has made a useful contribution by focusing on an area of study that is important nationally especially in the Nursing Department in HMC in the state of Qatar.

Conclusion

8.1 Introduction

This chapter presents conclusions of the study derived from this research. A number of recommendations can be formed as a part of an action plan for implementation in the Nursing Department. Some suggestions are also given for future research. The conclusions reflect the hypotheses; research questions and the objectives of this study.

8.2 Conclusion

The research presents the first time Checkland's SSM has been used in any study based on nursing staff records at the Nursing Department, HMC. The use of multimethodolgy (SSM & ISM) in this study gives promise to use this or similar approaches in the Nursing Department or HMC in the state of Qatar. The advantages of the use of SSM are not only to learn and understand about the issues under investigation, but also, to produce a plan of action to improve the problem situation.

8.2.1 Hypothesis Testing and Research Questions

The findings from the questionnaire survey and interview confirm the first hypothesis (H1) that migration from a manual based system to an electronic based system will provide benefit in two areas:

The process of implementing the SSM ensured a greater understanding of the issues that correspond to the identified problem themes: value system issues; technical issues and issues associated with information management. The study identified three levels at which electronic staff records system could improve the

management of the Nursing Department at HMC. The change management identified was at three levels of management: strategic, policy and operational.

The findings from the questionnaire survey and interview also indicate a general optimism of the staff and the management of the Nursing Department at HMC on the improvements that electronic based system of Nursing staff records would bring to bear on their activities, especially on information accuracy; information currency; information editing; information availability; information retrieval; information accessibility and information storage system.

The findings from the questionnaire survey and interview also confirm the second hypothesis (H2) that developing a system based conceptual model, using ISM, will provide benefits by making it possible to create a road-map to guide the introduction of electronic staff records system and making suggestions on ways of managing the process of change. The intent structure allowed for the identification of elements that aggregate into five categories: strategy/policy, resource, infrastructure, planning and goals and to deploy resources in an effective way to guide the implementation phase of the introduction of ESR.

Regarding the three research questions, these were addressed in detail in the literature review as well as in the questionnaire survey and interviews. As will be discussed under the research objectives below, there is a general view that the introduction of electronic staff records will assist nursing management in the management of resources and in facilitating accuracy, accessibility, storage and retrieval of appropriate data or records of the nursing staff

8.2.2 Current Trends in RM

The first objective of this study was to explore and critique the current trends in records management (RM). As discussed previously in Chapter Three, having an effective and functional organisation rely, to a large extent, on sound records management system. Most organisations approach the task of developing a good records management system by having in place articulate records management

policy and efficient RM. Survey questionnaire as well as interview survey asked a range of questions that borders on establishing the policy as well as system of records management in place in the Nursing Department at HMC. While the respondents were diverse in their responses on the policy and system of records management in HMC, all the respondents agreed on the fact that the Nursing Department in HMC does not have a policy regulating the right of staff to access the records in their files; lack of familiarity with the staff records system in use in the Nursing Department and confusion when respondents want to access their staff records in the Nursing Department. All these problems were attributed to lack of policy on records management. These findings formed the basis for the discussing Stage one and two of SSM, which are both concerned with finding out as much as possible about the problem situation from the respondents. In addition to RM, NI was introduced as a way of implementation of IT to Nursing Profession in relation to Nursing management.

8.2.3 Current Trends and Practices in Staff /Personnel Records System

The second objective of this study was to explore the current trends and practices in staff /personnel records system. The principal sources of information used to achieve this objective were the literature and interviews with senior management staff. There were not very many differences in the views expressed between the literature and the senior management staff responses in relation to benefits and the expectation of the personnel/staff records at the Nursing Department. In the UK, ESR divided the benefits of ESR into national and local benefits. These issues are discussed in Chapter Three.

8.2.4 Current Staff Records System in the Nursing Department at HMC

The first part of the third objective of this study was to analyse the current staff records system in the Nursing Department at HMC. The principal sources used to achieve this objective were questionnaire survey and interviews with senior staff management.

