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Exploration of the barriers of reporting nursing errors in intensive care units: A qualitative study

Hamid Peyrovi[1], Alireza Nikbakht Nasrabadi[2] and Sina Valiee[3]

Abstract

Aim: The aim of this study was to explore the barriers to reporting nursing errors in intensive care units in Iranian hospitals.

Methods: A descriptive qualitative analysis design was used. The data were collected through in-depth semi-structured interviews with a purposive sample of 16 nurses working in four general intensive care units in Kurdistan province, Iran. Interviews were transcribed and finally analysed through conventional content analysis.

Results: There are four major barriers to the reporting of errors by nurses working in Iranian critical care units: (a) saving professional reputation and preventing stigma; (b) fear of consequences – punishment, legal problems and organisational misconduct; (c) feelings of insecurity – pointing a finger at nurses and lack of managerial support and (d) not investigating the root cause of error.

Conclusions: The findings revealed the need to support and provide security to nurses and to consider and find the cause of error occurrence. Managers must provide the required personal, professional and legal support for nurses to encourage them to effectively report errors, discover the root cause of errors and take measures to prevent them.

Keywords

Incident reports, nursing errors, intensive care, qualitative study, content analysis

Introduction

Nurses and all other health care professionals make mistakes in providing their care services regardless of the level of expertise, knowledge and precision.[1] Nursing errors can occur at any point during nursing activities and procedures, and the outcomes may be subtle or severe.[2] Such errors are more common in intensive care units (ICUs), due to the high-risk nature of the patients and the complex care they require; critically ill patients receive medications and interventions approximately twice as often as patients in other units[3] and thus are exposed to greater opportunity for error.

As frontline clinicians, nurses play an essential role in improving patient safety.[4] Compared with other members of the health care team, nurses spend more time with the patients and are much more engaged in giving continuous care to the patients. Such a relationship can expose nurses to a higher risk of making errors.[5]

Statistics indicate that patients in ICUs experience an average of 1.7 errors per day and almost all of them suffer from a potentially life-threatening error at some point during their stay in the ICU.[6] In a study by Joolaee et al.[7] in Iran, the mean number of medication errors that nurses recalled was 19.5, and the mean error reporting was 1.3 cases in a 3-month period. Based on the code of ethics for Iranian nurses,[8] a nurse is required to prevent possible injury to the client/patient by identifying and reporting professional errors of team colleagues. Any errors require an honest and open explanation to the client/patient from the nurse involved.[9] Overall, clinical

[1]Nursing Care Research Center, School of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Iran
[2]School of Nursing and Midwifery, Tehran University of Medical Sciences, Tehran, Iran
[3]Social Determinants of Health Research Center, Kurdistan University of Medical Sciences, Sanandaj, Iran

Corresponding author:
Sina Valiee, Social Determinants of Health Research Center, Kurdistan University of Medical Sciences, Sanandaj, Iran.
Email: Valiee@muk.ac.ir

errors are considered as important issues in society and concerns about such errors are increasing.[10]

Reporting of human errors in health care agencies is often accompanied by embarrassment and fear of punishment; such errors can highlight lack of attention, motivation and sufficient education and so there is a tendency to hide them.[11] Estimates suggest that 50–96% of adverse events are never reported,[12] while about half of them are considered preventable.[8] Understanding the type and causes of errors, and how to deal with and manage them are necessary for future prevention; all of which depends on a robust process of error reporting.[13] Any concealment or negligence in this process, in turn, can lead to consequences for the nurses, health care providers and the patients.[13,14]

Iranian nurses are educated and prepared to provide care to critically ill patients through a bachelor course of nursing.[15] ICU nursing care in Iran is mainly provided with a ratio of three or four patients to a nurse. Since 2009, the 'seven pillars' model of clinical governance was introduced as the accepted framework to improve the quality of hospital care in Iran. Based on the risk management pillar of this model, a robust mechanism for reporting errors is required.[16]

Although the causes of errors are reported in many studies,[17–20] there is limited knowledge on the barriers to reporting nursing errors. The aim of this study was to explore the barriers of reporting nursing errors in ICUs in Iranian hospitals.

