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IMPROVNG KNOWLEDGE FLOW FOR NURSING CARE IN TUBERCULOSIS MANAGEMENT; THE CASE OF ST. PETER'S AND ALERT HOSPITALS

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Name and Signature of Members of the Examining Board

Examiner	Signature	Date
Examiner	Signature	Date
Advisor	Signature	Date
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ACRONOMY

AHRI	Armaur Hansen Research Institute
ALERT	All Africa Leprosy, TB rehabilitation and training center
CDC	Communicable Disease Control
DOTS	Direct Observation Short Course Therapy
FDRE	Federal Democratic Republic of Ethiopia
FMOH	Federal Ministry of Health
ICN	International Council of Nursing
ICT	Information Communication Technology
KAP	Knowledge Attitude Practice
KC	Knowledge Capture
KCM	Knowledge Continuity Management
KF	Knowledge Flow
KM	Knowledge Management
KMS	Knowledge Management Systems
KS	Knowledge Sharing
KSA	Knowledge Sharing Attitude
MCH	Maternal and Child Health
MDG	Millennium Development Goal
MDR TB	Multi Drug Resistance Tuberculosis
SECI	Socialization, Externalization Combination, Internalization
SPSS	Statistical Package for Social Sciences (Software)
TB	Tuberculosis

Abstract

Background: - Utilizing Knowledge Management Systems (KMS) to manage medical information and health care knowledge to support the full spectrum of knowledge needs in the nursing process has become an important issue for nursing professionals. However, despite its benefits, many nurses are not yet to fully understand and put to practice the nursing process. This may have led to poor patient care and outcome and it is the basis for this studies which to introduce knowledge management blueprint so as to improve nursing care tuberculosis management in St. peter's and Alert hospitals.

Methods: - A cross sectional design employing quantitative and qualitative methods was conducted in St. Peter's and Alert hospitals. Qualitative data was collected from 4 head nurse and matron two hospitals and quantitative was collected from 199 nurses selected by simple random sampling technique from the two hospitals proportional to their size. SPSS version 20 and thematic analysis was used for quantitative and qualitative data respectively.

Findings from the study showed that nurses of St. Peter's hospital and alert hospitals have poor implementation of nursing process in tuberculosis management. According to multivariate analysis, the factors that were independent predictors of knowledge flow are; good knowledge, in presence of organizational ICT, training to better knowledge capability, work experience. Knowledge flow practice of implementation nursing process during tuberculosis management of nurses good knowledge is by 7.5 times greater in presence of good knowledge than poor knowledge, knowledge flow of nursing care for tuberculosis treatment is by 17.4 times greater in presence of organizational ICT training than absence of ICT training in the organization and knowledge flow of nursing care for tuberculosis treatment is by 19.5 times greater in nurses having work experience of >15 years than those having <1year of experience. Designed knowledge flow to enable information technology plays its part in enhancing knowledge creation and sharing in these hospitals to make common understanding between nurses.

Concluding and Remark: The study shows that most of nurses are aware of knowledge flow during nursing process which will improve quality of tuberculosis management and have appropriate design for knowledge creation and sharing way but they are not engaged in knowledge sharing frequently. So these hospital administrations should plan a way to strengthen knowledge creation and sharing practice by improving the identified knowledge flow factors and implement the designed knowledge flow blueprint which will improve implementation of nursing process.

Key words: - knowledge flow, blueprint, nursing process, Assessment, Diagnosis, planning, evaluation.

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CHAPTER ONE

Introduction

Background

Health care takes an active approach to Medical knowledge management (KM) by executing a series of strategies to improve how knowledge is managed – including a branding strategy focused on mobilizing awareness and support of the KM initiative. The organization places value on the tacit knowledge that individuals have and combines it with explicit knowledge (e.g. scientific journals, clinical workflows, guidelines) thus improving communication, collaboration and information transfer. The co-ordination of the KM activities is performed by a dedicated team of KM "workers" that actively manage the operational KM process. They aim at improving knowledge creation and sharing processes in the organization and also, the team coordinates the basic processes of the knowledge life-cycle which comprise the identification of knowledge need, creation, collection, storage, sharing and update (1).

A knowledge-based community that connects hospitals for knowledge acquisition and knowledge sharing is critical for improving the quality of health care (2). Since the 1990s, organizations throughout the world have begun investigating and applying principles of KM in order to protect their intellectual assets and investments. This is also true of healthcare organizations that have the additional goals of improving patient care and decreasing medical errors (1).

KM is the intentional application of processes and procedures that enhance the creation, codification, and dissemination of knowledge throughout an organization for the purpose of achieving competitive advantage. As the pressures on hospitals mount to increase productivity and decrease cost, the management of their knowledge resources is essential (2).

The systematic process of finding, selecting, organizing, distilling and presenting information, improves an employee's comprehension in a specific area of interest. KM also helps an organization to gain insight, understanding from its own experience and specific knowledge management activities help focus on organization on acquiring, storing and utilizing knowledge

for problem solving, dynamic, strategic planning and decision making. It also prevents intellectual assets from decay, adds to firm intelligence and provides increased flexibility (3).

Nursing Process is a systematic method which utilizes scientific reasoning, problem solving and critical thinking to direct nurses in caring for patients effectively (4)and also Nursing process as problem solving approach and evidence based method which involves different steps and it is a goal oriented method of caring for patients (5) based on assessment data and the identification of patient problems and plans for interventions are the priority and also evaluation includes analysis of conflicts or discrepancies in the plan of care that may require adjustment (6,7,8 and 9).

Nursing process involves several complex and knowledge-intensive practices that highly depend on nursing professional know-how and experience. Thus, nurse's effective utilization and management of their knowledge in nursing process is vital to the quality of care (6). Be caused of this reason the aim of this project is to constrict blueprint for nursing care so as to improve TB patient management.

Overview of St. Peter's Hospital and Alert hospitals

The current St. Peter's hospital was established in 1963G.C as a TB treatment center for the nation (10). In the time of Haile Sellassie I, with the charity and goodwill of Knojit Anbenet, wife of Ras Abebe, the residence of the War Minister was given to Ministry of Health to serve as TB sanatorium. The house was renovated, furnished and equipped by the government. It was inaugurated by the Emperor in 2nd of February 1963 G.C. The Hospital started service with 100 beds, 3 expatriate physicians, a matron, 2 nurses and 11 patient care givers (total of 16 healthcare workers and 51 administrative staff). It has expanded to include female and pediatric wards and in 1968 G.C. was upgraded to a Hospital. The outpatient department in Mesalemia and inpatient department in Entoto merged in 2010G.C. Starting from February 2009, the hospital started initiating second line treatment for Multi- Drug Resistance Tuberculosis patients as nation pilot site (10).

Currently, the Hospital has a total of 500 staffs and from this 250 are health care professionals. The hospital is mainly involved in the management of TB and TB/HIV patients, in addition internal medicine, dermatology, ophthalmology, pediatrics service, maternal and child health,

HIV/AIDS treatment with VCT services, mental health and dental medicine is functional (10) And also ALERT Hospital which is one of the specialized tertiary referral hospitals in the country. It is located in Addis Ababa at 7 km southwest on the way to Jimma. It was established in 1934 with the objective of serving persons affected by leprosy. It was to fulfill this objective the training division was established within the hospital compound and it was named ALERT on December 11, 1965 (ALERT, 2008). The hospital currently provides a wide range of services in the various departments. These include emergency, gynecology, general OPD, ART & TB and MDR TB , Psychiatry and counseling, dermatology and red medical (the department where leprosy patients are treated), general reconstructive and plastic surgery, minor operation room and ulcer clinic, dental, ophthalmology, pediatric, surgical and orthopedic, laboratory, pharmacy, radiology, anesthesia, environmental health education and promotion, rehabilitation and physiotherapy, prostatic orthotics, occupational therapy and research center. ALERT is served by a combination of both experienced medical scientific technical and administrative staff of about 540 workers. Daily about 600-700 patients are treated and these patients come from all over the country (11).

1.2 Statement of the problem

Nurses play a vital role in improving safety and quality of patient care not only in the hospital or ambulatory treatment facility, but also of community based care and the care performed by family members (12). New a day practice of nursing process are challenge for developing a scientific base for nursing practice in order to improve the practice of its members in rendering services to clients/patients to make the greatest impact has been the basis for evolving a knowledge which is uniquely nursing(17). Implementing a new methodology to guide nursing care delivery implies facing a series of challenges, which requires a priori acknowledgement of the institution's and the nursing team's possibilities and limits. Although the nursing process has become the standard for nursing for worldwide over the past thirty years, the perception persists that it is time consuming and impractical (18). If the nursing process is not valued and not used, then nurses might continue to intervene in standardized nursing procedures on the basis of medical diagnoses rather than a rational based on nursing assessment, diagnoses, planning, implementation, evaluating record keeping and feedback. If the nursing process is not used, the

question might be asked in what way nurses assume accountability and responsibility for the patient and how the quality of nursing care could be measured (17). Nurses need know what proven technique and intervention they can use to enhance patient outcomes. Emphasis on the need to improve health care systems to enable nurses not to be at the "sharp end" so that they can provide the right care and ensure that patients will benefit from safe, quality care(12). Lack of application of the nursing process as a standard of care can reduce job satisfaction, incorrect evaluation, scientific and practical retardation, reduction in the quality of care, neglecting of some of the authorities to this field, devaluation of this profession by nurses themselves and their excessive dependency to the physicians, indisputable obedience, doing routine activities without thinking, conducting one dimensional care, reduce in patients independence and costing heavy expenses due to doing repeated acts and also Some nurses tend to hold onto previous knowledge and skills without making efforts to improve and maintain new skills. Many nurses are not willing to accept the challenges of staying abreast with education and development of new skills in nursing practice (17).

Tuberculosis (TB) is increasing word wide and Ethiopia ranks seventh on WHO's list of 22 high burden TB countries globally(13).The main reasons of the burden of TB are the inadequate health services, improper management practices resulting in poor case detection, misdiagnosis, and maltreatment (7). According to the Ministry of Health Hospital statistics data, TB is one of the leading causes of morbidity, the fourth cause of hospital admission, and the second cause of hospital death in Ethiopia (13).

Nurses play a crucial role in TB control program (7). The International Council of Nursing (ICN) believes that nurses are in a position to advocate for strong TB therapy DOTS (7). The nurse who can best assure that each patient successfully complete treatment, the main principle of nursing intervention is the integrated organization of multiple activities to achieve specific outcomes for patients(7). In TB control nurses routinely collect data relating to case finding and treatment outcomes, which could be useful in evaluating a number of different practices (14).The nursing intervention IS required so as to improve performance and support the quality of health services (7, 15).

The TB treatment guideline was develop by Communicable Disease Control (CDC), also provided supportive foundation to the existing recommendations. However, this document did not provide sufficient methodology description of nurses as one of their intended users; it did not directly mention what they should do (7) and also FMOH in Ethiopia TB treatment guidelines has not identified the role of nurse clearly and directly (16).

Nurses are knowledge intensive and primary professional in health care organizations. Nurses are being asked to do more with less in such context (6) and also gap of knowledge and awareness such as lack of experience or knowledge about medications or patient's condition is common among nurses (4,8,9,15).

Study in Addis Ababa selected governmental hospitals among 192 participated nurses, 52.1% of them implemented nursing process (17), whereas study carried out in Mekelle zone hospitals identified all the 200 respondents reported that they did not apply any of the nursing process steps (18). Also a study conducted in Ethiopia found that 43% of the patients interrupted their treatment, be caused of poor Patients' knowledge of TB and its treatment, inadequate supervision of health care providers and also describing the poor knowledge among health workers as a result poor knowledge of patients about TB transmission and treatment. This leads to deficient self-care, implying increased demand for other people to take over parts of the patients' self care to compensate for patients' limitations. Knowledge among patients may not only encourage the patients to higher adherence but also better equip patients for better self-care (19).

Based on the direct observation made in St Peter and Alert hospital we found that nurses are working the nursing management process based on their interest and by the order of physicians. This leads to miss -management of patient like administration of medicine in inappropriate time, committing errors in over prescription of medicine, failure to follow the proper prescription, error in drug concentration, and giving medicine to the wrong patient due to improper identification of patients. This will result in complication, treatment failures, re-infection, relapses and death.

In order to improve miss- management of patients, the general lack of knowledge and several misconceptions about TB management by nurse should be improved using knowledge management system, tools and technique and also by extracting tacit and explicit knowledge from experienced nurses.

So, the aim of this project is to design knowledge management blueprint so as to improve nursing care tuberculosis management in St. Peter's and Alert hospitals.

1.3. Objectives of the project

1.3.1 General objective

The overall aim of this project is to introduce knowledge management blueprint so as to improve nursing care tuberculosis management in St. Peter's and Alert hospitals Addis Ababa, Ethiopia, 2017.

1.3.2 Specific Objectives

To achieve the general objective, the following specific objectives are formulated.

- To assess the current Knowledge, Attitude, Practice of nurses on nursing process in tuberculosis management in those hospitals.
- To identify factors associated with implementation of nursing process.
- To constrict and validate blueprint for nursing care so as to improve tuberculosis management.

1.4. Scope and limitation of the Project

Knowledge management is a wide area to study. It encompasses knowledge creation, capturing, representation and finally sharing for an organizational success (20). However, this project explores the flow of knowledge acquisition of nurses for tuberculosis management practice among themselves, so as to improve knowledge flow for nursing care. The problem covered all

nurses that are actively working in ST. Peter's and Alert hospitals. The project assesses the knowledge of nurses and identifies the problem faced by nurses on TB management.

This project is guided by conceptual framework included element of knowledge flow among nurses, assess factors affecting of knowledge flow in nursing care practice, and SECI model for organizational knowledge creation (19, 21, 22) Finally, the project attempts to constrict blueprint for nursing care so as to improve tuberculosis management. The reason for selecting St. Peter's hospital and Alert hospital in this project is that it is both of them are referral hospitals under the Ministry of Health especially in TB, MDR-TB cases center and general service provided.

Some of the limitations that occurred during the study period are as follows.

- The potential for recall bias exists in this study since data were based on self-reported information.
- The quantitative questionnaire was prone to social desirability bias; because of every one do not want to expose once inability.
- Resource constraint in terms of money and time.

Because of these constraints extensive evaluation is not done.

1.5 Significance and benefit of the project

Knowledge in organizations is either tacit (knowledge within a person's head) or explicit (codified in some manner) (20).Explicit knowledge is made tacit through internalization. Operational knowledge is a subset of organizational knowledge and includes network, systems, process, cultural, cognitive and skills knowledge all critical for job function and performance .This type knowledge is important resource of healthcare organization and most of this improve knowledge flow of nursing management process about tuberculosis management resides in the heads of health care professionals. In healthcare organizations, patient oriented care and medical decision depends mostly on experience and knowledge of health professionals.

Thus, speeding the maximal productivity of new employees, facilitating the interaction, collaboration, sharing and making knowledge of nursing management process about tuberculosis management and control are available to healthcare professional will improve health care delivery by decreasing redundant work practices and system development and decision making.

1.6 Organization of the project

This project is organized six chapters. The first chapter deals with introduction of the study, statement of the problem, objective, significance and scope of the study. The second chapter presents the review of the related literature in the area of knowledge management process specially knowledge acquisition and sharing and nursing management process component and discuss related works. The third chapter discusses the methodology followed for data collection, data analysis and interpretation way .The fourth chapter detail data analysis and interpretation of result, fifth chapter design of blueprint of knowledge flow nursing process during tuberculosis management. Finally chapters six are the part of conclusions and recommendation.

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CHAPTER TWO

LITERATURE REVIEW

For service rendering enterprises like a health care organization, new approach and methods are the life blood of the future, so finding ways to capture and share knowledge of an organization to promote innovation is paramount to continued quality effectiveness (23)

2.1 Overview of knowledge and its Type

Different authors **to**day define knowledge in different contexts and purpose.

They conceptualize the term in different ways based on different epistemologies. Fissaha (24) defined knowledge as 'the application, analysis and productive use of organized data and /or information with a set of rules, procedures, and operations learnt from experience and practice. Knowledge is interpreted data or information, with an extra layer of intellectual analysis added .Knowledge has a meaning attached by the mined; it is through this meaning that information becomes knowledge. Knowledge helps understand data /information and provides a guide or meaningful action it is socially, concentrated and culturally embedded.

Knowledge is a strategic asset of an organization, and the key to competitive viability and growth of learning organization. Employees will be needed to acquire knowledge to make decisions and influence others with quality management.

In addition knowledge is, major part of health organization's day today activities; whether for practitioners or for managers, for management it involves financial management, human resources management, and organizational dynamics and governance, strategic planning, information management, and quality management (23).

Knowledge represents a critical resource in the modern enterprise—so critical that it is now being conceptualized as central to competitive advantage in a knowledge-based view of the firm. But knowledge is not evenly distributed through the enterprise. Capitalizing on this resource for enterprise performance depends upon its rapid and efficient transfer from one organization, location or time of application to another (25)

“Knowledge in organizations is mainly classified into two types (10): such as explicit and tacit. Explicit knowledge is knowledge that can be captured and codified in documents or databases. Explicit knowledge can further be categorized into structured and unstructured. Documents, databases, and spreadsheets are examples of structured knowledge, because the data or information in them is organized in a particular way for future retrieval. In contrast, e-mails, images, training courses, and audio and video selections are examples of unstructured knowledge because the information they contain is not easily referenced for retrieval. Tacit knowledge is the knowledge that people gain through experience and store in their heads. It is much less concrete than explicit knowledge. Tacit knowledge is considered more valuable because it provides context for people, places, ideas and experiences.