The result from the interviews revealed that the present staff records system is manual with computerised components (stand alone system). The computerised system has been used in the Nursing Department since HMC opened 1982. Respondents to the questionnaire survey and interviews were not happy with the present system. They have to operate both paper-based and computerised systems, leading to a duplication of papers, where each of the senior nursing staff have records about their staff.

It is surprising that respondents did not know what type of staff records system was used in the Nursing Department (see Table 5.7, p.128) In addition, the respondents did not know how to access the staff records system in the Nursing Department at present (see Table.5.6, p.128) The respondents did not seem to be familiar with the list of documents that should be held in staff records (see Table 5.3, p.125). The results from the interviews reveal policy issues that must be rectified. These policy issues include retention of staff records, staff records accessibility, and the list /type of documents in staff records. From the evidence presented above part one of objective 3 was achieved.

8.2.5 The Barriers to the Computerisation

The second part of objective three was to identify the barriers to the computerisation of the staff records system within the Nursing Department. The principal source of information used to achieve this objective was the literature and the responses to the interviews. The results from the interviews reveal the following barriers: policy, budget, hardware, software, computers, cost, trained staff, staff training, nursing champion, and the infrastructures. From the evidence presented above the second part objective 3 was achieved

8.2.6 Staff Attitude Towards Computerisation

The third part of objective three of this study was to identify staff attitudes towards computerisation at HMC. The principal source of information used to achieve this objective was the questionnaire survey. It is not surprising that the use of computers at work was very minimal (see Table 5.8, p.130). In addition, the frequency of use of computers was also very minimal. The use of computer at work revealed that 11.8% of respondents do use word processing. The need for computer training is revealed by the fact that 58% of respondents have not taken any training as how to use computers (see Table 5.9, p.132). In contrast, only 6.5% of respondents have actively attended course on computer use within HMC (see Table 5.10, p.133). In relation to staff attitudes towards computers there are some similarities and differences in attitude of the staff at HMC with some of the studies done before. The results revealed that staff attitudes were positive towards computers. From the evidence presented above the second part of objective 3 was achieved.

8.2.7 The Proposed Model

The fourth objective was to propose a conceptual model from which an ESR/ IMS can be implemented within the Nursing Department. This was achieved by using a set of research methods that provided rich data and information to form a roadmap. The systems intervention to improve the problem situation used a multimethodology approach. The use of SSM was the first component of the multimethodology. The changes identified to improve the problem situation were at three levels: strategic, policy, and operational. The second component of the multimethodology involved the use of ISM analysis that provided an intent structure that is useful to identify the logical order of ESR/IMS development (i.e. roadmap) within the Nursing Department. The use of ISM was instructional and allowed for identification of elements that accumulated into five categories: these are strategy/policy; resource; infrastructure; planning and goals. The ISM roadmap is the proposed conceptual model for the decision-makers to distribute resources in a more effective way so that the implementation of change can take

place and provide the Nursing Department with ESR/IMS to enhance decision-making within the department.

8.3 Recommendations and Suggestions for Further Research

8.3.1 Recommendations

The main recommendations of this study can be seen in Table 8.1 are divided into strategic planning level, policy setting level and operational management level. For the strategic level it is recommended that HMC appoint a committee to review the present situation and evaluate the proposed staff records system for implementation. This will give the committee members the opportunity to evaluate the present system and to evaluate the proposed system if it meets the user requirements. Identification of the nursing staff training needs and establishing a staff development programme for the Nursing Department are further goals. It is also recommended that a training programme is created to demonstrate the importance of the research study within nursing staff development and the value of the information when there is a problem under investigation. Creation of a "Nursing Bulletin" with tie the nursing staff to training programmes for Qatari and all other staff working at HMC. It is also, recommended that NI, IMS and IT should be introduced as subject area in Nursing Programmes at the College of Nursing at Qatar University.

