



Prospective risk analysis prior to retrospective incident reporting and analysis as a means to enhance incident reporting behaviour: A quasi-experimental field study

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ABSTRACT

Hospitals can apply prospective and retrospective methods to reduce the large number of medical errors. Retrospective methods are used to identify errors after they occur and to facilitate learning. Prospective methods aim to determine, assess and minimise risks before incidents happen. This paper questions whether the order of implementation of those two methods influences the resultant impact on incident reporting behaviour. From November 2007 until June 2008, twelve wards of two Dutch general hospitals participated in a quasi-experimental reversed-treatment non-equivalent control group design. The six units of Hospital 1 first conducted a prospective analysis, after which a sophisticated incident reporting and analysis system was implemented. On the six units of Hospital 2 the two methods were implemented in reverse order. Data from the incident reporting and analysis system and from a questionnaire were used to assess between-hospital differences regarding the number of reported incidents, the spectrum of reported incident types, and the profession of reporters. The results show that carrying out a prospective analysis *first* can improve incident reporting behaviour in terms of a wider spectrum of reported incident types and a larger proportion of incidents reported by doctors. However, the proposed order does not necessarily yield a larger number of reported incidents. This study fills an important gap in safety management research regarding the order of the implementation of prospective and retrospective methods, and contributes to literature on incident reporting. This research also builds on the network theory of social contagion. The results might indicate that health care employees can disseminate their risk perceptions through communication with their direct colleagues.

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Introduction

Nowadays, harm caused by health care itself instead of an injury or disease (i.e. iatrogenic harm) is one of the main causes of death. World-wide, more people die as a consequence of errors in acute care than of road traffic accidents or natural disasters such as earthquakes or tsunamis (Runciman, Merry, & Walton, 2007). This alarming fact necessitates hospitals to identify risks and implement effective interventions. In this context, hospitals can use retrospective and/or prospective methods to improve patient safety. Retrospective methods, such as record review and incident

reporting, are used to identify and analyse errors and to facilitate learning. Contrary to retrospective methods, prospective methods such as Healthcare Failure Mode and Effect Analysis (HFMEATM) aim to determine and assess risks *before* incidents may occur. Besides this analytical approach, hospitals can also use a more indirect, behavioural approach to improve patient safety, for instance by enhancing incident reporting behaviour. Each time employees decide to report incidents and receive feedback, it might positively change their risk perceptions, their attitudes towards safety, and ultimately their behaviour as well (Aspden, Corrigan, Wolcott, & Erickson, 2004; Kaplan & Barach, 2002; Pronovost et al., 2007). However, the majority of the hospitals seem to fail to learn from errors due to limited error recognition and analysis (Cannon & Edmondson, 2005). Generally, incident reporting behaviour in hospitals often leaves much to be improved (Hudson, 2003). Far too many errors go unreported (Aspden et al., 2004; Barach & Small, 2000; Evans et al., 2006). Further, health care employees

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preferentially report particular types of incidents, like those with serious consequences (Hogan et al., 2008; Ligi et al., 2008; Moss, Embleton, & Fenton, 2005), or incidents without a direct relation with staff action, like falls (Hogan et al., 2008). While falls and certain medication errors seem to be over reported, other types of incidents appear to be underreported, such as those related to clinical treatment (e.g., a patient receiving the wrong treatment or procedure) (Evans et al., 2006; Nuckols, Bell, Liu, Paddock, & Hilborne, 2007; Olsen et al., 2007). Additionally, doctors are less willing to disclose errors than nurses are (Johnson, 2003; Kingston, Evans, Smith, & Berry, 2004; Shojania, 2008). Research has revealed a number of reasons for those problems, such as lack of error recognition, feelings of fear or shame, doctors' attitudes of errors being inevitable and their inclination to keep errors in-house, unfamiliarity with the incident reporting system and analysis process, lack of feedback and follow-up, and time pressure (Evans et al., 2006; Holden & Karsh, 2007; Johnson, 2003; Kingston et al., 2004; Shojania, 2008; Waring, 2005).

Prompted by regulations (Devers, Pham, & Liu, 2004) and the safety objective of preventing patient harm, hospitals recognise the need for proactive safety management. However, a lack of financial and nonfinancial resources, like staff, might hinder hospitals from implementing the necessary elements of a safety management system simultaneously (Akins & Cole, 2005; Devers et al., 2004). Unfortunately, little is known about the optimal order in which prospective and retrospective methods should be implemented (Hale, 2003). To our knowledge, no research has concentrated on the question of whether the order of conducting a prospective analysis and implementing an incident reporting and analysis system influences the resultant impact on incident reporting behaviour.

