Knowledge Management Problems in Hospital Work
A Case Study on Experiences in the Obstetrics and Gynaecology Department

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Abstract: In this in-depth case study, nine interviews were carried out to investigate knowledge management problems in one healthcare department in a hospital. Based on the Grounded Theory approach, we discovered six thematic knowledge management problem categories: Patient, Patient Data, Physician, Midwife, ICT Systems and Medical Equipment. Each thematic category was further decomposed into multiple items (traits) ranging from 3 to 18 items.

1 INTRODUCTION

Knowledge management is defined as a collaborative and integrated approach to create, capture, organize, access and use of an organization's intellectual capital (Dalkir, 2005). Räisänen et al. (2009) state that knowledge from medical and nursing practices is stored to information communication technologies (ICT), which cover electronic health records, computerized physician's order entry systems, mobile applications. ICT covers also medical equipment for diagnosis or treatment (IBM, 2014). Healthcare suffers from confusing ICT terms and issues and missing the right data about patients in them. (Viitanen et al., 2011). Dalkir (2005) states that knowledge ownership, non-promotion of the people when they share knowledge, lack of trust between the knowledge provider and receiver, and understanding the difficulties between the knowledge provider and receiver can cause problems in knowledge management. In this study we carry out a qualitative, in-depth case study (Yin, 2003) that identifies problems in knowledge management in one healthcare department in a hospital located in the South Karelia Social and Health Care District, Finland. The goal of this study is to categorize knowledge management problems and create a theory of knowledge management by using the Grounded Theory (GT) approach (Glaser and Strauss, 1967; Pawluch and Neiterman, 2010) and the case study approach (Eisenhardt, 1989; Yin, 2003). We explore strategies that the department deploys while learning about its knowledge management problems, the extent to what these problems are shaped by the organizational context, and how these potential problems influence the patient care work in practice. The rest of the paper is structured as follows. Section two describes related research, section three presents the research method, and section four outlines the analysis. Section five contains conclusions and discussion.

2 RELATED RESEARCH

Martikainen et al. (2012) claim that physicians and nurses have difficulties in keeping a professional distance to patients, lack of senior and experienced physicians, as well as knowledge transfer and capturing problems, and ICT professionals do not listen to healthcare professionals' requests. According to Viitanen et al. (2011), the new medical equipment technologies are complex, there are communication problems between the ICT systems, lack of time to use ICT systems, new ICT systems, as well as medical equipment and medical practices requiring constant learning; and especially new medical equipment forms a risk factor. Eppler (2007) states that there are differences in medical

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procedures and practice, and according to Reddy et al. (2009), there is lack of medical records and patients' control of their own data. According to Meade et al. (2009), healthcare professionals lack the knowledge or competence to use IT tools, a computer, or ICT systems. Gender differences and junior and senior physicians' differences in the ways of working with ICT technology have been reported (Westbrook et al., 2005). According to Nonaka (1994) and Alavi and Leidner (2001), there are problems in transferring tacit knowledge. Brixey et al. (2010) claim for interruptions in the physicians' workflow, and Mistiaen et al. (2007) claim for failures in patient discharge coordination. Westbrook et al. (2005) state for the senior physicians' requests of junior physicians to help them in computer problems, and Dias et al. (2003) argue for nurses' and physicians' stress. Jatain (2013) claims for problems caused by lack of ICT knowledge, Courtney and McCutcheon (2010) state for restrictions of expert nurses to attend patient care conferences, and Priebe et al. (2011) argue for lack of access to the medical and social history of undocumented migrants. Gadon and Jacobs (2007) report about communication barriers with limited English -proficient patients, Chadi (2009) report about physicians' lack of time in medical practice due to large amount of tasks, and Gill et al. (2012) claim that the wrong medication caused by interruption of work can cause a critical condition to the patient. Ijäs-Kallio (2010) discusses patients' resistance to their diagnoses, Misra et al. (2013) patients' limited memory concerning their past medical illnesses and procedures, and Friesen et al. (2009) nurses and physicians forgetting to save patients' medical information in the system. Sands (2004) writes about physicians worrying about patient data security, and Stausberg et al. (2003) mention extra work due to parallel checks from both papers and ICT electronic records. Hebert et al. (2011) argue that nurses and physicians have to work in a hurry, which can cause a risk to the patient, and Pellegrino (2003) states that physicians and nurses have difficulties to find information in the intranet, possibly because of lack of tuition on how to use it. Not surprisingly, the enormous number of past studies is confounding, and adequate theoretical explanations have yet to emerge to explain knowledge management in healthcare. In particular, little is known of how knowledge management problems are related to each other, and which problems are actually the main ones. Therefore, the aim of our study is to respond to this lack of knowledge and to provide new information about knowledge management problems in healthcare. Though demanding in terms of data collection and analysis, such investigations can improve our understanding of knowledge management problems in healthcare considerably in practice and help us identify how the hospital environment influences knowledge management at the department level. Based on the past studies, we have formulated the following research question, *RQ1: What are the knowledge management problems in the obstetrics and gynaecology department?*

