Investigate Knowledge Management Technology Implementation for Supporting Decision Making in Ethiopian Health Sectors

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Research Article

Keywords: Healthcare, KM Technology, Clinical Decision Making, Ethiopian Hospitals

Posted Date: January 4th, 2021

DOI: https://doi.org/10.21203/rs.3.rs-128865/v1

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Abstract

Introduction: Knowledge management technology is a key tool for facilitating and improving the quality of health care delivery in hospitals. However, the use and implementation of this technology is not an easy task. The aim of this study is to investigate a knowledge management technology implementation in Ethiopian hospitals, with a particular reference to Jimma University Specialized Hospital.

Methodology: Information about challenges of knowledge management technology implementation was gathered using qualitative research methods, through conducting semi-structured interviews. Purposive sampling method was applied to select fifty-four participants from a well-defined population. Findings were first validated, according to published literature and research works, and then sorted into three main areas with recommended solutions, such as current usage of KM technology to enhance and improve decision-making, factors affecting implementation of KM technology

Results: This study revealed that overall level of KM technology implementation in Ethiopia hospitals is still low.

Conclusion: Implementation and use of KM technology with a view to improving the quality of hospital health services is needed. Thus, it suggested that hospital managers should make much more effort to develop a strategy and policy on the implementation and use of KM technology so that the hospital could improve the quality of healthcare services.

1. Introduction

Nowadays, knowledge management technology is the major contributor to improve the service of healthcare. In organizations with an environment of unorganized information resources, technology has become the major issue for decision-makers. Technology can change the health sector and it also becomes an essential issue for the sustainable development of every organizations (Mohajan, 2017). For instance, newly created knowledge is overwhelmed by doctors and medical professionals and it is difficult for them to divide this knowledge into categories and save useful information, find necessary information when they need it. But, in order to be able to find the solution quickly and use information management technologies, this is important for them. Newly created information will strengthen the decision-making process and help not only to build the solution on their expertise, but also to use the entire healthcare delivery services (Masic, Miokovic, & Muhamedagic, 2012).

Knowledge management technology is referred to as the use of electronic media to manage health and medical care information of the patients (Laal, 2012). It is an umbrella term to describe the full management of health information across the computerized systems and its secure exchange between consumers, service providers, government and quality entities, and insurers. Similarly, knowledge management technology has the potential to improve the quality, safety, and efficiency of healthcare. Knowledge management technology has dramatically transformed clinical processes in health care,
where electronic health records; electronic prescription and computerized provider order entry systems have positively changed the practice of healthcare (Mohamed, 2018).

According to Houngbo et al., (2017), knowledge management technologies are the most abundant and widely used medical products in practice, providing many advantages to doctors and medical workers; but their management is difficult, particularly for sub-Saharan African countries, where many technologies are imported, human and financial resources are more limited.

Today in Ethiopian health sectors, the main challenges and concern in implementing knowledge management technology with the clinical process are related to strategic context, organizational approaches, technical characteristics and social consequences. Asemahagn, (2015) reported that technology applications in Ethiopian hospitals are still inadequately conceptualized in such a way that tools do not meet the complex needs of patients, professionals and organizations. For example, the benefits of knowledge management technology are dependent on transferring knowledge across healthcare organizations. However, implementing KM technology with healthcare and the accessibility of knowledge are the main challenges observed in Ethiopian health sectors. Moreover, Ethiopia has thus made progress in creating the conditions necessary to support and improve healthcare with the help of knowledge management technology; though significant challenges remain (Alebachew & Waddington, 2015).

Furthermore, in Ethiopia health sector setting, the basic challenge remains the awareness of the importance and the potentials of KM technology in health care. Besides, inadequate training for employees on KM technologies and up-to-date medical research, work-flow changes, lack of IT infrastructure, the unwillingness of clinicians to use KM tools on daily activities, lack of senior management support. Poor quality of managing knowledge and lack of fund to implement KM Technology, lack of communication between researchers and policymakers are some the challenges for implementing KM technology.

