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Alignment of knowledge management process with clinical process to support evidence based decision in healthcare improvements: The case of selected Ethiopian hospitals

Mniyichel Belay[1] | Amare Desta[2] | Steve Smithson[3] | Million Meshesha[4]

[1]Department of Information Science, Jimma University, Jimma, Ethiopia

[2]Professor of Information & Knowledge Management, Queen Mary University of London (QMUL), London, UK

[3]Department of Management, London School of Economics, London, UK

[4]School of Information Science, Addis Ababa University, Addis Ababa, Ethiopia

Correspondence
Mniyichel Belay, Department of Information Science, Jimma University, Jimma, Ethiopia.
Email: ethio2000mniyichel@gmail.com

This article aims to explore existing knowledge management (KM) process in healthcare sectors and argues for an effective KM alignment with the clinical processes. Basically, it discusses KM's processes such as knowledge capture, knowledge store, and knowledge transfer to support decision making. This article uses an ethnographic approach to studying the KM process in selected Ethiopian hospitals. Methods include qualitative interviews with senior administrators and various levels medical and administrative staff that record the existing ways of KM, knowledge process, medical decision makers, and support of KM for a medical decision maker. It include both primary and secondary data collected from health professionals in selected hospitals. A semistructured interview was employed to acquire the required knowledge from the selected domain. The findings highlight the weak trends of KM in our sample hospitals. Our results articulated ways to improve KM processes, increase the quality of health services, and support evidence-informed decision making. This article recommends the need for a detail view of KM strategy/policy supporting or assisting decision makers.

1 | INTRODUCTION

Efficiency and effectiveness of healthcare need seamless knowledge processes that enable and support decision making and interaction between different actors within healthcare (Stefanelli, 2004). Rexhepi (2015) also strongly argued that delivering effective and good quality care is a complex endeavor that is highly dependent on medical knowledge.

As stated by Farlex (2012), medical knowledge is the body of information about diseases, mechanisms and pathogenesis, therapies and interactions, and interpretation of lab tests, which is broadly applicable to decisions about multiple patients and public health policies. Similarly, it includes an understanding of all established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences (Nejim, 2016). The different authors also pointed out the applicability of medical knowledge in clinical processes healthcare. Nejim (2016) also argues that the acquisition of medical knowledge should continually circulate back to the application of it and provide better and more relevant, quality patient care.

Nowadays, health sectors are knowledge-intensive environments involving rapidly changing medical technologies and requiring tools, skills, and methods with more knowledge resources (Hyun-Sook,- 2017). Similarly, Figurska and Sokół (2014) report that knowledge as a strategic resource and its competent management is becoming increasingly important for the competitiveness of the health sector. Moreover, Shnhoras (2007) note that health sectors require a highly divergent set of activities, such as providing healthcare, testing, diagnosis and treatments, as well as understanding complicated decision-making processes with managing knowledge.

In healthcare, knowledge management (KM) is seen as a key factor in realizing and sustaining organizational success from improved efficiency and innovation (Alawneh, 2009). It is being developed mainly in the domain of electronic health record management and health organization management. But healthcare KM raises different challenges and issues due to its nature (Abidi, 2008). Similarly, KM is

becoming an established discipline with many applications and techniques; though its adoption and alignement in healthcare has been challenging (Zipperer, 2016).

The health sector relies heavily on knowledge and evidence-based medicine is expected to be implemented in daily healthcare activities; besides, the delivery of care relies on the cooperation of several partners that need to exchange their knowledge in order to provide quality of care. In public health, a decision is mainly based on data and a shift is needed towards evidence-based decision making (Zipperer, 2016).

As cited by Hyun-Sook (2017), Earl (2001) pointed out that KM has been recognized as being central to product and process innovation, executive decision making, and organizational adaptation and renewal. To achieve competitive sustainability, many organizations are launching extensive KM efforts. The success of an organization ultimately depends on the KM process, which creates long-term benefits, learns new techniques, solves problems, creates core competencies and adapts to new situations.

