RESEARCH

Inadequate medication reconciliation in hospitals

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Summary

Background: Inadequate information about what medications a patient is taking may jeopardise patient safety upon admission to hospital. Medication reconciliation is a method that can mitigate this problem. Ålesund Hospital has conducted a number of projects over a period of years to describe the process of medication reconciliation, but the process has proven to be challenging to implement.

Purpose: The purpose of this study is to gain insight into doctors' and nurses' experiences with medication reconciliation. Knowledge about this will be valuable in the effort to develop good routines for medication reconciliation, and thus may have a positive impact on patient safety in hospitals.

Method: Semi-structured interviews were conducted with five doctors and four nurses who had experience with reconciling medication information. The sample included personnel from both the emergency ward and medical wards.

Results: In the informants' experience, the process of medication reconciliation was inadequate. They stated that they used many different sources of information about the medications a patient was taking and that they were often unsure whether the information reflected the patient's actual medication use. They described a process of reconciling medication information that entailed an unclear allocation of responsibilities and a lack of communication and standardisation of tasks.

Conclusion: Doctors and nurses agreed that medication reconciliation is important for patients. However, they experienced numerous challenges related to unreliable information sources and inadequate routines. They said there is a need to clarify responsibilities.

Treatment by drugs involves multiple professional groups and service levels, and this makes it particularly challenging to gain an overview of a patient's medication regime. There is extensive documentation showing that an incomplete overview of the medications a patient is taking during transition between levels of care presents a potential risk to patient safety (1–7).

The Norwegian Patient Safety Programme

In recent years many countries and organisations have developed their own guidelines on medication reconciliation as a means of enhancing patient safety (8–11). The Norwegian Patient Safety Programme has identified reconciliation of medication lists as one of its target areas. In medication reconciliation, health professionals work together with the patient to draw up a precise, complete list of all the medications that the patient is actually taking (12).

The programme describes which tasks must be carried out and what the measurable indicators are, but it does not provide guidance on how medication reconciliation should be performed, how the process should be organised or what knowledge the health professionals should have to carry out these tasks. The healthcare institution itself must decide how to address these issues and how to implement solutions through, for example, procedures, leadership, and training of employees. Medication reconciliation in hospitals has proven to be both complicated and challenging to implement (13).

Research on medication reconciliation

In 2010, a group of US experts prepared a list of 10 areas that required attention in order to succeed with medication reconciliation (13). The Norwegian Knowledge Centre for the Health Services has published a systematic overview of medication reconciliation. The report concludes that medication reconciliation likely reduces the number of unintended discrepancies. At the same time, the report draws no conclusion about how reconciliation can be carried out in an effective manner (14).

In most of the studies that investigate the effect of medication reconciliation, clinical pharmacists have played a key role in the process (15). Up to now this group of health professionals has had a very limited presence in Norwegian hospitals, and it is therefore necessary to look at what contribution doctors and nurses can make. In focus group interviews with doctors, nurses and pharmacists, Vogelmeier et al. found that the term "medication reconciliation" was understood differently depending on one's profession. It was also unclear who was responsible for the process (16).

Experts have emphasised that clarifying both the term and roles is important for successful medication reconciliation (13). Other barriers to implementing medication reconciliation are unreliable information sources, the fact that health professionals give the task low priority, and poor communication and cooperation between professional groups and between hospitals and the primary healthcare services.

Complex process

A process can be described as a complex organisational phenomenon, and process orientation indicates that attention is directed towards how employees from various units work together on shared tasks (20). Medication reconciliation is a complex process involving multiple professional groups and hospital wards. As a general rule, the process begins by asking the patient what medications he or she is taking (medication history). In addition, there are other relevant sources of information about medications, depending on the level of care the patient is receiving.

«Medication reconciliation is a complex process involving multiple professional groups and hospital wards.»

Ålesund Hospital has conducted a number of projects over a period of years to define the process of medication reconciliation and establish procedures for it. In 2011, a descriptive study documented the quality of medication information after a procedure for obtaining patients' medication histories and training doctors and nurses on the emergency ward was introduced (3). The study showed the medication lists in the patients' charts and the actual medications the patients were taking did not correspond in two-thirds of the cases. This discrepancy was clinically relevant for one of four patients. These results differed from expectations held when the procedure was introduced.

Involving staff on the medical ward

On the basis of these results, a new measure was introduced in 2012 which involved medical ward staff in the medication reconciliation process. A key element in the process was a patient transfer form that would serve as a documentation and communication tool for the various personnel who took part in medication reconciliation. A survey from the medical ward in the period up to seven months after the procedure was introduced showed that medication reconciliation had been verifiably conducted for only eight per cent of the patients (21).