Methods

This study was approved by the code of ethics of the Ethics Committee of Tehran University of Medical Sciences. Written consent was obtained from all volunteer participants and a link-anonymised system was adopted; confidentiality was assured and maintained for all participants. A qualitative study design with conventional content analysis approach was used. Qualitative methodology contains the systematic collection, organisation and interpretation of textual material.[21] Qualitative content analysis examines specifically the experiences of the participants.[22,23]

We studied a convenience sample of diploma, associate, undergraduate and graduate nurses with a variety of ages, gender, work experience but with a minimum of 1 year of working experience in ICU. Participants were recruited from four general ICUs of four teaching hospitals in Kurdistan and Tehran provinces, Iran. Sampling continued until it was considered that no further data were needed to confirm the identified themes.

After providing volunteer information and gaining written consent for participation, data were gathered through in-depth semi-structured interviews. The interviews were conducted in places where the participants could feel comfortable speaking about their errors such as in the rest rooms of wards, the school of nursing and the clinical governance office. Interviews were conducted in Persian. The interviews began by asking a general question about error experiences in ICUs. Thereafter, we used probing questions to acquire an in-depth understanding of the participants' experiences. No pre-defined definition of nursing error was presented. The participants were asked to discuss what they experience and understand as nursing errors. The interview guide included the following questions:

- Please tell me about the errors you may have made in providing care.
- Do you remember not reporting an error?
- If so, why didn't you report?

The participants were subsequently asked to present other points coming to mind that had not been addressed during the interview. The interviews took 30 to 60 min, were audio-recorded and immediately transcribed to paper following which they were analysed using descriptive qualitative analysis.

Data analysis

The qualitative content analysis method was used to conduct the analysis. This method offers instruments for examining the experience and results from the phenomenon under study.[24] There are three distinct approaches of content analysis (conventional, directed or summative) used to interpret the content meaning from text data.[25] In our study, we used the conventional content analysis method. The emphasis in conventional content analysis is on counting/frequency, where the researchers count the occurrences of a word, phrase or theme. This approach is particularly suitable when analysing document texts and responses to open-ended questions.[26] In this method, the researcher refrained from using pre-defined categories and instead allowed the categories and their names to come out of the data. One of the advantages of such an approach is that the results are directly achieved by the data taken from the participants in the research without imposing any ideas.[25,27]

Qualitative content analysis is an approach to documents that emphasises the role of the investigator in the construction of the meaning of and in texts. There is an emphasis on allowing categories to emerge out of data and on recognising the significance for understanding the meaning of the context in which an analysed item appeared.[28]

Initially, the analysis of data started with frequent reading of the text in order for the researcher to be immersed and to find a general feeling. Then, the texts were read word-by-word to extract the codes. This process was followed continuously and consistently from extracting to naming the codes. The codes

were then categorised based on their similarities and differences, and finally a set of examples were prepared for each of the themes from the data.

Trustworthiness

The aim of trustworthiness in a qualitative study is to support the argument that the research findings are worth considering. Trustworthiness is achieved through data confirmability, credibility, transferability and dependability.[22] To increase the trustworthiness of the data in the present study, the following points were taken into account: allocation of a proper place and adequate time for collecting the data, establishing a suitable relationship with the participants, using the complementary views of the colleagues, reviewing the handwritten materials for the participants and examining the data by all researchers for increasing the acceptability of the coded data. The research was conducted by a PhD candidate of nursing with experience and education in critical care nursing and was supervised by an associate professor and a professor. Reflexive journaling were used to minimise the effects of the researchers' prior knowledge and experience during data analysis process.

Results

In total, 16 registered nurses, 8 female and 8 male, were recruited to the study. Three participants held a master's degree, while 13 participants held a bachelor's degree in nursing. The participants' mean age was 32 years. The minimum and maximum general work experiences were 2 and 23 years, respectively, with a mean of 9.56 years. The participants in this research had between 1 and 12 years of working experience with a mean of 6.98 years at ICUs.

The qualitative analysis led to the emergence of four themes about the barriers to report nursing errors by nurses: (a) saving professional reputation and preventing stigma; (b) fear of consequences – punishment, legal problems and organisational misconduct; (c) feelings of insecurity – pointing a finger at nurses and lack of managerial support and (d) not investigating the root cause of error (Table 1).