As indicated by various studies (e.g., Karamat et al., 2019), within developing countries, the adoption of KM has excited great interest in both public and private hospitals. However, KM implementation is currently in its infancy. The healthcare of developing countries has suffered greatly due to an increase in diseases, population growth, limited resources and performance issues, and many organizations now look toward the adoption of KM to manage their knowledge and improve their performance.

In order to manage knowledge effectively, the right KM processes and the essential factors for successfully implementing KM should be considered carefully. Although there is much literature that discusses KM processes and success factors (e.g., Igbinovia & Ikenwe, 2018; Jennex & Olfman, 2011; Zipperer, 2016), there remains a gap in understanding how KM processes and clinical processes should be aligned in hospitals.

Karamat,Shurong, Ahmad, Waheed, and Khan (2018) identify various challenges in implementing KM in the health sector, including lack of support from organization structure, unhelpful organizational culture, uncertainty about the effectiveness of KM, the complexity of healthcare systems, a lack of KM integration, scarcity of resources, poor information quality and a lack of teamwork. Schwartz and Cohn (2014) also identify a lack of leadership and process innovation as the main barriers to KM implementation. However, studies in the healthcare field concerning alignments of KM processes with clinical processes remain rare. Ethiopian hospitals, including Jimma University specialized hospital, have not practiced alignment with the clinical processes to support decision making in healthcare sector.

Therefore, the aim of this article is to examine the extent to which KM processes are aligned with the clinical processes in the healthcare industry of Ethiopia. To achieve the main objective of this study, the following specific objectives are formulated:

- To identify the existing ways and support of KM for the medical decision maker.
- To identify the knowledge processes and medical decision makers to have the most potential to be supported through KM.

This article presents a literature review of KM in healthcare and the alignment of KM processes with healthcare. This is followed by a description of the research methodology, the results and discussion, conclusion, and recommendations.

2 | LITERATURE REVIEW

2.1 | KM in healthcare

In a healthcare context, KM is the formal management of knowledge for facilitating the creation, identification, acquisition, development, dissemination, utilization, and preservation of healthcare knowledge using technology (Amararachchi & Pulasinghe, 2013).

According to Guptill (2015), KM has a tremendous role and value to the healthcare industry, particularly for hospitals and hospital systems. Dependence on knowledge requires the healthcare sector to implement an effective system to manage knowledge properly as new knowledge is continuously being generated (Karamat et al., 2019). Developing countries are now also looking towards the alignment of KM in their healthcare. Currently, Ethiopia is among the developing countries that need to make the most effort on aligning KM processes with clinical processes.

There are several definitions of KM within healthcare, reflecting how the management of knowledge is just as important as managing resources (Mohajan, 2017). KM is the management of information and knowledge and their usage in organizational processes within the organization. Bolarinwa (2012) lists other notable dimensions of KM in healthcare: clinical experiences (both recorded and observed) and lessons learnt, collaborative problem-solving discussions between practitioners, operational policies eliciting clinical protocols and care pathways, educational resources in terms of medical education content for practitioners and health education content for patients and social knowledge in terms of a community of practice and their communication patterns, interests and expertise of individual community members.

Jawad (2019) argues that KM can help in improving performance by reducing the time spent on communication, recording, and combining patient information because traditionally the information provided was often obsolete or unrecorded. This took up 33% of doctors' working hours, increased the cost and also resulted in improper medical care for the patient (United States Agency for International Development, 2012).

Bolarinwa (2012) discusses the importance of KM in healthcare, reporting that many organizations fail to effectively manage and use the most important competitive edge they possess: their knowledge and intellectual content. According to Hanka (2015), KM has become an important issue in healthcare as a medical practice requires tools to extend humans' limited capacity to recall and process large numbers of relevant variables. Much of the knowledge that professionals retain

becomes obsolete and there is no assurance that they would learn new knowledge relevant to their patients' problems. Similarly, Morr and Subercaze (2010) in their handbook of research on developments in e-Health and telemedicine argue that KM is of paramount importance for collaboration and sharing of knowledge so that optimal outcomes of the healthcare service are improved.