Therefore, the aim of this paper is to examine determinants and obstacles for effective and efficient implementation of knowledge management technology that is useful to enhance and improve medical decision making. Accordingly, this paper describes the major constraints and barriers faced in implementing knowledge management technology effectively in the health sector of Ethiopia. It draws out good practices for using technology in the health sector and highlights priority needs and issues of relevance to policymakers. The paper also looks at emerging trends in the usage of technologies that are likely to improve healthcare services and identifies gaps in supporting decision making.

In the next sections of this paper, we present a literature review of KM in healthcare perspective, Knowledge management technology concepts, challenges of use and implementing KM technology for clinical processes, discussion of results, and finally concluding remarks.

2. Literature Review
2.1 Overview of knowledge management in healthcare

KM is a systemic approach, according to Bocock et al. (2012), to ensure that health professionals have access to the latest expertise and can apply that knowledge to their work at all levels within the health system, internationally, regionally, and nationally, as well as at the frontlines.

In an area like the healthcare sector, it takes constant innovation and technical evolution to try and balance consumer needs and costs. Previous research conducted by Elliot in "Knowledge Management in Healthcare" (2000) reported that KM is an important instrument in today's emerging healthcare system. Hospitals trying to incorporate KM programs need to consider the human aspect of the operation (Guptill, 2013).

Mohajan, (2018), notes that medical errors are a big problem in determining the quality of healthcare and a threat when patients die. If the right person uses the right knowledge at the right time, errors are preventable. Medical errors arise from the under-use of healthcare information that is fundamental to decision-making by clinicians. Clinical decisions are taken in a cyclical way in which the healthcare professional applies his/her expertise during each cycle to validate the previous hypothesis and meet constraints to get closer to the final decision, indicating that knowledge of healthcare is not a resource but a service. Mariana (2008) highlights the need to increase the quality of healthcare through the use of innovations focused on patient and team treatment. Knowledge management refers to all management activities required for successful knowledge formation, capture, distribution, and management, according to WHO (2006). Houngbo et al., (2017) describes management of information as,

“A set of principles, tools and practices that enable people to create knowledge, and to share, translate and apply what they know to create value and improve effectiveness.”

The main aims of knowledge management for WHO is to bridge the gaps in knowledge between countries and within them. Similarly, Bolarinwa, Salaudeen, & Akande, (2012) suggests that knowledge management concerns itself with the creation of information and knowledge-based systems and processes to encourage originality, imagination, intellect, and learning. Successful knowledge management depends on three major components, according to Bolarinwa, Salaudeen, & Akande, (2012):

- People: who create, share, and use knowledge, and who collectively comprise the organizational culture that nurtures and stimulates knowledge sharing;
- Processes: the methods and procedures to create; acquire organize, store, share, use and apply knowledge;
- Technology: the mechanisms that store and provide access to data, information, and knowledge created by people in various locations.

2.2 Knowledge management technology and its role in healthcare
Different studies are conducted to investigate the needs and role of knowledge management technology in healthcare. Bali & Dived, (2007) indicate that KM needs are a pre-requisite for the KM ecosystem for KM technologies such as infrastructure, Internet, intranet and extranet. When developing a fully functional KMS for the e-health market, this instrument is an important technique (Mariana, 2008). Technology allows gratification to take place in ways that were never possible before. A network-computing infrastructure will speed up the harnessing of intellectual capital. In order to help any distinct approach to knowledge management, technology has emerged. Document management systems expedite the collection and retrieval of records. Web-casts allow synchronous communication between experts, while asynchronous interaction is made possible by discussion groups. Learning management systems control the progress of an employee with continuous learning, while data storage mines strong SQL databases that organize and analyze highly structured knowledge (Sharma & Wickramasinghe, 2004).

Healthcare is evolving rapidly because of technological advances, from anaesthetics and antibiotics to magnetic resonance imaging scanners and radiotherapy, according to Schwartz (2014). Similarly, Gulavani & Kulkarni (2010) point to the role of healthcare technologies. Such innovations have had a huge effect on healthcare and health service delivery. A variety of healthcare services have been shown to enhance organizational and logistical efficiencies, clinical performance, documentation and knowledge flow in a hospital environment, from telemedicine to electronic health records. However, adoption and benefits have not been widely distributed and it has been difficult to consistently achieve success. In order to enhance the quality, expense, productivity and capability of healthcare services, it is therefore important to incorporate knowledge management technologies.