Tacit and explicit knowledge are complementary, this means both types of knowledge are crucial to knowledge creation. Knowledge is created not only from either tacit or explicit but through interactions between tacit and explicit knowledge. Competitive advantage will only be gained if organizations value their tacit knowledge as explicit knowledge (10).

2.2 Understanding knowledge management

After explaining the concept of knowledg**e,** it is important to understand what knowledge management means. Knowledge Management (KM) is the process of gathering, managing and sharing employees' knowledge capital throughout the organization. It is a discipline that promotes a collaborative and integrated approach to the creation, capture, organization, access and use of an enterprise's knowledge assets. KM has now become a mainstream priority for companies of all sizes (3).

It is widely known that one of the most critical issues that most large organizations focus on is the capability of retrieving knowledge from expert minds and management of Intellectual Capital. Managing Intellectual Capital is not restricted only to humans but it includes Structural Capital, and Relational Capital of an organization (16).

KM gives the means for organizations to leverage information and expertise to get better innovation, responsiveness, productivity and competitiveness.

These assets, which give to the intellectual capital of an organization, contain databases, manuals, work reports, policies and procedures as well as other undocumented knowledge that sits in the heads of their employees. Human capital includes knowledge embedded in human minds, skills, experiences and intuitions possessed by individuals. The knowledge which the organization operational system contains called Structural Capital. The organization's relationships with its partners, network of customers and stakeholders is called Social Capital (26).

Knowledge management is about applying the collective knowledge of the entire workforce to achieve specific organizational goals. The intention of knowledge management is not necessarily to manage all knowledge, but just the knowledge that is most important to the organization. It is about ensuring that people have the knowledge they need, where they need it, when they need it- the right knowledge, in the right place, at the right time and for the right individual (10).

The current concept of Knowledge Management (KM), however, emerged in the early 1990s within various fields like business administration, public policy, information systems management, library and information sciences (10). KM is viewed as a way of providing the right information and knowledge with the potential of achieving superior competitive advantage. The discipline of knowledge management has four major components, people, process, technology and content (10).

People are those who create, share, and use knowledge, and who collectively encompass the organizational culture that nurtures and stimulates knowledge sharing. Peoples are primary because they implement KM processes as part of their daily work and help shape a knowledge sharing organizational culture (2, 10).

Processes: is the method to acquire, create, organize, share and transfer knowledge. In order to improve knowledge sharing, organizations often need to make changes to the way their internal processes are structured, and sometimes even the organizational structure itself (10).

Technology: is the mechanism that store and provide access to data, information, and knowledge created by people in various locations (10). Technology is often a crucial enabler of knowledge management – it can help connect people with information, and people with each other, but it is

not the solution. And it is vital that any technology used “fits” the organization’s people and processes – otherwise it will simply not be used (27).

Content: can be viewed as an evolution of data –any kind of item including unstructured and not necessarily discrete. Examples of content are image, free text, streamed video clips and also data items (i.e. discrete structured items that can reside in and fully managed by data base system) (2 and10).

2.2.1. Process of Knowledge Management

Knowledge Management involves the process of Knowledge acquisition, Knowledge Creation, knowledge storing and knowledge sharing**.**

Knowledge acquisition is the process of includes elicitation, collection, analysis, modeling and validation of knowledge. Hence the knowledge which has been acquired should focus on essential knowledge and it should capture tacit knowledge. It should allow the knowledge to be collated from different experts. Non-experts should also be able to understand the acquired knowledge. Experts are fully engaged and valuable, while capturing this knowledge is not such easy, since much of the knowledge lies deep inside people’s heads and is difficult to describe. So there is a great need to capture this knowledge that maximize the quality and quantity of the knowledge acquired whilst minimizing the time and effort required from experts valuable to the organization (28).

Knowledge Creation is a process of creating new knowledge through combining internal knowledge with another internal knowledge and analyzes information to create new knowledge. Moreover, knowledge creation relies on the selection of both the internal and external knowledge needed by the organization.

Knowledge sharing (KS) involves methods and model for the sharing and reuse of knowledge. Before Knowledge can be shared; it must first be captured, codified and deployed in a format acceptable to the user (29).

Knowledge sharing recognizes the personal nature of people’s knowledge gained from experience. There is a difference between information sharing and knowledge sharing. The

sharing of information covers a broad spectrum of exchanges and does not necessarily lead to the creation of new knowledge (30).

Summarizing, knowledge sharing is to promote knowledge transmission among the knowledge subjects with the help of all kinds of knowledge sharing ways and means. So appropriate Knowledge will spread in the whole organization and take the most effect (31)

2.3 Types of Healthcare Knowledge

There are different type of health care knowledge such as Provider Knowledge, Patient Knowledge and Organizational Knowledge **(**20**).**

A. Provider Knowledge

Provider knowledge is also called practitioner knowledge. Health care professionals in this capacity possess both explicit and tacit knowledge. However, some may consider the most important type of knowledge of providers is of tacit form. Years of experience with numerous patients' help, Health care professionals develop an internal knowledge base of symptoms and facts about patients and diseased conditions that are used in addressing needs for preventative maintenance and illnesses (20).

B. Patient Knowledge

On the other side of the medical spectrum, it consists of tacit knowledge in patients. This type of information is considered ―health status. Patients own complex knowledge in current and past medical conditions that, Health care professionals may not know about. However, such knowledge is vital for, Health care professionals to know, especially when it comes to the diagnoses and prescription treatments for illnesses (20).

C. Organizational Knowledge

Medical institutions consist of other knowledge-based resources that are available for patients and doctors to access. This domain of knowledge can be comprised of a variety of knowledge from medical diagnostic systems, text-based materials, and other, Health care professionals with medical specialties. Moreover, this domain could contain medical land treatment process

knowledge that is recommended by an institution or medical society (e.g., American Medical Association) (20).

2.4 Conceptual framework

A conceptual framework is a theoretical structure of assumptions, principles, and rules that holds together the ideas comprising a broad concept. It is a system of concepts assumptions, expectations, beliefs and theories that supports and informs to design a research method. It is used to make conceptual distinctions and organize ideas (23).

The "Design Process" is the use of design technique to solve a problem. Which design process is appropriate will depend on the type of problem and contextual factors affecting knowledge flow in the nursing process.

However, this seems to be an under-theorized subject as the design literature appears to lack Meta design models to explain how design processes fit particular problems or circumstances. Therefore while it is important for successful design to know the needs and constraints, knowing the context is also crucial (32).

In this project we are going to see about the knowledge models and the Knowledge acquisition techniques, the comparison of current knowledge acquisition techniques would help to choose the feasible technique which meets our needs (28).

Nonaka proposed the **SECI model** for organizational knowledge creation and sharing with four conversions dimensions between explicit knowledge and tacit knowledge show in figure 2.1 (22, 28).

- Socialization (tacit to tacit): is sharing tacit knowledge through face-to-face communication or shared experience. An example is an apprenticeship.
- Externalization (tacit to explicit): is developing concepts, which embed the combined tacit knowledge, and which enable its communication.
- Combination (explicit to explicit): is combination of various elements of explicit knowledge. An example is building a prototype.

- Internalization (explicit to tacit): is closely linked to learning by doing. The explicit knowledge becomes part of the individual's knowledge base (e.g. mental model) and becomes an asset for the organization (22).

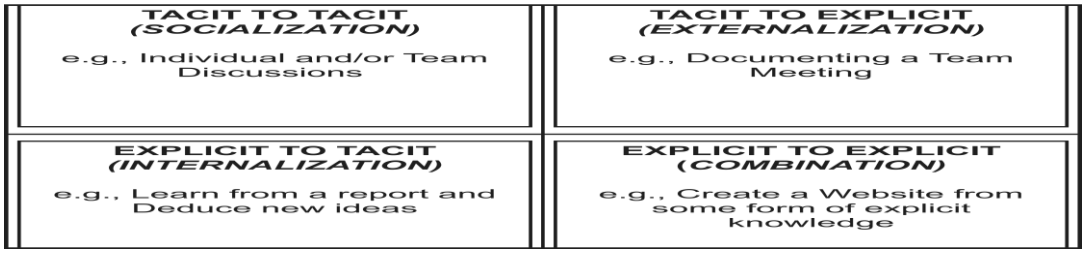


Figure 2.1 SECL model for organizational knowledge creation conversions

Knowledge Flow and Its Elements

According to Hal. Zhuge (21) knowledge flow (KF) is "A process of knowledge passing between people or knowledge processing mechanism." Knowledge flow is a prerequisite and precondition for the application of knowledge (the ultimate goal of the KM). Since the only knowledge that is actively processed in the mind of an individual can be useful, the research on knowledge flow receives more and more attention. According to above definition Knowledge flow consists of four key elements, as shown in figure 2.2 below

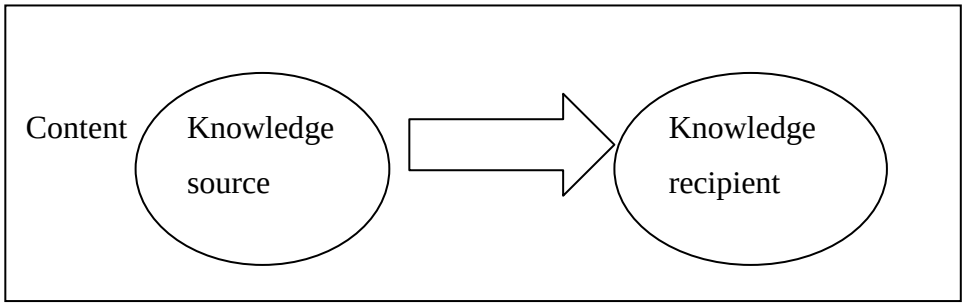


Figure 2.2 Key elements of knowledge flow

Knowledge nodes: knowledge sources (senders) together with recipients (customers) form the first element, namely Knowledge Nodes (KNs). A KN is possibly corresponded to a team member or an agent that is able to create process and deliver knowledge. Senders and recipients

of knowledge are also identified the direction of knowledge flows. In other words, the flow of knowledge can be the result of a knowledge source's trigger that is called Push strategy. Also, it can be prompted by a request for knowledge from the recipient that is called Pull strategy **(22).**

- **Knowledge:** The central element is knowledge that indicates the specific and sharable knowledge contents (22).
- **Carrier:** A carrier is the media that passes the knowledge content (21, 22). For instance, carriers can be based on local network, Internet or even magnetic tapes.
- **Context:** context represents the application environment wherein knowledge flow takes place.

Knowledge flow without a common shared context between KNs cannot occur. In other words, it is necessary that both the source and the recipient share a common understanding of knowledge for a successful knowledge flow.

2.5 Nursing

Nursing is a profession that ensures the successful implementation of interventions that welcome and nurture life, promotes or restores health, enables the means to a peaceful, dignified and pain-free death (8).

Nursing care delivery has changed tremendously in the last two decades. Hospitals from the 1970s to the 1990s functioned in a fragmented system that increased nurse frustration, job dissatisfaction, and an exodus from nursing (5). Nurses left the bedside because of obstacles to providing care, such as lack of supplies, lack of ability to advocate for patients, and lack of participation in developing care plans.

As the science of nursing builds its knowledge base, professional frameworks and models of care are used to guide practice. Practice models, as a blend of professional behaviors and clinical leader-ship, are a foundation that allows for mutual goal setting and facilitates the prioritization of patient care by the entire healthcare team (5).

The nursing process is one of Provider knowledge defines as the problem-solving method used in nursing practice. Its holistic perspective serves as a tool for evaluating and improving care. In addition, it helps avoid duplications and omissions while contributing to comprehensive and consistent care (6, 8)**.**

The nursing process also provides a means for evaluating the quality of nursing care given by nurses and assures their accountability and responsibility to the client/patient. In order to use the nursing process effectively, nurses need to understand and apply appropriate concept and theories from nursing, from the biological, physical, and behavioral sciences, and from the humanities, in order to provide a rationale for decision making, judgments, interpersonal relationships, and actions. These concepts and theories provide the framework for nursing care (6, 9).

2.5.1. Elements of the nursing process

As depicted in figure 2.3 the nursing process has four basic elements such as assessment and diagnosis, planning, implementation and evaluation.



Figure 2.3 Elements of the nursing process

Assessment is the systematic collection and analysis of data culminating in a nursing diagnosis. Assessment is the initial phase of the nursing process. It is a continuous aspect of the nursing process and involves collaboration with patients, caregivers, and healthcare providers who contribute to the patients' care. Conclusions are drawn regarding patients' needs, problems, concerns, or human responses (6, 7,8and9).

The planning component of the nursing process involves the establishment of intervention strategies. In the planning process, it is necessary that all interventions include outcomes (criteria

for evaluation) and a time frame for achievement. The third phase of the nursing process is implementation, the execution and completion of nursing strategies identified in the planning phase (6, 7,8and9).

Implementation requires communication of the plan to all participants involved in the patient's care, including the patient and family.

Evaluation is the final, ongoing phase of the nursing process that documents both the patient responses and the extent to which the expected outcomes have been achieved. The nurse assesses the patient's progress using expected outcomes as criteria for evaluation (6, 7,8and9)

2.5.2. Benefits of the Nursing Process

As noted by Federal Ministry of Health of Ethiopia (9) the nursing process has the following benefits

- Speed up diagnosis and treatment of actual and potential health problems, reducing the incidence of hospital stays
- Has precise documentation that improve communication, to prevent errors, omissions, and unnecessary repetitions
- Promotes flexibility and independent thinking
- Tailors interventions for the individual (not just the disease)
- Helps nurses to gain satisfaction of getting results. (9)

2.5. 3 Tuberculosis treatment and nursing

Tuberculosis (TB) is a bacterial infection spread through inhaling tiny droplets from the coughs or sneezes of a person who has infectious pulmonary TB. It is a serious condition, but can be cured with proper treatment. People with TB require a course of four, then two, antibiotics over a six-month period. There are forms of TB which are resistant to some of the first-line antibiotics. If infected with a drug-resistant form of TB, treatment can last up to two years. TB often affects the lungs. However, it can affect any part of the body. It is normally only infectious to other

people if the person has Pulmonary TB, and normally once a person has been on treatment for two weeks they are no longer infectious (33). TB is caused by a bacterium called Mycobacterium tuberculosis.

Tuberculosis is among the major contributors to global burden of diseases and has received considerable attention in recent years, particularly in low and middle income countries (8, 33, and 34).

Nationally, TB is among the top causes of morbidity and mortality. According to the 2007 WHO estimates, the incidence of TB of all forms and smear-positive TB stand at 341 and 152 per 100,000 populations, respectively. The prevalence and mortality of tuberculosis of all forms is estimated to be 546 and 73 per 100,000 populations, respectively. In the year 2006/07, Ethiopia registered 129,743 cases of TB. According to latest estimates, Ethiopia stands seventh in the list of 22 high burden countries for tuberculosis. According to the ministry of health hospital statistics data, tuberculosis is the leading cause of morbidity, the third cause of hospital admissions (after deliveries and malaria), and the second cause of death in Ethiopia after malaria (34)

The main reasons for the increase of the global burden of TB are the following: inadequate health services, improper management practices resulting in poor case detection, diagnosis and treatment, demographic changes: increasing world population changing age structure, and impact of the HIV as a pandemic disease (7)

Treatment failure may occur due to poor compliance of the patient or to practitioner errors, irregularity and loss to follow up resulted from the fragmentation and inconsistency of the provided service that lead to MDR TB is a man-made phenomenon and arises due to inadequate treatment of drug-sensitive TB (34).

Nurses play a crucial role in tuberculosis control program (7). The International Council of Nursing (ICN) believes that nurses are in a position to advocate for strong tuberculosis control programs and to implement the elements of direct observation short course therapy (DOTS) (6). The nurse who can best assure that each patient successfully complete treatment, the main principle of nursing intervention is the integrated organization of multiple activities to achieve

specific outcomes for patients. The nursing intervention requires a system of recommendation that improving performance and support the quality of health services (7, 9, and 15).

2.6 Factor affecting the knowledge flow in nursing care

Knowledge is managed by means of organizational learning processes the individual learning process requires from management the comprehension of positive and negative feelings of employees, the team learning process requires the mixing, interpretation and integration of individual knowledge and beliefs into shared collective systems (35).

A number of factors impact employees' perceptions of a knowledge flow nursing care**.** The identified factors can be broadly categorized into five groups: Knowledge management related factor, Professional related factor, technological factors organizational factor, and Patient related factor (21).

2.6.1 Knowledge management related factors

Knowledge management is the process of continually managing tacit and explicit knowledge of all kinds to meet existing and emerging needs, to identify and exploit existing and acquired knowledge assets and to develop new opportunities there is a need to define knowledge management as the generation, representation, storage, sharing, transformation, application, embedding, and protecting of organizational knowledge.

Knowledge Capture

Knowledge Capture involves tacit and explicit knowledge. Tacit knowledge is knowledge acquired by professionals over time, and explicit knowledge is best practice and business process digitized in medical documents, reports, books and records.

This involves the capture or retrieval of the medical tacit and explicit knowledge generated during diagnoses, surgeries and prescribed treatment conducted by visiting doctors (21).

Knowledge storages

The ability of providing a centralized repository for Knowledge storage**,** for example public library and a data base of related information about a particular subject (23).