Saving one's reputation

One of the important barriers to effective error reporting among critical care nurses was saving their reputation among their colleagues, physicians, managers, patients and families. The goal of saving the reputation was based on individual and professional aspects. On a personal level, nurses did not want to be stigmatised by others and they did not want to tarnish their professional reputation in the organisation.

Table 1. Summary of categories and subcategories.

Category	Subcategories
Saving one's reputation	Stigma Professional reputation
Fear of consequences	Punishment Legal problems Organisational misconduct
Feelings of insecurity	Pointing a finger at nurses Lack of managerial support
Not investigating the root cause of error	Lack of attention to the cause of the error Failure to follow the origin of error

Stigma. Stigma was mostly due to others' reactions. Participants were thinking that in providing an error report, the managers would attribute other problems of the patient to them.

In this regard, one of the participants stated that '*If you report an error and then something happens to the patient, there will be discussion for days that such a nurse makes mistakes. Then, if anything goes right, only the wrong things are thought about by others?*' (Participant 1). Another participant also alluded to the issue: '*...Projection means you see staff around yourself or doctors that relate everything to that error you made...*' (Participant 14). Another participant alluded to stigma by saying that '*...for example, I administer captopril rather than nitrocontin and I don't tell anybody, lest the viewpoint of others about me change...*' (Participant 15).

Professional reputation. Most participants pointed out that their professional reputation was very important too. Professional reputation differs from stigma in that it focuses on the image of the nursing profession, rather than the individual, in the view of the physicians, patients and families. One of the participants expressed his concern about maintaining professional reputation by saying, '*If I tell the doctor that such and such nurse administers mannitol, what can we do for the patient now? He/she pessimistically looks at the nurses as if the nurse is really careless and intentionally makes wrong choices*' (Participant 1).

Fear of consequences

Fear of the consequences that might occur after reporting an error for the nurses was one of the important factors leading to failure in reporting errors and wrongful dispelling. This theme had three sub-themes: punishment, legal problems and organisational misconduct.

Punishment. The participants considered punishment as one of the most important consequences after reporting an error. Punishments include moving the

nurse's work to another ward, lack of cooperation in shift scheduling, payroll deduction and reprimand. As argued by one of the participant, '*we believe that there is a series of punishments implemented following error reporting . . .*' (Participant 6). '*If I report my mistake, the supervisors will seek the culprit, then reprimand and punish me!*'. Sometimes, group punishment may also occur: '*Maybe reprimanding the nurse due to error was right, but other nurses on shift were not guilty, but unfortunately, we were all punished by the superiors . . .*' (Participant 4).

Legal problems. Another aspect of the fear of consequences after error reporting was the fear of legal implication. '*. . . They take a nurse to court! I don't know what happened then, but the nurse got in trouble, I fear that the same thing would happen to me . . .*' (Participant 3). '*Another is a lawsuit by a patient or family . . .* it *makes me not want to report an error of mine or my colleagues' . . .*' (Participant 14).

Organisational misconduct. Another important cause of nurses fearing the consequences of error reporting was the experience of organisational misconduct toward them. '*If we report our errors, the authorities would have improper behaviour towards me!*' (Participant 4). '*I feel that the system doesn't look for error and its cause, but wants to find a nurse to blame. . .*' (Participant 1). '*One of the reasons is that we are afraid of our administration system! If they know it's my fault, they may cancel my contract. I don't want it! . . .*' (Participant 7).

Feelings of insecurity

The third main theme of the study was the feeling of insecurity. The participants feel insecure after reporting an error and its consequences, because they experienced finger-pointing and lack of management support.

Pointing a finger at nurses. One of the important views of the participants was recognition of them as a perpetrator. Participant 2 reported '*Based on my experiences in intensive care, the nurse was scolded even if it was medical error considered as nursing errors! They first considered an error to be a nursing error, and then if they could not prove it, they considered it as medical error.*'

Another participant mentioned: '*. . . Now if we commit an error in patient care, I have to relate it to myself and colleagues and not to report it, because I do not want to compromise my position. I think that the nurses are accused by the health care system! . . .*' (Participant 17)

Lack of managerial support. The participants described the feeling of insecurity as a result of lack of support after error reporting. For instance, one of the participants said: '*Because whenever there was a problem, all wanted to be acquitted, there was selfishness and nobody wanted to support you!*' (Participant 10). This sense of insecurity was reported by most of the participants. Another participant explained: '*For reporting error, nurses must have a sponsor . . . sponsor against error consequences . . . we did not have a sponsor in the nursing administration who would advocate the nurses after the occurrence of nursing errors . . . So we prefer to cover up errors and not report them.*' (Participant 17)