2.3 Knowledge management technology and Decision making in healthcare

According to Saleh (2014), decision-making is a processes by which, based on collected knowledge, an optimal solution is selected among alternatives. It should have a fair priority based on its weight in order to choose this alternative. There are two key approaches to decision making (Phillips-Wren, Hahn, & Forgionne, 2014); Multi-Criteria Decision Making (MCDM) and Decision Support System (DSS). In order to assign the alternatives weights, both require a collection of parameters to be used. Both the MCDM and DSS are capable of addressing complex issues in application.

Effective decision-making needs the technology to be completely assisted by knowledge management. Simon (2016) examined "the relationship between knowledge management tools and decision-making by interprofessional healthcare teams." The study's results indicate that the decision-making process is assisted by knowledge management technology. However, to determine the correct form of information and knowledge management technology needed to properly support the decision-making process, it is necessary to consider the type of decision making being carried out. It is critical that the right information is readily accessible at the right time and is current in clinical decision making.

Moreover, understanding the requirements of decision-making processes is essential. Saleh, (2014) noted that in healthcare, the situation is scary because almost most decisions are made subjectively with no or little consideration for influential criteria. He identified, lack of policies and strategies, non-existence of
standardization, lack of training, shortage of funding, no sufficient analysis of data and inadequate reliable information communication technology are the major challenges observed in implementing and using knowledge management technology for clinical decision making.

Barsky, (2019) discussed the effect of technology on decision-making. Technology has modified the way health decisions are made by increasing the number of possible alternatives for the decision-maker. The diffusion of required information for rational decisions has compelled the decider to relinquish some or all of his authority. To a great extent, this has occurred because specialized knowledge is increasingly for understanding the treatment effectiveness and untoward consequences of decisions involving complex health systems or treatment programs. On the other hand, the decision-making role has under certain conditions shifted from the decider (physician, administrator) to the object (patient, community) affected by that decision. Experience with a major technological innovation, like the artificial kidney, which has been subject to much science and development (Tancredi & Barsky, 2014)

Furthermore, medical technology has a significant influence on health care decision-making at the patient-physician relationship, community-healthcare organization, and social-national government levels, according to Barsky, (2019). Three processes characterize this effect, such as the dissemination of decision-making by raising the potential alternatives, the relinquishing of part of the position of decision-makers to those in the healthcare system, and the transfer of some of the decision-making process to the intent of that decision (patient or community).

2.4 Barriers to implementing knowledge management technology in healthcare

A detailed literature review was done to identify the barriers of implementing KM technology for supporting decision making in health sectors. Garrett et al. (2006) endorsed this concept and noted that developed countries are still struggling to handle information and face many challenges, such as lack of infrastructure, expense, and time and value analysis, lack of qualified labor, national policies, and health-related staff motivation. There is a shortage of appropriate technical skills linked to technology. Projects in the field of health technology lack the requisite budget for implementation. The period of time needed for the proper implementation of a particular health technology is very long

Emdadulhaque, Ahsan, Rahman, & Islam, (2019) indicate that constraints to the implementation of technology in the hospital include low budget for Information Communication Technology, poor infrastructure in the maintenance of health services, unreliable electricity supply and insufficient human resource capacity. Emdadulhaque et al., (2019) stated further the major barrier to technology implementation is the failure of healthcare information systems (HISs) to interoperate in order to distribute information concerning different standards among the institutions in the healthcare sector.

According to Nzui, (2014), lack of institutional capacity and trained human resources that can disseminate knowledge quickly is a hindrance to the efficiency of KM. Employees create knowledge within the organization and a significant part of the organizational knowledge is saved in their minds,
thus a small change in their task positions can impose a fundamental effect on organization performance (UN, 2008).

The above literature shows that many organizations fail in their attempts to effectively use and implement KM technology in the clinical processes within their organization. Thus, this paper explores factors affecting the implementation of KM technology with clinical processes for supporting decision making in Ethiopian health sector.