All of these recommendations require clear strategy, the need to appoint ESR champion and NI champion by the Nursing Director with approval of Administrative Director of the HMC.The ESR champion will help establish the ESR base by adhering to the international ESR standards. The NI champion will help the introduction of NI as new specialty to nursing staff with adherence to the international nursing standards of NI. Senior nursing staff should learn about the current NI issues from essential resources, including literature, professional organisations and educational programmes, to develop successful strategies for innovation. The NI champion will also help in introducing the Nursing Information System (NIS) into the Nursing Department, which in turn helps to ensure the delivery of high quality care, advanced clinical research, appropriate

nursing organisation section and adequate staff resources. It is essential to plan a budget for the introduction of NI in the Nursing Department and for the planning of establishing the ESR in relation to hardware, software, staffing, staff training, user training and continuing training, recruiting NI champion, infrastructure and policies.

To achieve all the recommendations at the policy setting level, HMC required is to create appropriate policies. A policy regarding staff records retention in HMC is required. It is essential for the Nursing Department to adapt this policy and apply it to the staff records in the Department. Also, a Policy should be created for staff records accessibility; for example, to ensure that all staff records are password protected. Allowing access to nurses who have authorisation, thus ensuring the security of staff records, will help make the staff records secure. Similarity, a policy is needed to support the interaction of the Nursing Department at HMC and Nursing Departments within GCC to learn from their experience and creation of Data Bank for nurses details; for all to access; with appropriate password control.

A policy for co-operation with international and developed countries is required especially the UK, as the NHS they have a project for ESR (for all the staff working for the NHS, here it is a good chance to avail from the UK experience for example, how they chose the right software, staff training, the introduction of the new change in the NHS and how they manage staff resistance to change). In addition, a policy to facilitate the work with nursing organisations such as International Council of Nursing (ICN) in regard of establishing the Qatari Nursing Society in the state of Qatar and finally, a policy for Data Protection Act for HMC.

To achieve the operational management level it is recommended to create user training programmes after evaluating the need for them by nursing staff and create a training program to show the importance of the research study within nursing development section at the Nursing Department by establishing a research committee for nursing staff.

Strategic Planning	**Policy Setting**	**Operational Management**
Appoint a committee to review the present situation and evaluate the proposed staff records system for implementation	Create policy of the staff records retention in HMC	Create a user training programme
Appoint champion for ESR at Nursing Department and appoint Nursing Informatics champion	Create policy of the staff records retention in the Nursing Department	Create a training programme to show the importance of the research study within nursing staff development
Identify the nursing staff training needs. Establish staff development /training programme within staff development at Nursing Department	Create policy for staff records accessibility.	
Plan for budget for the planning to establish ESR in relation to hardware, software, staffing, staff training, user training and continuing training.	Policy for co-operation with GCC countries	

Introducing Nursing of Information System and Introduction of Nursing Informatics as new specialty to nursing staff	Policy for co-operation with developed countries e.g. UK, USA ,Canada and Australia and ICN, Policy for Data Protection Act.	

Table 8.1 Outline Recommendations

8.3.2 Suggestions for Further Research

Based on the findings of this study, a number of areas need further research. Some of these are as follows:

- Further study on the transition from manual- based staff records system to the electronic- based staff records system at the point of need;
- Further research is needed on the extent of implementation of the proposed system;
- Once the proposed system is implemented an evaluation of the impact of the changes on the Nursing Department effectiveness, efficiency and efficacy can take place;
- There is a need to evaluate and then, if necessary, modify and improve the proposed system, such study could be carried out with the co-operation of Personnel Department at HMC;
- There is a need to study the specific user needs which the new staff records system must satisfy;

- There is a need to further investigate nursing staff attitudes towards establishing ESR and its benefits to nursing staff and to nursing staff records;
- A study of staff attitudes towards computerisation, pre and post implementation phase is needed for comparative study;
- Research is needed to investigate the possibility of applying NI to nursing management issues (for example, NIS, nursing practice, nursing research and nursing education) within the Nursing Department, HMC and further a field in the state of Qatar.

It is hoped that by following the above conclusions, recommendations and suggestions for further research, the Nursing Department at HMC has an opportunity to become a beacon site for nurses within the GCC

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Appendix

(1)

INFORMATION MANAGEMENT WITHIN THE NURSING DEPARTMENT AT HAMAD MEDICAL CORPORATION (HMC) QATAR.