Knowledge use

The process of getting Knowledge utilized for a particular purpose; this occurs, when Knowledge is put in to action for decision making or policy making (23).

Knowledge transfer

Critical factor in the process of knowledge transfer is the recipients' absorptive capacity which is explained as their ability to value, assimilate and apply new knowledge (10) and also sharing knowledge step concerns the diffusion of knowledge and collaboration among co-workers, resulting from transfer and dissemination of best practices. Knowledge sharing is accomplished by different means such as training, intranet, groupware, extranets, communities of practice, benchmarking and cross-functional teams (35).

2.6.2 Professional related factor

Professional related factor is some of the barriers identified by (36) are general lack of time to share knowledge, apprehension of fear for job security, low awareness on the benefits of Knowledge manage, differences in experience level, lack of contact time and interaction, poor verbal and interpersonal skills, age differences, gender differences, lack of social network, difference in education levels, lack of trust in people, fear of not receiving recognition, lack of trust in knowledge source accuracy and cultural differences**.**

Level of knowledge and lack of knowledge were among those factors affecting nursing process implementation (5)

Job satisfaction

The feeling of pleasure and achievement which you experience in your job when you know that your work is worth doing, or the degree to which your work gives you this feeling .Many people are more interested in job satisfaction than in earning large amounts of money(10).

Knowledge Attitude Practice

It is difficult to bring significant improvement in nursing care if nurses don't use nursing process to assess, plan, implement, and evaluate clinical conditions of the client. Moreover, malpractice of nursing process will affect quality of nursing care as a result of different factors (5, 18 and 37,)

2.6.3. Information technology factor

Communication technologies and information systems are affecting in a significant way the processes of generation, diffusion and storing of organizational knowledge (35). Tirualem (35) highlighted that like technology barriers include

- lack of integration of IT systems processes
- lack of technical support
- lack of maintenance of integrated IT systems, people's unrealistic expectation on IT
- lack of compatibility between diverse IT systems processes, restriction due to mismatch between need requirements and IT system, people's reluctance to use IT systems
- Lack of training for familiarization of IT systems and processes.

2.6.4. Organizational factor

Organization related factors include as listed below.

Organization's culture and structure

Organization's culture affects the ability of its members to retrieve and store information, and ability to absorb and share knowledge (absorptive capacity) and also organizational structure influences Knowledge flow. A flexible organizational structure encourages knowledge sharing and collaboration across boundaries within the organization, while a rigid structure often has the unintended consequence of inhibiting such practices (10, 21)

Reward and recognition

Reward and recognition is the pro achievement provision of tangible or intangible incentives. Motivation and Rewards Motivation has been recognized as an important trigger for transferring and acquiring knowledge. motivation and incentive systems should be structured so that individuals are motivated and rewarded for taking the time to acquire and utilize new knowledge and share it with others (38) And also Lack of a transparent reward and recognition systems that would motivate people to snare more of their knowledge as potential organizational is barrier to sharing and acquiring knowledge (39).

Opportunity of training and development

This is also called knowledge development consists of all the management activities intended to produce new internal and external knowledge on both the individual and the collective level. There for, to maximize the effectiveness of training and development, organizations must constantly assess their employees current training development needs and prepare employees for the next position (39).

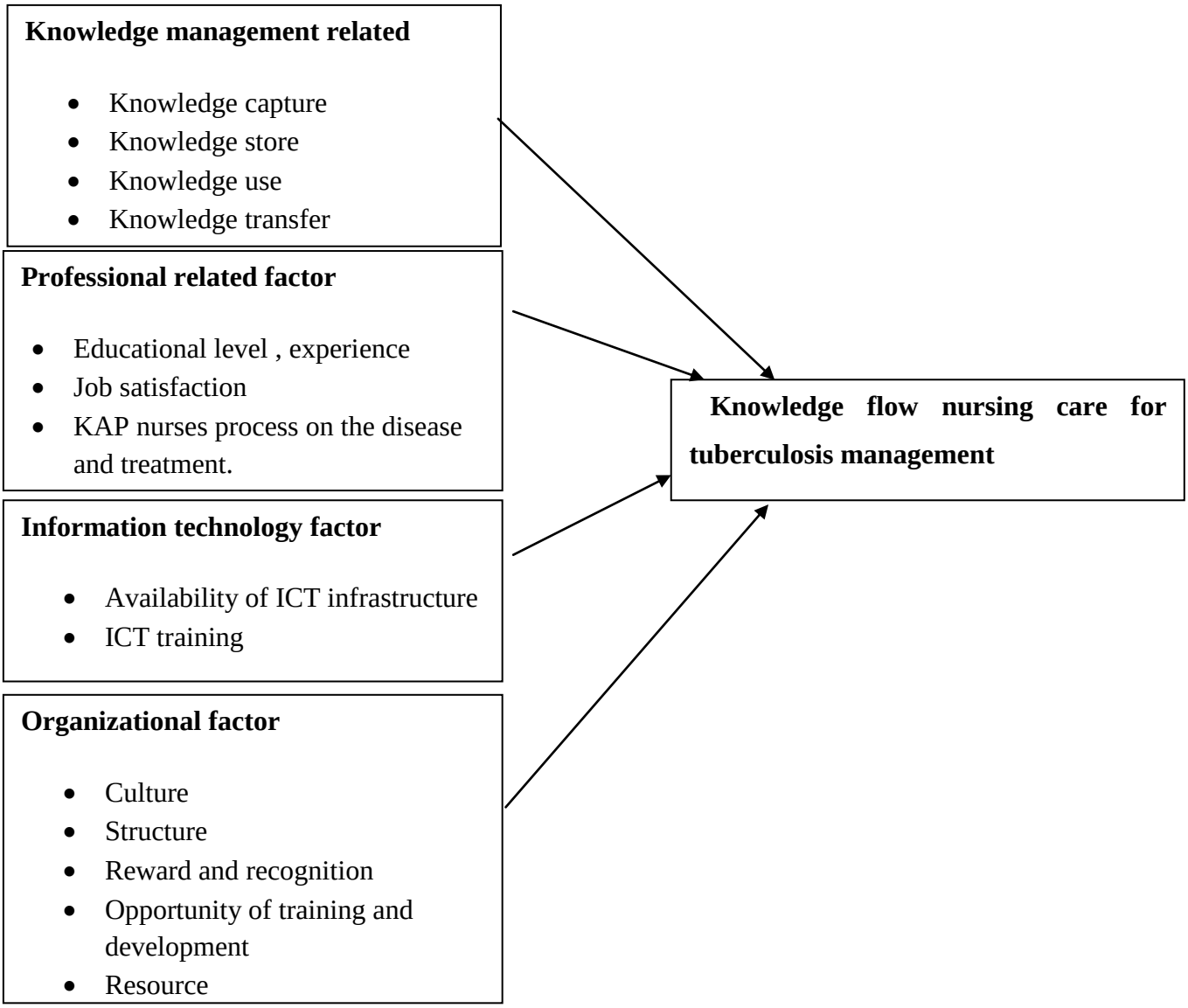
Organization Resource

Nurses shoulder much of the responsibility when care falls short of standards, whether because of resource allocation (e.g., workforce shortages and lack of needed medical equipment) or lack of appropriate policies and standards (14).

2.6.5. Patient related factor

Patient related factors Affecting the Implementation of Nursing Process be caused of Poor understanding of the principle of nursing process, poor patient economic status to implement designed nursing care plan, it need hospital stay and need of follow up and are patent related factors in implementation of nursing process (56). But in this study Patient related factor not included be caused of the study more focused on factor affecting implementation of NP health provider said.

2.7. Conceptual framework



According to Olaolorun, Ifeoluwatayo the study done a title of A Conceptual Framework for Community Pediatrics Using Knowledge Management said that the framework provides a conceptualization of knowledge management for the health setting. It initially defines knowledge as information combined with experience, context, interpretation, and reflection. The knowledge source may be explicit or tacit depending on where it is (39). Each core KM concept is expanded into the following sub concepts:

- **Knowledge production** has two parts: creation of knowledge through collection, generation, synthesis, and identification; and organization through codification, storage, packaging, and coordination.
- **Knowledge use** consists of distribution, sharing, application, and integration.
- **Knowledge refinement** consists of evaluation, reflection, adaptation, and sustainability
- **Social context** refers to the underlying structures, values, and preferences of individuals and organizations.

Introducing knowledge flow concepts to service design and provide a theoretical foundation for recent attempts of moving from "best practice" to "best process". Eva-Maria identified three types of knowledge, content, methods and context, needed for the Design Process, their flow characteristics both in terms of speed and range, as well as their modes of transmission. The three knowledge components for services can be found in existing service design approaches. However, usually these do not consider the implications of the different nature of the components (32).

Knowledge flows include four critical behaviors; those through which knowledge becomes available to the organization (acquisition), those involved in retaining that knowledge, the transfer of knowledge within the organization, and it use in (32).

A general architecture of knowledge flow management system is proposed by study (41). The system organizes the knowledge flow network using workflow process patterns and the distribution of the knowledge energy in the team, passes knowledge from node to node, collects knowledge, processes data and case documents, tracks the contribution and use of knowledge, and assesses node energies.

A case study conducted in a large public hospital in Thailand (42) on knowledge management practices and healthcare delivery. They followed a contingency framework and used personal interviews, document reviews and observation as data collection method for the case study and identified four primary contingency factors that affect the impact of knowledge management practices on healthcare delivery. These factors include the following. One, physician characteristic such as a Physicians and nurses technical skill, training, experience and a physician's subjective norms have an effect on their knowledge flow and sharing behavior. Two, ailment characteristics which include Ailments, the patients present themselves with, can be characterized in terms of complexity of the symptoms and urgency of treatment. Combinations of these factors lead the healthcare organization making choices towards adoption of knowledge management tools and putting their focus on specific performance measures. Three, Organizational IT infrastructure and finally, Organizational processes such as Implementation of knowledge management in healthcare delivery is dependent on leadership, culture, organizations operating procedures and policies also impact the use of knowledge Management methods and tools. Through literature analysis and a case study, this study concluded by pointing that administrators in healthcare delivery organizations have to be mindful that adoption of KM practices would be dependent on leadership, IT infrastructure (and integration) and supporting policies. As physicians within healthcare delivery organizations normally gain experience through a mentor-apprentice route, an organizational culture that promotes and rewards such behavior would be beneficial (42).

Knowledge of nurses on nursing process

A study conducted in Debre Markos and Finote Selam Hospitals assessed the implementation of nursing process and associated factors among nurses. they identified that most of nurses are highly knowledgeable on nursing process they also noted that nurses with low knowledge was 0.16 times less likely to implement nursing process (37). A study conducted in Bale zone hospitals, South East Ethiopia also related that most of the respondents were highly knowledgeable about the nursing process (17).

In contrast, according to a study conducted by Fisseha in Mekelle zone hospitals 90% of the respondents have scored below 50% on knowledge related questions and all the key informants

indicated that nurses lack knowledge to apply the nursing process. The study identified that knowledge is one of the most determinant factors for application of the nursing process (18).

Perception and attitude towards factors that influence the implementation of nursing process

A study conducted in Mekelle zone hospitals regarding the attitude of nurse to ward nursing process reported the 99.5% had positive attitude toward implementation of nursing process. The study identified that the problem was not related to attitude rather factors implementation of nursing process was mainly related to with knowledge and enabling and reinforcing factors .This is because they believe it qualifies nursing care: it strengths nurse patient relationships: it increase competency of the nurses(18). A study conducted in Bale zone hospitals, South East Ethiopia also noted that above 75 % of the respondents have positive attitudes. All the Nurses who participants interviewed manifested positive attitude regarding the nursing process (17).

Practice of nurses regarding on implementation of nursing process

A study conducted in Debre Markos and Finote Selam Hospitals related that most of nurses were fall from not all practicing to somewhat practicing (37). In contrast finding a study conducted in Mekelle indicated that the nursing process was not applied by following the scientific way in the hospitals. All the respondents reported that they did not apply any of the nursing process steps and in the in depth interview also all participants unanimously stated that the nursing process was not applied in patient care (18). A study conducted in Bale zone hospitals, South East Ethiopia application of steps of nursing process in patient care 78.1% nurses believed that nursing assessment/ data collection carried out in the ward, they were systematically identified nursing problems: 88.4% indicated they identified actual and risk nursing problems/ nursing diagnosis, 81.1% reported that nursing intervention were identified and documented in care plan, 60.5% nurses reported they usually re-assessed patients each time they carried out any patient care and 74.7% nurses reported they usually carried out a systematic evaluation of the effectiveness of care given and that it was documented either on the care plan or in the progress notes(17).

The study done at Addis Ababa on organizational and patient related factors in implementation of nursing process these factor include working overtime , working without payment, misconduct, high flow of patient, knowledge error, conflicting roles, high employee turnover and less recognition, unsympathetic manager, in a disorganized organizational structure, early discharge and poor participation of patients associated with professional (l5).

So, for facilitating the nursing process there is a need to facilitate seamless flow of knowledge among nurses in the nursing process. Accordingly, this study attempts to design a knowledge management blueprint that could enable to improve the flow of knowledge for nursing care in tuberculosis management.

CHAPTER THREE

METHODOLOGY

3.1 Study Design

Quantitative study with cross sectional study design was conducted. Conducting research used to quantitative but adds qualitative approach be caused that would have been missed if only a qualitative and gives superior evidence of the result. Cross sectional study design was selected because the researcher can collect all the needed data at single point in time; it's cheaper and can be conducted with limited time period than longitudinal studies (10).

3.2 Study Area

The study was conducted in St. Peter's and Alert hospitals. St. Peter's TB Specialized Hospital is found high in the mountain of Entoto, North of the Ethiopia capital, Addis Ababa and Alert hospital at All Africa Leprosy, TB rehabilitation and training center Alert hospital which is located in Kolfe Keranio Kifle Ketema. Both of the hospitals are under the authority of Ministry of Health (MOH) and selected criteria of These Hospitals is based on the general service they provide as a referral center of TB and MDR-TB patients, center of excellence training and Research site about TB treatment.

3.3 Source and study Populations

The source population is all nurses in Addis Abeba health institutions hospital, health center, clinics that are governmental and private owned. Since the source population is relatively small conducted by including all nurse professionals (degree and diploma graduate) that are working in the ward at St. Peter and Alert hospitals except Midwifery's, Anesthetist nurses and ophthalmic nurses. In-depth interview was selected for the qualitative study. Participants for in-depth interview was selected by using judgmental sampling technique nurses, who included Matron, head nurses of TB and MDR ward are used it is the only viable sampling technique in obtaining information from very specific group of people.

3.3.1 Inclusive Criteria

- All diploma clinical nurses and BSc Nurses with more than 6 months of working experience after completion of education.
- Nurses who was working at Hospitals available during the study period and willing to participate in the study.

3.3.2 Exclusive Criteria

- Nurses served less than six months
- Nurses who were not available due to sick leave, temporary reassignment, annual leave; free service workers, and
- Those who were decided to exercise their right not to participate in the study
- Midwifery's, Anesthetist nurses and ophthalmic nurses.

3.4 Sampling Procedure and Sample Size Determination

For quantitative study simple random sampling method is used to select participants and purposive sampling method was used for qualitative method. For quantitative study all nurses in St. Peter and Alert hospitals who were included in the study is taken from the respective coordinator of nursing unit and head nurse, then the selection of199 study participants was performed. Sampling was performed by all nurses in two hospitals of St. Peter and Alert hospitals by calculating proportion to the total numbers of nurses in each hospital. These Hospitals were purposively selected based on the general service and tuberculosis an MDRTB patient referral site and also research and training area they have been provided and their number of nurses for study area. Simple random sampling method was used to select the participants. According to the data obtained from the two hospitals there are a total of 341 available in the study populations. The overall minimum sample size was determined using single population Proportion calculation formula (55).

$$n = \frac{(z\propto\backslash 2)^2\ \mathrm{p}(1-\mathrm{p})\ ^k}{d^2}$$

Where **n** is minimum sample size required for the study, **Z** is standard normal distribution (Z=1.96), with confidence interval of 95% and **α** =0.05**, P** is prevalence/ population proportion (p=0.5), **d** is a tolerable margin of error (d=0.05)

$ni =$ 1.96(1.96) (0.5(1-0.5))/0.05(0.05) = 384.16 => $ni =$384 since the study population both St. Peter and Alert hospitals except Midwifery's, Anesthetist nurses and ophthalmic nurses are 341 which was less than 10,000. This calculated result was more than the total population we had in the study area. To get sample from the total population we used correction formula. The exact sample size therefore was calculated as follows (55).

$$Nf = \frac{ni*N}{ni+N}$$

Where $ni =$calculated sample size $Nf =$exact sample size, $N =$ sample population

$Nf =$ (384x341)/ (384+341) =130944/725=181 = 181+10% none response rate = 181+18 =199

The sample size for the Quantitative study is 199 that means from nurse professional (degree and diploma graduate) of that are working at St. Peter and Alert hospitals except Midwifery's, Anesthetist nurses and ophthalmic nurses be caused of the source population is relatively small.

For these hospitals to proportionate the number of study subject using

St. Peter TB specialized hospital = $\frac{Nf*N\ eachhospital}{Total\ N}$ = (199x91)/341 = 53

Alert hospital = (199x250)/341 = 146 Total of 199.

