

A Feasibility Study of Providing Folding Commode Chairs in Patient Bathrooms to Reduce Toileting-Related Falls in an Adult Acute Medical-Surgical Unit

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Nursing staff rated having a folding commode chair in each patient room bathroom, on a scale of 1 (*not highly rated*) to 10 (*very highly rated*), as being useful (mean = 8.56), feasible/practical (mean = 8.15), and appropriate (mean = 8.55). Providing a commode chair in each bathroom as an intervention in a multifaceted fall-prevention program is recommended to increase accessibility and efficiency in patient care delivery. **Key words:** *accidental fall, hospitals, inpatients, nursing, patient rooms, quality of health care, safety, toilet facilities*

THE NATIONAL QUALITY FORUM in the United States¹ called attention to all types of clinical care settings that should take action to prevent patient falls and to reduce fall-related injuries by implementing evidence-based intervention practices. Falls in the hospital may lead to potential physical and psychological negative outcomes and a poorer recovery, especially because 30% of the patients who fall experience minor injuries and 5% experience major injuries.^{2,3} About 79.5% of hospital inpatient falls occur

in patient rooms, 11% in patient room bathrooms, and 9.5% in hallways or examination or treatment rooms.⁴ For the circumstances related to patient falls, 38% to 47% of falls are associated with toilet-related activities that occur in the patient room bathrooms.^{4,5} More than 45% of all inpatient falls are associated with elimination-related activities and more than 10% of all falls are associated with slipping off the toilet or the bedside commode.⁶

Currently, falls still constitute the largest single category of reported incidents in hospitals.⁷ Yet, systematic reviews of the literature on hospital falls have not found consistent evidence for effective interventions to prevent falls. Only a little research^{6,8,9} has addressed toileting safety-related issues (eg, equipment).

Consequently, the purpose of this pilot study was to determine the feasibility of providing a folding commode chair in each patient room bathroom in an adult acute unit. The long-term goal was to learn whether providing a folding commode chair is a feasible

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solution in a multifaceted fall-prevention program to reduce toileting-related falls. The primary question that the study of the intervention was designed to answer was as follows: What are nursing staff's ratings of the usefulness, feasibility, and appropriateness of providing a folding commode chair in each patient room bathroom in adult acute inpatient care settings? The differences of the ratings between RNs and nurse aides were also examined.

BACKGROUND

Starting from fiscal year 2008, the Centers for Medicare & Medicaid Services no longer pays for certain preventable inpatient injuries (eg, fractures, dislocations, and intracranial injuries) that are precipitated because of hospital falls. The Joint Commission¹⁰ also emphasized the need to reduce the risk of patient harm resulting from falls; hospitals should evaluate patients' risk for falls and fall injury and take action to reduce these risks. The evaluation should include a patient's history of falling, review of medications, gait and balance screening, assessment of walking aids or assistive or protective devices, and environmental assessments.

Falls have many causes and involve multiple factors. Consistently identified across studies, risk factors for falls in acute care units include increased toileting needs, history of falling, unsteady gait, confusion, and use of sedative-hypnotics. Falls may be precipitated by *intrinsic* or *extrinsic* factors relevant to the patient. *Intrinsic risk factors for falls* are those that are integral to the patient's system, such as age-related changes, previous falls, reduced vision, unsteady gait, mental status deficits, and chronic illness. *Extrinsic risk factors for falls* are external to the patient, such as lack of support or grab bars in the bath and toilet area, unsafe design of furnishings, poor condition of the floor surface, poor lighting, inappropriate footwear, improper use of devices, and inadequate assistive devices.^{7,11-14} These extrinsic risk factors may be associated with patient room design and settings, hospital equip-

ment (eg, availability of bedside commodes), and human resources/nursing actions related to staffing issues (eg, determining patient care priorities).⁸

On the basis of previous studies,^{1,10,12} a theoretical framework, the Double Rings Model, was developed to portray the possible risk factors for patient falls in inpatient care settings (Fig 1). In short, the feasibility evaluation of any fall-prevention intervention should always take into consideration the patient and hospital factors that are associated with the proposed intervention.