This Questionnaire has been designed with your precious time in mind. All responses will be treated in strictest confidence.
Please tick the appropriate boxes or write your answer where indicated.

A. Demographic Data

1. Gender

❑ Male ❑ Female

2. Age

❑ 26 – 30 ❑ 31 – 40

❑ 41 – 50 ❑ 51 and over

3. Nationality .....

4. Highest Qualification

❑ Diploma

❑ Diploma & Specialty

❑ Bachelor in Nursing

❑ Master

❑ Ph. D

❑ Other, Please specify

5. **Current Position**

- ❑ Staff Nurse 4
- ❑ Acting Head Nurse
- ❑ Head Nurse
- ❑ Acting Assistant Director of nursing
- ❑ Assistant Director of nursing
- ❑ Other, please specify.....

6. **Working Place**

- ❑ Hamad General Hospital (HGH)
- ❑ Rumailah Hospital (RH)
- ❑ Women Hospital (WH)
- ❑ Primary Health Centre (PHC)

7. **Working Experience**

- ❑ Less than 10 years
- ❑ 10 – 13 years
- ❑ 14 – 17 years
- ❑ 18 – 21 years
- ❑ More than 22 years

8. **Number of Years Working at Hamad Medical Corporation (HMC)**

- ❑ Less than 7 Years
- ❑ 7 – 11 Years
- ❑ 12 – 16 Years
- ❑ 17 – 21 Years
- ❑ More than 22 Years

9. **Number of Years as Same Position**

- ❑ Less than 3 Years
- ❑ 3 – 6 Years
- ❑ 7 – 10 Years
- ❑ 11 – 14 Years
- ❑ More than 15 Years

B. Nursing Staff Records System

10. How many staff do you have working in your unit?

❑ 20 – 40 ❑ 41 – 60

❑ 61 – 80 ❑ More than 80

11. Do You have a record for each staff working in your unit?

❑ Yes ❑ No

12. If yes, please list all type of documents you keep.

A.....

B.....

C.....

D.....

E.....

13. Can the nurse look at her/his records at anytime?

If No, please proceed to question 15

❑ Yes ❑ No

14. Do you have to be present at that time?

❑ Yes ❑ No

15. Would you prefer to have the nurses' records in your unit?

❑ Yes ❑ No

16. Where the nurses' records are kept at present?

- ❑ Assistant Director of Nursing's Office
- ❑ Sr. Assistant director of Nursing's Office
- ❑ Central Nursing administration's Office.
- ❑ Head Nurse's Office
- ❑ Other, Please specify.....

17. How can you access your staff records at present?

- ❑ Through Assistant Director of Nursing
- ❑ Through Sr. Assistant Director of Nursing
- ❑ Through Staffing Co-ordinator
- ❑ Others, please specify.....

18. Do you know what type of staff records system the nursing department uses?

- ❑ Manual
- ❑ Electronic
- ❑ Both
- ❑ Don't know
- ❑ None
- ❑ If others, please specify.....

19. The advantages of the present staff records system used by the Nursing Department are : (you can take more than one).

- ❑ Has the total number of nursing staff, by title, by unit and nationalities.
- ❑ Has the number of budgeted nursing staff (approximately 2200) by unit.
- ❑ Has the total number of existing vacancies by title and by unit.
- ❑ If others, please specify.....

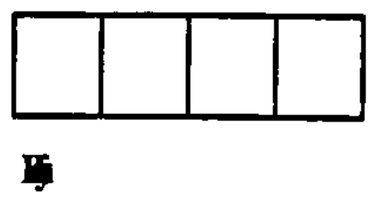
.....

.....

.....

20. The disadvantages of the present staff records system used by the Nursing Department are :(you can take more than one).

- ❑ It is a single user
- ❑ It cannot be accessible from any computer.