KM is able to assist in reducing medical errors and consequently their cost, by providing decision support for practitioners (Zipperer, 2016). The goal of KM is to support relevant actions, facilitating medical processes with "a knowledge pull" instead of increasing the knowledge load in healthcare. It also supports better approaches in prescribing medication and suggesting ways of curing or additional tests, as a reminder of best practices used for particular problems. To deal with tasks, we always need relevant knowledge from reliable sources within the domain. The challenge in healthcare is to increase such KM in an active manner so that healthcare professionals can realise the rich benefits for their routine purposes. For many years, healthcare professionals have relied on a fixed and body of knowledge and records to deal with their patients.

2.2 | Alignment of KM and clinical processes

Medical KM comprises knowledge gathering, sharing, transfer and retention within the clinical process and is used to enable effective and successful decision making. Ambrose (2000) points out the importance of alignment of KM:

> …. the patients present themselves with cases that can characterize them in terms of complexity of the symptoms and urgency of treatment. Combinations of these factors lead the healthcare delivery organization making choices towards the adoption of KM processes and putting their focus on specific performance measures.

As stated by Berman, Pallas, Smith, Curry, and Bradley (2011), improving the performance of organizations that deliver health services requires an alignment among strategy, environmental conditions, and implementation capability. Medical KM and care processes have come to be considered as valuable strategic assets that can lead to sustained increase in health care organization performance (Stefanelli, 2004). Thus, it is essential to investigate the alignment of healthcare knowledge, organization, process, and system perspectives.

Hanife (2018) argues that decisions about the care of individual patients require the alignment of KM and healthcare services. However, despite the justification that evidence-based medicine and shared decision making may lead to better quality and safety of care, implementation remains limited in practice (Barratt, 2008). As a matter of fact, the availability of patient information and medical knowledge is a prerequisite for evidence-based practice. However, much of the information about a patient (e.g., diagnosis, treatments, therapies, medication lists, etc.) and the latest medical knowledge are often under-utilized at the point-of-care and point-of-need, due to the absence of efficient and comprehensive KM systems throughout the healthcare delivery system. Many healthcare organizations today are experiencing the challenge of achieving a streamlined exchange of knowledge between different healthcare providers (Hanife, 2018):

> Healthcare professionals have limited access to patient information and medical knowledge. The patient's access to information electronically is also limited, which means that healthcare professionals are usually their primary source to information.

Various studies have been conducted internationally to investigate KM processes in healthcare; for example, a study conducted in Kongju National University, Kongju, Korea by Lee (2017) on "Knowledge Management Enablers and Process in Hospital Organizations." This research investigated the effects of KM enablers, such as organizational structure, leadership, learning, information technology systems, trust and collaboration, on the KM processes of creation, storage, sharing, and application, Using data from self-administered questionnaires in four Korean tertiary hospitals, this survey revealed that KM processes are essential because they enable organizations to enhance innovation performance and reduce redundant learning efforts. A study conducted in the University of KwaZulu-Natal, South Africa by Olateju and Stephen (2019) on "the relationship between knowledge management and nursing care performance" investigated the relationship between KM and the performance of nursing care in two selected teaching hospitals. Questionnaire data was collected from 320 registered nurses using the proportionate stratified sampling method. The findings reveal that information technology, organizational structure, and organizational culture in KM infrastructure are found to positively and significantly influence KM processes (knowledge acquisition, conversion, application, and protection).

The above literature shows that more research into the alignment of medical KM process with clinical processes is needed. The literature suggests that many organizations fail in their attempts to align their KM processes with the clinical processes within their organization. Thus, this article explores the alignment of KM processes with clinical processes in selected Ethiopian hospitals.