3 RESEARCH METHOD

The unit of analysis in this study is the Obstetrics and Gynaecology department in the central hospital of the South Karelia Social and Health Care District, Finland. The department has 8 senior physicians, 3 specializing junior physicians, 42 midwives, and 10 nurses. On average 1155 births in a year have taken place for the last ten years. In the department, patients make clinical visits to the maternity ward, and there is an open gynaecological clinic for women (Raudasoja, 2013). This study takes the qualitative, in-depth case study and Grounded Theory (GT) approach to understand the complex technological and social phenomena of knowledge management problems in one specific healthcare environment (Glaser and Strauss, 1967; Eisenhardt, 1989; Yin, 2003; Pawluch and Neiterman, 2010). The definitions of knowledge management and objectives of the research formed the basis for the interviews and data collection. The interviewees were chosen because their role was to use, create and transfer healthcare-related medical and ICT information, and translate it to knowledge relevant to the healthcare situation at hand. In order to address the research question, we carried out the study with four midwives, three senior physicians and two junior physicians in January-February 2013. The physicians had 10 to 30 years of experience of baby deliveries, and women's diseases and gynaecology. The midwives had 10 to 20 years of experience in delivering babies and taking care of women' illnesses. The interviewees chose options from a list of 32 pre-structured questions and were allowed to discuss the questions freely. The interviews included frequent elaboration and clarification of the meanings and terms, and they were audio-recorded and transcribed to text, yielding almost 250 pages of transcripts.

Table 1: Thematic category and definition, and item and definition.

Thematic category and definition	Item	Item definition
Patient: A patient receives care and treatment from a physician or a midwife	Characteristics	Each patient brings a set of unique characteristics to the care situation.
	Diagnosis attitude	Patient's attitude towards diagnosis is positive or negative, and beliefs and intentions can affect his/her behavior.
	Medication	Patient's pharmaceutical drugs.
	High health risk	Patient's high health risk increases the chance of disease or injury.
	Demobilization	Patient's discharge from hospital to home.
	Coordination problems between local services in primary and special healthcare	Problems with patient healthcare coordination in local settings.
	Lack of a contact tool	Lack of knowledge of which is the proper tool- a letter or phone call- to make contact if the patient has housing, alcohol or drug problems.
Patient data: Patient's personal data, medical history, treatments, tests, examinations, diagnoses, and consultation requests	Data in ICT systems	Patient's personal data, medical history, treatments, tests, examinations, diagnoses, and consultation requests in the ICT systems.
	Lack of data in ICT systems	Patient's personal data, medical history etc. are missing from the ICT systems.
	Lack of international patients' medical data	Lack of access to the medical history of undocumented migrants.
	Transfer on paper	Patient's personal data, medical history etc. are transferred on paper.
	Check from paper and ICT	Both paper-based and electronic patient records must be checked in parallel.
	Access rights and permission denial	Access through the portal is restricted to seeing patient data inside or outside the hospital. The patient can deny access to his/her data on paper or in ICT systems.
Physician: A physician needs knowledge of anatomy, physiology and medical science in practicing medicine.	Thoughts about midwives' professional distance towards patients	Midwives want to keep a professional distance towards patients, because they want to understand the patient from the patients' point of view by using midwives' psychological knowledge.
	Clinical work time	Physicians need time for clinical work, but midwives and nurses do not.
	Gender differences	Female physicians spend more time in consultation with the patient than male physicians.
	Dominant power position	Senior physicians use their superior position over nurses, midwives, and junior physicians.
	Lack of resources	Lack of physicians to carry out patient care in hospitals.
	Non-routine work	Time is spent in face-to-face contact with patients by gathering information and developing a relationship, doing administrative work related to visits, and maintaining knowledge.
	Medical and clinical decisions	A physician makes a diagnostic decision and determines the proper treatment for the patient.
	Private files of patients	The physicians have private and secret files of a patient which they do not share with others.
	Tacit knowledge	A physician's tacit knowledge is related to how she or he is able to use his or her biomedical knowledge, intuition and experience.
	Stress	Patients cause stress to physicians.
	Lack of time	Physicians do not have enough time in the policlinic to search for patient information.
	Tiredness	Physicians feel tired of reading system manuals or getting familiar with new ICT systems constantly coming to use.
	Professional distance to patients	The knowledge of psychological aspects in a doctor-patient relationship enables doctors to establish professional distance.

