

Lifting Barriers: Improving Mobility and Dignity with Bariatric Powered Sit-to-Stand Toileting Technology



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Abstract

Background: Obesity affects nearly 40% of U.S. adults, creating significant challenges for healthcare systems, particularly in safe mobility and toileting. Patients with obesity face increased risks of falls, complications, and diminished dignity, while healthcare staff experience high rates of musculoskeletal injury associated with manual handling. Traditional toileting equipment often fails to meet the needs of the bariatric population, prompting the exploration of novel solutions to improve safety, independence, and staff outcomes.

Methods: This quality improvement project took place in the rehabilitation area of an acute care hospital. Powered sit-to-stand toileting technology, designed with increased weight capacity and widened seating, was trialed with multiple patients over four months. Patients and staff provided structured survey feedback on mobility, safety, dignity, ease of use, and satisfaction.

Findings: Patients reported greater independence, improved dignity, and enhanced comfort and safety while toileting with the powered lift. Staff indicated reduced physical strain, lower perceived injury risk, and high usability of the device. Qualitative feedback reinforced the role of the powered lift in facilitating safer patient care while preserving dignity.

Discussion/Conclusion: This technology has addressed a critical gap in safe patient handling and toileting solutions for patients with obesity. By improving patient dignity and reducing staff injury risk, the technology supported both quality of care and occupational safety. Although limited by small sample size and single-site design, these findings suggest that this technology may be an effective intervention for bariatric patient populations. Further large-



Confidence, communication, and technology are key to safe, dignified toileting

scale evaluations are warranted to confirm outcomes and guide integration into safe patient handling and mobility programs.

Keywords

bariatric care, obesity, safe patient handling and mobility (SPHM), falls prevention, powered toilet lift, dignity, caregiver injury prevention, mobility assistance, quality improvement

Background

Obesity has emerged as one of the most pressing public health challenges, with nearly 40% of U.S. adults now classified as obese, the highest prevalence ever documented (Centers for Disease Control [CDC], 2024; National

Health and Nutrition Examination Survey [NHANES], 2025). This represents more than 93 million adults who frequently require medical care across acute, subacute, and long-term care settings. Patients with obesity often present with reduced mobility, decreased functional independence, and increased risk of falls, all of which complicate hospitalization and rehabilitation (Ewens, et al., 2022; Golden, 2021).

Falls remain a critical safety issue in hospitals, with over 700,000 inpatient falls occurring annually in the United States, and approximately 30% to 50% of these events associated with toileting (Bernet et. al., 2022). Among adults aged 65 and older, fall-related mortality has increased by more than 70% between 2003 and 2023, with over 40,000 deaths reported in 2023 (CDC, 2024). These incidents extend hospital stays by an average of nearly six days and impose a substantial economic burden, with the mean cost of an inpatient fall estimated at \$62,521, including both direct and indirect costs (AHCQR, 2025). Beyond these financial considerations, the Centers for Medicare and Medicaid Services (CMS) have classified hospital-acquired falls as

preventable conditions, meaning associated treatment costs are not reimbursed, further compounding the financial strain on healthcare organizations (Health, 2020).

Caregivers face parallel challenges. Musculoskeletal disorders among healthcare workers are frequently linked to patient handling tasks, with toileting assistance cited as a leading cause of occupational injuries in nursing staff (Galinsky, et. al., 2021). Staff injuries not only threaten caregiver well-being but also contribute to absenteeism, turnover, and increased healthcare system costs.

Despite widespread recognition of the issue, practical solutions for toileting support in bariatric populations remain limited. Traditional bedside commodes often lack adequate weight and width capacity, compromising safety and comfort. Bedpans, another common option, are widely reported to cause discomfort, skin breakdown, and psychological distress, undermining patient dignity (Hales, et.al., 2018). Consider “end of day fatigue” which places the patient at risk for additional weakness, further impacting safe independent toileting. Previous research has emphasized the importance of mobility and dignity in bariatric patient care, yet specialized equipment designed to facilitate independence during toileting has not been widely studied or implemented (Yee, et. al., 2022).

Given the dual priorities of enhancing patient dignity and independence while protecting caregiver safety, innovative equipment solutions are urgently needed. Powered sit-to-stand toileting technology represents one potential approach, offering the ability to support safer transfers, reduce fall risk, and maintain functional mobility for patients with obesity. This quality improvement project was undertaken to evaluate the feasibility, safety, and perceived benefits of a prototype bariatric powered toilet lift in an acute care hospital setting. Further, this project explores mobility and dignity using powered sit-to-stand toileting technology among plus size patients in the rehabilitation area of an acute care setting.