3. Methods And Materials

The study used a qualitative approach to investigate implementation of knowledge management technology for supporting decision making in Ethiopia health sectors. The reason behind using qualitative methods was to seek in-depth and condensed information about the study's phenomenon (Creswell, 2013). Detail information about perceived challenges in the implementation of knowledge management technology in healthcare enables to suggest better ways for improving the quality of decision making. Qualitative methods were used, through conducting semi-structured interviews, to collect opinions, experiences, and suggestions of stakeholders on this specific study area. Findings of the conducted interviews were first validated, according to published literature and research work, and then sorted into different challenges and opportunities.

For this specific study, the ethnographic methodology was used to investigate the challenges for knowledge management technology implementations in the clinical process of the selected hospitals in Ethiopia. The main reason for selecting the ethnographic methodology is that it 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 main 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 collected data from different sources and methods (Small, 2011).

3.1 Setting

The researcher identified two sites for conducting the assessment. The first one is a large size public hospital (Jimma University referral specialized hospital) and the second one is Ethiopian Ministry of Health with a total number of fifty-four (54) from the two sites. Jimma University referral specialized hospital is located in Jimma town 352 km to Southwest of Addis Ababa; It was the only teaching and Referral Hospital in the Southwestern part of the country until recently. It runs an annual governmental budget of Birr 171.3 million with a bed capacity of 800, with 640 active. It has a total of 1837 staff currently including contract staff.

Some of the experts of knowledge management were selected from Ethiopian Minister of Health. IT professionals and knowledge managers participated in the study. These make them very familiar and in
continuous contact with the hospital’s practical environment related to technology integration with the clinical process. The researcher observed that the respondents were appropriate to give their opinions and perspectives regarding issues raised in the study, which are related to challenges of implementing KM technology within hospitals services. Those participants for this study were to increase the validity and objectivity of the findings and to make use of different opinions in order to reach a better understanding of the situation.

3.2 Study participants’ sampling

Purposive sampling was used to identify the decision-makers in the study site. This allowed us to focus on a limited number of participants that have direct access to the study area and working environment. The participants were selected depending on the objectives of the study and the questions that we are trying to find answers. Table 1 below presents the study participants from the selected sites.

| Study site                                             | Number of samples | Profession                     |
|--------------------------------------------------------|-------------------|--------------------------------|
| Jimma University Referral Specialized Hospital          | 2                 | managers/administrators        |
|                                                        | 6                 | Interns                        |
|                                                        | 4                 | Surgeons                       |
|                                                        | 4                 | ICT professionals              |
|                                                        | 8                 | general medical practitioners  |
|                                                        | 8                 | Pharmacists                    |
|                                                        | 9                 | Nurses                         |
|                                                        | 3                 | Radiographers                  |
|                                                        | 4                 | laboratory staff               |
| Ethiopia Ministry of Health (MOH)                       | 6                 | KM experts and HIT professionals |

Table 1 Summary of sample participants in the study

The general managers and administrators from the two sites helped to identify the list of potentials respondents. Letter of kindness support with outlined the research objectives were sent to individual sections. Those fifty-four volunteers were contacted and an interview was arranged to take place in a location that suited them.

3.3 Data collections and Data analysis

Semi-structured interviews were exploited for conducting this study. Although it is a time-consuming method, it allows the interviewees (i.e. the healthcare and ICT staffs) to express their opinions in a free
and spontaneous manner (Creswell, 2012; Maxwell, 2012). The same open-ended questions were used with all the participants.

Each interview started with a very general question about the participant’s name, age, current position and previous experiences to break the ice. Then followed three basic areas, such as the current practice of KM technology to enhance decision-making, tools selected for supporting decision making, and barriers for implementing KM technology with decision making.

The interviewees were signed a consent form. The interviews were recorded with permission from the participants and the interviewer afterwards conducted the interview. After conducting the interview, the preliminary data analysis was made. During data analysis paragraphs and sentences were coded, labeled and classified into (i) the use of knowledge management technology, (ii) types of technology used, and (iii) barriers to implementation of knowledge management technology for the clinical decision-making processes.

