Nurses' information practice in municipal health care – a web-like landscape

Abstract

Aim: To uncover the characteristics of nurses' information practice in municipal health care and to address how, when and why various pieces of information are produced, shared and managed.

Background: Nursing documentation in the Electronic Patient Record (EPR) has repeatedly been found to be unsatisfactory. Little is known about how the information practice of nurses in municipal health care actually is borne out. In order to understand why nursing documentation continues to fail at living up to the expected requirements, a better understanding of nurses' information practice is needed.

Design: A qualitative observational field-study. The study complied with the Consolidated Criteria for Reporting Qualitative Research (COREQ).

Methods: Empirical data was collected in three Norwegian municipalities through participant observations, and individual interviews of seventeen registered nurses on regular day shifts. The data was analyzed through thematic content analysis.

Results: Nurses' information practice in municipal health care can be described as complex. The complexity is reflected in four themes that emerged from the data: 1) web of information sources, 2) knowing the patient and information redundancy, 3) asynchronous information practice, and 4) compensatory workarounds.

Conclusions: The complex and asynchronous nature of nurses' information practice affected both how and when information was produced, recorded and shared. When available systems lacked functions the nurses wanted, they created compensatory workarounds. Although EPR was an important part of their information practice, nurses in long-term care often knew their patients

well, which meant that a lot of information of the patients was in their heads, and that searching for information in the EPR sometimes seemed redundant.

Relevance to clinical practice: This study provides contextual knowledge that might be valuable a) in the further development of information systems tailored to meet nurses' information needs, and b) when studying patient safety in relation to nurses information practice.

Keywords: nursing documentation, electronic patient records, information practice, patient safety, continuity of care

Introduction

To be able to facilitate patient safety, continuity, and quality of care, nurses need information about their patients. Municipal health care in Norway includes care provision in both nursing homes and home health care, and is characterized by the involvement of many carers in the provision of care to the same patient (Gjevjon, 2014). Continuity of care is defined as: *"the degree to which a series of discrete healthcare events is experienced as coherent and connected and consistent with the patient's medical needs and personal context"* (Haggerty et al., 2003, p.1221). In order to ensure continuity of care, communication between caregivers is crucial. This communication can be defined as informational continuity, where continuity is seen as dependent upon the transfer of relevant information to connect one episode of care to the next (Gjevjon, 2014; Haggerty et al., 2003; Meissner et al., 2007).

The various ways in which information is gathered, stored and passed on between nurses and other caregivers differ across settings; these have changed over the last few decades, due to the introduction of Information and Communication Technology (ICT) and the Electronic Patient Record (EPR) in health care (Meissner et al., 2007; Olsen, Hellzen, Skotnes, & Enmarker, 2014).

Documentation is recognized as an important part of nursing, and is mandated by Norwegian law (Keenan, Yakel, Tschannen, & Mandeville, 2008; Ministry of Health and Care Services, 2001). Nurses' recordkeeping does not only have a legal purpose, it also provides information of high practical value and of importance for communicating about patient care (Blair & Smith, 2012; Hellesø & Ruland, 2001).

Nurses need access to relevant patient information to be able to deliver good nursing care (Urquhart, Currell, Grant, & Hardiker, 2009). Hence, information is important for the care and subsequently the safety of patients. Patient safety is defined as: *"the prevention of errors and adverse effects to patients associated with health care"* (World Health Organization, 2018). Because information is of such high importance, many studies have been concerned with the quality of nursing documentation. Studies have repeatedly found quality of nursing documentation to be unsatisfactory when compared to guidelines and ideals related to content and structure (Ehrenberg & Birgersson, 2003; Gjevjon & Hellesø, 2010; Karkkainen, Bondas, & Eriksson, 2005; Wang, Yu, & Hailey, 2015). It has been reported that nursing documentation lacks important information while containing a large number of routine notes that make it difficult to find important elements (Tornvall & Wilhelmsson, 2008).