QUALITY IMPROVEMENT INITIATIVE IN THE STUDY HOSPITAL

Recognizing the problem

The chief nurse of the study hospital and the author agreed that installing raised toilet seats with armrests might lead to fewer inpatient falls or injurious falls in the bathroom. The surgical unit with medical overflow was selected by the chief nurse as the pilot unit for this initiative. In the past 2 years (the first quarter of 2007 to the fourth quarter of 2008), the average total fall rate was 2.65 falls per 1000 patient-days and the average injurious fall rate was 0.65 injury falls per 1000 patient-days. Reducing total fall and injurious fall rates has been the quality improvement focus of the study unit as well as the entire hospital.

The study unit has standard ceramic toilets (height 15.5 in from the floor to the top of the toilet seat) in all patient room bathrooms, except for 2 bathrooms located in the south wing that were dedicated to patients having bariatric surgery (steel toilets, height 17 in from the floor to the top of the toilet seat). As reported by the nurse manager of the study unit, patients sometimes complained that these standard toilets were too low. Patients could easily lose their balance when performing the stand-to-sit and sit-to-stand movements. The grab bars on the wall next to the toilets in the patient room bathrooms were insufficient; instead of using the grab bars, patients tended to hold on to the

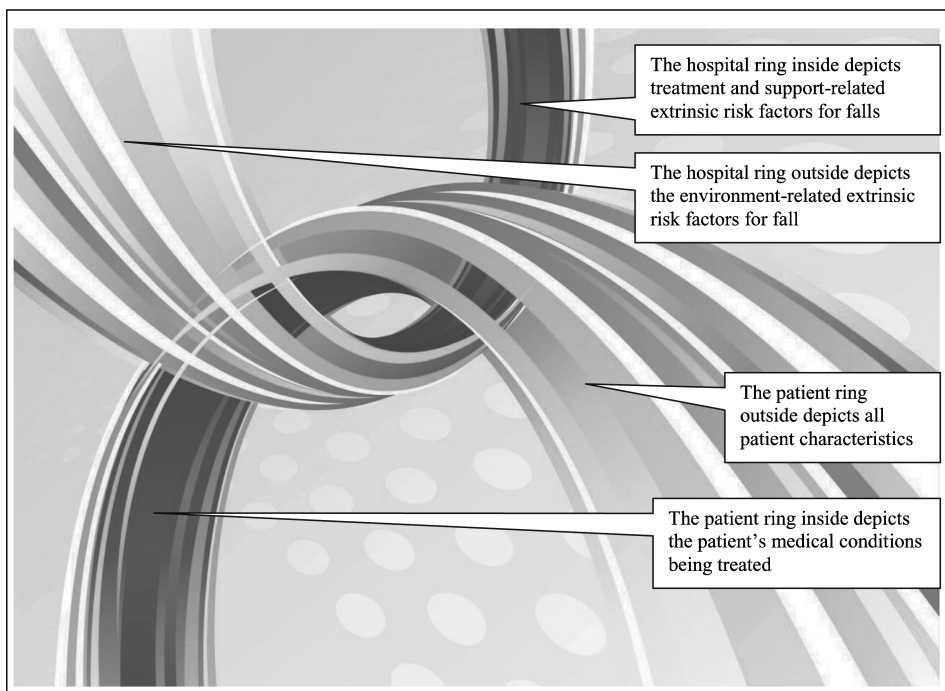


Figure 1. The Double Rings Model portrays the risk factors for patient falls in hospital settings. The patient ring (lower ring) inside depicts the patient's medical conditions being treated. The patient ring outside depicts patient characteristics, including age, mental/emotional conditions, existing medical complications, and family support. The hospital ring (upper ring) outside depicts the environment-related extrinsic risk factors for falls, such as facility design and layout, and equipment. The hospital ring inside depicts the treatment and support-related extrinsic risk factors for falls, such as medications in use, health care providers' competencies and skills (physicians, nurses, and pharmacists), management, and supplemental personnel (eg, family visitors, sitters).

sink to maintain their balance and gain the push-up force.

Preexisting resources

Before this quality improvement project was initiated, the study unit had a total of 18 standard bedside commode chairs and 2 bariatric bedside commodes in its inventory. Patients in all 29 patient rooms shared these commode chairs. Ideally, after use and being cleaned, these commode chairs should be stored in a designated storage area. However, when patients required commode chairs, nursing staff usually needed to search room to room for available ones. Patients with knee or hip replacements may have basic raised toilet seats (no armrests, no locking) in use as prescribed by physical therapists and paid by

insurers. However, ordered raised toilet seats may not be available to the patients for a day or two, and these raised toilet seats always go home with the patients.