- ❑ The user does not use any options other than the ones mentioned in the system.
- ❑ The user adds records to access system in a single interactive window only
- ❑ It does not give you the total staff resigned/terminated in a particular year.
- ❑ Cannot give you the number of staff hired in a particular year.
- ❑ Cannot give you the number of Qatari nursing staff graduated by year, higher education, with the year and university.
- ❑ Cannot give you the number of staff promoted each year according to position wise.
- ❑ Cannot give the data as per qualifications.
- ❑ If others, please specify.....

.....

.....

.....

.....

C. Use of Computer (Computer Usage)

21 Have you used previously a computer in a hospital?

❑ Yes ❑ No

22. Do you currently use a computer at work?

❑ Yes ❑ No

If No, please proceed to question 25

23. How often do you use computer at work?

- ❑ Daily
- ❑ 2 – 3 days
- ❑ 4 – 5 days
- ❑ 6 – 7 days

24.What do you use computer at work for? (you can tick more than one)

- ❑ Access for staff records
- ❑ Word processing
- ❑ Spreadsheets
- ❑ Literature searching
- ❑ Internet/E-mail
- ❑ If other, please specify.....

25.Have you undertaken any computer courses?

- ❑ Yes
- ❑ No

26.If yes, please indicate the courses you have taken (you can tick more than one)

- ❑ Internet/E-mail
- ❑ Word processing
- ❑ Spreadsheets
- ❑ Presentation packages (eg. Power Point)
- ❑ Statistics packages
- ❑ If other, please specify

27.Please indicate the courses were taken, the duration and the name of the institution.

Courses	Duration	Name of the institution
a.	.....	.....
b.	.....	.....
c.	.....	.....
d.	.....	.....

D. Attitudes Towards Computers

28. Each indicator is to be rated using a five point Likert scale. Please, use the response that reflects your attitude for each statement.

Scale:

1	2	3	4	5
Agree Strongly	Agree	Not Certain	Disagree	Disagree Strongly

	1	2	3	4	5
• The computer is a powerful enabling tool	❑	❑	❑	❑	❑
• In healthcare, computers could save a lot of paperwork	❑	❑	❑	❑	❑
• I feel alarmed when I think of using a computer	❑	❑	❑	❑	❑
• I regularly use a computer at home	❑	❑	❑	❑	❑
• I would love to be a proficient user of computers	❑	❑	❑	❑	❑
• I will never feel relaxed about using a computer	❑	❑	❑	❑	❑
• Computers can help me to be creative	❑	❑	❑	❑	❑
• I would enjoy learning course work using a computer programme	❑	❑	❑	❑	❑
• Computers are frustrating to use	❑	❑	❑	❑	❑
• Computers will someday put health professionals out of job	❑	❑	❑	❑	❑
• I am in control when I use a computer	❑	❑	❑	❑	❑
• I feel confident that I can master using a computer	❑	❑	❑	❑	❑
• I can let my creativity flow when writing using a computer	❑	❑	❑	❑	❑
• Computers in healthcare will create more work for nurses	❑	❑	❑	❑	❑
• Computers can be great problem-solving tools	❑	❑	❑	❑	❑
• Computers are too complicated for me to learn well	❑	❑	❑	❑	❑

- The future promise of computers in healthcare excites me ❑ ❑ ❑ ❑ ❑
- I feel a computer course in nursing is totally unnecessary ❑ ❑ ❑ ❑ ❑
- People who like computers are introverted and antisocial. ❑ ❑ ❑ ❑ ❑
- Working with computers is boring and tedious ❑ ❑ ❑ ❑ ❑
- I can easily master the content of computer lessons ❑ ❑ ❑ ❑ ❑

Thank you for your time completing the questionnaire

Please return by 26/01/2002 to Mr.Basheer,Central NursingAdministration Office, Women's Hospital.