There is limited knowledge about why nursing documentation consistently fails to meet expected quality standards. Possible explanations have included heavy workload, staffing shortages (Ouslander et al., 2004), limited competence, disruptions, low motivation, ineffective procedures, too little supervision (Cheevakasemsook, Chapman, Francis, & Davies, 2006), insufficient training, and ineffective documentation systems (Voyer et al., 2014). Some have suggested that nurses, for example in long-term care, have a substantial amount of accumulated knowledge that is not expressed in their writing (Ehrenberg & Ehnfors, 2001), and others have found that not all

information about patients is entered into the 'official' records (Voutilainen, Isola, & Muurinen, 2004).

Background

Information and information practice

In this study, information is taken to refer to both health-related information, and information of a coordinating nature. There are differences in different settings both in the practice, and in the specific information practice, of nurses, due to locally developed culture and management strategies (Anderson, Issel, & McDaniel, 2003; Jylha, Mikkonen, Saranto, & Bates, 2017). In this study we see information practice from a social constructionist point of view, where we understand the practice to be socially developed through interactions of individuals belonging to that specific setting (Burr, 1995). A practice can be described as a) lying in-between habit and action; meaning that some actions are repeated habitually while others are of a more purposeful character, and b) lying in-between reproduction and production; meaning that while some actions are constantly being reproduced in a practice, a simultaneous production of results will also occur. When people share a practice they behave according to certain norms of what is considered to be correct or incorrect, to aesthetic norms, and to standards of fairness (Gheradi, 2008). Information practice is therefore considered to be a socially constructed practice that determines how information is produced, organized, disseminated, distributed, reproduced and circulated in the community, and which specific types of information are legitimized (Bonner & Lloyd, 2011). Information practice is context specific. Even though political and legal demands together with available resources will provide some regulations to the information practice, the people in any particular context, such as a nursing home, will over time have their own specific agreed-upon way of acting and speaking about things that may be unfamiliar to an outsider (Tuominen, Talja, & Savolainen, 2006).

Previous studies on specialized care have found that even though the documentation system might be digitized, the EPR is still not a sufficient source of information for nurses. The EPR cannot easily replace all of the functions of paper-based information systems due to a number of factors, including inaccessibility at the point of care and limited functionalities (Iversen, Landmark, & Tjora, 2015; Saleem et al., 2009; Saleem et al., 2011). This would resonate also in municipal care where accessibility remains an issue.

Other forms of communication that augment (or are augmented by) paper-based systems and the EPR include oral communication and whiteboards. Oral communication remains a major currency in health care, for example in handover situations where it not only provides information about a patient, but can also serve as education to other members of the staff and an opportunity for debriefing (Giske, Melas, & Einarsen, 2018). The use of oral information to augment the EPR in municipal health care has been described previously (Obstfelder & Moen, 2006), but has to the best of our knowledge not been explored in terms of how it works together with other information sources in an information practice. The use of whiteboards, especially for task administration, has been described also previously (Bost, Crilly, Patterson, & Chaboyer, 2012; Mackintosh, Berridge, & Freeth, 2009). Whiteboards are used widely in Norwegian municipal health care, but their use remains under-researched. Although the organization of activities traditionally has not been viewed as a part of patient care, this invisible work is important for care delivery and subsequently patient safety (Allen, 2014), and thus we have chosen in this study to include organizing activities in our understanding of nurses' information practice. Aspects of information practice, such as oral handovers or EHRs have been studied previously but separately. However, there is a gap in knowledge about how these independent pieces work together and how the information practice of nurses in municipal health care actually is borne out. The aim of this study is to uncover the

characteristics of nurses' information practice in municipal health care and to address how, when and why various pieces of information are produced, shared and managed.

Methods

Design

This observational field-study is qualitative in nature and draws on a number of methods, such as participant observation and individual on-site interviews. A qualitative approach is suitable for research in areas where one seeks a deep understanding of the nature of an area of interest, such as nurses' information practice. Observing and interviewing allows the researcher to record and question features of everyday practice that the nurses themselves may not see as part of the context or as worth mentioning (Green & Thorogood, 2014).

By combining observation and interviews in this study we were able to observe nurses' information practice, to ask questions and to have informal conversations with the nurses during the observations, and to follow up with interviews to get a more in-depth understanding of their opinions and thoughts concerning what was observed. This would provide rich data that would contribute to a broader understanding of nurses' information practice. The study complied with the Consolidated Criteria for Reporting Qualitative Research (COREQ) (See Supplementary File 1).