In-depth interview was selected for the qualitative study. Participants for in-depth interview was selected by using judgmental sampling technique nurses, who included Matron, head nurses of

TB and MDR ward are used finally developing blueprint of managing knowledge flow for tuberculosis management.

3.5 Data collection techniques

3.5.1 Quantitative Method

The structured questionnaire was distributed and collected by four data collectors, two of them are BSC nurses and two diploma nurses. Prior to data collection one day training was given for data collectors on how to collect the data and other related procedures, and during the data collection continuous follow up and supervision was made by principal investigator throughout the data collection.

3.5.2 Qualitative Method

To conduct the Qualitative study in-depth interview method was selected. In-depth interview is the Major data collection for constricting the blueprint of managing knowledge for improving nursing care on tuberculosis management it was conducted with head nurses by using face to face interview method. Principal investigator conducted the in-depth interview. List of open ended semi-structured and structured questionnaire was prepared (see annex) and during the interview there was note taker and tape recorder to capture the information given by the participant and the interview was conducted in Amharic for ease of communication and the transcripts was later translate in to English by principal investigator and finally was summarized for writing up.

3.6 variables

The study guided by a conceptual framework with the following dependent and independent variables**.**

Dependent variable; Knowledge flow

Independent variables

- ✓ Knowledge management system

- ✓ Professional related factor
- ✓ Organization factor
- ✓ Information technology

3.7 Data Quality Management

To ensure the quality of data, Training was given to data collectors for one day about the content of the questionnaire and Not leading type of Questionnaire was used and also The Pre-test was carried out on 10% of sample size in St. Peter and Alert hospitals one week before actual data collection and modifications or taken according to the findings. On the days of data collection, the principal investigator and supervisor was monitoring the data collection process by checking for completeness of the data. Data were checked again for completeness before data entry and during data cleaning process. Structure and Open ended Questionnaire was used. Problem encountered at the time of data collection reported and appropriate action will be done.

3.8 Data analysis

Analysis was done by using Quantitative the data is initially entered and cleaned using SPSS software version 20 .Univariate analyses is used to describe the study participants. Bivariate analysis is used to assess the association between dependent variable and independent variables. Multivariate analysis was used to examine the relationship between multiple independent variables and dependent variable.

Analysis of Qualitative study was done by using thematic analysis that means data was analyze by theme which is highly inductive.

3.9 Ethical consideration

Prior to data collection appropriate ethical clearance was taken from ethical committee of the School of Public Health, Addis Ababa University. Further, concerned administrative bodies of the hospital under the study will be informed about the study and formal letter was obtained.

During data collection, each respondent was informed about the purpose, scope and expected outcome of the project and appropriate informed written consent was taken from the

respondents. Anyone who is not willing to participate was excluded from the study and during the interview, respondents who is interested to avoid specific question or discontinue the interview will be allowed to do so.

3.10 Dissemination of the result

The positive or negative finding, the final conclusions and the constructed blueprint for improving nursing care to manage tuberculosis patient are given to these hospitals administrative, responsible person and to the library of St. Peter , Alert hospitals and Addis Ababa university to available for all participants.

3.11 Operational Definition

Medical knowledge Identification ;This involves tacit knowledge which is acquired knowledge of medical professionals over time, and explicit knowledge which is digitized in medical documents, reports, books and records(40).

Knowledge flow: - is the passing of knowledge between nodes according to certain rules and principles.

Blueprint:-a plan of action or a guide to doing something

Knowledge Management is viewed as a way of providing the right information of nursing process and knowledge about nursing process.

Tacit Knowledge: - is Knowledge that people carry in their heads. This knowledge often provides context for ideas, experiences, people, and places and is not easily captured

Explicit knowledge:-is what is recorded; easily identified, articulated, shared.

Professionals: - nurses who somebody whose occupation requires extensive education or specialized training.

Nursing: - is the diagnosis and treatment of human responses to actual or potential health problems.

Nursing process: - is the process of doing care based on assessment, diagnosis, plan, implementation, and evaluation.

Year of Experience: Number of year nurses has worked in nursing only**.**

Job satisfaction is the degree to which an individual is satisfied with his/her own daily work (10).

Knowledgeable Nurses: awareness about nursing process. Good knowledgeable nurses were those answered more than 50% of the questions, poor knowledgeable group were those scored <50%.

Attitude of nurses': is the perception towards implementation of nursing process**.** Those nurses were scored average questions of practice, i .e. nurses those were scored > 10 out of 20.

Practice of nursing process: application of nursing process in the patient care. Applied/ implemented NP: Nurses those were scored above average questions of practice, i .e. nurses those were scored > 10 out of 20.

Organizational factors: Hospital issues/ authority including policy, manpower development, material resource, structure and facilities, etc that affect the implementation of nursing process

Information communication technology is the degree to which employees actively use ICT and the presence of ICT infrastructure, experts and training within the hospital

Operational definition measurements

Knowledge capture was measured by three close ended questions and the response option was chose one answer.

Knowledge store was measured by two close ended questions and the response option was chose one answer.

Knowledge use was measured by two close ended questions and the response option was chose one answer.

Knowledge transfer was measured by three close ended questions and the response option was likert scale ranging from strongly disagree to strongly agree.

Job satisfaction was measured by one close ended question and the response option was likert scale ranging from strongly disagree to strongly agree.

Information communication factor was measured by four close ended questions and the response of each questions was likert scale ranging from strongly disagree to disagree.

Organizational cultures was measured by three close ended questions and the response of each question was likert scale ranging from strongly disagree to disagree.

Organizational structure was measured by five close ended questions and the response of each question was likert scale ranging from strongly disagree to disagree.

Organizational resources was measured by three close ended questions and the response of each question was likert scale ranging from strongly disagree to disagree.

Reward and recognition was measured by Five close ended questions and the response of each question was likert scale ranging from strongly disagree to disagree.

Opportunity of training and development was measured by four close ended questions and the response of each question was likert scale ranging from strongly disagree to disagree.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETION

In this study both quantitative and qualitative data collection methods have been employed.

4.1. Result of Qualitative Study

A total of 5 key informants drawn from department heads of tuberculosis ward, MDR ward, marten of both St Peter's TB and Alert hospitals. The data collected from interviewees was summarizes thematically by the core ideas they have responded.

1. **What is the term "knowledge of nursing care (process) to you?**

Nursing process is an organized sequence of problem solving steps used to identify and to manage the health problems of clients. But most participants do not define nursing process properly. And also most of the nurses have listed nursing process steps incorrectly. They fall to mention types of nursing Assessment and type of nursing diagnosis.

2. **What specific nursing process do you provide to your tuberculosis patients?**

For this question most participants explained that there was not specific nursing care provided to their tuberculosis patients. In their hospitals, is nursing process was mostly implemented in ward for tuberculosis patient starting from assessment by asking demography data, by taking a baseline data about the manifestation of the diseased, vital signs ,anthropometric measurements from new admission patient. And they use practical doing in both hospitals .Nurses might continue to intervene in standardized nursing procedures on the basis of medical diagnoses rather than a rational based on nursing assessment ,diagnoses, planning , implementation, evaluating system different way one nurses to other, because one participant said that "*I asserted that there was knowledge gap among different categories of nurses "*.

3. **What challenges do you encounter when implementing Nursing Process for tuberculosis patients (in terms of facilities, human resources, communication channel, attitude, and skill of the staffs and how influential is the challenges?**

The respondents explained that some of the challenges encountering to implement nursing process in the hospitals identified as factors were knowledge gaps among nurses, some nurses didn't attend up to date ICT training, lack of interest by some of nurses due to negligence of nursing process, lack of necessary equipment, lack of regular supervision by hospitals' management, lack of ICT infrastructure for nurses. One participant said that " *there is knowledge gap among different categories of nurses and also Some of the challenges encountering to implement nursing process in our department includes: lack of up to date ICT training and poor inter personal communication , some nurses are concerned only with treatment issue rather than a rational based on nursing assessment ,diagnoses, planning , implementation, evaluating".*

4. **What factors do you think are important in order to implement it properly?**

Most of the participants said that, ICT training must also be given to all nurses working tuberculosis treatment ward; strong supervision provided with checklist should be maintained. As much as possible the organization should enhance nurses' interest by providing them with incentive like ICT training education promotions. The hospital administration also should fulfill the necessary ICT infrastructure or equipment, continuous access of internet in the organization. This is important for nurses as motivation. These challenges can be addressed by providing through employing more nurses work based on standards.

5. **Do you find them willing improve knowledge flow of nursing care in tuberculosis management by addressing the challenges /factors?**

The participants agreed that all challenges /factors addressed by the organization improve knowledge flow of nursing care in tuberculosis management. One participant said that "According to my view, in the hospitals some measures should be undertaken by hospital management.

Firstly, there should be regular supervision, monitoring and evaluation on the implementation of nursing process. Secondly, nursing process in the hospital should be given with continuous ICT training to all nurses. Thirdly, the hospital administrator or management staffs should develop reward and motivation mechanism like internet accesses, develop knowledge portal and also fulfill necessary ICT material or equipment ,open discussion mechanism or inter personal

communication .It is important to apply nursing care and also develop IT based information system for nurses to tuberculosis management."

4.2 Quantitative study

4.2 1 Demographic Profile of the Respondents

Out of the 199 questionnaires distributed among the study populations 174 were filled completely and returned making the response rate 87 %. The majorities of respondents were from alert hospital 126(72%), and st peter hospital 48 (28%).

Table 4.1 socio-demographic characteristics of respondents in St. Peter's TB Specialized Hospital and (AHRI/ALERT) hospital, 2017, Addis Ababa, Ethiopia, n=174 **.**

Demographic	Characteristics	No	Percentage
Sex	Male	64	36.8
	Female	110	63.2
Age	19-29	135	77.6
	30-39	25	14.3
	40-49	10	5.8
	50-59	5	2.8
	Mean	28.08	
	Std. Deviation	7.049	
Educational level	Diploma	53	30.5
	Degree	116	66.7
	Master	5	2.9
Religious	Orthodox	118	67.8
	Muslim	20	11.5
	Protestant	32	18.4
	Catholic	3	1.7
	Other	1	0.6
Marital status	Married	69	39.7
	Single	97	55.7
	Widowed/separated	8	4.6

Percentage distribution of respondent 53 (30 %) of the respondents were diploma nurses, 116(67%) degree and 5(3%) are master.

As it is depicted in table 4.1 most of them were females (63.2%). And less of them were male (36.8%). Most of the respondents (77.6%) fall in the age group of 19 to 29, 14.3% of the respondent fall in the age group of 30-39, 5.8% of the respondents fall in the age group of40-49 and 2.8 % of the respondents' five out of the total respondents fall in the age group of 50 to 59. The mean age of the respondents is 28. 08 years as shown in the following table.

As it is depicted in table 4.1 most of the respondents are Orthodox in religion (67.8%) and single in marital status (55.7%).

4.2.2 Knowledge Management Practice of Study Participants

Assessing knowledge flow of nursing care in tuberculosis management practice of study participants helps in determining the states of knowledge flow in the hospital and also helps in proposing a way to improve the knowledge flow of nursing care in tuberculosis management practice. The result of the study shows that 144 (83%) participant said improving knowledge flow of nursing care will improve TB management.

Knowledge capture mechanisms

Table 4.2 summarize of Knowledge capture mechanisms in St. Peter's and Alert hospital, 2017, Addis Ababa, Ethiopia, n=174

Knowledge capture mechanisms		Response of study participants	
		Yes	(%)
Face to Face communication		114	65%
Computer		10	6%
Internet/intranet		17	10%
Phone		1	1%
Type of knowledge	Tacit	59	34%
	Explicit	92	53%
	I don't know	23	13%

Nurses using knowledge capture mechanisms such as face to face communication, computer, internet phone, and tacit or explicit knowledge enhance the capture of knowledge. Unless these mechanisms are available within the hospital, 34% of nurses knowledge capture mechanism for

tuberculosis management was tacit type of knowledge and also way of communication was 65% face to face be able to practice knowledge capture.

Knowledge store

Documenting of working practice facilitates knowledge flow of clinical data and procedures among nurses. The finding of the result shows that majority of the respondent's 82 % document their working practice and procedures whereas 18 % respondents do not document their working practice. Among those respondents who document their working practice 60 % use writing manual such as patient chart for documentation.

Knowledge use

Concerning knowledge use 21% of nurse's access knowledge for tuberculosis management and the other 79% of nurses are not accesses knowledge. From nurses who accesses knowledge the mechanism of accesses are 54% of respondent from written document and 41% of respondent knowledge from internet.

Knowledge transfer

While 31% of nurses transfer knowledge after training or work shop offered, 50% of nurses are not transfer knowledge after training or work shop offered be caused if there is no interested to transfer knowledge by different reason like low or very low motivated and Also there is 55 % of nurses answer strongly agree or agree concerning not gain new idea by sharing knowledge.

Generally nurses have poor knowledge management practice during implementation of nursing process in tuberculosis management.

4.2.3 Professionals Related Factors Affecting Nursing Process

Educational Level and Experience

Adequate education levels are critical to apply and implement nursing process and also important to participate for improved knowledge flow in nursing care. The finding of the result shows that majority of the respondent's education level is adequate to apply and implement nursing process

with 88 % and also 82% strongly agree or agree educational level and experience of nurses result in different outcomes for tuberculosis management

Job Satisfaction

Employees should be satisfied with their job in order to improve knowledge flow in nursing care. So if employees are satisfied with their daily job, they will be involved in knowledge to improve knowledge flow in nursing care practice. The result of the study shows that 47 % of the respondents are not satisfied with their current job due to lack of attractive salary43% and 29% due to lack of rewarded and recognition system for achievement of nursing care.

Knowledge Assessment of Nurses

Table 1.3 Shows the result regarding knowledge assessment of nurses in St. Peter's and Alert hospital, 2017,Addis Ababa, Ethiopia, n=174

Characteristic			Response of nurse		NO	%
1	Know the first steps of nursing process		Yes		146	83%
			No		28	17%
2	Recognized the difference between nursing approach and medical approach		Yes		108	62%
			No		66	38%
3	Identified activities to be performed in planning phase of nursing process		Yes		69	39%
			No		105	61%
4	Recognized the role of nurse in implementation phase of nursing process		Yes		73	42%
			No		101	58%
5	Recognized the component of evaluation phase of nursing process		Yes		14	8%
			No		160	92%
6	Identified the first steps of nursing diagnosis		Yes		95	54%
			N0		79	46%
7	Mentioned the steps of nursing process in order		Yes		166	95%
			No		8	5%
8	Listed the types/ number of nursing Assessment	Initial assessment	Yes		37	21%
			No		137	79%
		Focused	Yes		29	17%
			No		145	83%
		Emergency assessment	Yes		35	20%
			No		139	80%
		Time lisped assessment	Yes		1	.6%
			No		173	99.4%

Majority of respondents 166 (95 %) have mentioned steps of nursing process in order while the remaining 8 (5 %) failed to respond to the question the steps nursing process effectively. One hundred and forty six (83%) of respondents have answered correctly-collecting baseline information is the principal activity to be performed in the first phase of nursing process while the remaining 28(17%) have wrongly answered. Nightly five (54.6. %) of respondents have correctly answered as nursing diagnosis for a problem to be manifested in future is potential nursing diagnosis while the remaining 79(46 %) have wrongly answered. One hundred eight (62 %)respondents have chosen the correct answer that the major difference between nursing and medical diagnosis is the focus of nursing diagnosis towards human response than the disease process while 66(38%) of them answered wrongly. Sixty nine (39%) of respondents have chosen the correct answer that was, data base the patient could not be recorded in the planning phase of nursing process where as the remaining 105 (61 %) of respondents have wrongly answered .Seventy three (42%) of respondents correctly answered the implementing the proposed intervention in the planning phase is the expected activity to be performed in the implementation phase of nursing process and 101(58%) have wrongly answered. fourteen (8%) of the respondents knew that nursing diagnosis, collaborative problems, priorities and nursing interventions, and expected outcomes could be guidelines for evaluation of nurses performance in nursing process. The remaining 160 (92%) respondents have wrongly answered.

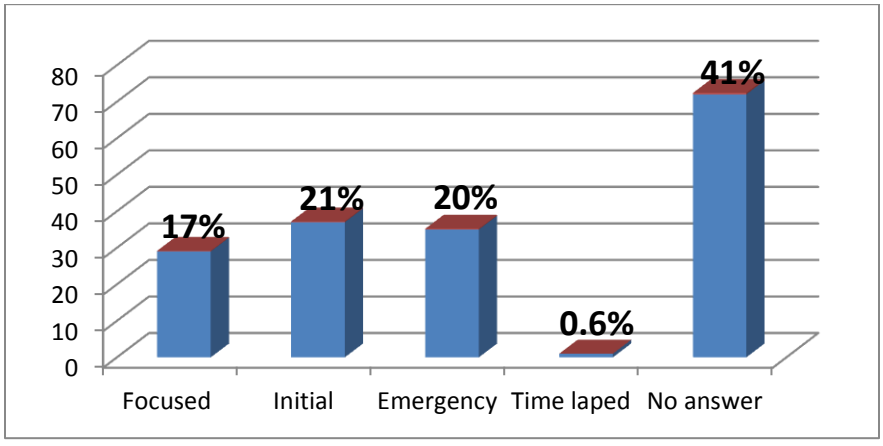


Figure4.1 knowledge about types of nursing assessment of nurses in St. Peter's and Alert hospitals, 2017, Addis Ababa, Ethiopia, n=174.

