

Barriers to the reporting of medication administration errors among nursing students

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KEY WORDS

medication errors, barriers, reporting, nursing student

ABSTRACT

Objective

The main aim of this study was to describe the perceived barriers to medication administration error (MAE) reporting among nursing students.

Design

A cross-sectional, descriptive study was conducted using self-report questionnaires. An 18-item barriers to MAEs reporting questionnaire with 6- point Likert-type scale (1=strongly disagree, to 6=strongly agree) was used for this study.

Setting

Three nursing schools at Arak University of Medical Sciences in Iran.

Subjects

Two hundred and forty nursing students were invited through census method.

Main outcome measure

Nursing students' perceived barriers to MAE reporting.

Results

Nursing students estimated 80.12% of all medication errors by nursing students are reported to their instructors. Administrative barrier (standardised mean=4.31) and fear (standardised mean=4.24) were the top two reasons for not reporting medication errors among nursing students.

Conclusions

Findings from this study suggest MAE occurrences among nursing students are often underreported. Nursing student's instructors must demonstrate positive responses to nursing students for reporting medication errors to improve patient safety.

INTRODUCTION

Patient safety is a central concern of current health-care delivery systems. It is an important indicator of health care quality (Benjamin 2003; Kohn et al 1999). MAE are often used as indicators of patient safety in hospitals because of their common incident and potential injury to patients. Study results have indicated approximately one third of adverse drug occurrences are associated with medication errors that are viewed as preventable (Bates et al 1995; Bates et al 1993). Ten to 18% of all reported hospital injuries have been attributed to medication errors (Stetler et al 2000; Hume 1999). Medication errors are caused by many health care professionals, such as physicians, pharmacists; however, nurses are usually placed on the frontline when medication errors occur (Mrayyan et al 2007).

Licensed registered nurses are responsible for the preparation, administration and evaluation of therapeutic responses to medications administered to patients. Assessment of student progress in developing requisite knowledge and skills is fundamental to the safe administration of medication.

Because of students' limited clinical experience, they may be at risk of inadvertently making medication errors associated with medication administration. A logical assumption would be that by administering medications, there is an intention to improve patients' conditions while at the same time avoiding harm. Nursing educators emphasise the seriousness of medication administration and discuss safety strategies in classroom presentations and during clinical supervision (Wolf et al 2006).

Currently, limited research is available on the type and incidence of student made medication errors. These studies indicated that the rate of medication errors among nursing students was high and it may be more frequent than suspected (Wolf et al 2006; Koohestani et al 2008; Koohestani and Baghcheghi 2008; Baghcheghi and Koohestani 2008).

Baghcheghi and Koohestani (2008) conducted an observational study to ascertain the frequency, type and causes of errors made by final year nursing students in intravenous drug preparation and administration. The results of this study indicated that in 372 registered observations, 153 errors were detected, while in 139 cases, at least one error occurred. The most frequent errors in drug preparation and administration was in diluting (2.68%) and inappropriate infusion rates (11.55%), respectively. The most common cause of errors was inadequate pharmacologic knowledge (18.95%).

Harding and Petrick (2008) conducted a three year retrospective review of 77 medication errors made by nursing students in a community college program. The findings of this study indicate that the three categories of contributing factors of medication errors made by nursing students were: rights violations, system factors, and knowledge and understanding. Wolf et al (2006) found the most prevalent cause of student medication errors (51.01%) was student performance deficits. Moreover, there has been concern expressed in the literature as to the adequacy of the content of pharmacology included in present nursing education curricula (King 2004; Manias and Bullock 2002; Morrison-Griffiths et al 2002). For instance, the results of Koohestani and Baghcheghi's study (2008) indicated the most prevalent cause of medication errors made by nursing students was poor pharmacologic knowledge. Poor mathematical skill can contribute significantly to increasing the risk of administration error. Numerous research studies showed nurses and student nurses difficulties with basic mathematical skills and medication calculation abilities (Weeks et al 2000; Hutton 1998; Santamaria et al 1997; Craig and Sellers 1995; Gillham and Chu 1995; Kapborg 1994; Blais and Bath 1992).

