A novel indicator for how fairly hospitals treat healthcare professionals’ safety improvement efforts: differences in hospital responses to medical error reports depending on the type of healthcare professional reporting the event

Abstract

Error reports and subsequent improvement actions are critical components in patient safety, possibly preventing the same events from occurring again. This study investigates how fairly or differently hospitals respond to healthcare professionals’ medication error reports according to their job types (i.e., physicians, nurses, and pharmacists). Data from a national voluntary medication error reporting system (MEDMARX) in the US from 1997 through 2007 were utilized for this study. A logistic regression model was applied to understand the difference in the odds that an error report leads a hospital to take actions depending on types of reporters. Actions were acknowledged only when solid changes took place following reports. Because harmful errors generally induce more actions than nonharmful errors, we examined the effect of the reporter separately in harmful and nonharmful error reports. In addition, the differences in responses among different types of hospital owners—namely, government hospitals (GH) and nongovernment hospitals (NGH)—were analyzed to see whether they influence responses to error reports. Phases of the medication use processes such as prescribing, transcribing, dispensing, administering, and monitoring medication related to reporter type (e.g., pharmacists tend to detect most prescribing errors) and, thus, are controlled in the analysis. In addition, to address any clustering of reports within hospitals, the model included a random intercept for hospitals. Ultimately, 605,422 medication error reports were collected from 574 hospitals (153 GH and 421 NGH) for analysis. For nonharmful error reports, compared to hospital responses to reports from physicians, reports from nurses induced significantly fewer actions in both GH (OR=0.63, 95% CI: 0.52–0.77) and NGH (OR=0.62, 95% CI: 0.53–0.72). The ORs for pharmacists (compared to physicians’ reports) were 0.25 (95% CI: 0.20–0.30) in GH and 0.56 (95% CI: 0.48–0.66) in NGH. For harmful errors, in GH, reports from nurses and pharmacists were also less likely to lead to action compared to physicians’ reports (nurses: OR=0.58, 95% CI: 0.42–0.79; pharmacists: OR=0.60, 95% CI: 0.41–0.87). Ideally, error reports should initiate improvement actions regardless of types of reporters. However, this study shows that hospitals are less likely to respond to reports from nurses and pharmacists compared to those from physicians. When healthcare professionals’ reports are not addressed well, it can decrease the professionals’ morale. Healthcare organizations with error reporting systems need to take full advantage of these underutilized error reports, not only because they are a rich potential source of information, but also because they propel healthcare providers to pursue safety improvements.

Introduction

Patient safety culture is well acknowledged as one of the most important factors for keeping patients safe from preventable adverse events. To manage or even improve safety culture, the first step is to be able to measure it precisely. To this end, several tools for quantifying safety culture have been developed and are being used, and most of them utilize self-administering survey questionnaires targeting healthcare professionals. Methodologies analyzing the survey responses have also evolved to get the most out of collected responses. For example, Jeong et al., in their series of articles, proposed several novel approaches to process and analyze the
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We utilized data from a national voluntary medication error reporting system in the US, MEDMARX, collecting errors from 1997 through 2007. A logistic regression model was developed to examine the difference in the odds that a medication error report causes a hospital to take actions depending on the reporter’s job type (i.e., physicians, nurses, and pharmacists).

Methods

We utilized data from a national voluntary medication error reporting system in the US, MEDMARX, collecting errors from 1997 through 2007. A logistic regression model was developed to examine the difference in the odds that a medication error report causes a hospital to take actions depending on the reporter’s job type (i.e., physicians, nurses, and pharmacists).

An exemplary case of how a nurse felt ignored

Imagine you are a nurse working in an intensive care unit (ICU) of a general hospital. One day, you find a medical error and report it with the hope that an action will be taken to prevent the same event from occurring, but nothing changes. A few weeks later, the very same error occurs, but this time you do not report it because of your previous experience of your report being ignored. Interestingly, however, a decisive action is taken, with a considerable amount of investment being made to prevent the incident. Curious, you learn that a physician reported the error. Both you and the physician reported very similar events in the same ICU, but your report was practically ignored.

We cannot even imagine how frustrated the nurse in the case was, but we fully anticipate that she will not report any errors in the future. From the patient safety perspectives, this example highlights a huge loss of opportunity to prevent future events. Given this situation, we wanted to develop a new method to measure and analyze how a hospital and its decision-makers value healthcare professionals’ time and efforts to prevent future accidents. In addition, we pushed the envelope to examine any discrimination occurred when responding to error reports across job types, as the above vignette depicts. In other words, how many of these efforts are being ignored due to the job type in the hospital? In this study, we looked into the most frequently used treatment modality: the medication use process, where the key players are physicians, nurses, and pharmacists.