Wasmiya Dalhem, Ph.D Student
W. Dalhem@lboro.ac.uk
Department of Information Science
Faculty of Science
Loughborough University

Appendix

(2)

Department of Information Science
Loughborough University Leicestershire LE11 3TU UK
Switchboard: +44 (0)1509 263171 Department: +44 (0)1509 223052

Mr Turki Al-Khater
Administration Director
Hamad Medical Corporation
PO Box 3050
Doha
STATE OF QATAR

Loughborough University

Direct Line: +44(0)1509 223055
Facsimile: +44(0)1509 223053
E-mail: j.harrison@lboro.ac.uk
url: http://info.lboro.ac.uk/departments/dis/

8 November, 2001

Dear Mr Al-Khater

Wasmiya Dalhem

As you are aware, Ms Dalhem is studying for a PhD in Nursing Informatics with this Department. As part of her studies, it will be necessary for her to undertake field work in her home country. It is proposed that Ms Dalhem conducts a survey of the n ursing staff at HMC to gauge their attitude to computerisation of records.

I trust this explains the position. Thank you for your co-operation in this matter.

Yours sincerely

Janet Harrison

Janet Harrison
Lecturer

no objection

19/11/2001

Appendix

(3)

The Interview Questions

1. How would you describe the current system of staff records in Nursing Department?
2. What documents do you keep in the staff records?
3. How long do you keep staff records after staff have resigned or been terminated?
4. Do you have a retention policy about the staff records system?
5. Who do you think have the right to access staff records?
6. Can you access staff records at anytime from your office?
7. Where do you think the staff records should be kept?
8. Do you have problems with staff records system at present?
9. How long has the Nursing Department been using the staff records system for individual staff?
10. What are the barriers to computerisation of the staff records system in Nursing Department?
11. What are the expectations, or the advantages of the new staff records system?
12. What role will you have in involvement in the selection of the new system?
13. Would like to add anything to this interview.

Thank you.

Appendix

(4)

What are the objectives in implementing an electronic nursing staff records system at Nursing Department over the next three years?

1. To ensure that less physical space is required for electronic nursing records to accommodate the expansion of services and increase in nursing manpower.

2. To improve the requirements with regards to statistics, budget, staffing, reports etc could be prepared in less time with more accuracy.

3. To have a policy which should be written on how and what to enter, what to delete from the system and who will be the authorized personnel for deleting any documents.

4. To provide the nurse leaders an easy access to the nursing personnel records as and when needed.

5. To have all the required information with regards to statistics, budget, staffing, reports etc could be prepared in an accurate way.

6. To improve the quality of staff records and to integrate it with other systems in the hospital.

7. To ensure that information is shared interdepartmental and intradepartmental i.e. staffing issues, budget.

8. To assign a responsible personnel who will have an easy access to the nursing personnel records without dependence on others.

9. To facilitate distribution of qualified personnel in to the suitable areas.

11. To ensure confidentiality, security, and integrity of data and information are maintained.

12. To ease distribute of qualified personnel in to the suitable areas.

13. To make sure data will be kept in the best manner with regards to confidentiality, safety, security, protection etc.

14. To provide and design a software to suit our system.

15. To ease in retrieval of statistical data which can be used for research purposes.

16. To ensure safeguard data/information including the clinical records against loss, destruction and tampering.

Appendix

(5)

Likert Scores Table

Figure	Statement	Likert Score
5.7	The Computer is powerful enabling tool	4.58
5.8	In health care, computers could save a lot of paperwork	4.57
5.9	I would enjoy learning course work using a computer program	4.38
5.10	Computers will some day put health professionals out of job	2.24
5.11	Computers in healthcare will create more work for nurses	2.72
5.12	Computers can be great problem-solving tools	3.79
5.13	Computers are too complicated for me to learn well	3.20
5.14	The future of computers in healthcare excites me	3.84
5.15	I feel a computer course in nursing is totally unnecessary	1.74
51	I can easily master the content of computer lessons	3.66

For example,

Figure 5.7 The computer is powerful enabling tool

	Agree Strongly	Agree	Not Certain	Disagree	Disagree Strongly	Total
A. Value	5	4	3	2	1	
	x	x	x	x	x	
B. No. of Respondents	164	79	9	0	2	254
C.	820 + 316 + 27 + 0 + 2					1165
C ÷ B	1165 ÷ 254 = 4.58					
Likert Score is 4. 58						