4. Survey Result

The interviewed experts highlighted different current activities and developments that contributed to improving the use of knowledge management technology for supporting decision making processes in Ethiopian hospital. This paper first presents some positive highlights and next shows problems, challenges from the perspective of the interviewees. These include gaps and barriers identified, and matters related to organizational structure, culture, managerial and professional skills, budget-related to it as well as technological infrastructure. Finally, the experts raised the central issue of coordination, collaboration, and governance and leadership, which are needed to improve the quality of healthcare service. Table 2 below presents common ideas from all respondents by classifying into the predefined three thematic areas.
| No. | Thematic areas                                                                 | Common concepts                                      |
|-----|-------------------------------------------------------------------------------|------------------------------------------------------|
| 1   | KM technology to enhance and improve decision-making                          | - Understanding                                      |
|     |                                                                                | - Current practice                                    |
|     |                                                                                | - Importance/ usage                                   |
|     |                                                                                | - Tools                                               |
| 2   | Types of technology used for supporting decision making in Ethiopian health sector | - Existing tools                                      |
|     |                                                                                | - Skills of using among the staffs                     |
|     |                                                                                | - Professionals staff in the hospitals                |
| 3   | The barrier to implementation of technology with decision making              | - Existing practices                                  |
|     |                                                                                | - KM technology strategy                              |
|     |                                                                                | - Policy                                              |
|     |                                                                                | - Perception                                          |
|     |                                                                                | - University special supports                          |

Table 2 Thematic areas of analysis

**4.1. Current trends in KM technology use for clinical decision making**

Respondents provide their opinion on the current trends of knowledge management technology used in Jimma University Specialized Hospital and Ethiopia Ministry of Health in terms of having organized knowledge to enhance and improve decision-making. Understanding of decision-makers, such as top-level manager and medical doctors is the main drivers for properly using technologies in this hospital. But it is well known that Ethiopia is one of the developing countries with much healthcare needs to implement the technology to support knowledge management processes for improving decision making.

The awareness of the importance of knowledge management technology for supporting decision making in Ethiopian hospitals, especially Jimma University specialized referral hospitals is one requirement to improve the quality of healthcare. Director of ‘Quality Improvement and Clinical Government’ replied that most of the decision-makers in hospitals are not familiar with the importance of medical technology. However, the director strongly agreed that knowledge management technology could be a valuable tool for decision making and it should become a requirement for decision-making processes in the hospitals.

The notion of importance of knowledge management technology was further emphasized by top-level managers as noted below.
I think medical knowledge management technology is a good basis to support decision making as well as to improve the quality of health care. In Jimma University specialized referral hospital there is responsible section to properly manage the created knowledge. However, this office is not well organized with knowledge management technology.

Medical doctors and nurses were asked for their opinion on the current practice of supporting decision-making process with knowledge management tools in the hospital. Most of the decision-makers believe that it would be more effective if the decision-making process is more formal and structured to ensure that decisions are facts and evidence-based.

As a matter of fact, the use of technology for supporting decision-making processes is still very low in health sector. We always say that it’s very important for supporting decision making with suitable technology, but we still do not have awareness of how to use it.

4.2 Types of technology used in the Ethiopian health sector to support decision making

There are currently numerous tools and technology used in the health sector to facilitate decision-making. These include databases; libraries built locally, different forms of artificial intelligence systems, including expert systems, system support for clinical decision-making, neural networks, fuzzy logic, genetic algorithms and agents of intelligence or software.

In addition, the types of technology an organization has been able to use effectively to enable and support clinical processes for evidence-based decision making. Nowadays, the Jimma University Specialized Hospital in Ethiopia has needed the implementation of unique technologies to help and enhance healthcare decision-making. In this link, the hospital information communication technology section head reported that

*Currently, one of the key technologies that are used in hospitals is a human resource management information system. These tools enable to routinely generate human resources information for fact-based decision making.*

Furthermore, one of the staff of hospital information communication technology noted about lack of technology for managing knowledge.

*There is no knowledge management technology that can allow hospitals to build knowledge portals that can handle a substantial amount of information.*

Medical doctors were also asked about the type of technology that was chosen and used in hospitals to handle expertise and support decision-making. Consequently, their answer is summarized as follows.

*Currently, there is no medical knowledge management technology that serves as a repository to have all the decisions made previously; so that they can use it as a reference in similar situations. However,*
hospitals tired to implement technology like an open clinical system for integrating the services of different department and sections.