Setting

This study was set in municipal health care in Norway, and included both nursing homes and home health care. Norway is divided into 422 municipalities (per Jan 1st 2018). The municipalities are responsible for the delivery of primary health and care services, including both home care services and nursing home care. The Norwegian municipalities vary in size and population, and thus the

number of nursing homes and home health care districts in each municipality vary. The population of the three municipalities included in this study ranged from 10.000 to 60.000 inhabitants.

Norwegian municipal health care has changed over the last decade with an increased number of patients, and an increased responsibility for patients with chronic conditions in need of complex care. A general rise in the elderly population (Statistics Norway, 2017), combined with national political strategies to handle the aging population resulting in the Care Coordination Reform (Ministry of Health and Care Services, 2008-2009) and The Norwegian Public Health Act (Ministry of Health and Care Services, 2011) requires municipalities to assume more responsibility for the medical care of patients.

Context and participants

Participants were selected through convenience sampling in three municipalities. The three municipalities were all piloting standardized care plans using the International Classification for Nursing Practice (ICNP®) as part of another study. Access was gained through leaders of health-care services in the municipalities. When initial permission was granted, the leaders of the nursing homes and home health care districts were contacted. Permission to conduct the study in these specific locations was granted. Eligible RNs received information about the study and 17 RNs agreed to participate (Table 1). All RNs met the inclusion criteria; they were employed as 0.75 or 1 Full Time Equivalents, and had been employed for over a year in the ward, which meant that they were familiar with local routines and practices. All but one RN were women. To protect the anonymity of the male participant, nurses are described as female (she, her) throughout this paper.

INSERT TABLE 1 HERE

Details related to type of ward are listed in table 2.

INSERT TABLE 2 HERE

Data collection

Data was collected from May to October 2016. The first author (N.N., MSc) observed 17 registered nurses on a normal dayshift, that each lasted from 7 to 8 hours. As most of the inter-professional collaboration and care planning takes place during the day, we decided dayshifts would provide the most suitable time for studying the nurses' information practice. All nurses were interviewed individually at the end of their shift. All observations and interviews were conducted by the first author who is a female PhD-student with two years of prior experience in conducting qualitative research. She is also an experienced nurse, but unfamiliar to the municipal health care setting. Being an experienced nurse gave her the advantage of understanding the language used and the nurses' actions.

Observations

The first author participated as an observer for a total of 124 hours, and interacted with the people in the setting, but did not interfere with or join in patient care. Participant observation was chosen because it provided a first-hand opportunity to observe the information practice of RNs in municipal health care in situ. An observational guide was developed and used to narrow the scope, and guide the gaze of the observer. The guide included questions such as: "How does the nurse receive and give information?" and "Where can information be found?". Field notes were written down as keywords or short sentences during the observations. As soon as possible after the observations the field notes were written down in full sentences. The field notes were descriptions of the conducted observations. Additional reflective notes were produced for questions, feelings, reactions or thoughts that arose during the observations.

Interviews

All interviews were conducted in a room close to the ward at the end of the shift. Each interview lasted approximately 50 minutes. The interviews were semi-structured with predefined themes regarding information practice. The interview guide was developed on the basis of results of previous studies, e.g. we found several studies on the use of different handover styles (Giske et al., 2018; Meissner et al., 2007) and thus found it important to explore how the nurses got information at the beginning of their shift. Questions regarding the piloting of standardized care plans were based on the Unified Theory of Acceptance and Use of Technology (Venkatesh, Thong, & Xu, 2012). See Table 3 for main themes of the interview guide. In addition, the first author added some questions related to observations made that day. The interview guide served as a reminder of topics to be discussed, but did not structure the interviews. This allowed the nurses to share their stories and speak about what engaged them in connection to their information practice. Our approach recognizes that the researcher is an active participant in the construction of meaning during the interviews (Jootun, McGhee, & Marland, 2009). Conducting interviews at the end of the day gave a more in-depth understanding of the RNs' information practice.

