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Identifying Modifiable Barriers to Medication Error Reporting in the Nursing Home Setting

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Abstract

Objectives— To have healthcare professionals in nursing homes identify organizational-level and individual-level modifiable barriers to medication error reporting.

Design— Nominal group technique sessions to identify potential barriers, followed by development and administration of a 20-item cross-sectional mailed survey.

Participants and Setting— Representatives of 4 professions (physicians, pharmacists, advanced practitioners, and nurses) from 4 independently owned, nonprofit nursing homes that had an average bed size of 150, were affiliated with an academic medical center, and were located in urban and suburban areas.

Measurements— Barriers identified in the nominal group technique sessions were used to design a 20-item survey. Survey respondents used 5-point Likert scales to score factors in terms of their likelihood of posing a barrier (“very unlikely” to “very likely”) and their modifiability (“not modifiable” to “very modifiable”). Immediate action factors were identified as factors with mean scores of <3.0 on the likelihood and modifiability scales, and represent barriers that should be addressed to increase medication error reporting frequency.

Results— In 4 nominal group technique sessions, 28 professionals identified factors to include in the survey. The survey was mailed to all 154 professionals in the 4 nursing homes, and 104 (67.5%) responded. Response rates by facility ranged from 55.8% to 92.9%, and rates by profession ranged from 52.0% for physicians to 100% for pharmacists. Most respondents (75.0%) were women.

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Respondents had worked for a mean of 9.8 years in nursing homes and 5.4 years in their current facility. Of 20 survey items, 14 (70%) had scores that categorized them as immediate action factors, 9 (64%) of which were organizational barriers. Of these factors, the 3 considered most modifiable were (1) lack of a readily available medication error reporting system or forms, (2) lack of information on how to report a medication error, and (3) lack of feedback to the reporter or rest of the facility on medication errors that have been reported.

Conclusions—The study results provide a broad-based perspective of the barriers to medication error reporting in the nursing home setting. Efforts to improve medication error reporting frequency should focus on organizational-level rather than individual-level interventions.

Keywords

medical errors; medication errors; risk management

INTRODUCTION

According to the National Coordinating Council for Medication Error Reporting and Prevention, a medication error is “a preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer.”¹ These errors can occur at various stages of the medication use process—including the prescribing, order communication, dispensing, administering, and monitoring stages.² Because medication errors represent one of the most common, costly and preventable causes of patient injury in the nursing home setting, the Institute of Medicine has called for a thorough and systematic approach to documenting them.^{3–5}

Voluntary reporting, direct observation, manual chart review, and computerized techniques can be used to detect and document medication errors.^{6, 7} However, the majority of nursing home policies and procedures specify the use of voluntary incident reporting, which results in a low frequency of formal reporting.^{8–10} Incomplete reporting and documentation can prevent healthcare organizations from establishing the base rates of specific types of errors, from understanding the underlying causes of errors, and from appropriately prioritizing the opportunities to correct and prevent errors both within and across facilities.^{11, 12}

A wide variety of reasons have been proposed for underreporting of medication errors in the nursing home setting, but little empirical research has been done on this topic. Therefore, we designed a study that used qualitative and quantitative techniques to explore this topic from the perspective of 4 groups of nursing home professionals involved in different stages of the medication use process: physicians, pharmacists, advanced practitioners, and nurses. The objective of this study was to have healthcare professionals in nursing homes identify organizational-level and individual-level modifiable barriers to medication error reporting, as an initial effort to improve reporting frequency and medication safety.

METHODS

Study Participants and Settings

The participants in our study were healthcare professionals who worked at 1 of 4 independently owned, nonprofit nursing homes affiliated with the University of Pittsburgh. One nursing home is in an urban setting, and the others are in suburban settings. The average number of beds in these nursing homes was 150 (range, 126–180), and the total number of regular full-time and part-time healthcare professionals who were classified as physicians, pharmacists, advanced practitioners, and nurses was 154. The University of Pittsburgh Institutional Review Board deemed the study exempt.

Nominal Group Technique Sessions

For the qualitative phase of the study, we asked the administrators and medical directors of each participating nursing home to identify a representative group of 5–10 healthcare professionals from their own institution. We then invited these healthcare professionals to participate in 1 of 4 profession-specific sessions. Each session was held on the University of Pittsburgh campus during March or April of 2005, was supervised by an experienced moderator and expert in qualitative research (EFO), and used the nominal group technique to identify factors that affect the reporting of medication errors in the nursing home setting. As a token of appreciation, we gave each nominal group technique session participant a \$100 gift certificate.

