A Review of Three Models for Knowledge Management in Healthcare Organizations

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ABSTRACT

The paper discusses previous models constructed for managing knowledge in the context of healthcare organizations. These previous studies are focused on suggesting implementations for the knowledge management's initiatives that are aimed at optimizing the healthcare services. Three models had been thoroughly reviewed and attention has been addressed to explain the constructs of these models. These constructs include factors, entities and elements involved in the creation, storing, transfer and use of the knowledge within a healthcare organization. Subsequently, a gap analysis has been applied to shed light on the shortcomings of each model and how the proposed framework will overcome them. These shortcomings were synthesized in six themes, these themes were realized from the inclusion of all constructs and factors addressed by the three studied model. The development of the proposed framework (HKMF) is still under study in an ongoing research that aims at optimizing the medical knowledge management within a selected healthcare organization. Further refinements and improvements will be applied to the proposed framework and its elements after the data collection and analysis are completed. The paper concludes with recommendations for future research works and efforts intended enhancing the management of knowledge within healthcare organizations.

Keywords: Knowledge management, healthcare organization, medical knowledge, knowledge management model.

I INTRODUCTION

Knowledge management (KM) implementations in the healthcare sector depend on the technological tools to manage creating, storing, sharing, and utilizing knowledge. The continuous improvement to the healthcare services requires adequate implementations to overcome the obstacles occurring in this sector. Systems used in managing healthcare services are considered to be much compounded with internal and external entities, that it involves several partners operating in diverse domains that need to be coordinated in order to deliver quality healthcare service to patients (Platis, Reklitis and Zimeras, 2015). Those entities might involve general practitioners, specialized physicians, nurses, medical assistants, clerks, and general workers. Depending on the size of operations in the healthcare facilities, these systems can include administrators, managers in finance, human resources, IT technicians, pharmaceutical suppliers, healthcare insurance providers, education institutes and research communities. Based on the interactions between those partners, the amount of knowledge is massive while all of knowledge details created by any of those partners are necessary for a successful healthcare service delivery.

II KM IMPLEMENTATIONS IN HEALTHCARE

KM techniques in healthcare sector has been connected to an exceptionally expansive range of organizational exercises intended to oversee, trade and make or improve knowledge resources inside of a healthcare organization (Araujo et al. 2015; Gattnar et al. 2015). Key improvements in Healthcare Knowledge Management (hereinafter HKM) have been focused mostly on productivity issues and given less attention on the creation of knowledge and methods to manage this knowledge. Studies in the field of KM in health services had shown the existing policies and practices have not been effective in actualizing adequate methods in delivering quality healthcare service and meeting the medical organizations' objectives (Rexhepi, 2015; Matshwane, 2015). Some healthcare organization have taken the approach of viewing these practices as a pro table vital resource, and knowledge sharing between representatives seems to be originated from formal and informal knowledge sources. One of the most vital elements for effective HKM policies is to encourage the workers to join the knowledge sharing activities inside of the healthcare organization (Ahlan and Ahmad, 2015). Some of these organizations have taken the path of utilization workers' knowledge through procedures and enhanced them through innovation that is used to enhance the quality, proficiency, intensity of the healthcare services. These procedures are aimed at urging the medical staff to share knowledge that has impact on improving the performance and productivity (Khammarnia et al, 2014). On the other hand, HKM has similarly included

the collaboration of social components that depends greatly on informal interactions among the medical staff, which usually involves implicit knowledge sharing. The successful application of HKM systems has been connected to internal social practices of the employee communities (Knauth and Meinerz, 2015). The execution of HKM system like-wise requires a comprehension of the knowledge management process to be carried out by suitable experts and managerial staff. In healthcare centers, explicit knowledge, i.e. documented knowledge, is accessible in patient's records, exploration reports, and industry databases. Whereas, implicit knowledge is found in the brains of very specific professionals, for example, neurosurgeons, pediatricians, pathologists and cardiologists, nurses and medical assistants. Sometimes this type of inferred knowledge surfaces when effective knowledge sharing takes place. This type of communication happens in the gathering among medical professional's communities in the conferences, workshops and specialized informal trainings (Tahamtan and Sedghi, 2014).