INSERT TABLE 3 HERE

Ethical Considerations

The study was approved by the Norwegian Centre for Research Data (ID: XXXXX). The nurses' participation was voluntary. The observations focused on information management, and not on the patient. All patients visited during the observations were asked by the nurse for their acceptance of the researcher's presence in their home or in their room at the nursing home, with respect to the principle of autonomy. The first author did not interfere with patient care during the observations. All data were de-personalized before analysis.

Data Analysis

The interviews were audiotaped and transcribed verbatim by the first author using the software HyperTRANSCRIBE. The software NVivo 11 was used as an aid to keep track of codes and categories during the process of analysis. The transcribed interview data and the observational field notes were all printed out on paper and read as a whole by the Norwegian speaking researchers (N.N., N.N. & N.N.). First, a search of patterns and themes that were common across all the interviews and observations was conducted (Patton, 2015). This provided an overview of the data as a whole. The text was then subjected to a thematic content analysis and meaning condensation to extract the meaning of the text presented as codes, and further analyzed into categories. In this process the text was shortened to more precisely show the meaning of the content. Similar categories were grouped together and developed into final themes (Green & Thorogood, 2014). For an example see Table 4. As part of an iterative process, field-notes and interview-transcripts were re-read several times to make sure the themes were fitting, and to examine how they illuminated the data (Patton, 2015).

INSERT TABLE 4 HERE

Trustworthiness

All members of the research team are health care personnel, and two (N.N. & N.N.) have done an extensive amount of research on nursing documentation, and we acknowledge that this might have influenced our prior understanding of the field of research. However, we have taken measures to assure trustworthiness of the results presented in this paper (Jootun et al., 2009; Patton, 2015). In reporting our process of analysis we have provided information of the software used, and provided examples of the statements, codes, categories and themes in Table 4. In addition, we have added quotes in the presentation of our results to add transparency and illustrate our interpretations.

Although we acknowledge that the data may be read in multiple ways, we believe that we have reduced potential bias in our interpretations, with three people reading, analyzing and discussing the data, and one non-Norwegian speaking person (N.N.) validating and discussing these interpretations later on (not least to identify potential 'group think'). Through reflexivity we account for our part as researchers in the construction of meaning presented in our results (Jootun et al., 2009). Finally, reflections of the dynamics in the observations and interviews were captured in addition to the field notes.

Results

The findings from this study revealed that nurses' information practice in municipal health care is complex. The complexity is reflected in four themes that emerged from the observations and interviews: 1) web of information sources, 2) knowing the patient and information redundancy, 3) asynchronous information practice, and 4) compensatory workarounds.

Theme 1: Web of information sources

It became apparent through our analysis that the nurses used a variety of information sources interchangeably in their daily practice: electronic information, paper-based information, oral information, and information written on whiteboards. The information sources together resembled a spider's-web i.e. they were connected to each other, and the same information could be found several places:

> *The nurse had her patient list for the day ready in her basket, and said she did not have the need to read about the patients in the EPR because she knew them quite well. (…) The nurse knew exactly where to find everything she needed (at the patient's home), and what she should do. I noticed a list that was hung up on one of the cupboard doors in the bathroom.*

It was a reminder of what the nurses should do while helping the patient, such as: "Wash

his face". I was thinking that this is like a detailed care plan. The nurse did not look at this

list. (OBS NO. 12)

Just from reading this small part of a field note, we can identify three different sources of information regarding a patient: the patient list, the EPR and the list in the bathroom. The patient list was an A4 sheet of paper with an overview of patients and their condition. The list had some variations in content, but it could be found in all settings. The second source of information, the EPR, was where one can find the majority of health-related information concerning a patient, such as progress notes and the care plan. In the patients' home there was a third source of information, hung up in the bathroom. This list was specific, detailed, of a practical character, and accessible at point of care. Similar informal lists or notes to health care workers could be found across settings, both in home health-care and in nursing homes. The nurses pointed out that such information ensured accessibility to information and was regarded as useful at point of care:

"You must have a pretty good memory if you are able to remember everything you have

read in the care plan (in the EPR) when you are caring for the patient." (INT NO. 12)

Electronic EPR information did not have the same accessibility as a hand-written list or a note placed where the information was needed. This was partly due to limited or no access to mobile EPR-devices in these municipalities. Hence, other sources of information were used in addition to the EPR:

"It is a challenge that we don't have access to it (the EPR) in the patient's home. If I have

made a detailed care plan in the EPR I don't think it will be followed, if it isn't written on

the patient list as well." (INT NO. 11)

Additional paper-based information was available in a number of settings e.g. binders with patient-related information of a sensitive character. These binders contained printouts of important information from the EPR, medication lists, other lists, risk assessment forms and information received on paper that was later to be scanned and put in the EPR. In some settings there was a general skepticism towards the trustworthiness of the EPR, and thus they printed out information and stored it in a paper record called "the journal".