The nominal group technique builds consensus through a 4-step process of generating, recording, discussing, and then prioritizing ideas about a specific topic.¹³ This technique has been used in the past to assess various aspects of healthcare, including the appropriateness of and barriers to implementing different types of quality improvement and clinical interventions.^{14–17} Unlike other consensus-building techniques, such as the focus group techniques, brainstorming, and Delphi techniques, the nominal group technique is specifically designed to avoid problems associated with group dynamics. Previous research suggests that this approach balances participation across group members, balances the influence of individuals, produces a greater number of ideas and more creative ideas than do traditional group interaction meetings, and results in greater satisfaction for participants.^{18, 19}

At the beginning of each of our nominal group technique sessions, we provided participants with an overview of the study goals and asked them the following question: “From the perspective of your profession, what are the reasons for not reporting medication errors in the nursing home setting?” During the first step of the nominal group technique process (generating ideas), we asked the participants to think silently and write down any reasons that occurred to them. During the second step (recording ideas), we asked each participant to share his or her list so the moderator could record the information on a flip chart that was visible to all. During the third step (discussing ideas), the group clarified the wording and meaning of each item on the flip chart and combined ideas that were similar. During the fourth step (voting on ideas), the group chose the 5 items that they considered to be the most important and ranked them in order of importance. As an additional step in the nominal group sessions, and similar to the methodology used by Uribe,²⁰ we asked participants to classify the 5 factors as organizational (defined as primarily involving the structure and process of reporting medication errors) or individual (defined as primarily involving the intrinsic preferences, abilities, or characteristics of those who are responsible for reporting medication errors).

Survey Development

Using methodology similar to that used by Uribe et al.,²⁰ we combined the top 5 non-redundant factors from each of our 4 nominal group technique sessions to create a 20-item survey (see Appendix). In one part of the survey, we asked respondents to use a 5-point Likert scale to rate how likely each listed factor was to act as a barrier to medication error reporting, with 1 indicating “very likely” and 5 indicating “very unlikely.” In another part, we asked respondents to rate how modifiable each factor was in terms of implementing new policies or strategies, with 1 indicating “very modifiable” and 5 indicating “not modifiable.” Two members from each profession (physicians, pharmacists, advanced practitioners, and nurses) pilot-tested the survey before we administered it to others.

Survey Administration

Between May and July of 2005, survey packets were distributed to all 154 healthcare workers from the four homes. The survey packet included a cover letter that explained our study and was signed by the nursing home administrator and medical director, a prepaid reply envelope

for confidential return of the completed survey via US mail, and a \$10 gift certificate request. After 4 weeks, a second packet was distributed to all nonrespondents.

Survey Analysis

To calculate response rates, we divided the number of respondents per nursing home or profession by the total number of potential respondents per nursing home or profession. To obtain an overall summary statistic for each factor listed in the survey, we calculated a least squares mean (equally weighted across the 4 professions) for the likelihood rating and a least squares mean for the modifiability rating. We selected this technique to prevent any one profession from influencing the overall results. Because the vast majority of respondents were nurses, the ordinary mean (or simple average) would have been very close to the nurses' mean, thereby effectively silencing the opinions of the other professions and preventing us from using the information in the future to develop interventions to improve medication error reporting across all professions. We also calculated the standard error of the least squares means, to provide a measure of precision of the results.

Using methodology similar to that described by Uribe et al.,²⁰ for each factor, we combined the likelihood mean and the modifiability mean to arrive at a factor relevance matrix. Based on this matrix, we categorized each factor as either an immediate action factor or an awareness factor. The immediate action factors are the ones that should be a high priority for improving medication error reporting because they are likely to act as barriers to reporting (overall mean <3.0) and are perceived to be modifiable (overall mean <3.0). The awareness factors are the ones that are a lower priority for improving medication error reporting because they are less likely to act as barriers (overall mean >3.0) even though they are modifiable (overall mean <3.0). For all statistical analyses, we used SAS version 8.2 for Windows (SAS Institute, Inc. Cary, NC).

RESULTS

Nominal Group Technique Sessions

The nominal group sessions involved a total of 28 participants (Table 1). The majority of participants were women (67.9%), were full-time employees (89%), and had worked for an average of 11.2 years in nursing homes. In each of the four individual sessions, participants discussed an average of 19.3 barriers to medication error reporting.