Actions were acknowledged only when solid changes followed the reports, such as:

- Computer software modified/obtained;
- Environment modified;
- Formulary changed;
- Policy/procedure instituted;
- Policy/procedure changed; and
- Staffing practice/policy modified.

Any softer actions, such as informing staff who made the initial error, were disregarded.

Harmful errors are known to attract more attention and may lead hospitals to take more actions; thus, we examined the effect of reporter separately in harmful and nonharmful errors. In addition, we tried to understand if any differences emerged in taking action in response to errors among different types of hospital owners—namely, government hospitals (GH) and nongovernment hospitals (NGH).

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Errors from each of the medication-use process phases (i.e., prescribing, transcribing, dispensing, administering, and monitoring) are highly related to reporter type. For example, many prescribing errors are detected by pharmacists. Thus, such a relationship was controlled in the analysis; to control for organization (hospital)-level clustering effects, we added a random intercept to the logistic model, obtaining a two-level model.

**Results**

A total of 605,422 medication error reports collected from 574 hospitals (153 GH and 421 NGH) were analyzed (Table 1).

**Table 1** Characteristics of hospitals where data were collected

<table>
<thead>
<tr>
<th>Hospital type</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>153</td>
<td>26.70%</td>
</tr>
<tr>
<td>Nongovernment</td>
<td>421</td>
<td>73.30%</td>
</tr>
<tr>
<td>Total</td>
<td>574</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

As described in Table 2, among those errors, 594,232 (98.2%) were nonharmful and 11,190 (1.8%) were harmful errors. Nurses reported 58.1% of the errors, followed by pharmacists (39.7%) and physicians (22%).

**Table 2** Odds ratio of actions following error reporting

<table>
<thead>
<tr>
<th>Error reports by reporter types and harm level</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error characteristics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reported by</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physicians</td>
<td>13,487</td>
<td>2.20%</td>
</tr>
<tr>
<td>Nurses</td>
<td>351,473</td>
<td>58.10%</td>
</tr>
<tr>
<td>Pharmacists</td>
<td>240,462</td>
<td>39.70%</td>
</tr>
<tr>
<td>Total</td>
<td>605,422</td>
<td>100.00%</td>
</tr>
<tr>
<td>Harm level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harmful</td>
<td>11,190</td>
<td>1.80%</td>
</tr>
<tr>
<td>Nonharmful</td>
<td>594,232</td>
<td>98.20%</td>
</tr>
<tr>
<td>Total</td>
<td>605,422</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Table 3 shows the main findings of this study: For nonharmful error reports, reports from nurses and pharmacists were less likely to lead a hospital to take actions than those from physicians. Compared to hospital responses to reports from physicians, reports from nurses induced significantly fewer actions in both GH (Odds Ratio(OR)=0.63, 95% Confidence Interval(CI): 0.53–0.72) and NGH (OR=0.62, 95% CI: 0.48–0.66) in NGH.

**Discussion**

As our fellow safety researchers, you may already understand that the null hypothesis of this study was that there was no difference in hospitals’ responses to different healthcare providers based on job type. Quite honestly, we sincerely wanted to fail to reject the null hypothesis, although publication bias might have hindered this article from being published. However, the fact that you are reading this article now suggests we had the unhappy success of rejecting the null hypothesis. There was indeed a difference in responses to error reports from different job types; rather, we might be able to call it discrimination, which is not possible given the scarcity of resources. At least the available glue should be distributed fairly to those who are eager to fix the system. The distribution should be free from job type, seniority, or power gradient in an organization. In this way, we can fully propel our healthcare to the world of safety as fast as possible, although we need everybody’s devotion to succeed, and that means we never have the right to disregard anybody’s efforts.

We all know that, regardless of how well a system is designed, there must be faults. What we should do is accept reality and fix such flaws as soon as possible. The faster we can, the more lives we can save. Thanks to God, we have received the gift of glue, the tool necessary for fixing the flaws. Maybe we always need more glue, which is not possible given the scarcity of resources. At least the available glue should be distributed fairly to those who are eager to fix the system. The distribution should be free from job type, seniority, or power gradient in an organization. In this way, we can fully propel our healthcare to the world of safety as fast as possible, although we need everybody’s devotion to succeed, and that means we never have the right to disregard anybody’s efforts.

In this current study, we unfortunately successfully demonstrated that the different job types of error reporters led hospitals to act differently when responding to such reports. From our extensive experience, we guarantee such job type-based prioritization or discrimination will eventually and undoubtedly push our hospitals into a spiral of silence, where words like mending and glue do not even exist. That is not the kind of hospital we want taking care of our family members.
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Acknowledgement
None.

Conflict of interest
None.

References