The information that was shared was both of a health-related and of an organizational and coordinating character. Information that was of an organizing character was regularly shared during the morning handovers. This information was usually written in a large calendar-book called the "black book" that was read aloud each morning. The messages could concern both the patients and the nurses and their working day as in one nursing home:

> *The nurse reads from a book with the messages for today. This is what it says: The daughter of a patient is coming today with his antibiotics. There is a researcher coming today (me). One patient has a wheelchair that needs to be repaired. Another patient fell yesterday and is being operated in the hospital today. (OBS NO. 14)*

The book provided a short summary of what was going to happen that particular day, and gave a quick overview of things to be aware of. Some of these messages on one ward were also written in the EPR, but on this particular ward the nurses experienced that access to the EPR was limited and time consuming. Another source of information that nurses used to get a quick overview of patient status and/or tasks to be done was the whiteboard or electronic board that could be found in the nursing station in most settings. The whiteboard was sometimes used as an aid in interdisciplinary meetings. In one ward it contained information about:

...patients daily Modified Early Warning Score, risk assessment scores, ability to make informed consent, score in relation to assistance needs, decision regarding resuscitation, living situation, technical aids, responsible nurse and discharge planning. (OBS NO. 1)

Across all wards, oral information was observed to be in frequent use, both as an organized activity and more ad hoc when situations occurred. Oral handovers took place in most wards, and even in a ward that practiced so-called "silent handovers", where everybody read the EPR individually, the nurse described a need for oral exchange of some information:

"We give each other messages orally if there is something special, but it is not organized. (…) For instance if something happened the night before, like if the nurse brought back some medications from the patient's home to do changes, and you are bringing them back in the morning." (INT NO. 11)

In the interview the nurse confirmed that this information could also be found in the EPR. Thus, oral information in this context does not serve as an alternative to documenting in the EPR, but rather as a supplement and a reminder. For various reasons not all information could be found in the EPR, and thus the nurses were reliant on talking to each other to get the necessary information.

We found that information was shared in many different ways, and that the same information could be found in several places. Where and how to look for and share information amongst these choices was not necessarily comprehensible for an outsider. Despite this complexity, the nurses were familiar with the web of information sources and had no problem navigating them.

Theme 2: Knowing the patients and information redundancy

We found that the nurses' information seeking behavior was influenced by the nature of long-term care. The nurses expressed that they did not need to read in the EPR every day to get an overview of their patients, because they knew them well. "Knowing the patients" meant both knowing their care needs and habits, but also knowing anything that had happened over the last period in time. When the nurses had been away from work for a period of time, or the patients' status was significantly changed, the situation was different. One nurse in a nursing home explained it like this:

> *"I am here pretty often so I don't miss much (of what is going on). But if I for instance have had several days off, and I am going to a patient that I have not been with in a while, I read to update myself first. To see if something has happened." (INT NO. 2)*

The nurses had developed a practice that involved reading the EPR to update themselves when they had been away, but otherwise they did not find it necessary to start their shift by reading the EPR. They often waited until later in the day when their numbers of tasks were fewer, and they were going to use the EPR for documentation. This was a practice seen across all the wards in this study, and that seemed to be accepted by the nurses. However, some nurses expressed that they thought the EPR should have been used more often than it actually was:

> *"I think one should read the care plan, maybe not every day if you have been at work and know what is going on (…), but I think you should read the care plan. However, I don't think it's being done. (…) I think it is being used too seldom." (INT NO. 7)*

This quote points to a contradiction in the nurses' information practice. On one hand the nurses express clearly that when you are present at work full time, reading the EPR is redundant. On the

other hand, they think the EPR should have been used more. They had multiple explanations as to why the EPR was not used that often. In addition to knowing the patients, and accessibility at the point of care, lack of time was commonly mentioned.