3 | RESEARCH METHODOLOGY AND DESIGN

For this study, a qualitative research approach was used to investigate the alignment of KM processes with clinical processes in selected hospitals in Ethiopia. This approach allowed the researcher to be closely involved with the respondents and the data in the study. Qualitative research designs stress the importance of looking at the variables in their natural settings. This offers investigators the opportunity to engage with respondents in flexible, and rewarding interviews. In addition, qualitative research methods are increasingly recognized in

the area of health and health care; Sarah and Gesler (2000) comment that "Qualitative research is … essential to the knowledge development of the health care discipline." Qualitative methods involve fieldwork where the researcher participates in the setting through observation and interviews with respondents.

For this study, the interpretive paradigm was adopted, first, in order to provide richer and more authentic information. Second, leveraging interactive interview "allowed the researcher to investigate and prompt things that we couldn't observe, researchers can probe an interviewee's thoughts, values, prejudices, perceptions, views, feelings and perspectives" (Wellington & Szczerbinski, 2007). This paradigm encouraged us to understand the perceptions of the variety of different stakeholders: IT professionals, interns, surgeons, general medical practitioners, pharmacists, nurses, radiographers, laboratory staff, managers, administrators and researchers—all the essential actors within Jimma University specialized referral hospital and the Ministry of Health.

The ethnographic methodology was followed for conducting the survey. This enabled the researcher involved in collecting observational data of an intact cultural group of decision makers. Ethnography has been described as the study of individual cultures and producing a "descriptive work from such research" (Rudkin & Deo, 2006). Ethnography was selected for this study for two reasons: firstly, it enabled the analysis of actual experiences when gathering empirical data and, secondly, it was most appropriate for studying different aspects of the research and comparing themes that emerged from the data collected from different sources and methods (Small, 2011).

For this research, purposive sampling techniques were used to select samples from the total population. This allowed us to focus on a limited number of participants that have direct access to the study area/working environment.

Data about the alignment of KM processes with clinical processes were collected from primary sources using semistructured interviews, and documentation was reviewed to ensure the validity and reliability of the findings. Data collection involved 78 interviews with a wide range of people from Jimma University referral specialized hospitals and the Ethiopian Ministry of Health. The respondents were selected based on their relationship with the phenomenon under investigation, sufficient and relevant work experience in health sectors, active involvement in decision making, as well as demonstrating an understanding of KM processes. The summary of interviews conducted with members of each stakeholder group is listed in Table 1 below.

TABLE 1 Statistical information of respondents interviewed

Stakeholder group	No. of participants interviewed	Percentage of participantsinterviewed
Managers/ administrators	2	2.6
Interns	10	12.8
Surgeons	5	6.4
IT professionals	8	10.2
General medical practitioners	16	20.5
Pharmacists	14	17.9
Nurses	15	19.2
Radiographers	3	3.7
Laboratory staff	6	7.5

4 | RESULT AND DISCUSSION

This research investigated the process of KM in decision making in healthcare improvements. The findings identified the experience of employees in managing knowledge for facilitating the clinical process.

In this section, the results of the data collection are interpreted and compared to the existing literature. The findings developed from all data collection and interpretations are comprised of the following basic theme:

Theme	Subtheme
Existing ways of KM process	• Existence trends/practice of KM processes ◦ Capture of knowledge ◦ Store of knowledge ◦ Reuse of knowledge ◦ Transfer of knowledge • The sources of medical knowledge (internals and externals • Methods and techniques
Decision-making processes and decision maker	• Decision-making processes support with KM • Decision maker

4.1 | Existing ways of the knowledge management process

On this specific issue, the researcher tried to identify the existing experience in managing knowledge in healthcare. In health sectors, the sources of medical knowledge (internals and externals) used in diagnosis aids and the existing knowledge proceses, people (stakeholders or decision makers), methods and techniques, procedures or processes (capture, store, reuse, and transfer) are essentials to effectively manage knowledge and this also helps to make effective decisions.

The selected medical doctors, nurses and top level manager were asked about KM process. Their response indicated that, the existing KM process needs modification, transfers of knowledge and new knowledge needs to be well aligned with clinical processes. According to respondents reply, it is their day-to-day practice that knowledge is captured, stored, transferred, and reused within and among hospitals.