Table 1: Thematic category and definition, and item and definition (cont.).

Physician: A physician needs knowledge of anatomy, physiology and medical science in practicing medicine.	Medical practice differences	Physicians claim that there are medical procedures which are not used in their internal unit.
	Lack of ICT competence and knowledge	Physicians lack knowledge or competence to use IT tools, computers, and ICT systems.
	Work flow interruptions	The work flow is interrupted by phone calls, computer systems, specific equipment, and delays of patients or colleagues.
	Lack of expertise sharing between local and university clinics' physicians	In the hospital, the local clinic's physicians cannot discuss or share expertise in video consultations with university clinics.
	Work competence differences	Junior physicians have limited experience and they do not yet trust their clinical judgment fully.
Midwife: A midwife is a trained nurse specialized in women's labor, delivery, women's special illnesses, and taking care of the baby after the birth.	Lack of knowledge of the patient's social issues	During the patient interview the midwives do not know the patient's social history without asking.
	Lack of ICT and IT competence and knowledge	Midwives lack knowledge or competence of how to use IT tools, computers, and ICT systems.
	Acute work	The midwives are busy or have to work in a hurry in the baby delivery room.
	Work flow interruptions	Constant work flow interruptions in baby delivery.
	Stress	The midwives feel stress also in miscarriage situations.
	Diagnosis counseling	The physicians do not have time to explain the diagnosis to the patient thoroughly, and thus the midwives have to explain the diagnoses.
	Lack of time	The midwives have to work in a hurry because of stressful and busy work, challenging work, time pressures, or high job demands.
	Lack of work competence development possibility	Expert midwives cannot participate in patient care conferences even if they have in-depth knowledge of the patient care system.
	Unclear responsibilities	Difficulty to distinguish the difference of work between midwives and physicians.
	New practices review	The new practices or information sent by the physicians are first compared with the on-paper practices of the department or hospital.
	Non-routine work	Time is spent in face-to-face contact with patients by gathering information and developing a relationship, doing administrative work related to visits, maintaining knowledge.
ICT Systems: There are hundreds of ICT systems used in hospitals, and the physicians and other professionals use them in their daily work with patients.	Communication barriers	Hospitals using different ICT systems are not able to communicate, and paper serves as a coordination tool.
	User problems	The hospital ICT systems are difficult to use.
	Time spent in using ICT systems	The healthcare ICT systems are difficult to use and not user friendly, and it takes a lot of time to use the system. The systems reduce the time spent with patients
	Economic purposes	ICT systems are rather made for economic purposes.
	Information retrieval difficulties	The users claim that it is difficult to find information from the intranet, possibly because of lack of tuition in how to use it.
	Physicians' attitudes towards the ICT vendor	The ICT developers do not ask users about their opinions or experiences of the ICT systems.
Medical equipment: Medical equipment is designed to aid in the diagnosis, monitoring or treatment of medical conditions.	Risks	When the system fails in the middle of a medical situation it poses a risk to patient safety.
	Responsibility for failures	There are responsibility problems for technological failures between physicians, selling firms and buyers of medical equipment.
	Physician's attitudes to medical equipment	Physicians' attitudes towards medical equipment are negative because of lack of time.