Theme 3: Asynchronous information practice

The third theme that we found was that nurses had what we interpret as an asynchronous information practice. The information practice did not follow a chronological timeline, but happened when a need for information occurred or an available moment for documentation opened up. Nurses used the EPR to document both occurrences of the past as well as for messages for the future. Such messages were also written in other places. This was related to the non-use of the EPR, but it was also in response to the fact that information written in the EPR "disappears" when new recordings are made. Therefore, the EPR was mostly used for information and knowledge of the past, for instance, the patients' medical history, or how a wound had looked the last time the dressing had been changed. However, as one nurse explained, there was not always time to read the EPR:

> *"Not always, because there are quite a few alarms, and many patients waiting to get up. They are maybe going to the doctor or joining different activities" (INT NO. 14)*

Such accounts show that even when there is a will to read the EPR, a patient in need of help will become the highest priority. The nurses prioritized present needs. The unpredictable nature of working with patients meant that nurses needed to be prepared for the unexpected. For example, in a nursing home:

> *The nurse began on the medication round. (…) On her way to patient number two, she was stopped by a phone call regarding one patient at the ward. She talked to the person on the*

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phone, and then she went to give this message to the person in charge of the patient. On

her way back through the hallway she met the son of one of the patients that had been very

ill. He told her that his mother had just passed away. The nurse had to talk to this man a

little bit, before she could go and inform the person in charge of this patient. (OBS NO. 4)

The nurse in this field note was interrupted by unexpected events, and had to handle several urgent matters along her way. She received information of new situations orally, and had to communicate this information to the right person immediately. In these situations, new information was produced and handled, and such information was often received and communicated orally. A nurse at a nursing home explained it like this:

"Sometimes you need the information earlier, before it has been written down. Then you

have to (talk to each other). Because you are dependent of them doing this and that before

you can do this and that. So we must cooperate that way." (INT NO. 2)

Nursing work requires a flexibility to change plans and handle new information, and to give information quickly when needed. This affects the information practice, in particular how information is exchanged and where it can be found. Working with patients means that a continuous stream of potentially new information needs to be managed. Often we saw that new information was first communicated orally, and was written in the EPR at a later time, i.e. the nurses' information practice was asynchronous and did not necessarily happen according to a specific timeline.

Theme 4: Compensatory workarounds

In our analysis we found that when the nurses met an obstacle or a shortcoming to the available information systems, they had developed what we have called "workarounds" to overcome this. These non-formalized information practices were in response to issues that nurses evaluated as necessary or useful to overcome. The two following excerpts from field notes are examples of situations when available informational resources did not provide the nurses with the information they wanted. The examples show workarounds where the nurses chose to solve the situation by using their own private cell phone to get information:

> *From the medication round: The nurse takes out a dosette where she finds the patients' pills. They need to be double checked to make sure that the patient receives the right medication. There are many pills, and it is difficult to know which one is which. The nurse takes her cell phone out of her pocked and go to an online medicine page to search for pictures of the different pills. She compares the pictures and finds out that the pills are the correct ones. (OBS NO. 1)*

> *From a wound care situation: The nurse shows me that she has pictures of the patients' wound from one and two weeks ago on her private cell phone. She explains that she takes pictures to follow the development of the wound. She does not have access to a camera at work, nor is there a possibility for adding pictures to the EPR. She looks at the pictures and assesses changes in the size of the wound and maceration of the skin around the wound. (OBS NO. 10)*

What these field notes exemplify is that the available resources of the workplace are not necessarily the only sources used in nurses' information practice. Where the specific type of information nurses need is not available, they use their creativity and develop workarounds to overcome this obstacle.

Discussion

The primary aim of this study was to reveal the characteristics of nurses' information practice in municipal health care. Our results describe a complex practice where information is produced, shared and tied together in a spider's-web, in many different ways. Although this may be a well-known phenomenon for nurses, it has previously not been explored in-depth. Previous studies have focused primarily on the patient record system and the quality of what has been recorded there (Wang, Hailey, & Yu, 2011). It has been suggested that by improving nursing documentation, patient safety will be enhanced (Fossum, Alexander, Ehnfors, & Ehrenberg, 2011; Middleton et al., 2013), however, the results of this study provide an extended and nuanced perspective of this assumption.