Choosing the right equipment

The nurse manager and a senior RN from the study unit spent about 4 months evaluating the safety, steadiness, and sturdiness of different types of raised toilet seats (with or without armrests, being able to lock to the toilet or not) and commode chairs. The folding commode chair with the capability of adjusting seat height was chosen for this pilot study and paid by the study hospital for \$40 each. It is manufactured by Medical Depot (Port Washington, New York).

Preparing for the implementation

Because of budget constraints, the chief nurse officer and the nurse manager decided to purchase 19 folding commode chairs for each of the patient room bathrooms located in the north and east wings (including 2 private rooms); these folding commode chairs would be kept in each patient room bathroom. Prior to deployment, 2 on-the-job training sessions (15 minutes each) were led by the nurse manager and the author together to explain the purpose of this pilot study and to provide staff an information sheet about the scope of the study and support from the chief nurse officer.

Staff were taught to place the newly purchased folding commode chairs on the top of the toilets to be used as raised toilet seats. The folding commode chairs may be used as bedside commodes and may be removed from the toilets if patients said they did not want to use them (but were still kept in the patient rooms).

Deploying the equipment

The folding commode chairs were assembled and deployed by the nurse manager and senior RN on January 26, 2009. Each commode chair was set at the height of 19 in from the floor to the top of the chair seat as the default height. The folding commode chair was placed on top of the toilet. A bright green label (letters in black) made by the nurse manager, "Property of XX unit: Patient care study—Do not remove from room" (XX unit was the study unit), was attached to each folding commode chair to inform housekeeping and nursing staff that these particular items should be kept within the patient rooms during the study period.

In the first month after deployment, housekeeping staff had a tendency to remove the cleaned folding commode chair from the bathrooms and place them in the hallways or store them in the storage area. Because these housekeeping staff members were not regular staff of the study unit, the nurse manager met with the housekeeping supervisor and

explained the purpose of the pilot study, reminding housekeeping staff to keep the study folding commode chairs in the patient room bathrooms in the north and east wings of the unit. These bathrooms do not have shower facilities and all have limited space to store extra equipment. Nursing staff were also reminded to use only the 18 preexisting standard commode chairs and the 2 bariatric commode chairs for the patients staying in the 10 patient rooms located in the south wing.

METHODS

Design

This pilot study determined the feasibility of providing a folding commode chair in the patient room bathroom in an adult acute surgical unit with medical overflow in a Michigan community hospital. This equipment (folding commode chairs) was added to the existing hospital-wide multifactorial fall-prevention protocol. Semistructured interviews were used to collect both quantitative and qualitative information. The interview sessions started in February 2009 and ended in August 2009. The project was approved by the study hospital's institutional review board for human subject protection.

Data source

After deployment, the author and 2 trained research associates made 8 visits to the study unit and conducted brief individual interviews to obtain the staff perspectives about the usefulness, practicality, and appropriateness of providing a folding commode chair in each patient room bathroom. A total of 63 interviews were conducted with 23 RNs, 38 patient care technicians (PCAs)/nurse aides, and 2 housekeeping staff members. Some RNs and PCAs were interviewed more than once. Each interview lasted for about 10 minutes, and each staff member was interviewed during work hours in a vacant patient room or the family waiting room. An informed consent form was given to staff who were interviewed and signed by them before starting the interviews. Staff participation

was voluntary and anonymous; only the job titles of the interviewees were documented for analysis purpose (RN, PCA, and house-keeping staff). All interviews were recorded and then transcribed by a trained research associate under the author's supervision.

Semistructured interviews were conducted by the 2 research associates, using 2 main open-ended questions: (1) What comments do you have about the raised toilet seat/commode chair? (and 3 subquestions: (a) What did you like about it? (b) What did you find challenging about using the raised toilet seat/commode chair? and (c) Would you make any changes in the raised toilet seat/commode chair?) and (2) What experiences did you have using the raised toilet seat/commode chair that were beneficial or detrimental to your work in patient care? Can you give me an example?