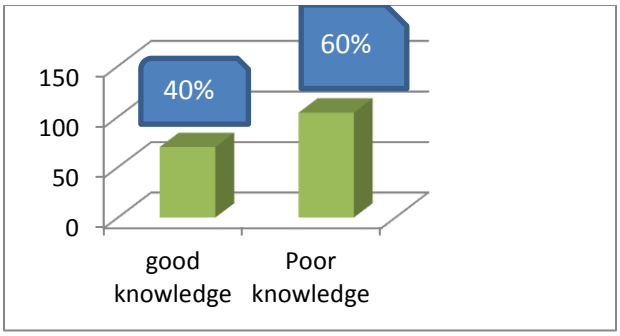


Figure4.2 knowledge of nursing process in St. Peter's and Alert hospitals, 2017, Addis Ababa, Ethiopia, n=174

This study showed that 40% of the respondents good knowledge of nurses about nursing process.

Attitude of Nurses towards Nursing Process

Around 167 (96 %) of the respondents reported that they either strongly agreed or agreed that the aim of the nursing process is appreciable, at same time 151 (86 %) either strongly agreed or agreed that they were convinced that nursing process would work if applied in patient care. One hounded nineteen (68 %) of the respondents showed their disagreement that the nursing process should be used only by BSc and above nurses. One hounded thirty two or 75% of the respondents either strongly agreed or agreed that the nursing process works well in practice. Seventy nine percent of the respondents reported that there were not time constraints to apply the nursing process. Around 89% of the respondents said that the nursing process enables to provide quality nursing care, while 25 % said that pts may not like to be cared for using nursing process. Around 56% of the respondents also either disagreed or strongly disagreed to the statement nurse staffs have no willingness to apply the nursing process. The result of this study has showed that 38% of the respondents had good attitude and the other 62% had poor attitude towards TB management.

Table 4.4 Attitude of the respondents towards the nursing process in St. Peter's and Alert hospitals, 2017, Addis Ababa, Ethiopia, n=174

Variables	Strongly agree		Agree		Neutral		Disagree		Strongly disagree	
	NO	%	NO	%	NO	%	NO	%	NO	%
I like the aim of nursing process	69	39%	98	58%	15	8%	1	1%	1	1%
I'm convinced the NP will if applied in pt care	50	28%	101	58%	15	8%	6	3%	2	1%
The nursing process is elaborated Cardex	52	30%	88	51%	16	9%	17	9%	1	1%
The nursing process should be used by BSc only	14	8%	28	16%	13	7%	72	41%	47	27%
The nursing process works well in practice	46	26%	86	49%	8	4%	28	16%	6	3%
The nursing process can be used in any settings	36	20%	59	34%	29	16%	43	25%	7	4%
There is no enough time to apply NP during pt care	23	13%	45	26%	23	13%	56	32%	27	15%
Nursing process is a waste of time	6	3%	23	13%	8	4%	85	49%	52	30%
I'm ready for the application of nursing process	80	46%	82	47%	5	3%	7	4%	-	-
The Kardex system of nursing record is unsatisfactory	12	7%	37	21%	19	11%	66	38%	40	23%
The NP simplifies the awareness of needs	48	27%	99	57%	14	8%	12	7%	1	1%
Priorities of care are easy to identify using NP	56	32%	84	48%	16	9%	15	9%	3	2%
I'm fed up with hearing about the nursing process	27	16%	64	37%	13	7%	52	30%	18	10%
The nursing process involves too much of paper work	20	12%	56	32%	16	9%	54	31%	28	16%
NP enables to provide quality nursing care to pts	68	39%	87	50%	6	3%	12	7%	1	1%
I'm willing apply nursing process during pt care	69	39%	79	45%	8	5%	16	9%	2	1%
I think introduction of NP will cause a problem	16	9%	25	14%	32	18%	68	39%	33	19%
I think the pts will not like to be cared for using the NP	11	6%	34	19%	21	12%	65	37%	43	25%
I think the nursing staff have no willingness to apply NP	16	9%	43	25%	18	10%	54	31%	43	25%
I think the staff will never accept the nursing process	6	3%	28	16%	35	20%	58	33%	47	27%

Practice of Nurses Regarding Implementation of Nursing Process

Majority of the respondents reported that they followed the scientific ways of application of the nursing process during provision of care to their patients at the time of the study. Seventy six (52.1%) of respondents reported that they followed the nursing process in the provision of care to their clients. List the following

a. Assessment and Nursing Diagnosis

In relation to new tuberculosis patients admitted to the ward, most nurses agreed that they were carry out an initial patient assessment or during assessment phase. However, if they did one, it was usually within 24hours of patient admission. There was agreement among nurses regarding the use of a written assessment.

Majority of the nurses 137(79 %) believed they used Specific form for writing patient history and the other that they did not. One hundred and sixty five (95 %) respondents believed that nursing assessment/ data collection carried out in the ward. More than two third of respondents were -reported as to whether they systematically identified nursing problems: 105(60.3%) indicated they identified actual and sixty three (36%) risk nursing problems/ nursing diagnosis, however more than half of them failed to respond to the question of the wellness and collaboration nursing diagnosis. Seventy (40 %) nurses reported that were nursing problems arranged by priorities the other one hundred four (60%) not arranged by priorities.

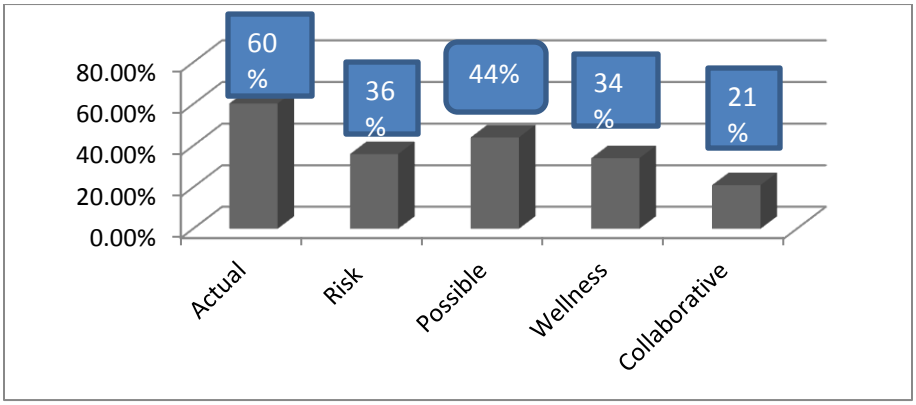


Figure4.3 Implementing nursing diagnosis in St. Peter's and Alert hospitals, 2016, Addis Ababa, Ethiopia, n=174

b. Planning and Implementation

Sixty five (37%) of respondents reported that they identified the goals for care one hundred nine (63%) of respondents reported that they are not identified. The majority of the respondents 105(60 %) reported that nursing intervention were not identified and documented in care plan. 57 (33 %) nurses are reported usually re-assessed patients each time they carried out any patient care the other 67% not re-assessed.

c. Evaluation

Majority of the nurses 96(55 %) of nurses are not reported they usually carried out a systematic evaluation of the effectiveness of care given and that it was documented either on the care plan or in the progress notes. Eighty six (49 %) of respondents recorded that they modified the care plan according to evaluation. Majority of respondents one hundred fourteen (66%) indicated that objective criteria were not used to evaluate patient progress. Eighty three (48 %) respondents were implemented nursing process while ninety one (52 %) did not implemented nursing process.

Table 4.5 the result of implementing the nursing process in St. Peter's and Alert hospitals, 2017, Addis Ababa, Ethiopia, n=174

Variables		Yes	No
Follow the steps of nursing process during provision of care		157	17
Data collection take place during the assessment phase		165	9
A written nursing history taken, using a specific form		137	37
Developed nursing Diagnosis from you Assessment	Actual	105	69
	Risk	63	111
	Possible	76	98
	Wellness	60	114
	Collaborative	37	137
Problem statements arranged in order of priority		70	104
The goals provide enough detail (i. e. time to be accomplished, who will accomplish		65	109

what and how		
Goals for the resolution of each one of the problems identified and documented in the care plan	69	105
Nursing interventions identified and documented in the care plan	158	16
Planned nursing interventions written with enough detail	83	91
The patient's condition reassessed before implementing any planned nursing Intervention in order to be sure of its appropriateness	57	117
Nurses in this hospital responsible for the planning of patient care	145	29
A systematic evaluation made of the effectiveness of care given to solve patient	80	94
The evaluation recorded in the care plans or progress notes	80	94
Objective measures of patient progress towards the identified goals used on a ward"	60	114
Care plans modified according to the results of evaluation	86	88
Attended any course, talk or seminar related to the nursing process recently on the ward or in the Hospital	75	99
The nursing process taught during your studies at the Nursing School	132	42

4.2.4 Information Communication

Technological Factors

Ninety three percent of the respondents said that there is lack of access to information communication infrastructure, fifty three percent of the respondents who strongly disagree or disagree said that there was no up to date ICT infrastructure. Fifty five percent of respondents who strongly agree or agree said that lack of technical support within the hospital and also noted that 58% of respondents who strongly agree or agree lack of training regarding new information technology familiarization to nurse. The preferred method of documentation system of nursing care practice are 43.7% of respondents said that written manual, 23% respondents said that computer based and 33.3% of respondents said that both of them.

Table 4.6 the result of information communication in St. Peter's and Alert hospitals, 2017, Addis Ababa, Ethiopia, n=174

Variables	Yes	%	No	%	I Don't know	%
1. Can you present computer nursing room for recording management of patient and reporting purpose?	5	2.9	161	92.5%	8	4.6%
2. Which method of documentation system prefer for nursing care in tuberculosis management?	Writing manual	%	computer based	%	both of them	%
	76	43.7%	40	23%	58	33.3%
3. My organization has up-to-date ICT infrastructure which helps knowledge flow	Strongly agree	agree	Neutral	Disagree	Strongly Disagree	
	27(15.5)	39(22.4)	16(9.2)	65(37.4)	27(15.5)	
4. In my organization, employees use knowledge networks such as (email, intranet, internet) to communicate with colleagues	16(9.2%)	35(20%)	21(12%)	76(43.7%)	26(14.9%)	
5. In my organization there is lack of technical support and immediate maintenance of integrated IT systems which obstructs work routines and communication flows.	17(9.8%)	79(45.4%)	37(23.3%)	30(17.2%)	11(6.3%)	
6. In my organization there is lack of training to familiarize employee's new IT systems and processes	42(24.1%)	60(34.5%)	23(12.2%)	37(21.3%)	12(6.9%)	

4.2.5 Organization Factors

The administrations of the hospitals were supportive in the application of the nursing process, while 109 (66 %) the respondents reported that allocation of resources for application of nursing process was inadequate. Majority 100 (57%) of the respondent said that the nurse to patient ratio was not optimal to apply the nursing process; whereas 91 (52%) said that lack of reward and recognition system for the work not promotion were motivating for the application of the nursing

process and also 49% of nurses are not satisfied with the nursing care knowledge that is available in department to use.

Table 4.7 the result of the respondents about Organization factors in St. Peter's and Alert hospitals, 2017, Addis Ababa, Ethiopia, n=174

Variables	Strongly agree		Agree		Neutral		Disagree		disagree Strongly	
	No	%	No	%	No	%	No	%	No	%
My organization has developed culture that encourages learning from mistake	21	12%	60	35 %	23	13 %	45	26 %	25	14 %
Oriented the work of my job and structure of organization while joining the current organization	7	4%	13	8%	32	18 %	85	49 %	37	21 %
My organization has Nursing process work based unsympathetic managers	17	10%	55	31 %	34	20 %	49	28 %	19\	11 %
The organization leaders openly explain the purpose of the company policies objective, strategies, Expectations to workers.	39	22%	73	42 %	23	13 %	24	14 %	15	8%
The hospital administration supports the application/ implementation of NP?	39	22%	70	40 %	18	10 %	32	18 %	15	8%
My organization has dedicated staff who can contribute knowledge easily when required	28	16%	73	42 %	29	16 %	39	22 %	5	3%
There is continuous monitoring and evaluation Practice.	34	19%	70	40 %	27	15 %	37	21 %	6	3%
Nursing process implementation delay based on changing new reporting system	20	11%	63	36 %	44	25 %	34	29 %	13	8%
The organization allocation adequate resources for application /	32	18%	26	16%	16	9%	79	45	21	12

implementation of NP?								%		%
There is shortage of nurses(man power) in the hospital	56	32%	68	39%	10	6%	30	17 %	10	6%
The nurse patient ratio is optimal to apply / implement the nursing process?	46	26%	48	28%	26	14%	37	21 %	17	9%
The organization provide training and development of better knowledge capability skill sets	25	14%	66	38%	24	14%	35	20 %	24	13 %
They are Contributing to a library of re usable knowledge resource	35	20%	53	30%	20	11%	51	29 %	15	8%
The area To maximize collaboration, trust, team spirit ,and staff relationship	35	20%	75	43 %	26	15 %	29	16 %	9	5 %
Lack of reward and recognition system for the work	31	18%	82	47 %	27	15 %	22	12 %	12	7 %
Reward is encouraging someone while discouraging the other	33	18%	60	35 %	21	12 %	38	22 %	23	13 %
Offer training for nurses about tuberculosis management	34	20%	66	38 %	14	8%	41	23 %	19	11 %
I got on the job training on nursing process for tuberculosis treatment	18	10%	77	44 %	11	6%	51	29 %	17	9 %
I always find sufficient knowledge to enable me to do my task	33	19%	82	47 %	13	7%	36	21 %	10	6 %
I am satisfied with the nursing care knowledge that is available in my department to use	25	14%	42	24 %	19	10 %	70	40 %	17	9 %

Generally from organization factor it is well known that one of the limitations of the nursing process is that it need sample of resources. Most of the key informants believe that most of the organization factors such as, resource, culture, and training and development were inadequate to apply nursing process. One of the key informants said **"**main obstacles for application of the

nursing process are resource scarcity and lack of adequate knowledge. Other key informant supported the previous one by saying "there is shortage of material and human power. In addition to that there is also no motivation at all to apply the nursing process." Some of the key informants said that lack of training on tuberculosis treatment application of the nursing process is one of the factors why nurses lack adequate knowledge to apply the nursing process. Another key informant said "Lack of attention and no opportunity for further education and training are factors contributing to the failure of applying the nursing process.

Bivariate Analysis

Bivariate analysis is the second step in the analysis and it is done to test the presence of association between two variables. In this study in order to test the presence of association between variables logistic regression analysis was used. Since all variables have more than two categories all variables are changed in to dummy variable in which one category is omitted and became reference category against which the effect of the other category /categories are assessed.

Table 4.8.1 summarizes bivariate associations between selected variable and knowledge flow in St. Peter's TB Specialized Hospital and Alert Hospital, 2017, Addis Ababa, Ethiopia.

Variables	x^2	Sig	COR (CI 95%) Logistic regression
1. Knowledge management system			
1.1 Knowledge capture			
1.1.1 nurses knowledge use			
tacit	1	.183	2.3(0.683-7.4)
Explicit	1	.531	1.3(0.535-3.4)
I don't know			1
1.1.2Knowledgecapture mechanism			
Internet/extranet	1	0.052	10.666(0.984-115.685)
Computer	1	.332	2.804(0.349-22.557)

Phone	1	1	000
face to face			1
2. Professional related factor			
2.1 **work experience**			
>15year	1	.004	11(2-60)
5-10year	1	0.049	4(1-21)
1-5 year	1	.260	2(0.471-16)
<1year			1
2.2 Job satisfaction			
Neutral	1	.001	14.000(2.747-71.356)
Dis agree	1	059	3.410(0.954-12.194)
Strongly disagree			1
2.3 KAP of nurse for implementation NP			
Good knowledge	1	0.000	6.761(2.7-17)
poor knowledge			1
Good attitude	1	.006	3.3(1.4-7.8)
poor attitude			1
Good practice	1	.001	5.7(2-15)
poor practice			1
3. information communication			
3.1 update ICT infrastructure			
Disagree	1	.156	2.612(0.693-9.840)
Strongly disagree			1
3.2 lack of training new IT system			
Neutral	1	.168	4.812(0.517-44.822)
Strongly disagree			1

Key wards $Df =$ degree of freedom $sig =$significant $COR = crod\ odd\ ratio$ $CI = confident\ interval$

The Bivariate analysis shows that socio demographic characteristics such as gender, age; marital status, and salary were not significantly associated with willingness of knowledge flow of nursing management and some of knowledge management related factors, professional related factors and ICT related factors are associated with willingness of knowledge flow .

1. **Knowledge management related factor**

From those knowledge management related factors knowledge storage, use and knowledge transfer were not associated with knowledge flow, were as knowledge capture has association with knowledge flow, i.e., The probability of knowledge flow is by 2.3 times greater in those nurses that use tacit knowledge for nursing process than those nurses that do not know the source of knowledge used for NP and by 10.6 times greater in those nurse that use internet and extranet as knowledge capturing mechanism than those using face to face, The probability of knowledge flow is by 2 times greater in those nurses that use computer as knowledge capturing mechanism than those using face to face .