Not investigating the root cause of error

The participants described the experience of not investigating the root cause of error as an important barrier to reporting. In the participants' views, it was very important to pursue the cause of errors as a motivation for reporting: '*Nobody ever asks the real reasons for nursing errors; nobody asks me if I was tired when I committed the error? Was there any excessive workload on you? What is your problem? . . . Unfortunately, it's not important!*' (Participant 4). One of the nurses pointed out that: '*. . . Because the origins of nursing errors remain unknown, there is no desire for reporting . . .*' (Participant 7).

Discussion

The findings of this study provided useful information about the barriers to reporting nursing errors in ICUs. According to our findings, the barriers consisted of saving reputation, fear of consequences, feelings of insecurity and not investigating the root cause of error.

In our study cohort, nurses preferred not to report their errors because of stigma and professional reputation. In a study by Elder et al. in the United States, nurses refused to disclose error to other nurses and physicians.[29] Fear of reputational impact was also reported as a barrier to reporting errors in the general wards in Iran.[19] Nurses are afraid of being considered as professionals who make a lot of mistakes, because it undermines the reputation of their profession.[30] Stigma has a different impact in different cultures and is particularly important for Muslims; thus interventions to challenge stigma should be local, culturally specific and carefully targeted.[31] An important reason why nurses may not be willing to report their errors is a cultural one. Such cultural factors are based on the behaviour of those around the nurse after an error is reported. The organisational culture should be one of acceptance that human errors occur, but with systemic learning and positive support to individuals in response to error reporting. While a voluntary reporting system such as that used in the UK NHS seems attractive, Sari et al. reported that it may under-report incidents due to lack of feedback, time constraints, fear of shame, blame, litigation or

professional censure, and unsatisfactory processes.[32] Creating a confidential environment for the reporting of nursing errors can help increase reporting, and thus learning, without the undermining the an individual's reputation.

Fear of punishment and legal consequences in clinical practice has always been one of the barriers to error reporting. It is estimated that about 95% of medication errors are not reported due to the fear of punishment.[33] In the study by Hashemi et al. in Iran, the fear of occupational legislation and threat were reported as factors associated with reduced reporting of nursing errors.[19] In the study by Elder et al., the fear of being punished or found guilty was one of the important barriers of reporting error by nurses in ICUs.[29] Organisational misconduct was also identified as one of the barriers to reporting errors in the present study. Lack of appropriate feedback to nurses who reported errors has been shown to be one of the modifiable factors in medication error reporting.[34] Management factors and fear of the consequences of reporting errors are two important barriers among nurses.[35] Appropriate organisational attitude and conduct towards nurses who report errors is an incentive to increase error reporting. Personal and systemic approaches to error management exist. The personal approach focuses on the errors of individuals and individual blame allocation. The systemic approach focuses on the conditions and environment in which a person works, and tries to prevent or reduce the effects of errors.[36] A systemic approach needs to be adopted in order to reduce the individual consequences of error reporting and provide support to those involved. Nurses should undertake practice based on policy and protocols (where they exist), as adherence can provide legal protection after an error has occurred.

We identified that insecurity was a barrier to reporting errors because our participants believed that others would attribute other patient complications to them. There was a perception that not enough support was available to individuals who report errors. Supporting health professionals is necessary in the event of error.[33] A study by Wagner et al. in Canada showed that error disclosure was a difficult process for nurses and that they need to be supported.[2] Regulatory response is an important factor in creating barriers or incentives to error reporting. In some systems, such reporting may lead to investigation and potential censure, license suspension and subsequent loss of income; enhanced regulatory trust is therefore needed.[37] Mayo and Duncan reported that 76.9% of nurses fear the reactions of administrators and colleagues after reporting errors.[30] If critical care nurses receive enough support after reporting an error, they will likely make more effort to disclose and report such errors.