In addition, interviewees rated the folding commode chair in the following 3 areas: (1) Please rate the *usefulness* of the raised toilet seat/commode chair (1 = *not useful*, 10 = *very useful*), (2) Please rate the *feasibility* (ie, practicality) of the raised toilet seat/commode chair (1 = *not feasible*, 10 = *very feasible*), and (3) Please rate the *appropriateness* of the raised toilet seat/commode chair (1 = *not appropriate*, 10 = *very appropriate*).

Data analyses

The qualitative data were transcribed and saved in Word files. Then, the interview transcriptions were analyzed using content analyses, which were conducted by the transcriber (a trained research associate) and the author for validation purposes. The results of the content analyses were then summarized by the author.

The Statistical Package for the Social Sciences (SPSS Inc, Chicago, Illinois) was used for processing and analyzing quantitative data. Descriptive analyses (means, standard deviations, and maximum and minimum values) were used to describe the interviewees' responses toward the 3 feasibility questions. The differences in the ratings between RNs

and nurse aides were analyzed using independent *t* tests (α was set at .05).

RESULTS AND DISCUSSION

Summary of the interview data

The qualitative data from the interviews are summarized in Table 1. The descriptive information from the quantitative data and the results of the independent *t* tests are shown in Table 2. Nursing staff rated having a folding commode chair in each patient room bathroom as being useful, feasible/practical, and appropriate. The independent *t* tests on the mean values between the responses of RNs and PCAs showed no differences for the 3 questions (Table 2).

Overall, the quantitative information was consistent with the themes developed on the basis of the interviews. The 3 aspects that staff reported improved when using the folding commode chairs (*What did you like about it?*) were having the necessary equipment available in each patient room bathroom, decreasing difficulties in toileting transfer, and fulfilling the patients' needs (Table 1). These comments suggested that the intervention was useful.

Staff also identified challenges related to this intervention (*What did you find challenging about using the raised toilet seat/commode chair?*), including space constraints in the patient room and bathroom, taking more staff time to clean the bathroom after use, the need for staff to adjust the height of the commode chairs for certain patients, and the perceptions of some patients that the chairs were not structurally sound and not supportive (Table 1). These findings explained why the average feasibility rating of the intervention was lower than the usefulness and appropriateness ratings (Table 2). Paired *t* tests showed that the difference between the usefulness and feasibility ratings was significant ($P = .03$). The difference between the appropriateness rating and feasibility rating was also significant ($P = .04$). In other words, the intervention was perceived

Table 1. Summary of Themes From Interviews About Folding Commode Chairs

Interview Question	Theme and Description
1a. What did you like about the raised toilet seat/commode chair?	<p>Three themes were evident:</p> <ol style="list-style-type: none"> 1. <i>Necessary equipment to have in each patient room bathroom</i>: It is stable and secure, compact, light in weight, and easy to carry and clean. Seat height can be easily adjusted. Can be used at bedside or in bathroom. Is readily available. 2. <i>Decreasing difficulties on toileting transfer</i>: It made toileting transfer easier for older and postoperative patients. No patients slipped off these new commode chairs. 3. <i>Fulfilling the patients' needs</i>: Patients liked using the armrest to steady themselves so that they did not fall off.
1b. What did you find challenging about using the raised toilet seat/commode chair?	<p>Four issues were evident:</p> <ol style="list-style-type: none"> 1. <i>Space constraints in patient room and bathroom</i>: Commode chairs made the semiprivate patient room and bathroom feel smaller and more crowded. 2. <i>Cleaning the bathroom after use</i>: Because the funnel does not go all the way down into toilet, excrement may splash on the bathroom floor. It takes more staff time to clean the bathroom. 3. <i>Adjusting the height of the commode chairs to meet patients' needs</i>: Some ambulatory patients thought that it was a nuisance and asked staff to remove it. 4. <i>Structure of the commode chairs</i>: Some patients thought that it was not structurally sound and not supportive.
1c. Would you make any changes in the raised toilet seat/commode chair?	<p>Two themes surfaced:</p> <ol style="list-style-type: none"> 1. <i>Accepting by staff and patients</i>: Staff indicated that it was something patients did not notice because it was there and working effectively. 2. <i>Self-hygiene and commode chair seats</i>: Patients could have disinfectant wipes to clean the seat before sitting down on it.
2. What experiences did you have using the raised toilet seat/commode chairs that were beneficial or detrimental to your work in patient care?	<p>Three major benefits to staff's work in patient care were:</p> <ol style="list-style-type: none"> 1. <i>Promoting safer toileting transfer for patients</i>: Normal/standard toilets are low. Having a commode chair over the toilet makes it easier for patients to transfer to seat and lift themselves up. 2. <i>Increased accessibility and saving staff time</i>: Commode chairs are always there when patients need them. 3. <i>Decreasing staff back injury and pain</i>: Staff do not have to lower the patient down as far and can help patients up easily because the distance is less, avoiding back injury.