III PREVIOUS MODELS OF KM IN HEALTHCARE

In order to understand the existing state of knowledge management in healthcare organizations, it is essential to review similar efforts made by other researchers. The study of literature showed the three models which directly focused on the management of knowledge in healthcare centers. The components of these models will be discussed and will aid in guiding the primary data collection and in realizing initial starting points for the proposed framework to be developed. The first model, Knowledge Management Conceptualization in Healthcare, was developed by the School of Health Information Science, University of Victoria, US (Lau, 2004). The second model, Total Knowledge Management in healthcare (TKMh), was developed by Knowledge Management for Healthcare research subgroup in Coventry University, UK (Bali et al. 2009). While the third model, Knowledge Management Infrastructure in Healthcare, developed by, School of Business IT and Logistics, RMIT University, Australia (Wickramasinghe, 2010).

A. Knowledge Management Conceptualization in Healthcare

This framework addresses the initial conceptualization of Knowledge Management for the healthcare centers. First, knowledge is defined in this model "as information combined with experience, context, interpretation, and reflections; the knowledge source may be explicit or tacit depending on where it is located". Attention is paid to the social interactions that require a continuous communication, coordination and collaboration among policymakers, practitioners, and researchers to be effective and sustainable as shown in Figure 1, Knowledge Management Conceptualization in Healthcare.

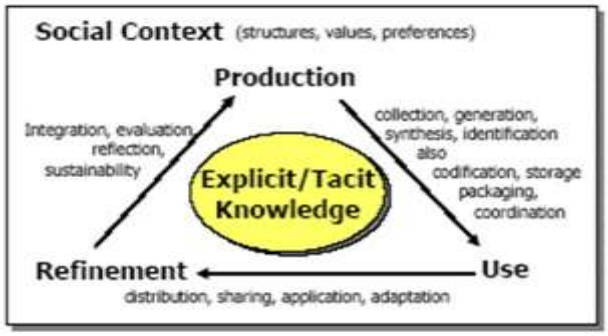

Figure 1. Knowledge Management Conceptualization in Healthcare (Lau, 2004)

i. Knowledge Production

Knowledge production addresses various methods in knowledge creation in the healthcare industry. Knowledge production in healthcare has sub-concepts which are Collection, Generation, Synthesis, Identification, Codification, Storage, Packing and Coordination.

ii. Knowledge Use

Knowledge use addresses the methods followed by policymakers and practitioners in the healthcare organization to transfer knowledge to the targeted communities. Knowledge use should be customized and made suitable to communities' cultural settings, values and differences. The sub-concepts for knowledge use are Distribution, Sharing, Application and Adaptation.

iii. Knowledge Refinement

Knowledge refinement refers to "ways in which policy, evidence, and experience as knowledge sources are institutionalized with organizations over time as part of routine practices in a taken-for-granted fashion". Knowledge refinement has four sub-concepts which are Integration, Evaluation, Reflection and Sustainability.

iv. Social Context

This evolving environment of healthcare organization requires the attention to social context that influence the production, use and refinement of knowledge in the healthcare organization. The social context construct has three sub-concepts which are Structures, Values and Preferences.

B. Total Knowledge Management in healthcare TKMh

The Total Knowledge Management in healthcare (TKMh) refers to the Knowledge management techniques in healthcare that are oriented towards main idea of knowledge-sharing in a tacit to tacit environment. This model (Bali et al., 2009) addresses the importance of a human-oriented approach to be followed, as shown in Figure 2, when executing knowledge management initiatives in healthcare. The layout of this model can be viewed as set of phases directed at implementing health care knowledge management.