When a mistake is made, admitting and promptly reporting the error to an appropriate authority is the 'right thing to do'. This is because hiding errors can have serious adverse consequences at both a practical and a moral level (Johnstone and Kanitsaki 2006). Reporting of MAE is as important as

intercepting them for providing valuable information about 'near misses' and errors to manage existing errors and prevent future errors (Kohn et al 1999). When hospitals identify medication error trends and problem areas, they can prevent future errors and, therefore, reduce patient harm and injuries (Association of Operating Room Nurses 2004). At the moral level, hiding errors (especially those that are clinically significant) may result in: besides, avoidable harm to patients, the nurse-patient fiduciary/trust relationship is being seriously undermined and, ipso facto, the good standing and reputation of the nursing profession as a whole (notably on account of the agreed ethical and professional practice standards of the profession concerning patient safety reporting requirements) being violated (Johnstone and Kanitsaki 2006).

Reporting medication errors cause to improve patient safety and providing valuable information for prevention of medication errors in the future. Findings of Koohestani et al's study (2008) indicated that 75.8% of medication errors committed by nursing students (n=76) were reported to the instructor. Assessing nursing students' viewpoints about barriers to reporting of MAE is a primary step to enhancing of reporting medication errors. Although, past studies have explored barriers to reporting MAE among nurses, no attention has been paid by researchers to MAE reporting barriers among nursing students. This study was designed to address the need for understanding of MAE reporting barriers for nursing students'.

LITERATURE REVIEW

Several survey studies have examined nurses' perceptions of barriers to reporting of medication administration errors. However, no attention has been paid by researchers among nursing students. Much of the literature regarding the prevention of medication errors among nursing students focuses on teaching strategies for accurately calculating drug dosages.

Nurses are often reluctant to report MAE and as a result they tend to be underreported. The results of

Stratton et al (2004) indicated paediatric and adult nurses estimated that 67% and 56% of all MAE in their patient care units were reported, respectively.

Sanghera et al (2007) conducted a qualitative study to explore the attitudes and beliefs of healthcare professionals relating to the causes and reporting of medication errors. Some staff stated they would only report certain errors or errors that resulted in harm. The results of this study indicated barriers to reporting included: not being aware that an error had occurred, the process of reporting (e.g. detailed paperwork), no benefit to reporting (perception that nothing is done with the data) and motivational factors (e.g. fear of loss of professional registration) (Sanghera et al 2007). The basic reasons for not reporting MAE was classified as individual factors and organisational factors (Leape 2002; Uribe et al 2002; Wakefield et al 1996). Fear is one of the primary individual barriers that impede error reporting among nurses. Fear of reprimand from those in authority, disciplinary action (Walker and Lowe 1998), potential reprisal (Karadeniz and Cakmakci 2002; Osborne et al 1999), manager and peer reactions (Mayo and Duncan 2004) and being blamed and lawsuits (Uribe et al 2002) were identified in studies. Studies have indicated that between 63% and 84% of nurses did not report MAE because of negative manager and peer responses (Karadeniz and Cakmakci 2002; Osborne et al 1999).

AIM OF THE STUDY

The aim of this study was to estimate the proportion of medication errors reported by nursing students and describe the perceived barriers to MAE reporting among nursing students. In addition, a secondary objective of this study was to specifically compare the nursing student findings in relation to the semester of the program.

METHOD

Design and Sample

This descriptive cross-section study was conducted during the winter of 2008 using a self-report survey. Statistical population of this study consisted of

nursing students enrolled at the Arak University of Medical Sciences in Iran. The sampling criterion was nursing students that have worked in hospital settings for a minimum period of one semester and have been involved in administering medications. All nursing students in their second semester or more, enrolled in three courses at the Arak University of Medical Sciences (n=240), were selected through a census method. Sampling was performed at the beginning of a class by a member of the research team, with no teaching role.

Instrument

The data gathering tool was a questionnaire consisting of three parts. The first section of the questionnaire included background data (gender, age, and semester of program). The second part consisted of four questions regarding medication errors and an estimate of the number of medication errors reported by nursing students to their instructors. The final item asked each participant to estimate the overall proportion of medication errors reported by nursing students. An 11- category response scale was used ranging from 0 to 100%. In the third section nursing students' perceptions of barriers to reporting MAE was measured by the reason why MAE are not reported (Wakefield et al 1996). This questionnaire was translated and back-translated. The content validity of the translated questionnaire was evaluated by seven members of nursing faculty.