as being useful and appropriate; however, its feasibility (eg, practicality) was compromised perhaps because of limited space within each patient room and bathroom.

According to the responses to the question of "What experiences did you have us-

ing the raised toilet seat/commode chairs that were beneficial or detrimental to your work in patient care?" staff members generally perceived the intervention as being beneficial to their work in patient care. Benefits included promoting safer toileting transfer for

Table 2. Usefulness, Feasibility, and Appropriateness Ratings and Differences Between RNs and PCAs^a

Areas Assessed	<i>n</i>	Mean (SD)	Maximum/ Minimum	Independent <i>t</i> Test (RNs vs PCAs)
Usefulness	RN = 23	8.82 (1.09)	7/10	<i>t</i> = 1.48 <i>P</i> = .14
	PCA = 38	8.43 (0.89)	7/10	
	HP = 2	8.00 (1.41)	7/9	
	Total = 63	8.56 (0.98)	7/10	
Feasibility	RN = 23	8.05 (1.40)	5.5/10	<i>t</i> = -0.55 <i>P</i> = .59
	PCA = 38	8.25 (1.38)	4/10	
	HP = 2	7.50 (0.71)	7/8	
	Total = 63	8.15 (1.36)	4/10	
Appropriateness	RN = 23	8.75 (1.18)	7/10	<i>t</i> = 0.74 <i>P</i> = .46
	PCA = 38	8.51 (1.19)	6/10	
	HP = 2	7.00 (0.00)	7/7	
	Total = 63	8.55 (1.20)	6/10	

Abbreviations: HP, housekeeping staff; PCA, patient care technician.

^aEach question was measured using a scale of 1 (*not highly rated*) to 10 (*very highly rated*).

patients, having increased accessibility, saving staff time, and decreasing staff back pain (Table 1).

Study limitations

Several study limitations should be noted. This pilot study was conducted in 1 adult surgical unit with medical overflow in a Michigan community hospital. Folding commode chairs were deployed in the patient room bathrooms located only in 2 of the 3 wings of the study unit. In addition, use of folding commode chairs as a fall-prevention intervention was added to the existing hospital-wide multifactorial fall-prevention protocol. In this pilot study, any decreased number of falls and injurious falls might have resulted from the effects of the existing multifactorial fall-prevention program after providing a folding commode chair in each patient room bathroom. Therefore, this study cannot attribute reductions in falls to this intervention alone and to the exclusion of other interventions that occurred at the same time. Consequently, the effect of the use of folding commode chairs in toileting-

related fall reduction was not examined in this study.

CONCLUSIONS AND PRACTICAL IMPLICATIONS

The findings of this pilot study suggested that providing a folding commode chair in each patient room bathroom is a useful, feasible, and appropriate intervention in a multifaceted fall-prevention program. Such a fall-prevention strategy is recommended to increase accessibility and save staff time by increasing efficiency in patient care delivery. As for practical implications, using folding commode chairs as raisers over the toilets can be a good in-between step that hospital administrators take to avoid the significant expense of replacing existing standard toilets with toilets with higher seats (eg, handicap toilets) and adding armrests around the toilets.

For future research, a larger study is needed to examine the effect of this single intervention on reducing toileting-related fall and injurious fall rates. A multi-institution study or international comparison study would be

important to enhance the understanding of the value of providing a folding commode chair in each patient room bathroom across

different health care settings (eg, hospitals, rehabilitation centers, and skilled nursing homes) and ethnic patient populations.

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