Similarly, the respondents from Information Communication Technology commented about the use of technology for enabling knowledge sharing in the clinical process;

There is no specified technology that can support the flow of knowledge with the clinical process but they only use the following Computer-mediated communication such as electronic mail or conferences to create communication among staff members.

Furthermore, thirteen respondents revealed that the individual staff skill on the use of technology is limited. Even we still don't use everything the technology offer, specially the technology related to managing knowledge for supporting decision making

Ethiopian Ministry of Health has a plan to implement a healthcare information system in hospitals. Electronic medical record (EMR) systems and personal healthcare records (PHR) have been developed and deployed, transforming the customary patient paper-based record system. Even patient’s diagnostic data and treatment information have been converted into an electronic format that can be accessed by medical staff within a hospital and other partners for the purpose of assessing a variety of test results and providing treatments.

4.3 Barriers to implementing KM technology with clinical process

An assessment was also made to identify challenges hampering the implementation of knowledge management technology. These comprise the fears of creating knowledge and the problem with accessibility, dissemination or transfer for quality and evidence-based decision making.

The health sector faces many challenges in properly implementing KM technology with the clinical process. Accordingly, the interviewees identified many critical barriers for effective implementation of KM technology in health sectors. The most important barriers are categorized into human resources, organizational culture, organizational structure, and overemphasizing technology. The most critical barriers identified from the interview were summarized in Table 3 below.

Table 3 Critical barriers to effective implementation of knowledge management technology
| Barriers                     | Reasons                                                                                                                                 |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Human resources management  | - Lack of skill in the full profession<br>- Lack of awareness of KM technology provisions<br>- Absence of employee training<br>- Absence of employee motivation<br>- Absence of employee empowerment<br>- Employees resistance to transfer knowledge |
| Organization structure and culture | - Poor management support<br>- Poor organizational structures<br>- Lack of leadership<br>- Poor organizational culture<br>- Insufficient planning<br>- Lack of well-formulated strategy and policy |
| Technological                | - Lack of information technology, apart from personal computers and single-user access to manage existing knowledge<br>- Insufficient infrastructure<br>- Poor IT design and planning<br>- Poor networking<br>- Lack of maintenance and training |
| Finance                      | - Limited financial support for professional development<br>- The poor financial investment of the organization<br>- Security concerns<br>- Insufficient IT investment |

Most of the participants revealed that staffs are not strongly concerned with the implementation of systems, which requires overcoming expectations that it would be a simple replacement of their existing paper processes, as well as a continuous refinement of new electronic processes. Even, managers lack a strong commitment to organizational changes through the technology that can accompany the implementation of knowledge management technology to use it to its full capabilities.

Furthermore, the respondents from radiology, nurse and general practitioner asked about the weakness that prevents effective knowledge management technology implementation for supporting decision making across the hospitals. Their response is summarized as follows.
Knowledge management culture is still weak due to the following reasons, such as weak knowledge management procedures, weak information and communication technology infrastructure, weak networking activities, lack of financial resources to support knowledge management activities, lack of standards and tools for knowledge management, weak knowledge translation activities and low utilization of knowledge for decision making and policymaking.

5. Discussion

Overall, participants describe that the decision making processes is not fully supported with knowledge management technology. Staff members still do not have awareness on how to use it for supporting decision making. Even, most decision-makers in hospitals are not familiar with the importance of medical KM technology. Similarly, the use of knowledge management technology for supporting decision making is still at a low stage. Decision-makers are even unaware of the possibility of acquiring knowledge from different sources with the help of appropriate technology.

Hospitals are still using inadequate KM technology that does not meet the complex needs of professionals and organizations itself. But the top-level manager believes that implementing KM technology to share best practices improve the healthcare service as compared to paper-based processes. Gulser & Badur, (2011) supported this idea in that, integrating knowledge management system with a decision support system will improve the quality of decision-making process and make it more effective by using enhanced and required knowledge.

The knowledge management technology has great potential to manage, share, and target information and knowledge for health interventions, but there are many barriers for implementation of technologies in healthcare for supporting decision makings, such as lack of awareness of KM technology provisions, poor management support, poor organizational structures, lack of leadership, poor organizational structure, insufficient planning, lack of well-formulated strategy and plan, insufficient infrastructure and limited financial support.