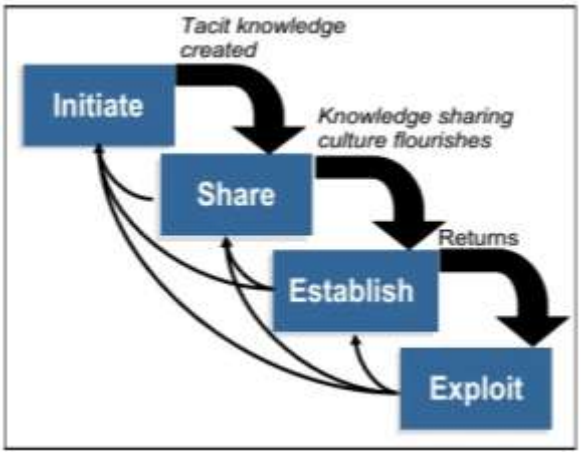

Figure 2. Total Knowledge Management in healthcare (TKMh) (Bali et al., 2009)

There are four phases in this model, the first phase is Initiate which focuses on improving the required abilities for the healthcare workers and activities of those workers to create tacit knowledge that is embedded in the daily routines. The second phase is Share which prepares the appropriate domain for the healthcare personnel to have plans for knowledge sharing and focus on tacit-to-tacit knowledge transfers. The third phase is Establish which refers to the sharing of knowledge within network structure in the healthcare Organization's communities. The fourth and final phase is Exploit which indicates the iteration loop and urges the healthcare organization to make use of the returns of the established culture for the ultimate objective of delivering better healthcare services. These set of phases work in an iterative feedback cycle to improve its earlier stages and to strengthen the quality of each phase until each phase has attained its highest efficiency.

C. Knowledge Management Infrastructure in Healthcare KMIH

This model is made of social and technical tools and techniques, including hardware and software that should be established "so that knowledge can be created from any new events or activities on a continual basis" (Wickramasinghe, 2010). The Knowledge Management Infrastructure (KMIH) depicted in Figure 3 presents the five essential elements (organizational memory, human asset infrastructure, knowledge transfer network, business intelligence infrastructure and infrastructure for collaboration). These five elements are essential for effective knowledge management initiatives.

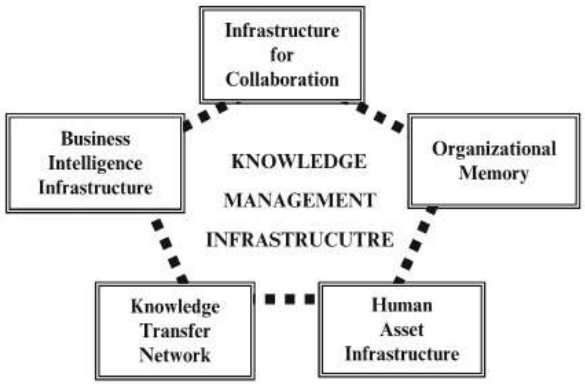

Figure 3. KM Infrastructure in Healthcare (Wickramasinghe, 2010)

There are five components of the KMIH model the first one (Infrastructure for Collaboration) represents a fundamental part in ensuring competitive advantage and improving customer satisfaction. The second component (Organizational Memory) refers to the retention of the health organization's "know-how" which is recorded in documents or in its people. The third component (Human Asset Infrastructure) indicates the willingness of workers to take part in knowledge sharing activities. The fourth component (Knowledge Transfer Network) addresses the channels and means for dissemination of knowledge in the healthcare organization. The effective transfer of knowledge depends greatly on the availability and the quality of such networks. The fifth and final components (Business Intelligence Infrastructure) expresses the fact that healthcare organizations usually gather sizable amount of data and the need to analyzing those data in order to effectively utilize the knowledge exist in the organization. This model has taken a different approach comparing with the other two models discussed in the previous two sections. The focus here is mostly on improving the processes of knowledge management by focusing on adequate infrastructures in the aforementioned areas. Additionally, it paid attention to the information systems and the importance of utilizing the knowledge bases in these organizations in order to provide quality care service to the patients. This framework has discussed the vital role of establishing adequate business intelligence infrastructure, this attention to business intelligence has been detected in recent studies in the field of managing knowledge within

healthcare organizations (Baeshen 2014; Brooks, El-Gayar and Sarnikar, 2015; Safwan, Meredith and Burstein, 2016).