Nursing documentation in the EPR is important as a source of a large amount of patient data (Hayrinen, Saranto, & Nykanen, 2008), that also is of legal value (Ministry of Health and Care Services, 2001). The content of the EPR is also important for other purposes, such as for aggregating data for health policy, research and the allocation of resources (Hayrinen et al., 2008). Our results show that in the daily practice of nurses in municipal healthcare, information is shared in numerous ways. Reading EPR records at the beginning of the shift was considered to be redundant by nurses who work full time and who feel that they know their patients well. Hence, improvement of EPR content may not influence the care delivery of these nurses. This finding is in line with previous research concluding that better nursing documentation does not necessarily lead to improved patient care (Müller-Staub, Lavin, Needham, & Van Achterberg, 2006). "Knowing the patient" is a concept that has been described in nursing literature as an important aspect of clinical knowledge (Jenny & Logan, 1992), and has been identified by nurses as a factor facilitating quality of care (Murphy, 2007). Hence, its importance should not be underestimated.

Our study identified several other parts of nurses' information practice that could be interpreted as initiatives to promote also patient safety. Examples include reminders on patient lists or paper notes, messages communicated orally, and compensatory workarounds like controlling patient medication by comparing pills in a dosette box with online pictures found through a private cell phone. The use of patient lists has previously been described as a tool for immediate recording, retrieving and sharing of patient data in a way that is not supported by the EPR system (Iversen et al., 2015). These findings point to improvement opportunities for the EPR system. However, some studies have already described valuable information as hard to find in the EPR due to a large amount of routine notes (Tornvall & Wilhelmsson, 2008). It is important therefore that improvements to the EPR system do not add to this difficulty. Elements of the information nurses exchanged in the wards investigated could not easily be entered in the EPR system, as they were of an organizing character and not necessarily connected to a single patient. There appear to be several good reasons for having an information practice where multiple sources of information are being used.

The nurses' information practice was characterized by being asynchronous, where information seeking and sharing happened at different points in time, and not necessarily according to a scheduled timeline. This could be seen in relation to the unpredictable nature of working with patients, where unforeseen events often occur. The EPR is however developed in a way that supports the chronological recording of events, and has thus been previously described as having more of an archiving function, rather than being designed to support the organization of ongoing activities (Allen, 2013). We found that for situations occurring in the present, nurses very often used oral communication as their preferred source of information. In this way the person providing

the information can be assured that the message is received immediately, which in practice also means an immediate transfer of the responsibility.

An interesting finding in our study was that the nurses had developed what we have described as compensatory workarounds. These were used when available information sources did not meet the nurses' information needs. Workarounds, seen as unconventional methods for accomplishing work, have been described in previous studies as recurring events in health care result from a combination of the complexity of the setting and problems with the EPR system (Stevenson, Israelsson, Nilsson, Petersson, & Bath, 2018). Although one can argue that not all workarounds should be applauded, for instance it is not appropriate to take pictures of patients on private cell-phones, we argue that the workarounds identified in this study were all done with the intention of providing the patient with the best possible care. From this we interpret that more knowledge of workarounds is needed for further development of EPR systems, to make sure they provide nurses with the tools they need to give patients the best care possible.

Conclusion

In this study we found that nurses' information practice in municipal health care may be characterized as being complex and asynchronous. This affects both how and when information is produced, recorded and shared. When available systems do not have the functions nurses want, they create compensatory workarounds. Although the EPR is an important part of their information practice, nurses in long-term care often know their patients well, which means that a lot of information of the patients is in their heads, and that searching for information in the EPR sometimes seems redundant. This has obvious implications both for the uptake of EPRs, and the eventual use of the information they contain.

Relevance to clinical practice

The results of this study provide contextual knowledge that might be of value a) in the further development of information systems tailored to meet nurses' information needs, and b) when studying patient safety in relation to nurses information practice.

