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Medication Errors and Safety Culture in a Norwegian Hospital

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Abstract. Medication errors are associated with adverse health outcomes and may prolong hospital stays and increase societal costs. Safety initiatives to reduce adverse health outcomes should be based on reliable information of current shortcomings. The aim of this study was to identify barriers to medication error reporting in a hospital and to describe heath personnel's views of the safety culture. Seven interviews with health personnel (two doctors, four nurses and one pharmacist) were conducted November 2016 - January 2017 at the University Hospital of North Norway. Nurses, more frequently than doctors, reported medication errors and discussed reported errors at staff meetings. Doctors preferred to solve the problem directly, for example writing a new medication order, rather than writing a report when a medication error had been identified. There was variation between the wards regarding the perception of support, confidence in and focus on error reporting, which indicates different safety cultures within the hospital. Identified barriers to medication error reporting included lack of time, and the impression that the reporting system is complicated and not user-friendly. Staff also reported inadequate training using the system, which could contribute to the perception that the system is inaccessible. Hospital management should take actions to improve the safety culture throughtout the hospital based on the barriers identified in this study. This could include stronger focus on the importance of reporting medication errors, a transparent review process and clearly communicated actions.

Keywords. Medication error reporting, hospital, error reporting system, electronic error reporting, safety culture

1. Introduction

Medication errors are associated with prolonged hospitalizations at higher health costs and represent increased burdens for patients and public healthcare services [1, 2]. The cost of unwanted medication incidents in the US has been estimated to $3.5 billion annually [3]. Norwegian health institutions are obliged to report unwanted incidents where such incident has resulted, or might have resulted, in considerable personal injury [4]. During 2017, 10 126 incidents were reported in Norway. Among these were 1 676 incidents concerning medication management, of which 14 resulted in death [2]. Health institutions are also obliged by law to continuously work on quality improvement and patient safety [4]. This includes establishing and maintaining systems for reporting errors

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and incidents, and to incorporate a safety culture characterized by openness, which is a prerequisite to uncover and prevent errors [5]. Systematic evaluation of error reports is needed to further develop health services and increase patient safety. Error reports can be used to identify areas where there is potential to improve, and can indicate what actions should be taken to avoid repeated incidents and errors [6]. The University Hospital of North Norway (UNN) uses a web-based system for management and quality assurance procedures and appurtenant documentation.

The aim of our study was to identify barriers to medication error reporting and to describe health personnel's views of the hospital's safety culture.

2. Method

2.1. Recruitment and Setting

Semi-structured interviews were performed from November 2016 to January 2017 at UNN. The strategic selection of informants was based on purposeful sampling and included two doctors and four nurses from one psychiatric and five somatic wards, and one pharmacist from the hospital pharmacy. The number of informants from each occupational group was determined in advance to cover multiple occupational groups with distinct authorities and duties. There was no relation between the interviewer and informants. There were no inclusion or exclusion criteria for the selection of informants based on gender, work experience or employment status, since health personnel in general should know and have experience with medication error reporting.

2.2. Interviews

Two relatively similar structured interview guides were made, one for the pharmacist and one for the other health professions. The questions for the pharmacist was directed towards experiences from hospital departments and not the pharmacy. Examples of prompts from the interview guide: "*Please tell me how medication errors are reported*", "*What would you say are some of the positive/negative aspects of error reporting?*", "*What happened the last time you identified a medication error?*", "*What happens after a medication error has been reported?*" *What stops you from reporting errors?*".

The participants were interviewed once by AA. Interview transcripts were not returned to participants for further comments or corrections. The interviews, which lasted on average 30 minutes, were recorded and transcribed. Field notes were taken during the interviews.

2.3. Data Process and Analysis

The audio recordings were transcribed and edited using a slightly modified verbatim mode. The data material was de-identified during transcription. All data obtained from the interviews were analyzed by AA and later discussed with MW and ECL to compare personal interpretations. We performed systematic text condensation (STC) inspired by Giorgi's phenomenological analysis, modified by Malterud [7, 8].

2.4. Ethical Considerations

This study was conducted according to the guidelines laid down in the Declaration of Helsinki. The study was approved by the data protection officer at the University Hospital of North Norway. Written informed consent was obtained from all informants.

3. Results

A total of five themes, Table 1, were derived from the text condensation.

Table 1. Simplified version of the analysis matrix describing the themes and selected informant quotes on which the themes are based.

Themes	Quotes
Defining a medication error	*"I think it may be unclear what is conceived as an error"* *"[…]we are supposed to report errors even if it didn't reach the patient and caused no patient harm"* *"It happens several times that the wrong dose is prepared but is discovered during double check. This is never reported as an error."*
Leadership/management	*"[…] we prioritize the clinical work"* *"There need to be a decree from the management that this is something we are supposed to do, or prioritize to do"* *"[…] show that reporting errors makes a difference. There also need to be emphasized that reporting errors are ok, and that we actually need to take the time to do it, because it is part of the daily improvement work."* *"The report is sent to the department manager, and then you might not hear anymore, you just hope that someone takes care of it. [...] in my experience, the only way to have something done about an error, is to do it yourself."*
Safety culture/under-reporting	*"Yes, errors are reported, but I think far too few are reported, and I do not think there is a good environment for error reporting"* *"I think employees in the departments know that they should report errors, but I think there is under-reporting of errors"* *"I feel it [the culture] is good among the nurses, but not so good among the doctors"* *"We have a good culture for talking about the reported errors […]"* *"It is the nurses who report errors, at least in our department"* *"I have never received an error report from a doctor"*
Barriers* to error reporting	*"Lack of time, and that you don't understand Docmap"* *"[…] I think there is a lot of potential for improvement when it comes to training and focus on errors, at least among the doctors"* *"[reporting] errors sounds like you are starting to report and denounce, it sounds like something which implies punishment, more than focus on quality improvement"*
Electronic error report system	*"I actually started to report an error, but it was so cumbersome and I understood so little of the report form that I discontinued"* *"I do not think it is intuitive and it is too difficult to use"* *"I think Docmap has a poor reputation when it comes to finding procedures"*

* Specifically mentioned as barriers by the informants

3.1. Barriers to Medication Error Reporting

The informants described several factors that represent plausible barriers to medication error reporting. They can be summed up in four main points: 1) the electronic reporting system (access, training and interface), 2) time, 3) culture, particularly among doctors (whistle-blowing, no doctors' discussions), and 4) management (communication, support, transparent review process after reporting).