4 ANALYSIS WITH THE GROUNDED THEORY APPROACH

After transcribing the interviews we searched for knowledge management problems from the empirical data. Then we categorized the discovered knowledge management problems under thematic categories according to the relevant terminology and past studies (see chapter 2) that were the most often refereed work of categorizing concepts in the studied research area. In this Grounded Theory analysis we used our intuition and knowledge in fragmentating and reassembling our data into thematic categories (Glaser and Strauss, 1967; Pawluch and Neiterman, 2010). Finally, we decomposed each category into multiple items (traits) by using content analysis to derive the items from the data and validate them with past studies. The special data table including the categories, definitions, literature sources, empirical evidence, transcript numbers etc. is available by a separate request from the second author. The thematic categories and definitions, items and definitions are presented in Table 1 below.

As shown in Table 1, six thematic categories were formed in the study: the Patient, Patient data, Physician, Midwife, ICT systems, and Medical equipment. The patient category had 14 observations and 7 items; the Patient data category 20 observations and 6 items; the Physician category 33 observations and 18 items; the Midwife category 12 observations and 11 items; the ICT Systems category 17 observations and 6 items; and the Medical equipment category had 11 observations and 3 items.

5 DISCUSSION AND CONCLUSIONS

In the Grounded Theory approach the theory emerges from the data. In our in-depth case study we took carefully into consideration beforehand who to interview, what to do next, what group to look for, and what additional data we should collect in order to develop a theory from the data. During the study we learned that some questions in the interview protocol tool were more specific to physicians than to midwives and vice versa. Theoretical background knowledge was gained during the research, which increased the credibility of the study (Miles and Huberman, 1994). According to Eisenhardt (1989), the combination of case study with the Grounded Theory approach has three major strengths: it produces a novel theory, the emergent theory is testable, and the resultant theory is empirically valid. The first limitation of the study is the question of whether there was enough data to derive the knowledge management categories and items, and if the discovered categories and items were the correct ones. The second limitation is that the external validity of the data is higher because we analyzed real data, but our internal validity is lower because we did not have complete data to all the stimuli. Therefore some caution must be exercised when interpreting the results. In the future, we will continue the study, and our next task is to find out propositions (hypotheses) on how the categories are related on the basis of the data, and finally what is the higher level of abstraction of the statements. Our new theory, a conceptual framework which includes thematic categories and items, and relationships between the categories, will be based on empirical evidence and theories reflecting the findings in the field, which is in line with Pawluch and Neiterman's (2010) suggestions for creating a grounded theory with the Glaser and Strauss (1967) approach based on own intuition and knowledge. As our goal is to create a theory, and to enhance the validity and reliability of the categories and their relationships, the data will be analyzed with novel intelligent computing methods (Kohonen 1989) to find out unique patterns and clusters of knowledge management problems and items. The knowledge management practices will be improved when the physicians and nurses understand their own valuable knowledge capital and practice, and understand knowledge management problems when building up healthcare information systems in the hospital. Furthermore, four other departments have been included in the research, and new interview rounds have been and will be carried out in the following order: in January - April 2014, a second round of interviews was carried out in the Obstetrics and Genecology department.; in March - May 2014 the first interview round was carried out in the Paediatric department.; in March - June 2014 the first interview round is carried out in the Paediatric Neurology department.; in May - September 2014 the first interview round will be carried out in the Surgical department.; and finally in May -September 2014 the first interview round will be carried out in the Anaesthesia and Surgery department.

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