Data evaluation

Data was analysed using SPSS at an alpha level of 0.05. Descriptive and correlation analyses were conducted. Data was analysed using independent t-tests, pearson correlation and one-way analysis of variance (ANOVA). One-way analysis of variance followed by Tukey's studentised range (HSD) was used to examine differences in each subscales and total scores mean of barriers to reporting MAE according to one semester of the program.

Ethical consideration

This study was neither mandatory, nor was it disadvantageous in any way for the participants.

Identities were anonymous throughout the study. This study was approved by the ethics committee of Arak University of Medical Sciences in Iran.

FINDINGS

Response rate was 100%. The mean age of the participants was 21.71 years (SD 3.2, range 19-27), majority of the participants were female (79.2%).

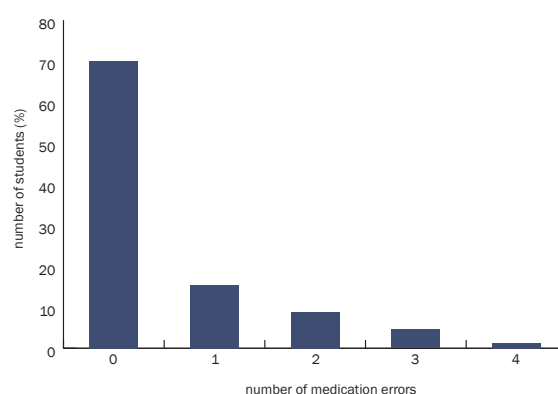
Twenty seven point five percent of participants were second-semester nursing students, 28.5% were forth-semester, 25.8% were sixth-semester and 17.9% were eighth-semester.

Seventy two nursing students (30%) reported making at least one error during their academic period. In total 124 medication errors were made by students and 75.8% of medication errors were reported to the instructor.

The average number of recalled medication errors per student was 1.93.

Numbers of medication errors made by nursing students over the course of their academic period are shown in graph 1.

Figure 1: Number of medication errors among nursing students



Nursing students estimated that 80.12% of all medication errors by nursing students are reported to instructors. Mean and standard deviations of the total scores and sub scores of barriers to MAE reporting are presented in Table 1.

Table 1. Perceived Barriers to MAE Reporting (N=240)

| Items | Std M ^b | Group M (SD) | Item M (SD) |
|--|--------------------|--------------------|-------------|
| Barriers to MAE reporting ^a | 3.93 | 70.75(4.23) | |
| Subscales: | | | |
| Fear of: | 4.24 | 38.21(2.44) | |
| 1. Being recognised as incompetent | | | 4.91(0.87) |
| 2. Patient or family's negative attitude | | | 4.64(0.88) |
| 3. Physicians' reprimand | | | 2.93(0.86) |
| 4. Decreasing evaluation score and introducing educational problems | | | 5.34(0.59) |
| 5. Being blamed for MAEs results | | | 4.45(0.85) |
| 6. Instructor's reprimand | | | 5.05(0.66) |
| 7. Side effect of drug | | | 4.22(0.83) |
| 8. Forensic problems | | | 3.64(0.97) |
| 9. Nursing staff 's reprimand | | | 2.98(0.95) |
| Reporting process | 3.06 | 15.3(2.72) | |
| 10. Think MAEs not important enough to be reported | | | 4.22(1.33) |
| 11. Too much time for contacting instructor | | | 2.66(0.91) |
| 12. Unclear MAE definition | | | 3.03(0.98) |
| 13. Forget to report | | | 2.35(0.91) |
| 14. Unrealistic expectation for administration of drugs | | | 3.01(1.08) |
| Administrative barrier | 4.31 | 17.25(1.9) | |
| 15. No positive feedback | | | 5.12(0.78) |
| 16. Much emphasis on MAEs as nursing quality provided | | | 4.60(0.89) |
| 17. Focus on individual rather than system factors to MAEs | | | 4.66(0.97) |
| 18. Instructors' responses to MAEs do not match the severity of the errors | | | 3.01(1.13) |

Note

^a Range=1(strongly disagree) to 6 (strongly agree)^b Standardised mean is mean divided by the number of items

Compared to the standardised mean of each subscale, administrative barrier (standardised mean=4.31) was considered as a major barrier. From the 4-item administrative barriers listed in Table 2, nursing students tended to have the highest level of agreement with "No positive feedback". This item had a mean greater than five; indicating the item "No positive feedback" was located between agree and strongly agree.