2. **Professional related factor**

From professional related factor work experience, job satisfaction and knowledge, attitude practices for implementation of nursing process were associated with knowledge flow.

i.e. the probability of knowledge flow is by 11 times greater in those nurses that have work experience>15 years than those nurses having work experience <1 year, the probability of knowledge flow is by 4 times greater in those nurses that have work experience5-10 years than those nurses having work experience <1 year and the probability of knowledge flow is by 2 times greater in those nurses that have work experience1-5 years than those nurses having work experience <1 year by 14 times greater in those nurses that were indifferent for job satisfaction than those who do not have job satisfaction and by 6.7 times greater in those nurses that have good knowledge to implement NP than those nurses having poor knowledge, by 3.3 times greater in those nurses having good aptitude to implement NP than those nurses having poor attitude and by 5 times greater in those nurses that have good practices to implement NP than those nurses having poor practices.

3. Information communication related factor

The probability of knowledge flow is by 2.61 times greater in those nurses that disagreed in the presence of updated ICT infrastructure in their organization than those nurses strongly disagreed in the presence of updated ICT infrastructure in their organization. In those nurses that were indifferent for lack of ICT training in their organization 4.81 times greater than those nurses strongly disagreed.

Table 4.8.2. Bivariate associations between selected variable and knowledge flow in St. Peter's and Alert hospital, 2017, Addis Ababa, Ethiopia.

Variables	x^2	Sig.	COR 95%CI Logistic regression
1. Organizational structure			
1.1 My organization has dedicated staff canprovied knowledge as			
Strongly agree	1	.065	8.6(0.873-86)
Agree	1	.100	3.9(0.772-19)
Strongly Dis agree			1
1.2 there is continuous monitoring and evaluation practice			
strongly Agree	1	.007	33(1-84)
agree	1	.030	10(1.3-89)
neutral	1	0.044	9(0.045-1.798)
strongly disagree			1
2. Organizational resource			
2.1The organization allocate adequate resources for application NP			
Nurses answer neutral	1	.061	3.000(0.950-9.477)
Nurses answer strongly Agree			1
2.2 There is shortage of man power in the hospital			
strongly Agree	1	.057	4.2(0.957-19)

Strongly disagree			1
2.3The nursing pts ratio is optimal to apply NP			
strongly Agree	1	.114	3.629(0.733-17957)
Strongly disagree			1
3. Reward and recognition			
3.1The organization provide training of better knowledge			
strongly Agree	1	.078	7.263(0.803-65.713)
Agree	1	.190	4.107(0.497-33.950)
neutral	1	.114	6.053(0.650-56.365)
Dis Agree	1	.080	6.815(0.792-58.619)
strongly Disagree			1
4. Opportunity of training and development			
4.1Offer training for nurse about tuberculosis management			
strongly Agree	1	.102	3.6(0.772-17)
Agree	1	.088	3.3(0.836-13)
Strongly Dis Agree			1

Key wards $Df =$ degree of freedom sig =significant $COR = crod\ odd\ ratio$ $CI = confident\ interval$

The Bivariate analysis shows that organizational related factors are associated with willingness of knowledge flow of nursing process TB management from above table 4.8.2 the interpretation done for strong association significant valve is less than 0.05.

4. Organizational factors

From organizational related factor organizational structure**,** organizational resource**,** reward and recognition, opportunity of training and development were associated with knowledge flow. From those organizational factors that have strong association were organizational resources and organizational structure. this is the probability of knowledge flow is 0.05 times greater in nurses that were indifferent for the organization having dedicated staff that can provide knowledge as required than those nurses strongly disagreed. Those nurses that strongly agreed in the presence

of continuous monitoring and evaluation practice in their organization are 33 times greater than those nurses strongly disagreed in the presence of continuous monitoring and evaluation practice, those nurses that agreed in the presence of continuous monitoring and evaluation practice in their organization are 10 times greater than those nurses strongly disagreed in the presence of continuous monitoring and evaluation practice and those nurses that indifferent in the presence of continuous monitoring and evaluation practice in their organization are 9 times greater than those nurses strongly disagreed in the presence of continuous monitoring and evaluation practice.

Multivariate result

Multivariate analysis is process used to examine the effect of two or more variables on the dependent variable simultaneously. Seventeen variables having association in the bivariate analysis are selected for further multivariate analysis.

Table 4.9 Multivariate analysis between selected variables related with knowledge flow in St. Peter's and Alert hospital, 2017, Addis Ababa, Ethiopia.

Variable	X^2	Sig	AOR 95% C.I. Logistic regression
Good knowledge	1	.000	7.583 (2.785-20.646)
Poor knowledge			1
Presence of organizational ICT training	1	.022	17.375 (1.510-199.945)
Absence of organizational ICT training			1
Work experience>15years	1	.002	19.506 (2.879-132.133)
Work experience<1year			1

Key wards $Df =$ Degree of freedom $sig =$Significant $AOR =$ Adjusted $Odd\ Ratio$ $CI = Confident\ Interval$

According to the result logistic regression shows that from Seventeen variables, good knowledge, the ICT training provide by organization with better knowledge capability and Work experience were found to be independent predictor of knowledge flow of nursing care for tuberculosis treatment that is knowledge flow of nursing care for tuberculosis treatment is by 7.5 times greater in presence of good knowledge than poor knowledge, knowledge flow of nursing care for tuberculosis treatment is by 17.4 times greater in presence of organizational ICT training than absence of ICT training in the organization and knowledge flow of nursing care for tuberculosis treatment is by 19.5 times greater in nurses having work experience of >15 years than those having <1 years of experience.

4.3 Discussion

The purpose of this project is to explore the current knowledge flow of nursing care practice so as to introduce knowledge management blueprint for improving nursing care tuberculosis in St. Peter's Hospital and Alert hospital. According to 83% of survey participants, improving knowledge flow practice of nursing care will improve TB management.

Among nurses in both St. Peter's and Alert hospitals are 53% were implemented nursing process while other 47% are not implemented nursing process. A study by Tesfaye Assefa tried to identify factors affecting implementation of nursing process among nurses working in Bale zone hospitals. Tesfaye noted that 52.1% nurses were implemented nursing process while 47.9% of them were not implemented nursing process. The study carried out in Addis Ababa related the same result as in bale zone. But we noted that there is an improvement in implementing nursing process.

Fifty three percent of nurse's knowledge capture mechanism was tacit type of knowledge and also the way of communication by 65% face to face to practice knowledge capture. This result is less than a result of a study conducted in St. Peter Hospital in which 68.1% respondents use face to face communication for sharing knowledge, 33.5% use observation, 13.5% of the respondents use internet such as e-mail and 14.6 use phones (10). In this study 21% of nurse's access knowledge for tuberculosis management and the respondents accessed knowledge using different mechanisms 54% of respondent from written document and 41% of respondent from internet.

On the Knowledge store mechanisms, out of the total respondents 82% document their working practice this is lower than the result of the study conducted in Mekelle which was 85.2%, The finding of the result of a study conducted in St. Peter's hospital shows that majority of the respondent's (72.4%) document their working practice and procedures whereas 27.6% respondents do not document their working practice. Among those respondents who document their working practice 86.6% use writing manual such as patient chart for documentation (10).The finding is greater than of the result of a study conducted in Addis Ababa Health Bureau in which 76.5 % professionals document their working practices whereas 23.5% do not document their working practices on patient charts and log books (36).

Knowledge transfer could only occur when an individual is really interested in helping others to develop a new capability for action and it is the willingness of employees in an organization to share with their colleagues the knowledge they have acquired or created (35).

Knowledge transfer is a human act and is considered critical to organizations (43). In organizations, the biggest value of knowledge that can be achieved when it is shared because it can help to increase job performance and facilitate new knowledge creation (44). Knowledge sharing can also increase intellectual capital, change individual competitiveness, change organizational competitiveness and reduce cost (45). In this study 31 % of the respondents were willing to share and get knowledge from their colleagues which are lower than in the study conducted in Addis Ababa Health Bureau in which 50.3% of health professionals share their knowledge with their colleagues within the organization (36).

The finding of the result shows that majority of the respondent's Education level adequate to implement of nursing process 88 % and also 82% strongly agree and agree respectively on educational level and experience of nurses are different outcome for tuberculosis management. A study by Tesfaye showed that 61.6% of the respondents were diploma nurses. With respect to their year's experiences, 43.8% had up to four years of experiences, while 5.5% of the respondents had work experience more than 25 years at the time of the study. Majority 70.5% of the respondents acquired their educational award from government institutions; and 25.9% of the respondents have been working at the surgical ward (17).

When the respondents of this study are seen in terms of job satisfaction, 47 % of the respondents are not satisfied with their current job. This is mainly due to lack of attractive salary rewarded and recognition system for achievement of nursing care. This result is less than a study conducted in Addis Ababa health bureau which show that 57.2% of the study participants were not satisfied with their current job. The cause of job dissatisfaction is the same as our study; i.e, lack of inadequate opportunity for further education and lack of reward and recognition system for the work (36).

Among all the respondents 40% of them have good knowledge indicating that most of them have poor knowledge (60%). This study is on the contrary of the study by Tesfaye conducted in Bale Zone Hospitals in which 54.1% of respondents were highly knowledgeable, 22.6% were moderately knowledgeable and 23.3% had poor knowledge (17). This study is also different from a study conducted in Debre Markos and Finote Selam Hospitals on the implementation of nursing process and associated factors among nurses, the knowledge level of nurses on nursing process as identified, 58.1% were highly knowledgeable, 30.6% were moderately knowledgeable and 11.3% were under the group of low knowledgeable category. This study is also different from a study done in Addis Ababa in which 16.1% of respondents were highly knowledgeable, 52.6% were moderately knowledgeable and 31.2% had poor knowledge. Highly knowledgeable nurses were 38.9 times more likely and significantly associated with implementation of nursing process than low knowledge group nurses. Moderately knowledgeable nurses were positively and significantly associated with implementation of nursing process. The study revealed that knowledge is mandatory to implement the nursing process (46), This study is similar to a study conducted in East Shoa in which greater proportion of the respondents 55% had poor knowledge. But there were no association found between knowledge of nurses on nursing process and implementation of nursing process (47). It is also in the same range of a study conducted in Mekelle zone hospitals which is less than this 90% of the nurses had scored below 50% on knowledge related questions and all the key informants indicated that nurses lack knowledge to apply the nursing process. (18).

The result of this study has showed that 38% of the respondents had good attitude and the other 62% had poor attitude towards TB management. In a study conducted in Addis Ababa Negative

attitude of nurses regarding cancer pain management were observed From the 12 pain attitude questions assessed, the mean number of correctly answered questions was 5 (SD =1.64), with a range from 2 to 9. Accordingly, more than half, 53.7%, of the nurses' have a negative attitude, while 46.3% had a positive attitude towards cancer pain management (48) This study is different from a study in Bale zone hospitals had in which nurses of the study sites have positive attitude towards the nursing process. Above 75 % of the respondents have positive attitudes (17). This study also disagree with a study conducted in Mekelle zone hospitals regarding the attitude of nurse to ward nursing process reported the 99.5% had positive attitude toward implementation of nursing process. The author identified that the problem was not related to attitude the rather mainly related to with knowledge and enabling and reinforcing factors because they believe it qualifies nursing care: it strengths nurse patient relationships: it increase competency of the nurses(18).

In this study 53% of the respondents had good practices of nursing process while the rest 47% had poor practices of the nursing process. This study is different from a study conducted in Addis Ababa in which the mean number of correctly answered questions was 2 (SD=1.2), with a range from 0 to 5. Almost two third (65.9%) of respondents had poor cancer pain management practice whereas only 34.1% had good cancer pain management practice (47). This study is lower than a study conducted in East Shoa which was reported 108(66%) respondents that they followed the nursing process in provision of care to their clients (47). It is varies study conducted in Debre Markos and Finote Selam Hospitals about 37.1% of nurses were implementing nursing process very much and the rest 62.9% fall from not all practicing to somewhat practicing (36). In contrast to this a study conducted in Mekelle findings revealed that all the 200 respondents reported that they did not apply any of the nursing process steps and in-depth interview also all participants, unanimously stated that the nursing process was not applied in patient care (18).

In this study ninety five percent of respondents believed that nursing assessment/ data collection carried out in the ward. Sixty point three percent dictated they identified actual and 36% risk nursing problems/ nursing diagnosis. Forty percent nurses reported that were nursing problems arranged by priorities the other 60% not arranged by priorities.

Information communication

Ninety three percent of the respondents said that there is lack of access to information communication infrastructure, strongly disagree or disagree 53% of nurses said that there were up to date ICT infrastructure, strongly agree or agree 55% of the respondents said that lack of technical support within the hospital and strongly agree or agree 58% of respondents lack of training regarding new information technology familiarization to nurses. And a study in Addis Ababa Health Bureau showed that 62.4% respondents' lack of training regarding employee familiarization of new IT systems within the organization whereas 17% are indifferent and 20.6 % respondents disagreed on this point. In general more than half, 58.3% responded that there is lack of access to familiarization and training to new it systems and technical support regarding information communication technology in the hospitals (36). Another study conducted in St. Peter Hospital showed that 59.8% of the respondents said there is lack of access to information communication infrastructure and technical support within the hospital and training regarding information technology familiarization to health professionals and IT has a range of 16 with a mean score of 13.66 and standard deviation of 2.92 (10).

Organizational factors

In this study sixty six percent of respondents were reported that allocation of resources for application of nursing process was inadequate. According to majority 57% of the respondent the nurse to patient ratio was not optimal to apply the nursing process; whereas 52% said that lack of reward and recognition system for the work not promotion were motivating for the application of the nursing process and also 49% of nurses are not satisfied with the nursing care knowledge that is available in department to use. The result was the same as the study conducted in Addis Ababa Health Bureau in which 55.5% respondents reported that there is no specific budget dedicated to acquire, and share knowledge in the hospital where as 22.9% are indifferent and 21.6% respondents agreed/strongly agreed on the availability (36). In a study conducted in St. Peter Hospital 66% of the respondents did not get extrinsic benefit or recognition for their contribution and 42.1% the respondents preferred acknowledgement as motivational schema to improve their knowledge sharing practice (10).

The hospitals under this study provide training and development of better knowledge capability skill sets (according to 52% of the respondents). The study in St.Peter's hospital shows that there is no formal opportunity like training, regular meeting among staffs are not to the highest level and communication technology infrastructures like internet are absent in the hospital, which shows, internet is the least used knowledge sharing mechanism within the hospital (10)

4.4 Finding of the result

The finding of the current study is summarized as follow

4.4.1. Professional Factors

Commitment of employees in the organization is one of the key issues in making the employees facilitate knowledge flow. Commitment is important because workers with high levels of organizational commitment are less likely to leave, are more likely to be highly motivated, and will probably be more willing to provide extra discretionary effort and be generally more willing to improve their flow of knowledge NP for TB management within the organization (10).Therefore, the presence of high level of commitment among employees will improve willingness of employees in improving their knowledge flow.

Work experience

Nurses are the more experience level develop technical skills, from training, learning from experience like error or communicate from friends those have an effect on their knowledge flow (42).

Knowledge capture mechanism

Organization must acquire the ability to make knowledge useful for others and for future application, which means the organization knows what it knows and have systematic routine for locating and retrieving the knowledge. Knowledge capture happens when people are aware of what they learned and what aspects of the learning would be useful in the future and for others. Both tacit knowledge and explicit knowledge needs to be captured. Product knowledge is

captured in different documentations and databases; however, there is a lack of knowledge pool with good documentation of the complete product knowledge (51).

Job satisfaction

Job satisfaction is the most effective and least costly method that can encourage nurses to improve their flow of knowledge. Many people are willing to acquiring and share their knowledge with others if they feel that the person is honest and can be satisfied. Thus, high level of interpersonal Job satisfaction correlates with high levels or willingness to improve their flow of knowledge.

An employee should feel satisfied with his daily jobs in order to be in knowledge capture and transfer environment; if employees are satisfied with their job they will have willingness to knowledge flow improve nursing management for TB management .In order to have willingness of knowledge flow improve nursing management for tuberculosis patient, employees should have communication skills either verbal or written. Employees, who can socialize, open minded by adding extra motivating reward system and self confident are more willing to their knowledge flow improve nursing management for TB management knowledge than those employees that do not have this kind (10).

Knowledge Attitude Practice

Awareness of good KAP of nurses at all levels of employees is the main component of successful implementation of knowledge management programme. Employees inclusive the top management should aware the importance of improving knowledge flow of nursing care for TB management; therefore; if employees are aware they will be willing to knowledge flow improve nursing management for tuberculosis patient (10).

4.4.2. Organizational Factors

Organizational Structure

Organizational structure also influences improving knowledge flow. A flexible organizational structure encourages knowledge flow and collaboration across boundaries within the

organization, while a rigid structure often has the unintended consequence of inhibiting such practices. Organizational structure is capable of facilitating knowledge flow. The flow is shaped by the organization's policies, processes, system of rewards and incentives (10).

Reward and recognitions

People are more willing to their improve flow knowledge, if they are assured that doing so is valuable and if they get recognition from the knowledge for improve flow knowledge process. Thus, giving reward and recognition to employees for their contribution will improve their willingness to improve flow knowledge (51).

4.4.3. Framework for knowledge flow

By considering individual and organizational factors we can improve willingness of nurses to improve knowledge flow. Besides, Successful engagement with health workers is also crucial to the integration of ICTs in healthcare. ICT can be very challenging to the autonomy and professional status of health workers. The challenge arises from the ability of ICT to fundamentally change the way care is delivered, changing working practices, enabling different skill mixes in clinical teams, empowering different clinicians to make decisions about patient care, and empowering patients to self care (53). ICT plays a great role for enhancing willingness of individuals in the knowledge capture and sharing for improving knowledge flow. But ICT that enables knowledge flow found to be lacking in the organization and also the result of our study shows that lack of ICT was associated with knowledge flow among nurses (10).