In the surgical clinic it was decided to introduce the procedure on three different wards simultaneously, and a prospective controlled study was conducted. The share of patients whose medication lists in their charts did not correspond with their actual medication use was reduced from 53 to 25 per cent following the "implementation project" (22). To summarise, the study showed that it is possible to reduce the number of errors on the medication lists of patients when they are admitted to hospital if the staff works systematically to obtain and document information about their medications. This was achieved by giving nurses on the wards training in and responsibility for medication reconciliation.

Purpose of the study

The purpose of this study was to gain insight into doctors' and nurses' experiences with medication reconciliation upon admission to hospital. As far as we know, no such study has been conducted at Norwegian hospitals before. Since medication reconciliation is dependent on cross-professional cooperation and organisation, it is not possible to simply transfer results from international studies to Norwegian conditions. At the time the study was conducted, the hospital procedures distinguished between the terms "medication history interview on the emergency ward" and "medication reconciliation on medical wards". Thus the emergency ward staff described their part of the job as obtaining patients' medication history. Today these processes are compiled into a single procedure. We have therefore chosen to refer to the entire process as medication reconciliation. The research question formulated was:

"What are the experiences of doctors and nurses related to medication reconciliation upon admission to hospital?"

Knowledge about this will be valuable in the effort to develop effective routines and learning concepts for medication reconciliation, and may have a positive impact on patient safety in hospitals.

Method

Design

The study has a qualitative design (23). We conducted interviews with doctors and nurses because we wanted to obtain data about their experiences with medication reconciliation. We chose to conduct one-on-one interviews because we wanted to understand the experiences of the individual (24).

Sample

We selected a strategic sample of doctors and nurses at Ålesund Hospital (23). The informants were recruited by the ward manager. We chose to include both professional groups since both doctors and nurses have duties related to the medication reconciliation process. The sample was comprised of nurses and various groups of doctors, such as house officers, speciality trainees and senior consultants, because they have different roles in the process. The sample included staff from the emergency ward as well as medical wards because we wanted to see how the various wards cooperated on the process.

Data collection and analysis

One-on-one interviews were conducted with five doctors and four nurses (24). The interviews took place during a two-week period in January 2013 in Ålesund. The lead author (TK) conducted the interviews, which lasted 30–60 minutes. On the basis of previous research (3, 22) we developed a semi-structured interview guide with questions about the medication reconciliation process. We used a digital sound recorder, and the interviews were held in a meeting room in the hospital pharmacy. We concluded the interviews when we felt we had obtained as much data as possible (25), and the interviews were transcribed to standard Nynorsk with no dialectal variations.

We performed an analysis of the data using systematic text condensing (24). The method has four analytical steps. First the transcriptions were read so we could gain an overall impression of the material and identify preliminary themes. Then the data that shed light on the research question were organised into meaning units and sorted into code groups (decontextualising). In the third step of the analysis, the knowledge obtained from coding the meaning units were extracted into three condensates. Finally, we compiled the essence of each of the condensed groups into one analytical text (recontextualisation) that describes the kind of experiences the health professionals had with the medication reconciliation process (24).

Both the lead author and the last author analysed the data and discussed the material until they arrived at themes and codes in the various steps of the analysis. The last author was knowledgeable about the process from work with procedures and training of health personnel, while the lead author became familiar with the process during the study.

Ethics

Informed consent was obtained prior to the start of the interviews. The project was pre-approved by the Norwegian Centre for Research Data. The data was anonymised, and sound recordings and name lists were destroyed when the study was concluded.

Results

The findings from the interviews with five doctors and four nurses are presented under three main themes: 1) different and unreliable sources of medication information, 2) the need to clarify responsibilities, and 3) inadequate communication and standardisation.

We have chosen to present the results from the various professional groups and units together because medication reconciliation is a task that involves a cooperative effort.

Different and unreliable sources of medication information

The doctors and nurses reported that they use a number of different sources when compiling information on the patient's medication use upon admission to hospital. These sources included the general practitioners' list, hospital admission papers from the general practitioner or on-call doctor, previous patient records, case summaries, lists from home-based care services or nursing homes, multidose lists and the patient's own list. The informants said they had more faith in the lists from home-based care services and nursing homes than from general practitioners' lists and hospital admission papers. One of the doctors stated, "The lists from nursing homes and home-based care services have updated information on what medications the patient is actually taking, so this is often regarded as the gold standard."