Supposedly, a sophisticated incident reporting and analysis system can improve incident reporting behaviour because of clear definitions, limited time needed to fill out the reporting form, short feedback loops, and clearly visible improvement efforts (Aspden et al., 2004; Shojania, 2008). Nevertheless, retrospective analyses are generally more threatening than prospective ones. After an employee has reported an *actual* error that might have produced patient harm, he or she is confronted with questions about what has happened and what has caused the error. This might cause feelings of embarrassment or fear, which impedes openness and limits learning (Cannon & Edmondson, 2005). On the other hand, prospective analyses are less threatening (Senders, 2004), thanks to open and active multidisciplinary discussions about *possible* risks. A process model, which is the starting point for the prospective analysis, provides insight into other employees' tasks (Habraken, Van der Schaaf, Leistikow, & Reijnders-Thijssen, 2009) and might increase employees' abilities to identify errors (Pronovost et al., 2007). The multidisciplinary discussions about potential risks could create a shared vision (Bonnabry et al., 2006) and growing understanding (Battles, Dixon, Borotkanics, Rabin-Fastman, & Kaplan, 2006). This might enhance error recognition through increased alertness and vigilance (Kontogiannis & Malakis, 2009). Moreover, the open and positive atmosphere might remove specific social barriers for incident reporting, such as shame or fear (Cannon & Edmondson, 2005).

Together, the facts that many errors go unreported, that reports do not cover the full spectrum of incident types, and that particularly doctors are reluctant to disclose errors, indicate that incident reporting in hospitals is still in its infancy. Because a prospective analysis might enhance error recognition and remove social barriers for incident reporting, one might assume that those benefits translate to incident reporting behaviour. On the basis of this assumption, we formulated a first hypothesis:

Hypothesis 1: If a prospective risk analysis is carried out prior to, instead of after, the implementation of a retrospective incident

reporting and analysis system, the resultant positive impact on incident reporting behaviour will be enlarged in terms of the:

- a. number of reported incidents;
- b. spectrum of reported incident types;
- c. proportion of incidents reported by doctors.

Practically speaking, this hypothesis is only valuable for those hospitals that have not yet implemented a sophisticated incident reporting and analysis system. Although this holds true for many hospitals, several hospitals are already using a sophisticated incident reporting and analysis system that promotes learning. Since those hospitals do not start from scratch, it is also interesting to explore whether a prospective analysis could be used to boost reporting to an *existing* incident reporting and analysis system. Therefore, we formulated a second hypothesis:

Hypothesis 2: Conducting a prospective risk analysis has a positive effect on reporting to an existing incident reporting and analysis system in terms of the:

- a. number of reported incidents;
- b. spectrum of reported incident types;
- c. proportion of incidents reported by doctors.

Because advances in incident reporting increase hospitals' possibilities to learn from errors, it would be valuable if the anticipated positive effect on incident reporting behaviour not only holds true for the participants of the prospective analysis but also for their direct colleagues. Moreover, because carrying out a prospective analysis such as HFMEA™ takes a lot of time (Habraken et al., 2009; Linkin et al., 2005), hospital management probably will not even allow all employees to participate in a prospective analysis. Theories about social contagion support the diffusion of beliefs and perceptions among individuals. According to the network theory of social contagion, individuals adopt attitudes and behaviours from others, just by communicating with them; an intention to influence is unnecessary (Scherer & Cho, 2003). Research has shown that this theory can explain the creation of risk perceptions within social networks (Scherer & Cho, 2003). More specifically, in a social network, such as a nursing ward, individuals communicate about their own risk perceptions with their colleagues. Beliefs about error and risk are thus shared in groups, enabling organisational learning to take place (Cannon & Edmondson, 2001; Edmondson, 2004). Consequently, if participation in a prospective analysis would actually change participants' risk perceptions and incident reporting behaviour, mere communication with colleagues might bring about dissemination. On the basis of this assumption, we formulated a final hypothesis:

Hypothesis 3: A positive effect of conducting a prospective risk analysis on incident reporting behaviour holds true both for participants and non-participants, provided that the latter are informed about the results of the analysis.

Methods

Setting

From November 2007 until June 2008, a quasi-experimental study was carried out in two Dutch general hospitals, both belonging to the same health care institution: a hospital that offers basic care (250 beds, Hospital 1) and a teaching hospital that offers basic and specialised care (750 beds, Hospital 2). At the start of the study, both hospitals used a simple procedure for reporting (major) incidents. However, both hospitals had not yet implemented a sophisticated incident reporting and analysis system that facilitates learning, nor

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