Our findings showed that nurses did not report errors in critical care units, due to a lack of root cause analysis. Whether this is perceptual or real, it is clear that a lack of feedback on error reporting leads to a sense of futility in reporting.[29] In a study by Sanghera, Franklin and Dhillon in United Kingdom, lack of encouragement by managers was reported as a one of the barriers to medication error reports in ICUs.[38] Today, root cause analysis is used as a means to understand factors contributing to medical errors and identify systemic factors that contribute to errors.[39]

Research in other countries suggest that ICU nurses reported errors only to a limited extent[40–42]; time pressure, presence or absence of patient harm and an ethos of errors being routine problems have all been identified as reasons for under-reporting in ICUs.[29,41] Handler et al. investigated the barriers to reporting of errors by nurses in United States and emphasised that the main focus must be on organisational barriers.[34] A study conducted by Hashemi et al. in Iran aimed to clarify the factors associated with reporting of nursing errors through the experiences of clinical nurses and nursing managers.[19] The barriers of reporting nursing errors were reported in four categories related to the nurse, error perception, organisation and work pressure. Interestingly, the nursing factors concurred with those identified in our study.

Despite our efforts to translate and report the findings, we recognise that there are limitations in choosing labels with the same meaning in different clinical contexts. The context of nursing and hospitals chosen to participate in our study may be inherently different to that of other countries, but we believe our participants described a broad range of experiences that are likely to resonate with many ICU nurses.

Conclusions

ICUs nurses experience barriers to error reporting due to feelings of insecurity, fear of its consequences and in an attempt to preserve personal and professional reputations. Overcoming the barriers of reporting nursing errors in ICUs requires an atmosphere based on mutual trust between nurses and nursing managers in which transparency and impartiality prevail.