IV GAP ANALYSIS FOR THE STUDIED MODELS

The reviewed KM healthcare models reflected several gaps and themes that have not been fully addressed. The role of gap analysis is to report the ideal state and the current state of a system of a model (Kahle-Piasecki and Doles, 2015). Several researches had recommended the application of gap analysis when dealing with knowledge management systems in healthcare organizations (Cudney et al. 2015; Abbate et al. 2014). The previous knowledge management models in healthcare organizations have shown different level of itemization for the elements involved in the management of knowledge. Six major themes were excerpted from the previous three models: acquiring of knowledge, people dealing with knowledge, knowledge-sharing culture, knowledge repository, ICT support and top management reinforcement. Gap analysis for the three studied models will consider these themes to shed light on the shortcomings of each model and how the proposed framework will overcome them as shown below:

A. Shortcomings of Knowledge Management Conceptualization in Healthcare

1. Acquiring of Knowledge: It has discussed the production of knowledge however; it has not provided what are the entities involved in acquiring knowledge in a healthcare organization. Additionally, this model did not explain the connection between the knowledge acquisition and the sustainability of healthcare organizations which is essential for a successful management of knowledge in organizations (White, 2015).

2. People Dealing with knowledge: This model did not address the role of employee dealing with knowledge in the healthcare organization. It has merely mentioned the general notion of social context. Explaining 'who does what' in the healthcare organization was an absent part in this model, this part is considered to be of a high value to the knowledge management in healthcare according to Ratnapalan and Uleryk (2014).

3. Knowledge-Sharing Culture: the importance of an organizational culture that promotes sharing of knowledge has not been fully addressed in this model. It has been stated that inadequate knowledge sharing within healthcare organization can cause medical error and inefficient delivery of medical services (Tabrizi and Morgan, 2014).

4. Knowledge Repository: this model has discussed the static sense of storing and retrieving knowledge in storage devices. The lack for proper structure for the knowledge stored in a healthcare organization can hinder the productivity of the organization due to the fact that medical personnel base their decision making on the stored knowledge regarding a specific patient or medical procedure (Ling et al. 2014).

5. ICT Support: There is an absence of clear explanation for the role of ICT solutions in supporting the knowledge management initiatives within the healthcare organization. Consequently, this model missed out the facilities which can be provided by technological advances (Ramli and Ali, 2015).

6. Top Management Reinforcement: The role of top management in the knowledge management activities was not presented in this model. The main concepts and sub-concepts has not reported any involvement of the of the organization's leadership, an involvement that is required for smooth knowledge sharing within the healthcare organization (Kim, 2016).

B. Shortcomings of Total Knowledge Management in Healthcare TKMh

1. Acquiring of Knowledge: the model referred to creation of knowledge in a pure technical aspect, there's no indication of the organizational practices involved in the creation and acquiring of healthcare knowledge, these practices are focal in the acquisition of healthcare knowledge according to (Olkiewicz, 2015). Furthermore, the TKMh model had solely mentioned the initiation process of the tacit knowledge with in an AI algorithm, no clarifications were stated to describe how the knowledge acquisition is being carried out.

2. People Dealing with Knowledge: due to the technicality of the TKMh, the model has neither pointed out the role of the healthcare personnel in the knowledge creation nor the knowledge sharing within the healthcare organization. The model has overlooked the pivotal role of people in organization (Simon, 2016) while focusing entirely on the functionality of the AI algorithm.

3. Knowledge-Sharing Culture: the term 'sharing' was addressed in the pure sense of transferring data

between several set of applications (Bali et al. 2009, p.25), there is an absence of the holistic view of knowledge sharing within an organizational culture that promotes such sharing activities. This model did not pay attention to the importance of organizational traditions and settings that advocate the knowledge sharing throughout the healthcare organization which is key for successful knowledge management (Rashid and Ahmad, 2016).

