Medication Reconciliation as Repair Work

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Abstract. In Norway, the process of developing a national shared medication list has been underway for several years. The shared medication list provides an overview of all the medications used by a patient. However, its proper use requires that it be maintained regularly through so-called medication reconciliation processes in which health personnel clarify – and ask patients – what and how much medication they use. We explore the work embedded in the bedside medication reconciliation process at a hospital, the health personnel conducting this work and the implications for the shared medication list. We argue that reconciliation processes can be conceptualized as collective repair work that needs to be continued after the shared medication list is implemented.

Keywords. Shared medication list, reconciliation, medication, repair work

1. Introduction

In Norway, the process of developing a shared medication list has been underway for a while. It is a national functionality with which all electronic health records (EHRs) must comply. The shared medication list provides an overview of all the medications used by a patient. This includes prescription medicines, over-the-counter medicines, medicines administered in a hospital, emergency room or nursing home and medicines purchased abroad. Generally, healthcare workers express great faith in the shared medication list [1] since it is intended to replace the current medication lists at hospitals, municipalities and general practitioner clinics. Since December 2021, it has been piloted in Bergen, Norway's second-largest city.

However, the proper use of the shared medication list requires that it be maintained regularly through so-called medication reconciliation processes [2,3] to clarify exactly what medicines – and dosages – patients use. For example, when a patient is admitted to hospital, a medication reconciliation process is necessary before relevant treatment is initiated.

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While physicians have the responsibility of patients' medicine use [3], several healthcare personnel are involved in the process – for instance, pharmacists, who are concerned with problems caused by medication interactions, and nurses, who distribute medicines to patients. This implies that considerable work needs to be conducted to maintain patients' medicine use. Therefore, we ask the following research question: What characterizes the work that goes into the medication reconciliation process at hospitals, who conducts this work, and what are the implications for the shared medication list?

Empirically, we focus on the bedside medication management at Narvik Hospital, one of several local facilities of the University Hospital of North Norway. From a theoretical point of view, this paper is positioned in the information infrastructure literature, which emphasizes that information systems and practices are tightly interwoven [4]. We particularly draw on the "repair" concept, which refers to who fixes the devices and systems that we "seamlessly" use and who maintains the infrastructure on which we depend [5].

2. Methods

Our study is based on an interpretive research approach which considers a phenomenon from different perspectives [6]. In the autumn of 2021, we held a one-day workshop with healthcare personnel from two hospitals, one of which was Narvik Hospital. This workshop focused on the sociotechnical challenges of medication management. Furthermore, during the spring of 2022, we conducted three one-hour interviews with three informants from Narvik Hospital: a physician, a pharmacist and a nurse. We also conducted a one-hour interview with a nurse at a municipal health centre that collaborates closely with Narvik Hospital. The interviews were conducted in an open-ended manner, but the focus was on medication management maintenance.

3. Results

3.1 Background of the technical systems in use

In this section, we focus on bedside medication management from the perspectives of a physician, a pharmacist and a nurse. This involves both how they use available information systems and how they interact with patients. Information systems supporting medication management at the local level include the Dips Arena EHR and paper-based medication charts. At the national level, the Central Prescription Database contains dispensed medications for active prescriptions, and summary care records are used to share consenting patients' health information across the healthcare sector [1].

3.2 The physician

Depending on the complexity of each case, the medication reconciliation process takes anywhere from a few minutes to half an hour. Initially, the physician uses several technological information sources to obtain an overview. First, she opens the EHR, which contains the medicines that the patient used at the last hospital contact. She then

adds any new medicine from the Central Prescription Database. After that, she checks the patient's summary care record, as it may contain medication that the patient acquired from a pharmacy, which is listed neither in the Central Prescription Database nor in the EHR. If the patient obtained a medicine – for example, an antibiotic – a week ago, it is likely that he is still using it. Conversely, a medicine obtained a year ago is likely to no longer be used. However, an antibiotic may also be listed as a regular medication or as needed and not as a cure. Therefore, the physician emphasizes that "one must use common sense to find out what the patient uses". If a patient is receiving home care, the physician can ask the home care service to obtain his medication list via the electronic PLO[2] messaging system. If there is a mismatch between this list and the Central Prescription Database, the physician is inclined to trust the list from the home care service because home care personnel go through the medication list quite often. At nursing homes, it is not certain whether there are recent entries either in the Central Prescription Database or in the summary care records because medication lists are stored only in the nursing homes' EHR systems. In this case, a nursing home physician may provide the most up-to-date list. The next step is to talk to the patient (if possible) to double-check everything. It is important to ask about the name of the medication, the dose and how often the patient uses it. Patients are often prescribed medications that they do not use. A patient may say, "I got it, but I don't really use it". The physician must then remove this entry from the EHR before she prints out and signs the list, which is subsequently used as the patient's medication chart throughout the hospital stay. If the patient is put on a new medication at the hospital, the physician must sign off on the medication chart to confirm that it is correct. If not, nurses cannot administer the medicine. The physician therefore checks the EHR from the date on which the medication was initiated to see why it was prescribed. Correspondingly, if the medication has been discontinued, the reason must be stated in the EHR. If the medication is listed in the medication chart but not explained in the EHR, the physician needs to establish the reason by asking the physician who prescribed it.