Survey

Of 154 surveys distributed, 104 (67.5%) were returned. Facility response rates ranged from 55.8% to 92.9%. Pharmacists had the highest response rate (100%), and physicians had the lowest (52.0%) (Table 2). Most respondents were women (75.0%) and were full-time employees (79.8%). Respondents had worked for a mean of 9.8 years in nursing homes and 5.4 years in their current facility. Fewer than 1% of the surveys had any missing information, and there was no identifiable pattern of missing responses across items or nursing homes.

Of the 20 items in the survey, 14 (70%) had likelihood and modifiability scores that categorized them as immediate action factors (Table 3). Of the 14 immediate action factors, 9 (64%) were classified as organizational barriers and 5 were classified as individual factors. The 3 immediate action factors that were considered most modifiable were (1) lack of a readily available medication error reporting system or forms, (2) lack of information on how to report a medication error, and (3) lack of feedback to the reporter or rest of the facility on medication errors that have been reported. Of the 20 items, 6 (30%) were categorized as awareness factors (Table 4), and 2 were classified as organizational factors. Although some of the means may be close to the cutoff value of 3, individual responses had a good spread. For example, none of

the factors had more than 34% of the respondents selecting 3 for likelihood. Likewise, none of the factors had more than 41% of the respondents selecting 3 for modifiability.

DISCUSSION

Our study provides a broad-based account of barriers to medication error reporting in nursing homes, as viewed from multiple clinical perspectives. To our knowledge, this is the first study that has focused on this topic in the nursing home setting. We found that about two-thirds of the modifiable factors requiring immediate action were organizational factors. This finding is consistent with recommendations made by various organizations, including the Institute of Medicine, the Joint Commission on Accreditation of Healthcare Organizations, the American Society of Consultant Pharmacists, the Institute for Safe Medication Practices, the Institute for Healthcare Improvement, and the Massachusetts Coalition for the Prevention of Medical Errors.^{2, 21–24} All of these organizations recommend that healthcare administrators reward people for reporting errors and that they focus on improving systems and processes rather than blaming, and or punishing individuals.

Some of our results are consistent with previous studies that have focused on barriers to medication error reporting. Similar to earlier hospital-based studies,^{25–27} our study indicates that important barriers include: not receiving feedback after submitting an error report, not knowing which errors should be reported, and not having a readily available error reporting system. Although several recent studies have shown that nursing homes have a poor patient safety culture,^{28–30} it is interesting to note that we did not find that survey respondents ranked factors such as fear of being blamed, fear of disciplinary action, and fear of liability or lawsuits high on the list of barriers to medication error reporting.

Some of our results were different than those reported in previous hospital-based studies of barriers to medication error reporting. Uribe et al, in their study of medication error reporting by physicians and nurses in a large academic medical center, found that the 3 most modifiable factors requiring immediate action were not being able to report anonymously, not knowing the usefulness of reporting, and having the belief that it is unnecessary to report errors that were not associated with patient harm.²⁰ In contrast, in our study in the nursing home setting, we found that the 3 most modifiable factors requiring immediate action were lack of a readily available medication error reporting system, lack of information on how to report a medication error, and lack of feedback to the reporter or facility once medication errors have been reported. This difference may be explained by the observation that nursing home employees are more likely to report adverse events than their hospital counterparts.²⁸

Strengths and Limitations

Our study has several strengths. First, by using the nominal group technique, we ensured that the items we included in the survey represented the perspectives of all 4 groups of professionals involved in the medication use process. Second, to improve the survey response rate and reduce the possibility of nonrespondent bias, we employed multiple methods, including university sponsorship, monetary incentives, and the distribution of reminders to potential participants.³¹ The response rate of nearly 68% in our study exceeded the mean response rate of 60% reported for mail surveys published in the medical literature.³² Third, although nursing staff turnover rates have been reported to exceed 50% per year,³³ the survey respondents had worked for a mean of close to 10 years in nursing homes, and over 5 years in their current nursing home. This likely resulted in a more accurate assessment of the modifiable barriers to medication error reporting.

Our study has several potential limitations. First, we used a convenience sample for each of the profession-specific nominal group technique sessions. Using a random sampling technique

may have strengthened the study by reducing selection bias. Second, we surveyed a small number of nursing homes with similar characteristics such as bed size, region, and nonprofit status. We did not include medication technicians in the study because they are not licensed to administer medications in the State of Pennsylvania where the study was conducted. Additionally, nursing home administrators were not included in the study because they are not part of the medication use process, nor do they routinely report medication errors. These factors may limit the generalizability of our results. Third, like Uribe et al.,²⁰ we used arbitrary cutpoints to determine barriers to medication error reporting that were both likely and modifiable.