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Doctor

Another doctor emphasised that it is important to assess which sources can be trusted in each case. He was concerned about the fact that the general practitioner should in theory have a complete list of all the medications a patient is taking, but his experience suggested otherwise. One of the hospital house officers had a patient who was taking completely different medications than those listed on the admission papers: "On my last shift a patient came directly from her general practitioner. It was my understanding that she had been to many medical check-ups, but the patient had her own list of medications on a piece of paper that did not correspond with her doctor's list." The experienced doctors said they had high expectations for ICT solutions, such as the *Kjernejournal*(Summary Care Record), and thought that this would solve the problem of different lists.

The informants emphasised that the patient is an important source of information, but in their experience, the patients do not always have a complete overview of the medications they are taking. One doctor stated, "When the average age is high and numerous drugs are involved, as is often the case, the patients have limited information about their own medications." A recurring theme in the interviews was that there is not a common standard for how health professionals speak with patients about their use of medications. It appeared to be random and up to each individual as to how to do this. The informants emphasised that everyone should do a better job of specifically asking the patients if they actually take the medications on the list and whether they take other drugs – such as over-the-counter medicines.

Need to clarify responsibilities

Both the doctors and nurses stated that the doctors are responsible for all treatment by drugs in the hospital, but that it is a joint responsibility to ensure that the information about the patient's medication use is correct. They emphasised that medication reconciliation is important, but many of the informants could not say who had responsibility for what in the medication reconciliation process – this was especially true for the medical ward. One of the doctors said that he did not think that one particular professional group had responsibility for medication reconciliation. One of the nurses put it this way: "I would say that we are a team. While some things are our responsibility, other things are the doctor's responsibility".

The allocation of responsibilities on the emergency ward appeared to be clear. The nurses stated that they obtained the patient transfer form and retrieved the list of medications, while the house officers said that they spoke with the patient and prepared the patient's chart. The house officers explained that the patient interview was a prioritised task on the emergency ward, but that the patients were often stressed and that the health professionals felt pressured for time. This made it difficult to gain a complete overview of the medications a patient was taking. In their experience, the health professionals often needed more time to complete this task thoroughly than they had available on the emergency ward.

The doctors on the emergency ward thought this was handled on the ward in calmer surroundings, but they said they were unsure whether this was actually done. One of the house officers said there is a need to quality assure the ward patients' medication information and to clarify whose responsibility it is to do so: "We must look at ways to ensure that the medication information is followed up on the medical wards. I think this is important. It may be defined whose task it is to check the information when a patient arrives on the ward, but it must be clearer whose responsibility it is".

«The interviews revealed that it was unclear who is supposed to do what on the medical ward.»

The interviews revealed that it was unclear who is supposed to do what on the medical ward. It did not appear that tasks such as interviewing the patients and obtaining lists were allocated to specific professional groups. The nurses said that they received patients when they came from the emergency ward, and explained that they often used this occasion to talk with the patients about their medications. They also reported that they were involved in contacting general practitioner offices and home-care nurses to obtain medication lists. Although the nurses said that they were concerned about medications, they also stated that medication reconciliation was dependent on time and resources. The task was not prioritised in busy situations. Several of the informants, both doctors and nurses, noted that clinical pharmacists could play a supportive role in medication reconciliation, but it was also mentioned that this group should not be given the responsibility for the process because pharmacists are not always present on the medical ward.

Inadequate communication and standardisation

The informants knew that the purpose of the patient transfer form was to communicate to hospital personnel about a patient's medications. The emergency ward staff said that they made notes about missing lists or dubious information on the form. At the same time, they said poor communication pervaded the medication reconciliation process and that hospital staff thought but did not know for sure what others did. It was emphasised that the doctors used the form to convey their uncertainty if the situation on the emergency ward did not allow them to totally clarify a patient's medication situation, but it also came to light that they did not know for certain whether their notes were followed up on the ward.

One specialty trainee put it this way: "I remember that it felt safe and secure to have the transfer form on the emergency ward. If I was unsure of something, there was actually someone who would check on it. Well, someone was supposed to check, in any case." The interviews with medical ward personnel revealed that the notes written on the transfer form were not always dealt with on the medical ward. The nurses said that if the transfer form was placed on top in the patient's folder and it was not too busy, the nurse might read the notes while admitting the patient to the ward. If not, the next checkpoint was the pre-visit on the following day during which doctors and nurses allocate tasks between them, but neither the doctors nor the nurses said that they paid much attention to the transfer form.