> Direct interview of patients or interaction with patients during rounds, meetings or discussions with

> staff are a source of new knowledge capturing for decision making.
>
> … We have a meeting throughout the different departments of hospitals, the minute containing daily meeting discussion distributed throughout the organization staff. This is a way of knowledge transfers.
>
> …. Patient record and organizational knowledge is store using personals computers and paper based on shelves.

Nurse members also pointed out that all KM processes need to be modified because this has a great opportunity to make an effective decision. Especially, the ways of transferring knowledge are not well organized due to the following reasons: the absence of a well-prepared KM technology platform for transfer knowledge, the presence of unorganized knowledge within an organization, lack of motivation to sharing knowledge and Inadequate skill of knowledge managers and workers.

Similarly, General medical practitioner strongly pointed out that,

> The huge amount of knowledge captured in the clinical process, but it is unable to successfully apply the information across the entire process of health-care delivery due to weak trends of knowledge transfer in the organization.

When asked about the flow of effective decision making supported with KM. Medical doctors said that

> In the clinical process, the first step is collecting information (i.e. diagnosis of patients). This is followed by an analysis of information. Based on the analysis of information course of action is chosen. Lastly, the processed information is communicated for the stakeholders to carry out decisions.

The respondents further asserted that health professionals are more likely to transfer knowledge with staff members among their professional group (communities of practice) through meetings, emails, internet, internal memos, and notice boards. Similarly, the patients also provide information about their own illness, symptoms, physical and psychological reactions, and previous diseases and treatments. During diagnosis and treatment, several staff members are involved such as doctors, nurses, and other health professionals. They have medical knowledge that can be transfered to support not only patients but also their staff members. The medical doctors also say,

> There is no central information repository where staff members could access knowledge, could be inhibiting to knowledge management process i.e. Knowledge creation, knowledge sharing or knowledge transfer and knowledge application.

The finding in the transfer of knowledge in the hospitals clearly shows that medical knowledge sharing and transfer are not effective among health professionals due to the absence of central information repository.

Based on the above finding on the KM process in decision making, it can be concluded that health professionals in their day-to-day practice medical knowledge are captured, stored, transferred, and reused within and among hospitals. However, it is unable to successfully apply the knowledge across the entire process of health-care delivery due to the absence of well-prepared KM technology in the organization.

4.1.1 | Sources of medical knowledge

As noted by respondents from different groups (i.e., IT professionals, managers, or administrators), the sources of knowledge in the hospitals are paper-based patient history, medical records, daily report papers meetings, consultations, and ward rounds reports, the report from broadcast media and Internet (website). They said that.

> …Even day to day we have individual patient's observations (visits) with group members of but we have weak trends to manage knowledge in the proper way.

4.1.2 | KM methods and techniques

In relation to methods and techniques of KM, IT professionals and administrators commented that

> ….We believe that there are no specific methods and techniques for managing knowledge in hospitals. But they are using during their duty hours a paper-based record management system for patient's history.

Similarly, one respondent said that,

> …….. Medical knowledge is underutilized due to the absence of efficient and comprehensive methods and techniques. As a result, health care professionals have limited access to patient information and medical knowledge.

During the interview, nurses informed us about methods and techniques for managing knowledge in each clinical process.

> They are using during their duty hours including paper-based record system for patient's history where they maintain log notes about their patients. For checking

> medication's side effects, a pharmaceutical system is used to connect with pharmacy system.

The nurse supervisor also says that

> At the end of our shift, we conduct meeting with the next shift's staff to inform about the conditions of the patients. Each floor of the hospital has a separate supervisor and charge nurse and other staff. So, they conduct such meetings. This is one technique for KM that gives us an idea of how meetings could play an important role in KM

.

In the course of the various discussions held with respondents during the interviews session, it was found out that respondents are enthusiastic about embracing it and many of them believe the following. First, there is a lack of awareness about managing knowledge for decision makers. Second, medical knowledge is underutilized due to the absence of efficient and comprehensive methods. Third, there is a lack of well-defined organizational structure for managing knowledge so as to improve health care services. Finally, health care professionals have limited access to patient information and medical knowledge.