Implications and Further Research

The Institute of Medicine and others have recommended that nursing homes establish formal medication error reporting systems that use a standardized taxonomy to effectively monitor, track, and share errors both within and across facilities and thereby, enable responsive action and feedback.^{2, 34} Several paper-based and Internet-based medication error reporting systems that would address the majority of barriers identified in our study are already available and being used by some healthcare organizations and coalitions.^{35–38} These systems include the Food and Drug Administration's MedWatch Program,³⁹ the Medication Error Reporting Program (MERP),⁴⁰ and MEDMARX.^{41, 42}

Further research is needed in several areas. Formal research is needed to assess the effect of deployment of medication error reporting systems on the frequency of error reporting, sharing of data both within and across facilities, and on medication safety in the nursing home setting. Research is also needed to further explore the barriers to reporting of other medication-related problems, including adverse drug reactions, adverse drug withdrawal events, and therapeutic failures.⁴³ Research can also help develop alternative detection strategies that do not rely primarily on self-report. Current examples of these alternative strategies include: pharmacy and laboratory computerized clinical event monitors, natural language processing of clinical notes, and identification of certain ICD-9 E codes associated with adverse effects of drugs.^{44, 45}

CONCLUSION

The study results provide a broad-based perspective of the barriers to medication error reporting in the nursing home setting. Our findings suggest that efforts to improve medication error reporting should focus on organizational rather than individual level interventions. Further research is needed to determine if such organizational interventions would increase the frequency of medication error reporting and ultimately improve medication safety.

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Appendix: Determining the Barriers to Medication Error Reporting in the Nursing Home

Several factors have been identified as potential barriers for medication error reporting. In **COLUMN 1**, please rate the following factors according to the **likelihood** of each one of them to act as a barrier that prevents you from reporting a medication error.

These same factors are **modifiable** as a result of the implementation of new policies or strategies at the organizational and individual levels. From your own perspective please indicate in **COLUMN 2** how modifiable you think these factors are.

Please make sure to circle your answers in BOTH columns.

Factor	COLUMN 1: LIKELIHOOD					COLUMN 2: MODIFIABILITY				
	Very Likely ▼ 1	2	3	Very Unlikely ▼ 4	5	Very Modifiable ▼ 1	2	3	Not Modifiable ▼ 4	5
1. Lack of recognition that a medication error has occurred										
2. Not knowing who is responsible for reporting a medication error	1	2	3	4	5	1	2	3	4	5
3. Fear of disciplinary action	1	2	3	4	5	1	2	3	4	5
4. Lack of feedback to the reporter or rest of facility on medication errors that have been reported	1	2	3	4	5	1	2	3	4	5
5. Lack of a readily available medication error reporting system or forms	1	2	3	4	5	1	2	3	4	5
6. Lack of a consistent definition of a medication error	1	2	3	4	5	1	2	3	4	5
7. Lack of information on how to report a medication error	1	2	3	4	5	1	2	3	4	5
8. Fear of being blamed	1	2	3	4	5	1	2	3	4	5
9. Belief that reporting medication errors has little contribution to improving the quality of care	1	2	3	4	5	1	2	3	4	5
10. Extra time involved in documenting	1	2	3	4	5	1	2	3	4	5

Factor	COLUMN 1: LIKELIHOOD					COLUMN 2: MODIFIABILITY				
	Very Likely ▼		Very Unlikely ▼			Very Modifiable ▼		Not Modifiable ▼		
a medication error										
11. Lack of knowledge of the usefulness of reporting medication errors	1	2	3	4	5	1	2	3	4	5
12. Difficulty in proving that a medication error actually occurred	1	2	3	4	5	1	2	3	4	5
13. Fear of losing respect of co-workers	1	2	3	4	5	1	2	3	4	5
14. Lack of a culture of reporting medication errors	1	2	3	4	5	1	2	3	4	5
15. Lack of an anonymous medication error reporting system	1	2	3	4	5	1	2	3	4	5
16. Belief that it is unnecessary to report medication errors not associated with patient harm	1	2	3	4	5	1	2	3	4	5
17. System or forms used to report medication errors are long and time-consuming	1	2	3	4	5	1	2	3	4	5
18. Lack of knowledge of which medication errors should be reported	1	2	3	4	5	1	2	3	4	5
19. Lack of recognition of the actual or potential harm of a medication error	1	2	3	4	5	1	2	3	4	5
20. Fear of liability or lawsuits	1	2	3	4	5	1	2	3	4	5

Table 1

Characteristics of Nominal Group Session Participants and Number of Barriers Identified, Stratified by Profession

Participants and Barriers	Physicians	Pharmacists	Advanced Practitioners [†]	Nurses [‡]
Number of participants	6	6	9	7
Gender (% female)	50	50	100	57
Employment type (% full-time)	83.3	100	77.8	100
Average number of years working in nursing homes (range)	16.2 (9–26)	5.8 (1–14)	7.9 (1–22)	15.0 (1–27)
Number of barriers identified	26	12	25	14

[†] Advanced practitioners include nurse practitioners and physician assistants.