One of the doctors thought that the notes were not always heeded on the medical wards. “I think there is often a glitch. If the notes say that someone should check on something, it may not get done if there are no routines for looking for the patient transfer form.” The interviews revealed that information about a patient’s medication use was communicated by means other than the form – for example, through yellow post-it notes or the admission records. It was stated that during the pre-visit, doctors make decisions based on the information on the patient’s chart, and one of the doctors thought that the information should be linked to this: “I think the best method is to put it in the chart if something needs to be checked, because you cannot complete a pre-visit without having looked at it.”

Discussion

The findings in this study show that both doctors and nurses felt that the process of medication reconciliation was inadequate. They stated that they used many different sources of information about the medications a patient was taking upon admission to hospital and that they were often unsure whether the information reflected the patient’s actual medication use. They described a process of reconciling medication information that entailed an unclear allocation of responsibilities and inadequate communication and standardisation of tasks. This corresponds with relevant literature on this topic (13, 16-19).

Both national and international research shows that there is good reason to be critical as to which sources should be consulted to gain an overview of the medications a patient is taking (1–7, 26). Despite the uncertainty among the health professionals and their knowledge of gaps in the system, we did not find that they were critical in a systematic way. Neither the house officers nor the nurses on the medical wards gave any indication that there was a common standard for how to speak with patients about their use of medications. The summary from the Norwegian Knowledge Centre for the Health Services shows that medication reconciliation likely reduces unwanted discrepancies when the process is carried out in a standardised way (14).

Can the Kjernejournal(Summary Care Record) help?

The informants in this study expressed a lack of confidence in the information sources, and several of the doctors had great hope for the *Kjernejournal*(27) which has now been introduced in Norway. The *Kjernejournal*has become an important source of information about the medications a patient is taking upon admission to hospital. The medication information found in a patient's *Kjernejournal*is taken from *Reseptformidlaren*, the central database for electronic prescriptions in Norway. Thus the quality of the information is dependent on the doctors' updating the prescription information in the central database. Consequently, the health personnel who reconcile the medication lists must be critical about the information found in the *Kjernejournal*. Not least, it will still be crucial that the health professionals speak with patients to find out which medications they are actually taking, how they take them, and whether they take over-the-counter medicines or dietary supplements as well. Our results suggested that there was room for improvement in 2013. In interviews with doctors and pharmacists, Boockvar et al. found that when electronic sources were used, health professionals spoke less with the patients because they put too much trust in IT tools (18).

Situation on the emergency ward

The study showed that the emergency ward staff were well organised and had a clear allocation of tasks related to gathering medication information. It could be asked, however, whether the situation and competency in the emergency ward are suited for this task. The nurses said that they helped to obtain medication lists from general practitioners, home-care nurses and nursing homes, but of course they are dependent on access to sources, e.g. open hours. The situation on the emergency ward can be chaotic at times, and assessments must often be done quickly. In addition, the house officers, who see the patient first, are the least experienced doctors in the hospital.

«Information about medications was communicated in multiple ways – for example, through patient charts, patient transfer forms, admission records and yellow post-it notes.»

We found that the doctors on the emergency ward conveyed their uncertainty about a patient's medication use on the patient transfer form, but neither the doctors nor the nurses on the medical wards said that they paid much attention to the form. This may indicate that at the time of the study a truth about the patient's prescribed medication was postulated by emergency ward staff upon admission and that this was never systematically queried on the ward. Our results showed that information about medications was communicated in multiple ways – for example, through patient charts, patient transfer forms, admission records and yellow post-it notes. Such a lack of standardisation makes the process of medication reconciliation even more complex. We believe it will be critical to develop uniform solutions for communication about medications and internal prescribing when developing ICT solutions for hospitals in the future.

Prioritising tasks

Qualitative research from other countries has shown that a lack of awareness and knowledge among health professionals about what medication reconciliation entails may be a barrier to implementing the process (17). In our study both doctors and nurses agreed that medication reconciliation is important, and there was no question as to whether or not it should be done. We did find, however, that medication reconciliation was given lower priority during busy periods. Prioritising other tasks that are viewed as more important is another barrier to carrying out the process (18). Medication reconciliation is required under the regulations, and the Møre og Romsdal Hospital Trust has described the procedures in its quality assurance system as well.