The next strongest perceived barriers were fear (standardised mean=4.24). Of the 9-item fear listed in Table 1, nursing students tended to have the highest level of agreement with "fear of decreasing evaluation score and introducing educational problems".

Items of the fear subscale with means greater than five: were items four (e.g. decreasing evaluation score and introducing educational problems) and six (e.g. instructor' reprimand).

The weakest perceived barrier was the reporting process (standardised mean=3.06).

Regarding demographic characteristics and personal experiences of medication administration errors, no differences were found in the barriers relating to nursing student's age or gender, also no difference in the barriers were found between nursing students who had experience of making MAE and nursing students who had no such experience.

ANOVA indicated there was a statistically significant difference between the mean of fear and administrative barrier subscales score of barriers to reporting MAE according to semester of the program.

The results of ANOVA followed by the post-hoc Tukey's HSD are presented in Tables 2 and 3.

Table 2: Sub-scale and total score of barriers to MAE reporting among nursing students according to semester of program

| | 2 nd Semester N=66 | 4 th Semester N=69 | 6 th Semester N=62 | 8 th Semester N=43 | F ratio | P value |
|------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|---------|---------|
| scale | M (SD) | M (SD) | M (SD) | M (SD) | | |
| Fear score | 39.48 (2.45) | 37.94 (2.53) | 37.83 (1.81) | 37.22 (2.38) | 10.03 | .000* |
| Reporting process score | 15.5 (3.37) | 15 (2.02) | 15.14 (2.74) | 15.65 (1.9) | 0.75 | 0.522 |
| Administrative barrier score | 16.69 (1.99) | 17.23 (1.96) | 17.27 (1.73) | 18.09 (1.83) | 4.72 | 0.003* |
| Total score | 71.68 (5.17) | 70.17 (3.53) | 70.25 (3.44) | 70.97 (4.57) | 1.82 | 0.143 |

Note

*significant

Table 3: Differences in Sub-scale and total score in barriers to MAE reporting among nursing students according to semester of program

| scale | Tukey's HSD | | | | | |
|------------------------------|---------------------|-------|-------|-------|-------|-------|
| | S ^a 2-S4 | S2-S6 | S2-S8 | S4-S6 | S4-S8 | S6-S8 |
| Fear score | n.s. | n.s. | * | n.s. | n.s. | n.s. |
| Reporting process score | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. |
| Administrative barrier score | n.s. | n.s. | * | n.s. | n.s. | n.s. |
| Total score | n.s. | n.s. | n.s. | n.s. | n.s. | n.s. |

^a semester

*P < 0.05

According to tables 2 and 3, second semester nursing students scored higher than the other three groups of students on the fear subscale score. Eighth semester nursing students scored higher than other three groups of students on the administrative barrier subscale score. All four groups had similar scores on reporting process sub-scales and total score mean.

DISCUSSION

The results of this study have significant implications for the nursing instructors. Thirty percent of the participants reported making at least one error during their academic period. However, in actual fact the frequency of medication errors is likely to be even greater.

In this study, the average number of recalled medication errors per student was 1.93. Results of Mrayyan et al study (2007) showed the mean of recalled errors was 2.2 per nurse. Result of Balas et al study (2004) showed approximately one third of the nurse participants reported making at least one error or near error during a 28-day period.

Twenty four point two percent of medication errors made by nursing students were not reported to their instructor. Such a rate shows medication errors were often underreported by nursing students and this finding is consistent with Koohestani et al (2008) study.

This study showed the overall average estimate of medication error reporting by nursing students was

80.12%. These estimates by nursing students are higher than some studies among nurses reported in the literature (Stratton et al 2004; Wakefield et al 1999; Wakefield et al 1996). Findings of this study suggest nursing students are more likely to report MAE than nurses.

Nursing students agreed that administrative barriers and fear were the main reasons for not reporting medication errors (4.31 administrative barriers, 4.24 fear). Similar findings were also supported in previous studies by using the same study instrument among nurses (Chiang and Pepper 2006; Blegen et al 2004; Wakefield et al 1999; Wakefield et al 1996).

Findings of Stratton et al's (2004) study using a different study instrument indicated nurse respondents agreed with both individual/personal and management-related reasons for not reporting medication errors. Results of this study showed nursing administration's focus on the person rather than the system and the fear of adverse consequences (reprimand) were primary reasons selected for not reporting medication errors.