4. Knowledge Repository: the iterative phases of TKMh (initiate, share, establish and exploit) were based mostly on the technological aspect of knowledge. The location and the process of storing were neither described in this model, the description of these essential information were overlooked on both organizational and operational viewpoints.

5. ICT Support: the model has explained the technical aspect of automating the process of predicating useful knowledge. This model's main focus was on providing a computer-based solution for prediction of knowledge, it has not specified the role of strategic sense of ICT support throughout organization's segments. The essential role of ICT support in the success of knowledge management initiatives (Limaye et al. 2015) was not indicated in this model.

6. Top Management Reinforcement: the intervention of healthcare organization's top management was not presented in this model. No details were stated of how top management can support the knowledge management initiatives within the healthcare organization. The support and encouragement of top management is necessary for the success of knowledge management initiatives according (Buta, 2015).

C. Shortcomings of Knowledge Management Infrastructure in Healthcare KMIH

1. Acquiring of Knowledge: although there is an indication of the importance of "organizational memory" the model has not mentioned how the knowledge acquisition is being performed and what are the roles and entities involved in the process of acquiring healthcare knowledge. Additionally, KMIH has not explained how the learning activities are taking place among the medical and non-medical staff within the healthcare organization. These learning activities are deemed to be immensely central in the forming of organizational knowledge in healthcare organization (Stary, 2016).

2. People Dealing with Knowledge: The model expressed the role of "Human assets" in the sense of people with special skills and experiences in creating better businesses (Wickramasinghe, 2010). However, the model has not demonstrated how the people in the organization are being affected by the knowledge and how they are affecting the creation and transfer of knowledge across various levels employees in the healthcare organization. Specifying how people are affecting healthcare knowledge is essential for smooth application of knowledge management initiatives (Alhalhouli, Hassan, and Der, 2014).

3. Knowledge- Sharing Culture: the model has briefly discussed the transfer of knowledge through the transfer networks, nonetheless there is no clear illustration of the importance of an organizational culture that fosters knowledge sharing among the healthcare organization staff. Clarifying the need for the knowledge-sharing culture is crucial for the sustainability of healthcare organization (Peralta and Saldanha, 2014).

4. Knowledge Repository: this model has pointed out the accumulation of knowledge and the existence for knowledge repository in KM infrastructure (Wickramasinghe, 2010, p.25). Yet the model has not provided clarifications of how this repository is being formed and updated as well as the method of which people are dealing with this repository in the healthcare organization. Knowledge management initiatives are expected to be effective when there is adequate knowledge repository that stores the healthcare organizational knowledge (Badimo and Buckley,2014).

5. ICT Support : the model has not clearly demonstrated the use of ICT-based solutions and or the type of technical tools in support to the knowledge management initiatives. The application of these strategic technical tools can ensure better management of healthcare knowledge and (Limaye et al. 2015).

6. Top Management Reinforcement: the role of the top management in the healthcare organization is not addressed in this model. The commitment of the top management is key for enabling an effective knowledge management and required for proper knowledge dissemination within the organization (Irfan et al. 2014).

V THE PROPOSED HEALTHCARE KNOWLEDGE MANAGEMENT FRAMEWORK

The review of the previous studied models of knowledge management in healthcare organizations has resulted in the formation of six themes reflecting the gap analysis of these models. These themes reflected the shortcomings of each model and were

thoroughly explored and crosschecked with the elements consisting the three previous aforementioned models. The detected themes and gaps in these models has revealed sufficient information to form the proposed framework. The six themes forming the gap analysis has been utilized to express the constructs of the proposed model. The proposed Healthcare Knowledge Management Framework (hereinafter HKMF) aims to bridge the gaps indicated in the analysis of three previous models, the proposed framework is depicted in Figure 4.