Limitations of the study

The study's limitations include the relatively small number of municipalities (n=3) and nurses (n=17) included, which in itself can compromise the possibility to generalize findings. A smaller number of participants does however give the possibility of achieving rich descriptions collected over a longer period of time, and continuing data collection until data saturation is met. Qualitative methods provide a deeper understanding of a number of important concepts, and through triangulation using a multi method approach of data collection we have gained an even deeper understanding and thus enhanced the rigor of the study. The understanding of nurses' information practice, and the themes presented in this study, illustrate issues that are recognizable and transferable to other settings and populations as well. All these issues enhancing rigor add to the trustworthiness of the findings of this study (Morse, 2015). All of the observations in the study were conducted during day shifts and, due to the possible difference in staffing ratio and in nursing tasks between day and evening shifts, it is possible that a combination of day and evening shifts would have extended our insight into the nurses' information practices. The translation of quotes from Norwegian to English may have caused some of the initial meaning to disappear, and all interpretations will necessarily in some way reflect the researchers' perspectives.

What does this paper contribute to the wider global clinical community:

- The paper adds a nuanced perspective of nurses' information practice in municipal health-care, describing its complexity and asynchrony.
- The paper shows that patient safety is not always dependent of the information found in the EPR, because nurses in long-term care use several other information sources as well, and often know their patients well.
- The paper also points to some limitations of the EPR regarding a) accessibility at point of care, b) lack of information of an organizing character not connected to a specific patient, c) missing functionalities for immediate reminders at point of care, d) missing possibilities for the immediate transference of new information to another person. This suggests that the EPR in its present form cannot be the only source of information available, and thus should perhaps not be the only source of information attributed value in nursing.

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Tables

Table 1: Participant demographics (n=17)

	Range	Mean
Age in years	27 – 60	40.9
Years as a nurse	2 – 36	13.6
Years on the ward	1 – 26	7.6

Table 2: Type of ward that participating RNs (n=17) worked in

	Short term ward	Intermediary ward	Long term ward	Home health care	Total amount
Municipality 1	2	3	0	0	5
Municipality 2	1	0	4	3	8
Municipality 3	1	0	2	1	4
In total	**4**	**3**	**6**	**4**	**17**

Table 3: Main themes of the interview guide

1	Getting and seeking information at the beginning of the shift
2	Use of the EPR - usability, responsibility, how and when is it used
3	Choices regarding what was documented where
4	The information practice on the ward – sources of information
5	Use of care plans
6	Experiences and evaluations regarding the piloting of standardized care plans

Table 4: Examples of codes, categories and main themes from the analysis

Transcribed text & field notes	Code	Category	Main theme
The nurse looks at the whiteboard at the base to see today's Modified Early Warning Score (MEWS) values for the patients. She writes them down on her paper list of the patients and goes to the doctor to inform about this. In 20 minutes there is going to be a meeting (OBS no. 3)	To manage one piece of information, the nurses use a whiteboard, a paper list and oral information	Several information sources	Web of information sources
"I do work almost full time, so very often I was here the day before. But if I have been away for a while I usually log into the EPR and read." (INT no. 16)	Working full time gives *knowledge* about the patients; absence creates a need to read the EPR	Reading EPR is not always necessary	Knowing the patients and information redundancy
The nurse starts the day by finalizing old progress notes in the EPR. She explains that they are not finalized because the nurses write a little now and then during the shift. Once the note is finalized and approved one is not able to write more on the same topic. Thus, the notes are often not finalized on the same shift as they are written (OBS no. 8)	The nurses write notes in the EPR several times during the day. The EPR is not *designed* for this. Thus, notes are not finalized	Nurses have a need to record when situations occur	Asynchronous information practice
"Every shift you have to read from the Patient Controlled Analgesia (PCA) pump, how many boluses, how much medication that is given, and things like that. You have to do that in the patients' room. So then we write it on a paper list. But we also have to write it in the EPR. Then you copy what the last person has written and just edit the numbers. (…) There should have been a template in the EPR." (INT NO. 9)	The EPR is not *available* where the PCA is. The numbers are documented on paper before the EPR. In the absence of a template they copy text from the nurse before	Nurses have to document twice, but find solutions to do it quick	Compensatory workarounds