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References

1. Crigger NJ. Always having to say you're sorry: an ethical response to making mistakes in professional practice. *Nursing Ethics* 2004; 11: 568–578.
2. Wagner LM, Damianakis T, Pho L, et al. Barriers and facilitators to communicating nursing errors in long-term care settings. *J Patient Saf* 2012; 8: 1–7.
3. Camiré E, Moyen E, and Stelfox HT. Medication errors in critical care: risk factors, prevention and disclosure. *CMAJ* 2009; 180: 936–941.
4. Chipps E, Wills CE, Tanda R, et al. Registered nurses' judgments of the classification and risk level of patient care errors. *J Nurs Care Qual* 2011; 26: 302–310.
5. Thomas MB. Registered nurses select multiple factors associated with their errors. *Crit Care Nurs Clin North Am* 2010; 22: 279–282.
6. Moyen E, Camiré E, and Stelfox HT. Clinical review: Medication errors in critical care. *Crit Care* 2008; 12: 1–7.
7. Joolaee S, Hajibabaee F, Peyrovi H, et al. The relationship between incidence and report of medication errors and working conditions. *Int Nurs Rev* 2011; 58: 37–44.
8. Zahedi F, Sanjari M, Aala M, et al. The code of ethics for nurses. *Iran J Public Health* 2013; 42: 1–8.
9. Sanjari M, Zahedi F, Aaelae M, et al. Code of ethics for Iranian nurses. *Iranian J Med Ethics History Med* 2012; 5: 17–28.
10. Wiencek C, and Winkelman C. Chronic critical illness, prevalence, profile, and pathophysiology. *AACN Adv Crit Care* 2010; 21: 44–61.
11. Beccaria LM, Pereira RAM, Contrin LM, et al. Nursing care adverse events at an intensive care unit. *Rev Bras Ter Intensiva* 2009; 21: 276–282.
12. Kagan I, and Barnoy S. Factors associated with reporting of medication errors by Israeli nurses. *J Nurs Care Qual* 2008; 23: 353–361.
13. Waters NF. Exploring perceptions of perinatal nurses towards incident reporting: a qualitative study. *Faculty Grad Stud*. Vancouver: The University of British Columbia, 2010.
14. Rathert C, and May DR. Health care work environments, employee satisfaction, and patient safety: care provider perspectives. *Health Care Manage Rev* 2007; 32: 2–11.
15. Bandari R, Heravi-Karimooi M, Rejeh N, et al. Psychometric properties of the Persian version of the critical care family needs inventory. *J Nurs Res* 2014; 22: 259–267.
16. Heyrani A, Maleki M, Marnani AB, et al. Clinical governance implementation in a selected teaching emergency department: a systems approach. *Implement Sci* 2012; 7: 1–10.
17. Shannon SE, Foglia MB, Hardy M, et al. Disclosing errors to patients: perspectives of registered nurses. *Joint Comm J Qual Patient Saf* 2009; 35: 5–12.
18. Espin S, Wickson-Griffiths A, Wilson M, et al. To report or not to report: a descriptive study exploring ICU nurses' perceptions of error and error reporting. *Intensive Crit Care Nurs* 2010; 26: 1–9.
19. Hashemi F, Nasrabadi AN, and Asghari F. Factors associated with reporting nursing errors in Iran: a qualitative study. *BMC Nursing* 2012; 11: 20.
20. Wagner LM, Harkness K, Hébert PC, et al. Nurses' perceptions of error reporting and disclosure in nursing homes. *J Nurs Care Qual* 2012; 27: 63–69.
21. Malterud K. Qualitative research: standards, challenges, and guidelines. *Lancet* 2001; 358: 483–488.
22. Holloway I, and Wheeler S. *Qualitative research in nursing and healthcare*. Oxford: Wiley-Blackwell, 2010.
23. Streubert-Speziale HJ, and Carpenter DR. *Qualitative research in nursing: advancing the humanistic imperative*. Philadelphia: Lippincott Williams and Wilkins, 2007.
24. Lichtman M. *Qualitative research in education a user's guide*. Thousand Oaks, CA: Sage Publication Inc., 2010.
25. Hsieh HF, and Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res* 2005; 15: 1277–1288.
26. Hancock B, Windridge K and Ockleford E. *An introduction to qualitative research*. Yorkeshire & the Humber: The NIHR RDS EM/YH, 2007.
27. Elo S, and Kyngns H. The qualitative content analysis process. *J Adv Nurs* 2008; 62: 107–115.
28. Kohlbacher F. The use of qualitative content analysis in case study research. *Forum: Qual Soc Res* 2006; 7: 114–121.
29. Elder NC, Brungs SM, Nagy M, et al. Nurses' perceptions of error communication and reporting in the intensive care unit. *J Patient Saf* 2008; 4: 162–168.
30. Mayo AM, and Duncan D. Nurse perceptions of medication errors what we need to know for patient safety. *J Nurs Care Qual* 2004; 19: 209–217.
31. Ciftci A, Jones N, and Corrigan PW. Mental health stigma in the Muslim community. *J Muslim Mental Health* 2013; 7: 17–32.
32. Sari AB-A, Sheldon TA, Cracknell A, et al. Sensitivity of routine system for reporting patient safety incidents in an NHS hospital: retrospective patient case note review. *BMJ* 2007; 334: 1–4.
33. Copping C. Preventing and reporting drug administration errors. *Nursing Times* 2005; 101: 32–34.
34. Handler SM, Perera S, Olshansky EF, et al. Identifying modifiable barriers to medication error reporting in the nursing home setting. *J Am Med Dir Assoc* 2007; 8: 568–574.
35. Mostafaei D, Marnani AB, Esfahani HM, et al. Medication errors of nurses and factors in refusal to report medication errors among nurses in a teaching medical center of Iran in 2012. *Iran Red Crescent Med J* 2014; 16: e16600.
36. Reason J. Human error: models and management. *BMJ* 2000; 320: 768–770.
37. Maamoun J. Overcoming the challenges to effective error reporting. *Canadian J Med Radiat Technol* 2006; 37: 14–17.
38. Sanghera IS, Franklin BD, and Dhillon S. The attitudes and beliefs of healthcare professionals on the causes and reporting of medication errors in a UK Intensive care unit. *Anaesthesia* 2007; 62: 53–61.

39. Dolansky MA, Druschel K, Helba M, et al. Nursing student medication errors: a case study using root cause analysis. *J Prof Nurs* 2013; 29: 102–108.
40. Capuzzo M, Nawfal I, Campi M, et al. Reporting of unintended events in an intensive care unit: comparison between staff and observer. *BMC Emerg Med* 2005; 5: 1–7.
41. Henneman EA. Unreported errors in the intensive care unit: a case study of the way we work. *Crit Care Nurse* 2007; 27: 27–34.
42. Olsen E. Workers' perception of safety culture at a hospital. *Tidsskr Nor Laegeforen* 2007; 127: 2656–2660.