So to enhance knowledge flow among nurses we propose the following framework depicted in Figure 4.4 by taking into account the following requirements.

- The need for an easy to use and a one point access knowledge portal that facilitate knowledge creation, acquisition, sharing and search.
- The use of internet /extranet for creating a secured knowledge flow environment.
- The need to create organizational memory such as clinical data base to retain knowledge acquire and sharing.

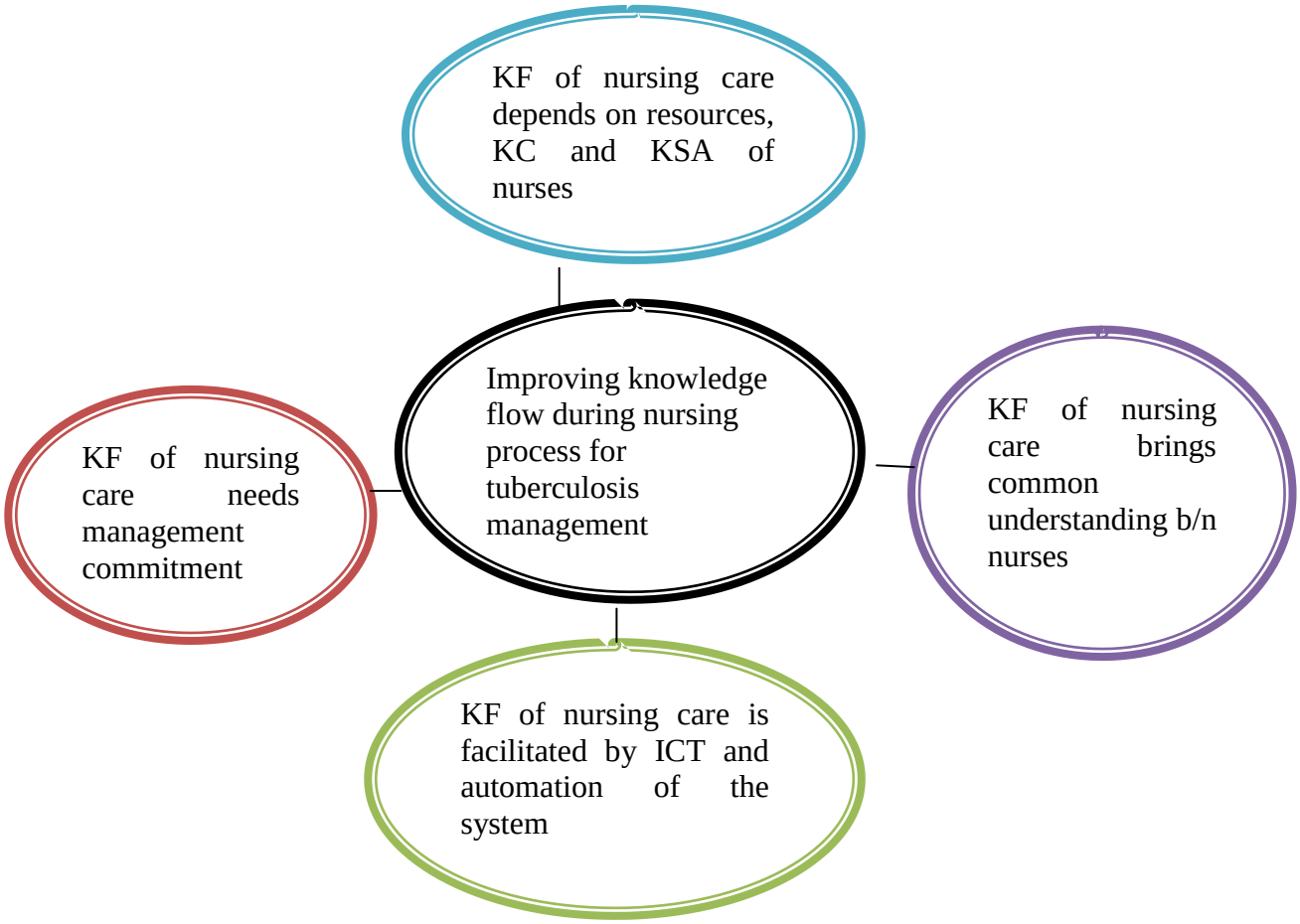


Figure 4.4 frameworks for improving knowledge flow during nursing process for tuberculosis management

The framework consists of four main components that are list as follow

a. KF of nursing care needs management commitment

According to *qualitative study* participants said that in the hospitals some measures should be undertaken by hospital management *Firstly, there should be regular supervision, monitoring and evaluation on the implementation of nursing process. Secondly, nursing process in the hospital should be given with continuous ICT training to all nurses. Thirdly, the hospital administrator or management staffs should develop reward and motivation mechanism like internet accesses, develop knowledge portal and also fulfill necessary ICT material or equipment ,open discussion mechanism or inter personal communication .It is important to apply nursing care and also develop IT based information system for nurses to tuberculosis management."* This idea support quantitative study is caused of this result *KF* of nursing care needs management commitment.

b. KF of nursing care depends on resources, KC and KSA of nurses

According to qualitative study *develop knowledge portal and also fulfill necessary ICT material or equipment, open discussion mechanism or inter personal communication important to apply nursing care and also develop IT based information system for nurses to tuberculosis management* this idea support quantitative study KF of nursing care depends on resources, KC and KSA of nurses.

c. KF of nursing care brings common understanding b/n nurses

According to qualitative study develop up to date information system is important easily accesses the management of tuberculosis patient .And also enhance nurses to doing nursing process their interest and KF of nursing care brings common understanding b/n nurses this idea also support quantitative study.

d. KF of nursing care is facilitated by ICT and automation of the system

According to qualitative study *internet accesses, develop knowledge portal and also fulfill necessary ICT material or equipment ,open discussion mechanism important to apply nursing care and also develop IT based information system for nurses to tuberculosis management* this idea also support quantitative study.

Impact of ICT on improving knowledge flow for nursing management of tuberculosis patient

Technological Barriers

Technology is said to be one of the knowledge management infrastructure along with people and processes to find technical ways in order to find, disseminate and utilizing the knowledge (51).

IT/ICT is an element crucial to the linkage of information and knowledge integration in organizations (10). The current IT systems clinicians use were originally intended for finance, laboratory or other ancillary functions that do not support professional practice at the point-of-care. More important, a lack of vision and lack of voice is absent for what nurses need most. Information technology should provide evidence-based, patient-centric technology that allows interdisciplinary collaboration at the point-of-care. IT should be an enabler versus a barrier (49).

ICT infrastructure is one of the important factors which should be considered in implementing knowledge management system for example knowledge creation a connection between the knowledge seeker and individuals and sharing information, knowledge and best practice in order to propose the necessary solutions to facilitate the smooth flow of knowledge who may have it without the needs of a formal communication line (52).

For organizations and industries to benefit better from their ICT enabled knowledge creation and sharing implementations, they need to consider and improving knowledge flow improve nursing management for tuberculosis patient Implementations in context of ICT. ICT removes some of the existing knowledge flow individual and organizational barriers (50).

The health industry has come to rely heavily on the use of technology across all practice areas. The use of IT is an integral part of the industry's daily practices. IT Successful engagement with health workers is also crucial to the integration of ICTs in healthcare. ICT can be very challenging to the autonomy and professional status of health workers. The challenge arises from the ability of ICT to fundamentally change the way care is delivered, changing working practices, enabling different skill mixes in clinical teams, empowering different clinicians to make decisions about patient care, and empowering patients to self care (51).

ICT has rapidly changed the way organizational members communicate. For instance, it has significantly improved a manager's ability to monitor individual's performance, allowed employees to have more complete information to make faster decisions. Besides, ICT has made it possible for people in organizations to be fully accessible, anytime, regardless of where they are (24). In order to provide safe and effective nursing care, nurses must be capable of accessing an expanding information base, developing skills needed to manage the technology required for information retrieval and using this information appropriately to solve clinical problems (51). An apparent benefit of using ICT based collaboration tools is that benefits of knowledge sharing come commercially advertised with these tools so minimum effort or responsibility lies on the management to communicate the benefits to the employees. The employees are as much aware of the benefits as is the management through commercial tools. So this tool enable in creating awareness on the importance of knowledge sharing among employees (50).

In order to have willingness of knowledge flow nursing management for tuberculosis patient, employees should have communication skills and should be sociable with their colleagues(10), ICT enabled knowledge flow on portals and online communities is mostly writing driven which eliminates the barrier caused by poor speaking skills and makes individuals to interact and share knowledge easily. This will further improves personal interaction of those employees with introvert personality as well as motivate and increase employees desire to share their knowledge with others.

Organizational culture includes presence of social interaction and open communication among employees. ICT may be effective in lowering temporal, spatial, physical distance. When temporal distance refers to barriers in the present (e.g. problems in coordinating schedules) ICT may prove helpful in the form of Internet-based discussion groups or electronic meeting software (EMS). For instance, an electronic meeting concerning specific topics may be scheduled to run for a preset period. Participants may contribute to the discussion at a time when their schedule allows or their inspiration suggests. By leveling temporal and spatial barriers, ICT may also facilitate new organizational forms for knowledge sharing, such as virtual knowledge teams. So ICT helps in eliminating the requirement of physical space as knowledge sharing is possible from office space and also enables employees to share any time of the day and improves social interaction among employees and also ICT based online portals helps in reducing communication gap between employees and management. This will help in resulting open communication among employees and the management (10).

Web portals and virtual knowledge sharing communities are more trustworthy and conducive. Trustworthy because knowledge capture and shared is documented and visible to everyone with employees unique username which reduces personal fear of not sharing knowledge. So using ICT improves trust among employees. And also ICT based tools, gives more job security since every employee is assigned with a unique username and password and all shared knowledge is shown with employee's identity. This will make employees to feel more comfortable in sharing their knowledge without fearing for their ideas to be stolen and their job jeopardized. Thus, ICT improves knowledge hording behavior of employees (50).

CHAPTER FIVE

DESIGN OF BULEPRINT OF KNOWLEDGE FLOW NURSING PROCESS FOR MANAGEMENT OF TUBERCULOSS PATIENT

In healthcare, knowledge flow are important of nursing care for brings common understanding nurses by using sharing and creation knowledge networking systems that are helpful in enhancing nurses like networking and education, patient education, patient care, health facility promotion and other public health programs. Its main importance is increasing health facility/organizations efficiency and competitiveness by improving the way the hospital manages its explicit and tacit knowledge assets in and outside the organization and simultaneously bringing responsibility and accountability to the employees on every activity they undertake in relation to patient care. This project has tried to propose a blueprint of knowledge flow nursing process for management of tuberculosis patient unit of St Peter's TB Specialized Hospital and Alert hospital after conducting qualitative and quantitative study and analyzing the professionals input from the collected data using the in depth interview guide and self administered questioners .

As show in figure 5.1 the knowledge portal designed in this project has user interface, knowledge management, knowledge repositories.

5.1 User interface

The interface is the part of the computer system with which the user interacts in order to use the system and achieve his or her goal (56).

Content of this project user interface

- ✓ Knowledge flow page
- ✓ Nursing care resources page
- ✓ Decision support
- ✓ Discussion Forum of nurses Page

5.1.1 Knowledge flow page

This page is the first page of the knowledge flow of these hospitals TB and MDR unit that anyone interested to know about the knowledge sharing can easily access whenever he/she opens the hospital web page. On this page, visitors may find the overall concepts what knowledge management mean, components/elements of knowledge management, knowledge sharing, means of knowledge sharing, importance of knowledge sharing, how everyone can be involved in knowledge sharing, components/knowledge areas to be shared in TB and MDR unit, importance of knowledge sharing in TB and MDR unit, the number and mix of nurses engaged in knowledge sharing in the department, role of professionals in knowledge sharing, hospital organogram, and other important information concerning knowledge sharing.

5.1.2 Nursing care resources page

In this page documents down load or uploaded on this site/page by the site administrator and/or nurses in soft copy can be easily accessed by professionals working in these hospitals, regardless of the department they are working in. The resources page is designed in a way that it can help nurse's access topic specific resources or knowledge of nurses based on assessment, diagnosis, planning, implementation, evaluation during TB and MDRTB management. Resources are materials like different modules, guidelines, manuals, research and others.

5.1.3 Decision support

In this page can be easily accessed rule based decision making system. Decision support page is designed in a way that it can help nurse's access knowledge based on assessment, diagnosis, planning, implementation, evaluation during TB and MDRTB management this is important nurses if were completely new and I did not know so much about TB treatment like what should be done now? It is simple to just I can see which work for each NP phase.

5.1.4 Discussion Forum of nurses Page

Discussion Forum Page Knowledge sharing among health professionals is important to quality health care. One means of sharing tacit knowledge among employees of a given organization is engaging in discussion forum face to face or using different platforms like this page. Therefore,

this specific discussion forum page plays its role in the knowledge sharing activity among nurses working in the TB and MDRTB management unit. Nurses s with account on this portal will easily chat with other colleagues either on the topic they created or titles created by other individuals, comment on other people‘s post, edit and delete their own post.

5.3 Knowledge management system

5.3.1 Knowledge Portal

Portal is a one point access user interface that provides secure, customizable, personalizable, and integrated access to dynamic information from a variety of sources, in a variety of source formats, wherever it is needed. Its offers various internal, external resources with other services which encompass and management of books, journals, databases, Web-sites, learning objects, library catalogue, email, forums, lesson learned, best practices and experiences of individual(10).

Knowledge Portal (KP) as a type of portal that purposely supports and stimulates knowledge transfer, knowledge storage and retrieval, knowledge creation, knowledge integration, and knowledge application (i.e., the processes of knowledge management) by providing access to relevant knowledge artifacts(25).

The major functionalities of knowledge portal are

1. **Search and navigation:** This functionality forms the basis for most of the successful public web portals meaning that a successful portal should support its users in an efficient search for contents.

2. **Personalization:** Personalization is vital to the devilry of appropriate information to portal user gets only the information which is specifically tailored to his/her needs. Personalization should be used on user roles, as well as user performances.

3. **Knowledge mapping:** provides guide to, or inventory of, an organization’s internal or external repositories or sources of information or knowledge. These sources may include documents, file and databases, recordings of best practices or activities.

4. **Content management system (CMS):** A Content Management System (hence after CMS) is a platform, system or software application which is powering websites, use to manage, edit, and upload the content of the website without changing any Html code (52)

5.3 Knowledge repositories

The bottom layer in knowledge management architecture is where repositories are installed. Repositories are storage devices that hold explicit and tacit knowledge and the rules associated with them (10).

Since, the knowledge required for healthcare is complex the implemented system should have Document Management of TB management based on NP, Clinical Data base and Data ware house TB management based on NP and Knowledge base and Knowledge warehouse TB management based on NP will be created from by application layer like web server and web browser, use search engine such as Decision support system Research Repository and guidelines, Discussion Forum of nurses, TB management resources. Once the repositories are created they are linked to form an integrated repository. An integrated repository brings together all the knowledge available from the repositories.