Similarly, most of the respondents also revealed that successful implementation of knowledge management technology in clinical processes are important to improve decision making and thereby enhance organizational performance within health sectors. However, the level of awareness of implementing and use of knowledge management technology in support of decision-making processes is still insufficient.

The study shows that Ethiopia is looking towards the implementation of KM technology to improve its healthcare service. Towards this, there exist several opportunities for supporting knowledge management implementation using technology, though there are some barriers as well. Some of the opportunities that can transform healthcare are advances in health information and communication technology, clinical decision support systems, electronic health record systems, communities of practice and advanced care planning.
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 implementing knowledge management technology 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 implementation of KM technology, such as Human resources management, Environmental with Organization structure and culture, Technological, Finance. The other is assessment of current KM technology practice like Understanding, Importance/ usage. Finally, selecting locally and internationally developed KM tools, technology and identification of its role in the healthcare.

This study focuses on the implementation of knowledge management technology to facilitate decision making. A rounded corners box at the top labeled “assessment of current km technology practice” is shown the evolution of individual-level knowledge or understanding, beliefs, perception, and cognitive process that influence understanding, practice for the implementation of knowledge management technology. Similarly, a rounded corners box at the right, a labeled “selecting of km tools/ technology and identification of its role” represent the examined the possible and selected tools /technology confront with the knowledge management for improve the decision making in the clinical processes. besides, a box at left side labeled “identification of challenge on implementation” shows challenges direct forwards to the characteristics of the organization such as organizational -level structure, culture and availability of resources, the technological character such as usability ad available of technical infrastructure that influences knowledge management implementation. Furthermore, an ellipse labeled “knowledge management technology implementation” represents the effects these changes have on the implementation of the technology.

In the current healthcare in Ethiopia, locally produced knowledge is not applied in improvements’ of service. Even a lot of knowledge is generated every day but not effectively used for evidence based decision making. To this end, the implementation of KM technology has opened a new chapter for improving healthcare delivery. Besides, the above theoretical model, shown in figure 1 integrate the key factors discussed in the findings section that can lead to effective implementation of knowledge management technology to discover knowledge that already exists and organize it to for simplifying its accessibility so as to support decision making.

6. Conclusion And Recommendations

The main aim of this research is to identify the critical barriers for successful implementation of knowledge management technology from the viewpoint of healthcare professionals in Ethiopia health sectors. The findings from this study would make significant contributions both to theory and practice of sustainable information system implementations in Ethiopia relating to the health sector.
Identifying barriers in the Implementation of knowledge management technology are a hot issue in health sector. Ethiopian health sector are still struggling for it and facing a lot of barriers like lack of infrastructure, cost, time and benefit analysis, lack of skilled workforce, national policies and motivation of health-related personnel. It is high time to recognize that evidence-based decision making is very helpful in enhancing the performance of health institutions. Enough professional skills related to technology usage are lacking. Knowledge management technology projects are lacking in the budget. The time period, which is required for a good implementation of the specific health technology, is quite long.

Finally, Ethiopian health sectors specifically Jimma University Specialized Hospitals should prepare the strategy and policy for supporting to implement knowledge management and simultaneously increase the awareness about supporting decision making with KM technology. Furthermore, the top-level management of the hospital should support knowledge management processes (i.e. knowledge transfer) with effective implementation of KM technology.

**Declarations**

**Availability of data and materials**

The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

**ACKNOWLEDGEMENTS**

We would like to thank EDMA for assisting me and Jimma University, Institute of Technology for the financial support of this study. We would also like to thank all the respondents and the healthcare organizations who participated in this study.

**Funding**

This study did not receive sponsorship. Publication costs are funded by all authors.

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Contributions

Amare D., Steve S. and Million M. contributed to study concept and design. Mniyichel B. collected the data: analyzed and interpreted data. Mniyichel B. drafted the manuscript; Amare D., Steve S. and Million performed revision of the manuscript critically for important intellectual content. Similarly, Amare D., Steve S. and Million M. supervised the study.

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Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

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**Figures**
Figure 1

The theoretical framework for implementing KM technology for support decision making