3.3 The pharmacist

When the pharmacist goes through a patient's medication list at the bedside, she uses the paper-based medication chart. If the patient handles his medication himself, the pharmacist talks to the patient and tries to establish what medicine he is using and how. She may also ask the patient's permission to access his summary care record to see what medication he has been prescribed and what he has picked up at a pharmacy. If the patient does not handle the medication himself, the pharmacist can obtain a medication list from a home care service or a nursing home. The pharmacist almost always finds that something is incorrect. It may be difficult to assess who has the right answer if a patient handles the medicines himself or if the patient's spouse or home care service is involved. Adding to the complexity, the medications that a patient uses may vary daily. The pharmacist says that it is challenging to obtain information from patients themselves on how they use their medicines because even if they know how they are supposed to use them, they may have found their own way or may not think that it is important to adhere to the prescriptions. For example, patients may take slightly higher painkiller doses than prescribed if they find that the prescribed doses are not sufficiently effective. In such

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[2] Norwegian: Samhandling-pasient med behov for kommunale tjenester – utskrivningsklar pasient. PLO=pleie og omsorgs melding, også kalt e-melding.

cases, it is difficult to ascertain the actual doses. Hence, the pharmacist tries to explain to patients that it is most useful to tell her not how they are supposed to use a medicine but how they actually use it. She sometimes also identifies major errors that can have serious consequences for the patients, although she usually finds less serious issues, such as using an additional medicine or making small dose changes. Based on all the information, she assesses whether a patient's treatment is optimal or whether adjustments to the type of drug or dosage are needed. She then enters a note into the EHR with the correct list and informs the physician who will make the corrections in the medication chart. Sometimes she informs physicians that she has written a note, while other times, she goes and talks to them so that they can correct the list immediately. In terms of the reconciliation process – that is, what patients actually use – physicians generally accept it. On the other hand, the medication review, which is an evaluation of a patient's medicines, and is the basis for further treatment, may result in a lengthier discussion if, for example, a patient uses a type of medicine that is against the guidelines or doses different from the prescribed doses, or if there are medication interaction issues. However, the physician has the final say.

3.4 The nurse

The nurse uses the paper-based medication charts as the basis for dispensing medicines to patients. She says that because physicians have different ways of prescribing, nurses must prepare the medicines very carefully. Physicians may prescribe doses in milligrams or in numbers of tablets – for example, five milligrams or three tablets. The nurse says that most nurses prefer doses in milligrams because it is easier to calculate how many tablets to administer, and this is what they are used to. There may even be inconsistency in how the medicines are described in the entries on the medication list. Another challenge is when a patient is to have, for example, a dose of 150 milligrams of Selo-Zok. The doctor may enter 100 milligrams × 2, one morning and evening, into the Central Prescription Database, and there may be an entry specifying 50 milligrams × 1. The nurse then wonders what the correct dosage is. Should it be 150 milligrams in the morning and 100 milligrams in the evening? The nurse says that these are typical situations in which she does not administer a medication until the prescribing physician clarifies the correct dosage. The nurse emphasizes that wards try to have all medications in one-dose packages, which are typically distributed by the nurse in charge of a round. The nurse usually takes a 25-millilitre medication cup and fills it with a certain number of packs and one-dose bags. If a patient uses several medicines, she must sometimes carry two or three cups. She takes them to the patient, carefully empties them on the bedside table and goes through the medicines with the patient. If she uses extra time on this task, she can observe and form a general impression of a patient. Patients sometimes say, "This one is wrong; I stopped using it a few months ago" or "I use a different dosage". Therefore, it is very useful to review the medications together with the patients. It also helps to make patients aware of their medicine usage.

4. Discussion

The information infrastructure concept suggests that information systems are never standalone entities; they are integrated with other information systems and deeply embedded in conventions and practices [4]. This is reflected in reconciliation processes

at hospitals. These processes are embedded in a large infrastructure consisting of a range of local and national systems, which together are intended to support health professionals in keeping patients' medication lists up to date. While individual physicians are formally responsible for patients' medicine use, our study reveals that nurses, pharmacists, relatives and patients are also involved in the task of maintaining medication lists, albeit from different perspectives and in different phases of the patient trajectory. For instance, the physician, as formally responsible for patients' medicine use, has access to all related information systems. The pharmacist, in turn, informs the physician about any updates and sometimes discusses medication interaction issues with the physician. Finally, the nurse sometimes needs to clarify what the physician has prescribed and can observe patients when delivering their medicines. What they all have in common is that they must talk to the patients to ascertain what medicines they take and how. Thus, reconciliation processes are an illustration of ongoing collective repair work – that is, they reflect infrastructures that have been broken and then restored [5] to maintain stability and order.

5. Conclusions

The implementation of the national shared medication list is expected to solve many issues with current medication management practices. It will replace numerous local medication lists and will be integrated with the Central Prescription Database, the summary care records, and many local EHRs. In this sense, the shared medication list may be considered an easy fix for physicians. However, the repair work and its collective characteristics presented in this study will not be rendered obsolete by the shared medication list. It will always be essential to talk to patients at various stages of their trajectories to clarify what medicines they use and how.

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