Main Menu User Interface Screen

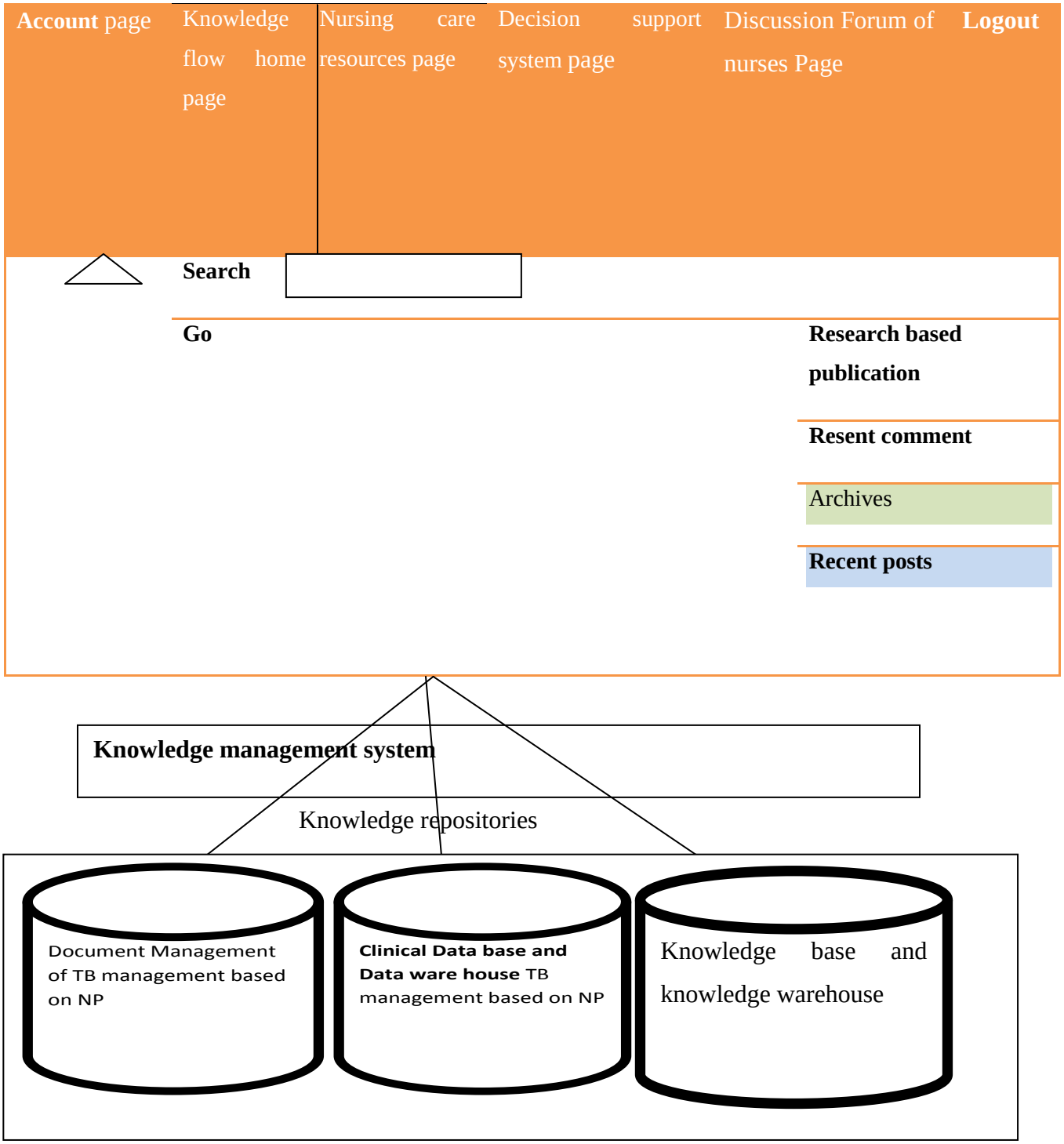


Figure 5.1 Proposed blueprint of improving knowledge flow during nursing process for tuberculosis management

5.4. Proposed blueprint of improving knowledge flow during nursing process for tuberculosis management evaluation

Initial input of for developing blueprint of improving knowledge flow during nursing process for tuberculosis management is result of the study participants like According to qualitative study *if possible available internet accesses, develop knowledge portal and also fulfill necessary ICT material or equipment ,open discussion mechanism or communication way important to apply nursing care and also develop IT based information system for nurses to tuberculosis management* this idea also support quantitative study and after Proposed blueprint evaluation of the proposed blueprint is all about checking whether the proposed blueprint of improving knowledge flow during nursing process for tuberculosis management is aligned with the expectation of end users. In order to evaluate the proposed blueprint, nurses from different departments were interviewed.

The interviewed nurses suggested the idea that the proposed blueprint is all about checking whether the proposed blueprint of improving knowledge flow during nursing process for tuberculosis management has ability to reduce medical errors and miss diagnosis by easing access existing knowledge resources, since we can manage our patients by referring to the existing knowledge example: how nurses implementation of nursing process during TB management. The main challenge that users specified is that the supporting infrastructures and ICT experts are lacking and suggested that the hospital should facilitate supporting ICT infrastructure and experts and should implement the proposed blueprint.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

The overall objective of this project is to effectively implement nursing process. Nursing process is perceived to be hindered by factors such as high patient nurse ratio/work load, and lack of training about ICT, motivating factors, lack of regular supply of nursing process materials or equipment, lack of interest by some nurses and knowledge gap among nurses or negative attitude of the health care givers toward implementation of NP. To improve the above factor and management of TB this project has created blueprint of Knowledge flow of NP. Hence, The proposed knowledge flow blueprint will enhance sharing of knowledge among nurses ,increase job performance and facilitate creation of new knowledge which will further help healthcare organization to improve the quality of healthcare delivery and produce more desirable work outcome.

The study result in St.Peter's hospital and Alert hospital shows that most of nurses are aware of the importance of knowledge flow and have appropriate personality for implementation NP but they are not engaged in NP implementation. Formal opportunity like training and communication technology infrastructures like internet are absent in the hospital, which shows, internet is the least used knowledge sharing mechanism within those hospitals.

A significant number of healthcare professionals are not satisfied with their current job. The cause for dissatisfaction is basically lack of reward and recognition for their effort.

To survive in such a rapidly changing environment**,** the public hospital is faced with a greater push and need to reduce costs and increase efficiencies while maintaining high standards of healthcare service delivery. Furthermore, the critical and emergent nature of the work carried out in such a knowledge-intensive work environment by highly knowledgeable workforce in crucially short supply made the usage of the web portal and its impact on knowledge sharing a pertinent area for research.

Factors that were identified as independent predictor of knowledge flow of NP for TB patient management are good knowledge, the organization provide training of better knowledge capability and Work experience. This shows that presence of these factors improves knowledge flow and absence will hinder knowledge flow of nursing process. Hence, the proposed blueprint frame work of improving knowledge flow nursing management for tuberculosis patient is designed to enable information technology play its part in enhancing knowledge flow in those hospitals.

6.2 Recommendation

Based on the findings of this project the following specific recommendations are made:

Nurses should be able to use other knowledge sharing mechanisms like internet and they should be able to create social network with colleagues. ICT infrastructure such as internet that can facilitate knowledge flow should be provided by these hospitals and also those hospitals should use the proposed blueprint of improving knowledge flow nursing management for tuberculosis patient as base and design healthcare knowledge management system.

There should be supportive leadership to encourage knowledge sharing activity with nurses within those hospitals to improved knowledge flow of nursing care practice TB patient management.

Those hospitals administrative should provide resources to hospitals such as specific budget, periodic plan and ICT infrastructure like providing internet access.

It is also necessary to undertake further research as to create a networked environment (i.e. online discussion) that enables other hospitals and health centers share knowledge and important to capture lessons learned from experience.

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ANNEXES

Annex 1. Information Sheet

My name is Adugna Bezabih. I came from Addis Ababa University and I am currently conducting a project for the partial fulfillment of master's degree in health informatics. The purpose of this research project is improving knowledge flow for nursing care in tuberculosis management; the case of St. Peter's and Alert hospitals.

I would like to ask you some questions related to the topic I mentioned above and all of your responses to questions will be kept strictly confidential throughout the project. Participation in this project is voluntary and you can choose not to answer any individual question or all of the questions. We look forward for your full participation as the answers you give on this form will help in better understanding of the situation of knowledge flow for nursing care in tuberculosis management; the case of St. Peter's and Alert hospitals and will help in proposed blueprint designing appropriate intervention programs to alleviate knowledge flow problems.

Your participation /non participation or refusal to answer question will have no effect now or in the near future on services that you or any member of the family may receive.

May I get your permission to continue?

Yes ☐ Go to the consent form

No ☐ stop

Annex II-Consent form

I have been informed that this questionnaire is part of research project that propose blueprint improving knowledge flow during nursing care for tuberculosis management; the case of St. Peter's and Alert hospitals. I have been told that the project will help in better understanding of the situation of knowledge flow during nursing care for tuberculosis management and understanding the situation will help in designing intervention program to alleviate the knowledge flow problems for future which will benefits all nurses in the health care organization. In addition I have been told about how the data collection will proceed. I clearly understand that my participation/non participation, or refusal to answer questions will have no effect now or in the future on service that I or any members of my family may receive from health services providers. At last I am assured that confidentiality of my response is maintained. Therefore, I am consented to participate in the study by signing this form

The study participant's Signature_____

Date_____

Annex III Questionnaire

Part 1: Demographic Profile of the Respondents

1. gender

   A Male B. Female

2. Date of births day, month, year _____
3. Current Salary (per month)? _____
4. Marital status

   a. Marred b. singled c. widowed /separated

5. Religious back ground

   a. Orthodox b. Muslim c. protestant d. catholic e. other

Dependent variable questioner

1. Do you think that improving knowledge flow of nursing care will improve tuberculosis management?

    a. Yes b. No

I. Questioners of factor

1. Knowledge management related factor

1.1 knowledge capture

2. What type of nursing care knowledge in organization exists mostly?

    A. Tacit (which Will be found in the mind of people

    B. Explicit (found in the document form)

    C. I don't know

3. is there any technique to capture nursing care knowledge in tuberculosis management?

    a. Yes b. no c. I don't know

4. If yes what type of technique used

    a. Face to face b. computer c. phone d. internet/intranet

1.2 knowledge stores

5. **do you document all nursing care practice and procedure**

    a. Always b. mostly c. sometime s d. never

6. what tool and technique in the organization to manage knowledge flow of nursing

    Care practice?

    a. manuals/hard copy b. internet/intranet c . Knowledge based d. never

1.3 .knowledge use

7. Do you access knowledge of nursing care that need for tuberculosis management?

    a. Yes b. no c. I don't know

8. If yes by what mechanism used

    a. Written document b. Knowledgebase c. internet(web based)

1 .4 knowledge transfer

9. How frequently formal opportunities like training and work shop offered within the organization that allow employees to share knowledge of tuberculosis management by nurse ?

    a. Yes b. no c. I don't know

10. Do you agree that you would gain new idea or information by sharing knowledge?

    a. Strongly agree b. agree c. Neutral d. dis agree e. strongly disagree

11. How much did you feel motivated to transfer knowledge in your organization?

    a. very high b. high c. medium d. low e. very low

2. **Professional related factor**

2.1 Educational level and experience

1. Your highest educational level in nursing?

    A. Diploma b. First Degree

    c. Masters Degree

2. Your work experience in the health organization in a year?

    2.2 <one year b. 1-5 years c. 5-10 d10-15years e. >15 years

3. Can experience and education level of nurses have different outcome in management of tuberculosis patient?

    a. Strongly agree B. agree C. Neutral D. Disagree E. Strongly Disagree

4. Does your education level adequate to apply / implement Nursing Process?

    a. Yes b. No

2.2. Job satisfaction

1. I am satisfied with my current job?

A. strongly agrees B agree C. Neutral D. Disagree E. Strongly Disagree

2. If your answer for Question number 1 is "strongly Disagree" or "Disagree" which of the following is/are the cause of dissatisfaction (possible to choose more than one answer)?

A. In adequate / no opportunity for further education and training

B. Lack of attractive salary

C. Lack of rewarded and recognition system for any achievement

D. Other Specify_____

2 .3. Knowledge attitude and practice of nurses (skill) about implementation of nursing process

Knowledge Assessment

1. Which one is the first step A nurse should do with nursing process

A. Collecting subjective and objective data

B. Directly intervening the problems of the patient

C. Evaluating what to be done for the patient

D. Indicating the activities to be done

E. Other, specify_____

2. What makes nursing process different from medical approach?

A. Nursing diagnosis always focuses on the diseases than other human responses

B. Nursing diagnosis always focuses on human responses than diseases process

C. Both focuses on human responses but nursing process is limited to pathological problems

D. Both have similar procedure to resolve a patient‘s problem E. Other, specify_____

3. One is not included under the activities to be performed in the planning phase of nursing process

A. Assigning priorities to the nursing diagnoses and collaborative problems

B. Specifying expected outcomes

C .recording the date base of patient

D. Specifying the immediate, intermediate, and long-term goals of nursing action

E. Identifying specific nursing interventions appropriate for attaining the outcomes

F. Identifying interdependent interventions G. Other, specify_____

4. In implementation step of nursing process a nurse is expected to perform

A. Proposing the interventions for the patient’s problem

B. Implementing the proposed interventions in the planning phase**.**

C. Performing the planned interventions excluding activity of daily living

D. Finishing the phase if the initial implementation could not bring any observable change on the patient’s problem.

E. Other, specify_____

5. One could not be a guide for evaluation of nurses’ performance in nursing process

A. The nursing diagnoses B. collaborative problems C. Priorities and nursing interventions D. expected outcomes

E. All could be guidelines F. Other, specify_____

6. Which one could be the first step of nursing diagnosis?

A .Identify the etiology of the problem B. Identify the Patient's nursing problem

C. Identify the defining characteristics of the nursing problem D. State nursing diagnosis concisely and precisely

E. Other, specify_____

7. Write down steps of nursing process in order?

_____ _____
_____ _____
_____ _____

8. Mention all types of nursing Assessment in tuberculosis?

_____ _____

_____ _____

_____

The attitude of nurse toward nursing process

The attitude of nurse toward nursing process know	Response				
	strongly agree	agree	neutral	Disagree	Strongly disagree
1. I like the aim of nursing					
2. I'm convinced if the NP will implemented in pt care process					
3. The nursing process is elaborated Kardex system					
4. The nursing process should be used by BSc only					
5. The nursing process works well in practice					
6. The nursing process can be used in any settings					
7. There is no enough time to apply NP during pt care					
8. Nursing process is a waste of time					

9. The Kardex system of nursing record is unsatisfactory					
10. I'm ready for the implementation of nursing process					
11. The NP simplifies the awareness of needs					
12. Priorities of care are easy to identify using NP					
13. I'm fed up with hearing about the nursing process					
14. The nursing process involves too much of paper work					
15. NP enables to provide quality nursing care to pts					
16. I'm willing implement nursing process during pt care					
17. I think introduction of NP will cause a problem					
18. I think the pts will not like to be cared for using the NP					
19. I think the nursing staff have no willingness implement to NP					
20. I think the staff will never accept the nursing process					

The practice of /the implementing nursing process by the nurses

Implementation of nursing process		**yes**	**No**
1. Do you follow the steps of nursing process during provision of care?			
2. Is data collection take place during the assessment phase?			
3. Is a written nursing history taken, using a specific form?			
4. Have you developed nursing diagnosis from your assessment?	Actual		
	Risk		
	Possible		
	Wellness		
	Collaborative		
5. Does the assessment of the patient conclude with the identification and documentation of the nursing diagnosis/ problems			

6. Are problem statements arranged in order of priority?		
7. Does the nursing care plan incorporate the nursing problems identified		
8. Do the goals provide enough detail (i. e. time to be accomplished, who will accomplish what and how		
9. Are goals for the resolution of each one of the problems identified and documented in the care plan		
10. Are nursing interventions identified and documented in the care plan?		
11. Are planned nursing interventions written with enough detail?		
12. Is the patient's condition reassessed before implementing any planned nursing intervention in order to be sure of its appropriateness?		
13. Are nurses in this hospital responsible for the planning of patient care?		
14. Is a systematic evaluation made of the effectiveness of care given to solve patient		
15. Is the evaluation recorded in the care plans or progress notes?		
16. Are care plans used both day and night as a basis for giving care?		
17. Are objective measures of patient progress towards the identified goals used on the ward		
18. Are care plans modified according to the results of evaluation?		
19. Have you attended any course, talk or seminar related to the nursing process recently on the ward or in the Hospital		
20. Was the nursing process taught during your studies at the Nursing School		

3. Information communication factor

1. Can you present computer nursing room for recording management of patient and reporting purpose?

a. Yes b. no c. I don't know

2. Which method of documentation system prefer for nursing care in tuberculosis management?

a. Writing manual b. computer based c. all of them

3. My organization has up-to-date ICT infrastructure which helps knowledge flow

a. Strongly agree B. agree C. Neutral D. Disagree E. Strongly Disagree

4. In my organization, employees use knowledge networks such as (email, intranet, internet) to communicate with colleagues

A. strongly agree B. agree C. Neutral D. Disagree E. Strongly Disagree

5. In my organization there is lack of technical support and immediate maintenance of integrated IT systems which obstructs work routines and communication flows.

a. Strongly agree B. agree C. Neutral D. Disagree E. Strongly Disagree

6. In my organization there is lack of training to familiarize employee's new IT systems and processes.

A. Strongly agree B. agree C. Neutral D. Disagree E. Strongly Disagree

4. Organization factor

NO	4.1 organizational cultures	Strongly agree	Agree	Neutral	Disagrees	Strongly disagree
1	My organization has developed culture that encourages learning from mistake					
2	Oriented the work of my job and structure of organization while joining the current organization					
3	My organization has Nursing process work based unsympathetic managers					
	4.2 Organizational structure					
4	The organization leaders openly explain the purpose of the company policies objective, strategies, Expectations to workers.					
5	The hospital administration supports the application/ implementation of NP?					
6	My organization has dedicated staff who can contribute knowledge easily when required					
7	There is continuous monitoring and evaluation Practice.					
8	Nursing process implementation delay based on changing new reporting system					
	4.3 organizational resource					
9	The organization allocation adequate resources for application / implementation of NP?					
10	There is shortage of nurses(man power) in the hospital					
11	The nurse patient ratio is optimal to apply / implement the nursing process?					
	4.4 reward and recognition					
12	The organization provide training and development of better knowledge capability skill sets					

13 6	They are Contributing to a library of re usable knowledge resource					
14 7	They are To maximize collaboration, trust, team spirit ,and staff relationship					
15 8	Lack of reward and recognition system for the work					
16 9	Reward is encouraging someone while discouraging the other					
	4.5 **opportunity of training and development**					
17 10	Offer training for nurses about tuberculosis management					
18	I got on the job training on nursing process for tuberculosis treatment					
19	I always find sufficient knowledge to enable me to do my task					
20	I am satisfied with the nursing knowledge that is available in my department to use					

Interview

1. What is the term "knowledge of nursing care (process) to you?
2. What the specific nursing care do you provide to your tuberculosis patients?
3. What challenges do you encounter when implementing NP for tuberculosis clients/patients patient (in terms of facilities, human resources, communication channel, attitude, and skill of the staffs and how influential is the challenges?
4. What factors do you think are important in order to implement it properly?
5. Do you find them willing to improve knowledge flow of nursing care in tuberculosis management by addressed challenges /factors?