In this study the strongest perceived barriers to MAE reporting were administrative barriers. Standardised mean of this sub-score was =4.31, indicating the administrative barriers to MAE reporting were located between slight agreement and agreement.

The primary administrative barriers were no positive feedback for giving medication correctly and too much emphasis on MAE as a quality indicator of nursing care. These barriers indicated instructor's management and attitudes toward MAEs.

These results suggested if medication errors are used as an indicator of an individual's performance or in a punitive manner, nursing students may be reluctant to report their own errors. Findings also suggest nursing students have no tendency to accept responsibility for errors in which they were the final player in a complex series of events leading to the error.

The next strongest perceived barrier was fear. Standardised mean of this sub-score was =4.24, indicating the fear subscale was located between slight agreement and agreement. The primary

barriers this sub-score were decreasing evaluation score and introducing educational problems, instructor's reprimand, being recognised as incompetent. Compared to the standardised mean of all items, fear of decreasing evaluation score and introducing educational problems was considered as a major barrier. These results suggested nature of the instructor's response to errors is an important factor to reporting MAEs among nursing students.

It has been suggested that punishment has little effect on future error prevention (McCarthy et al 1992).

The weakest perceived barrier was the reporting process. Standardised mean of this sub-score was =3.06, indicating the reporting process subscale was located between slight disagreement and slight agreement. In the reporting process, however, respondents indicated they somewhat agreed with "think MAEs not important enough to be reported" (item mean=4.22).

Overall, research has demonstrated nursing students will report errors, but the likelihood of reporting errors is influenced by the perceived punitive climate of the instructor or organisation. This study's findings suggest comprehensive strategies are required to improve medication safety and to promote reporting of medication errors among nursing students.

Limitations

As nursing students were selected in only three nursing schools in Arak University of Medical Sciences, the results are not generalised to all Iranian nursing students. Nursing students' perceptions of barriers to MAE reporting might vary from city to city, even if nursing students' demographic characteristics are similar.

Implications for nursing education

Nursing faculty might consider the medication administration experiences and reporting of medication errors of students and medication safety in light of these findings. Also, nursing faculty might reconsider their feedback to nursing students for reporting medication errors. Recognition of reasons for not reporting MAE among nursing students is

crucial to determining interventions that support reporting of all errors, including those related to medication administration. The most important step in decreasing medication errors appears to be in knowing the accurate rate of occurrence. Occurrence data can only be used to identify problems and develop solutions provided it is a true reflection of the type and number of medication errors that occur. Accuracy can only be improved in an environment that encourages and supports the reporting of medication errors.

An important finding in this study was of the 18 items, nursing students tended to have the highest level of agreement with fear of decreasing evaluation score and introducing educational problem was a major reason selected for not reporting medication errors. This result is very important and has significant implications for the nursing student's instructors.

Clinical nursing work is carried out in situations that are largely unpredictable and clinical experience of students is inadequate thus, nursing students run the risk of 'doing something wrong'. Creating an environment encouraging to the reporting of errors requires a systems approach to patient safety. Nursing student's instructors must demonstrate positive responses to nursing students for reporting medication errors and commit to a quality management process that is perceived by nursing students as designed to improve patient safety as opposed to discover mistakes.

It is important for the nursing instructor to accept mistakes made by nursing students may be the product of 'system flaws, not character flaws' and students who make mistakes are not necessarily poor students. In addition some causes of medication errors are multifactorial, for example deficient knowledge could be due to a failing on the part of the individual. However, it could also be due to a 'systems' failure on the part of educational program by not adequately preparing the student for their role. It should be highlighted that this does not mean individuals should never be held accountable for their actions, but it accentuates it is also important to try to take a more holistic view as to why errors occur.

Instead of viewing error reports and complaints as a reason to name and shame individuals, they need to be considered as 'learning treasures'- that is, as valuable opportunities to learn and to improve medication safety.

CONCLUSION

Findings from this study suggest medication administration error occurrences among nursing students are often underreported. Administrative barriers and fear were found to be the top two reasons for not reporting medication administration errors among nursing students.

Significantly this study found, fear of decreasing evaluation score and introducing educational problems was found to be the highest rated primary individual barriers that impede error reporting among nursing students.

It was found instructors must demonstrate positive responses to their nursing students for reporting medication administration errors as a means to improve patient safety.

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