Section 5 of the Norwegian Regulations on Medication Management states: "An updated, reconciled list of medications in use shall, with the patient's knowledge, always accompany the patient during transitions in levels of care" (28). The general level 1 procedures for medication reconciliation at the Møre og Romsdal Hospital Trust applies to all health professionals involved in the process. At the time of the study, the tasks of the ward staff had been defined, but not who should do what in the process. Our findings confirmed that the tasks related to medication reconciliation on the medical ward were not assigned to particular professional groups, nor were they standardised in any way. At the same time, the findings showed that the nurses were prepared to help with obtaining written sources as well as interviewing patients.

Clarifying roles and responsibilities

In a study conducted on the surgical ward of the same hospital, the accuracy of the medication lists improved when the nurses on the ward gathered the medication information (22). Prior to the project, the nurses received training from a pharmacist who also was present on the ward throughout the project period. They were not given additional nursing resources to carry out the task (22). When involved in a process, a person will take action on a case based on his or her level of competency, responsibility and authority (20). As such, we believe that systematising the process of medication reconciliation largely entails defining roles, assigning responsibility and ensuring that the health professionals are well trained on medication reconciliation. However, this is probably not sufficient to achieve long-term improvement.

In addition to clarifying roles and responsibilities, Greenwald et al. identify nine other areas that require attention in order to successfully carry out medication reconciliation (13). Medication reconciliation may increase the need for greater changes in traditional roles (29) – e.g. giving nurses responsibility in medication reconciliation. This should be given consideration, and we think it is crucial to develop good learning concepts. We believe that emphasis should be placed on critically assessing the sources of medication information, in addition to training health professionals how to communicate with patients in order to gain an overview of the medications they are actually taking.

A patient admitted to hospital unexpectedly comes in contact with many wards and many employees, and good information flow and communication about medication use is critical. Our study shows that this can be improved. Medication reconciliation is dependent on good communication between the employee who gathers the medication information and the doctor who assesses and decides what medications the patient will take. Medication reconciliation upon admission to hospital has not been completed until the medication information obtained has been assessed by the doctor and transferred into the patient's chart or records (12). It is therefore crucial that the messages between the nurses and doctors, and between the emergency ward and the medical wards, are sent and understood. The patient transfer form was intended to serve as a "baton" for transferring such messages, but our results show that this system was not working to its full potential.

Strengths and weaknesses

The study was based on the experiences of both doctors and nurses from the emergency and medical wards with medication reconciliation. We chose one-on-one interviews as our method because we wanted to understand the experiences of the individual informants. This method gives only indirect information about what actually occurs in the process (24). If we had used observation or focus group interviews as our method, we could possibly have obtained more data on the actual cooperation that takes place in the medication reconciliation process. This would have been interesting as well.

The informants were interviewed in a quiet meeting room in the hospital pharmacy. We believe this was a strength because the informants were away from their daily activities. The author group represented a cross-section of professions, and none of them has personally participated in the medication reconciliation process. This was a strength when formulating the research question, performing the analysis and interpreting the data. Although the study was conducted at Ålesund Hospital, it is likely that the findings have transfer value to other hospitals because the medication process is largely organised in the same way at the various hospitals. It is therefore reasonable to believe that other hospitals will also benefit from the knowledge produced in this study.

Implications for practice

The medical ward at Ålesund Hospital has focused attention on the proper use of medications for many years, and it has had clinical pharmacists working on the ward since 2010. The results from this study, through improvement projects in the clinic, have contributed to further development of the routines for medication reconciliation. This has been significant for practice and is in keeping with the guidelines from the Norwegian Knowledge Centre for the Health Services (14). In addition, this area has received more attention from the hospital management through the Norwegian Patient Safety Programme (12). When they began to demand results, the percentage of patients whose medication lists had been reconciled increased (30).

According to Iden's work model, which has three main elements (management, resources, and work and information flow), it is just as important to specify who (which roles) are included in the process and the relationship between them as it is to define the activities of the process (20). Incorporating new routines is a complex task that is dependent on many factors relating to the organisation, the employees and the managers, in addition to the process itself (31). There is ongoing work with motivation and training of health professionals. The training includes production of a video on the topic (32) and an e-training course. In the future it will be interesting to look more closely at the management aspect of Iden's work model, which points out that in order to administer and further develop a process, someone must be responsible for the process as a whole (20).

Conclusion

The doctors and nurses agreed that medication reconciliation is important for patients. However, they experienced numerous challenges. Many different and unreliable sources of medication information combined with a lack of routines made the process inadequate. The results from this study have been important in the effort to establish good routines for medication reconciliation. Important aspects that came to light in the study included the need to standardise the tasks, improve communication and assign responsibility. More research is needed to investigate whether such measures will help to increase patient safety in hospitals.

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