[‡] Nurses include directors of nursing (DON), licensed practical nurses (LPN), and registered nurses (RN).

Table 2
Response Rates and Characteristics of Survey Respondents, Stratified by Profession

Response Rates and Respondents	Physicians	Pharmacists	Advanced Practitioners [†]	Nurses [‡]
Number of individuals who responded to the survey	13	8	5	78
Number of individuals who were asked to respond	25	8	6	115
Response rate (%)	52	100	83.3	67.8
Gender (% female)	9.1	50	100	87.2
Employment type (% full-time)	0	100	80.0	91.0

[†] Advanced practitioners include nurse practitioners and physician assistants.

[‡] Nurses include directors of nursing (DON), licensed practical nurses (LPN), and registered nurses (RN).

Table 3
Barriers to Medication Error Reporting Categorized as Immediate Action Factors and Ranked by Mean Modifiability Score[†]

Barriers to Medication Error Reporting	Likelihood (SE [‡])	Modifiability (SE [‡])	Classification
1. Lack of a readily available medication error reporting system or forms	2.60 (0.13)	1.51 (0.08)	Organizational
2. Lack of information on how to report a medication error	2.71 (0.13)	1.65 (0.10)	Organizational
3. Lack of feedback to the reporter or rest of facility on medication errors that have been reported	2.42 (0.15)	1.73 (0.12)	Organizational
4. Lack of knowledge of which medication errors should be reported	2.54 (0.21)	1.73 (0.09)	Individual
5. System or forms used to report medication errors are long and time-consuming	2.73 (0.22)	1.92 (0.09)	Organizational
6. Lack of knowledge of the usefulness of reporting medication errors	2.87 (0.25)	1.97 (0.11)	Individual
7. Lack of a consistent definition of a medication error	2.67 (0.14)	2.00 (0.12)	Organizational
8. Lack of an anonymous medication error reporting system	2.80 (0.16)	2.07 (0.17)	Organizational
9. Lack of recognition that a medication error has occurred	2.69 (0.24)	2.17 (0.17)	Organizational
10. Lack of a culture of reporting medication errors	2.87 (0.18)	2.29 (0.13)	Organizational
11. Extra time involved in documenting a medication error	2.69 (0.22)	2.51 (0.19)	Organizational
12. Fear of disciplinary action	2.83 (0.24)	2.59 (0.22)	Individual
13. Fear of being blamed	2.73 (0.23)	2.91 (0.19)	Individual
14. Fear of liability or lawsuits	2.88 (0.20)	2.93 (0.21)	Individual

[†] Immediate action factors (mean scores of <3.0 on the likelihood and modifiability scales) are factors for which immediate actions should be undertaken to improve medication error reporting.

[‡] Standard error of least squares mean.

Table 4
Barriers to Medication Error Reporting Categorized as Awareness Factors and Ranked by Mean Modifiability Score[†]

Barriers to Medication Error Reporting	Likelihood (SE [‡])	Modifiability (SE [‡])	Classification
1. Not knowing who is responsible for reporting a medication error	3.27 (0.22)	1.60 (0.09)	Organizational
2. Belief that it is unnecessary to report medication errors not associated with patient harm	3.02 (0.24)	2.11 (0.14)	Individual
3. Lack of recognition of the actual or potential harm of a medication error	3.00 (0.19)	2.21 (0.21)	Individual
4. Belief that reporting medication errors has little contribution to improving the quality of care	3.70 (0.12)	2.24 (0.11)	Individual
5. Difficulty in proving that a medication error actually occurred	3.35 (0.17)	2.50 (0.14)	Organizational
6. Fear of losing respect of co-workers	3.22 (0.16)	2.97 (0.22)	Individual

[†] Awareness factors (mean score of >3.0 on the likelihood scale and <3.0 on the modifiability scale) are factors that an organization should be aware of to improve medication error reporting. The awareness factors have a lower priority than the immediate action factors.

[‡] Standard error of least squares mean.