Based on the above findings, KM is newly exercised in hospitals. However, medical knowledge is underutilized due to the absence of efficient and comprehensive methods and techniques for managing knowledge.

4.2 | Stakeholders and decision makers

When the members of medical doctors, and top managers or administrators asked about stakeholders and decision makers in the hospitals, they emphasized that identifying appropriate primary stockholders or, is very important. In the clinical process, managerial positions have been known as the most eligible positions for decision makers.

> …. In each section of the hospital's nurses, medical doctors, physicians, and others are the decision-makers but most likely the top-level management (managers) and the medical team is stakeholder highly required well-organized information to make a decision

.

4.3 | Discussion

In this study, an attempt is made to investigate the existing ways of managing knowledge, the medical KM process for decision making and the transfer of knowledge in the hospitals.

The finding of the existing trends of managing medical knowledge in healthcare shows that individual staff is exercising managing knowledge in a paper-based patient record management system. There are no automated ways that help to manage knowledge in hospitals. Even the health sector did not capture, organize, and disseminate medical electronic resources based on the need for decision making. Moreover, a huge amount of information captured in the clinical process, but it is unable to successfully apply the information across the entire process of health-care delivery due to weak trends of managing knowledge in the hospitals.

This shows that health care professionals suffer from a serious shortage of properly managed medical records. It further shows that the trend in managing medical knowledge is found to be at an infant stage. Due to this, the decision-making process is not fully supported with properly managed knowledge because health care professionals have limited access to patient information and medical knowledge and these highly affect the quality of decision making.

Leila et al. (2017) stated that "… providing the right knowledge at the right time, i.e., at the point of decision making by implementing knowledge management in healthcare is paramount important." Hence hospitals need to promote medical KM to enable health professionals engaged in knowledge sharing and transfer.

As stated by Morr (2014) "……while KM is becoming an established discipline… partners need to exchange their knowledge in order to provide quality healthcare…. On data and a shift is needed towards evidence-based *decision making*. It is obvious that healthcare can profit from many advantages that KM can provide."

Badimo and Buckley (2014) supported this idea by noting, organizations have recognized the strategic importance of KM, and are increasingly focusing efforts in managing knowledge. In fact, plans to modernize government processes and practices are leading to a reconsideration of how to manage the vast range of knowledge resources that are found within the health sector. In order to have an idea of the extent of KM in the health sector, questions were directed at finding out if an environment for knowledge existed, and what impact employees felt it had on their departmental performance.

The study also revealed that the existing KM process, especially transfers of medical knowledge is very weak. The process approach to KM basically practices with a direct interview of patients *or* interaction with patients during rounds, meetings, or discussions with staff that are a source of new knowledge capturing for decision making.

The survey result shows that there are no well-defined methods and techniques for managing knowledge in hospitals. However, the individual is using a paper-based record management system during their duty hours for managing a patient's history. This leads to weak communication in hospitals. The knowledge created in hospitals does not properly support decision making.

Mirza (2009) supported this idea in such a way that, Knowledge dissemination process consists of different techniques and methods of knowledge sharing and collaboration. Knowledge presentation includes searching, pulling, and providing relevant content automatically to the user on the basis of user requirements. Knowledge