(1) The electronic reporting system was mentioned by all informants as a barrier to reporting errors. Several nurses and students do not have access to the electronic report system because their employment is not linked to a specific ward. Accessing the form and other specific files/procedures regarding medication errors was described as cumbersome, with little "expert knowledge" even among word management. Nurses expressed a need for more systematic training in using the electronic report system. Although training sessions for interns are held a few times each year, the system is used so infrequently that staff forget how to use it. informants report error rarely, and when the training is rare too, they forget how to use the system. The system was described as non-intuitive and difficult to use. Several believed that a more user-friendly reporting system could make it easier to report errors, be less time-consuming, and thus increase reporting.

(2) The informants talked about hectic times during the shifts where there is no time for reporting errors. Some had been told by their management to report the error in quiet periods during the day and, if necessary, report the error during their next shift. The error was therefore often forgotten and not reported.

(3) The opinions varied regarding how informants experienced the safety culture on different wards. However, there was a clear agreement that the safety culture among nurses is better than among doctors. Doctors do not see the learning potential in reporting errors. The few errors reported by doctors are rarely discussed and the potential to learn from, and prevent future errors, is therefore lost. For example, should the wrong drug be given to a patient, the doctors will solve this situation by prescribing treatment to reduce potential discomfort/side effects, and not report this as an error. Doctors feel in control of such situations, and they do not view this as something they should share and learn from. Doctors, and a few nurses, stated that reporting errors sounded like whistle-blowing and something that could result in punishment. They were anxious about reporting and thereby upsetting colleagues.

(4) The informants expressed uncertainty about what should be reported as an error in medication management. Medication errors that, for some reason, do not reach or affect patients are generally not reported. Neither are medication errors that are resolved within a short period of time. The doctors, and some of the nurses, thought there was a lack of commitment to error reporting at the management level. Some of the informants experienced a lack of incentive to report errors and lack of support from management when incidents occurred. Some of those who had reported an error, claimed they rarely received feedback, thus did not bother to file new reports. Others voiced concern about the quality and the tone of feedback when provided by management.

4. Discussion

"To err is human" [9] and the aim of medication error reporting is to learn from our mistakes, thereby continuously improving treatment and ultimately treatment outcome. To establish a good reporting culture it is necessary to develop and achieve a good patient

safety culture [10]. Previous research have shown that reporting medication errors improves the safety of future patients [11]. There is positive correlation between high error report rates and positive patient safety culture [12]. Still, not all errors and incidents are reported [13]. The reporting culture should be characterized by openness and reassurance. It should aim for safety, learning and improvement [4, 5], and it needs to be underpinned by management policies, and work environment [5]. The organization need to build collective trust, system perspective and aim to learn from mistakes rather than blame those who make mistakes [10].

Our study suggests poor reporting culture and under-reporting of medication errors throughout the hospital, with variation between wards. From the interviews, we identified several barriers that can be grouped into four main challenges; the un-intuitive reporting system, lack of time, poor safety culture and unsupportive management. Of these, the reporting system might be the easiest challenge to address. To find time to report medication errors might be difficult within staff budgets and changing the safety culture will need constant work over time. Management and leadership is important in itself, but also heavily underpins the other three areas [5]. A study at UNN in 2010 about error reporting in general found that the most important barrier to error reporting was lack of time, followed by the poorly designed electronic reporting system [14]. Measures were taken to improve the situation, but apparently not sufficiently to avoid the same findings in our study.

To correct the situation, a number of measures need to be addressed. *Firstly,* staff need to know what incidents and errors are, and what should be reported. Clear guidelines effectively communicated by management could resolve this. *Secondly*, reporting errors should be considered worthwhile or staff will not prioritize this task. Discussions about what has been reported, and what measures have been taken to prevent similar errors in the future, should be discussed with, and communicated to, all staff. This seems to be in place for nurses, but not for doctors. Doctors carry the main responsibility for the treatment, and are supposed to be "in control". A doctor making a mistake probably feel a heavier burden than a nurse, increasing the threshold for reporting the error and for discussing it with colleagues [15]. An appropriate action to improve the safety culture among doctors, therefore, might be to facilitate regular meeting points for such discussions, as suggested by one of our doctor informants. *Thirdly*, the system used for reporting errors should be simple, accessible and intuitive. This could be achieved by intensified training in using the system, or substituting the software.

5. Methodological Limitations

The seven informants were all women. Health professions, particularly nurses, are predominately female, and the topics discussed are fairly gender neutral. Still, the results must be interpreted in light of the lack of male voices.

Due to the time frame for data collection (Master's thesis), the number of informants were set in advance while the recommended procedure is to continuing until data saturation [16]. As the last interview provided little new information, it seems that seven informants were sufficient.

6. Conclusion

Hospital management should take actions to improve the safety culture based on the barriers identified in this study. This could include a stronger focus on the importance of reporting medication errors, a transparent review process and clearly communicated actions. Of specific actions we would recommend improved communication, to establish a discussion forum for doctors and to manage the practical challenges represented by the electronic reporting system.

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