Figure 4. The Proposed Healthcare Knowledge Management Framework (HKMF)

There are six interrelated elements for the proposed HKMF, these elements are acquiring of knowledge, people dealing with knowledge, knowledge-sharing culture, knowledge repository, ICT support and top management reinforcement. The proposed framework provides a holistic approach in dealing with knowledge management represented in the six interrelated elements. processes taking place when creating, storing, and sharing of knowledge within a selected healthcare organization These constructs and their respective roles are as follows:

1. Acquiring of Knowledge: this element will specify the entities involved in the knowledge acquisition in the healthcare organization. These entities could be personnel, department, training programs or factors affecting the knowledge acquisition in the healthcare organization. Furthermore, this element would have discussed the sources of knowledge and the learning facilities provided for the staff and which are essential for a successful knowledge management in healthcare organization (White, 2015).

2. People Dealing with Knowledge: focuses on the role of employee and their involvement in the entire knowledge management processes within the healthcare organization. this aspect is considered in the proposed framework for its immense value in the success of the knowledge management initiatives (Simon, 2016). This element will explain how the employees are affecting the creation and transfer of knowledge, and how they are being affected by the learning and knowledge transfer within the healthcare organization.

3. Knowledge-Sharing Culture: the proposed framework will take into account the essential need for establishing and maintaining and organizational culture that encourages the sharing of knowledge. The setting of the knowledge-sharing culture is pivotal to the success of the knowledge management initiatives (Peralta and Saldanha, 2014). The formal and non-formal settings of knowledge-sharing activities will be considered in this element as well.

4. Knowledge Repository: this element of the proposed framework will clarify the processes followed when capturing and storing the organizational knowledge within the healthcare organization. Consequently, it will indicate the location and individuals dealing with the updating and maintaining of the knowledge repository within the healthcare organization. A well-defined knowledge repository will ensure better management of knowledge and will lead to a quality healthcare services (Ling et al. 2014).

5. ICT Support: this element refers to the strategic role of which ICT solutions can assume for better knowledge management in the healthcare organization. The advances in the technical tools and application will facilitate the creation, acquisition and sharing of knowledge. The proposed HKMF will include the implementation of of an ICT tool that is relevant to this ongoing research. This tool is known as KFTGA (Knowledge Flow Tracer and Growth analyzer) was developed by Syed Mustapha (2012) to capture the existing shared knowledge and to analyze the growth of that knowledge within the organization.

6. Top Management Reinforcement: this fundamental element indicates the importance of the top management's commitments for ensuring successful knowledge management initiatives. This element represented in a two-headed arrow across all other elements of the proposed framework in order to stress the necessity of top management's involvement in all other elements in HKMF. The support, encouragement and reinforcement of the top management are essential for smooth management of knowledge in the healthcare organizations (Kim, 2016). Additionally, top management's continuous overseeing of all process and elements in the proposed framework will ensure the flexible flow of knowledge among the communities of employees. Finally, the projected framework will have discussed the current state of knowledge domains and recommendations to improve them.

VI CONCLUSIONS AND FUTURE WORKS

This paper discussed the previous models of knowledge management in healthcare organizations as well as the creation, transfer and the use of medical knowledge by the medical and non-medical staff. Three models were reviewed and attention was paid to their components and the task of each component. Six common themes were synthesized from these models in order to understand the shortcomings of each model. These themes and their shortcoming were explained under a gap analysis for each of these models. The thorough study of these models will aid in realizing adequate methodology in approaching the problem of the knowledge management in healthcare organization. Additionally, understanding the weaknesses of these models will aid in developing the proposed framework while keeping in mind how to overcome them. The studied literature and previous models were lacking for an expansive and detailed focus on the role of top management in knowledge creation and sharing, thus it is worthwhile to exploit methods to overcome this gap. Additionally, the processes involved in the creation, transfer and application of knowledge within the healthcare organization might differ based on the job nature of each employee group (top management, physicians, medical assistants, clerks). Therefore, it would be valuable to investigate even further in these differences and what influence these differences when managing knowledge within a healthcare organization.

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