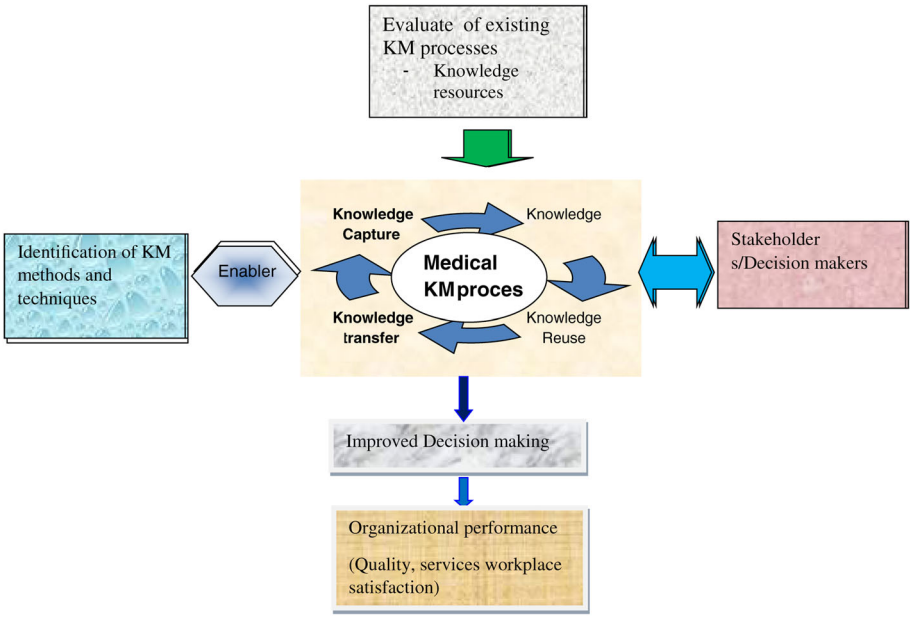

FIGURE 1 the theoretical framework for aligment of knowledge management processes with clinical proceses for support decision making [Colour figure can be viewed at wileyonlinelibrary.com]

transfering uses different means of amplification which are manual and automatic, such as training, education, documentation, and newsletter and organizational literature.

Finally, based on the finding of the study and literature review of KM technology theories and models used to explore and study the implementation of technology in health care settings, the theoretical framework depicted in Figure 1 is constructed.

Figure 1 presents the theoretical framework for aligment of KM processes that supports decision making in the health sector. On the way towards constructing the theoretical model, initial observation of the researcher generated different variables. The first one is, variables that interact in the aligment of KM proceses, such as identification of appropriate KM methods and techniques assessment of exisiting KM processes practice with understanding knowledge resources, Importance/usage. Others identify and arrange Stakeholder's/Decision makers and, its role in the healthcare.

This study focuses on alignment of KM process with clinical process to support evidence-based decision in healthcare. A rounded corners box at the top labeled "evaluate the existing km proceses" is shown the evolution of individual-level knowledge or understanding, the existing knowledge resources that currently used. Similarly, a rounded corners box at the right, a labeled "stakeholder s/decision makers and identification of its role" represent the examine the role and individual involoved with the KM for improve the decision making in the clinical processes. Besides, a box at left side labled "identification of KM methods and techniques" shows appropriate methods and techniques for managing knowledge.

Today in Ethiopia healthsector, locally produced knowledge is not aligned with clinical processe. Even a lot of knowledge is generated every day but not effectively used for evidence based decision making. To this end, the aligment of KM processe with clinical processes has opened a new chapter for improving evidence-based decision making . Besides, the above theoretical model, shown in Figure 1 integrate the key factors discussed in the findings section that can lead to effective alignment of KM procees to discover knowledge that already exists and organize it to for simplifying its accessibility so as to support decision making.

5 | CONCLUSION AND RECOMMENDATION

In developing country like Ethiopia, the KMs practice remains at its infant stage. From this study, the existing ways of KM show that KM takes place in an unstructured manner. KM is a relatively new subject area, still approached in its initial stages in the healthcare sector. Healthcare institutions have been late in adopting the KM concept, and are just now starting to take the first approaches to this field. For instance, Jimma University medical centers started to implement KM; however, due to lack of awareness of health processes and limited tools and technologies of medical knowledge it is challenging, particularly for improving the quality of decision making.

Adopting KM processes especially KM transfers should dominate within the staff members and these can support the process of patient treatments, supporting care, and reducing medical error.

In this research, we investigate the alignment of the KM process with the clinical process. Nowadays, we are working further to explore challenges and opportunities for integrating the KM process with technology.

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