Methods

This quality improvement initiative took place in the southeastern United States. The study period was four months. The convenience sample included adult inpatients with obesity (defined as body mass index [BMI] ≥ 30 kg/m² or weight ≥ 250 lbs) admitted to a rehabilitation unit, and staff members who cared for them. Patients identified by the clinical team as requiring assistance when toileting were included. However, patients unable to provide informed feedback due to cognitive impairment or critical illness were excluded.

Patients trialed the powered sit-to-stand toilet designed with a weight capacity up to 500 pounds (227 kg), an increased seat width and depth, and powered raising/lowering mechanism to support transfers. The device was positioned in patient rooms and bathrooms and was used in place of standard bedside commodes or mounted toilets.

One structured survey was developed for both patients and staff members. (See Table 1: Sample Structured Survey) The survey assessed perceptions of dignity and independence in toileting, comfort and stability, safety, ease of use, and overall satisfaction. Responses were collected using 5-point Likert scales (1 = strongly disagree; 5 = strongly agree). Open-text fields captured qualitative feedback. Survey responses were analyzed descriptively using frequencies, percentages, means, and standard deviations. Open-ended comments were reviewed for recurring themes.

Findings

The Evaluation Form gathered feedback from healthcare professionals such as occupational therapists, physical therapists, nurses/PCAs, and patients providing insights from those directly involved in patient toileting and transfer assistance. Patients who responded all were individuals with obesity. The mean BMI of respondents was 68 (range 46 to 80); and the mean body weight of respondents was 483 pounds (range 388 to 570 pounds). Respondents consistently indicated that the technology improved patient dignity, independence, and safety during toileting, reflecting its effectiveness in promoting both comfort and autonomy. From a staff perspective, participants reported that the device reduced their risk of injury by minimizing the lifting forces typically required in patient handling tasks. Most found the product simple to use, suggesting it integrates smoothly into clinical workflows without significant training needs. (See Table 2: Summary of Evaluation Responses)

Open-ended comments reinforced these findings, highlighting the technology's ease of operation, its dual benefits for patients and caregivers, and the comfort provided by its wide seat design. Staff members reported that the technology improved both patient dignity and caregiver safety while being easy to operate. Respondents emphasized its value as a practical, comfortable, and safe solution for patient toileting. Many respondents praised the device's potential for unit-wide implementation, viewing it as a valuable addition to their patient care environment. However, several participants suggested design improvements, such as adjustable height settings and enhanced back support, to further optimize comfort and functionality. Overall, the feedback indicated strong satisfaction with the technology, underscoring its role in enhancing safety, efficiency, and patient-centered care across healthcare settings.

Discussion

This quality improvement project demonstrated that the use of this technology in an acute care or rehabilitation setting was associated with meaningful benefits for both patients and staff. These findings suggest that powered toileting devices may fill a critical gap in safe patient handling and mobility (SPHM) programs.

Table 1: Sample Structured Survey

Respondent Information

Nursing Unit/Room Number: _____

Role/Title: Nurse PCA OT PT Patient Other: _____

Instructions

Please rate your level of agreement with each statement below using the scale provided:

Scale	Description
1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

Evaluation Items

Statement	1	2	3	4	5
1. This product improved the patient's dignity and independence related to toileting.	<input type="checkbox"/>				
2. This product made using the toilet easier for the patient.	<input type="checkbox"/>				
3. The product was simple to use with the patient.	<input type="checkbox"/>				
4. The wide seat surface provided a greater sense of safety, security, and comfort for the patient during toileting.	<input type="checkbox"/>				

Table 1: Sample Structured Survey (continued)

5. Using this product reduced my risk of injury by lowering the physical lifting required during patient toileting.	<input type="checkbox"/>				
6. The product was simple and efficient to operate.	<input type="checkbox"/>				
7. The design of this product supports staff workflow and patient safety.	<input type="checkbox"/>				
8. Overall, I am satisfied with the performance of the technology.	<input type="checkbox"/>				

Open-Ended Questions

1. What do you like best about this product?

2. How would you improve this product? What changes do you recommend?

3. Additional comments:

The results align with prior studies emphasizing the high prevalence of toileting-related inpatient falls and staff musculoskeletal injuries (Bernet et al., 2022; Galinsky et al., 2021). By specifically targeting toileting, a frequent source of falls, this technology may provide a focused and practical solution to reduce adverse events. Furthermore, the psychological impact of preserving patient dignity should not be underestimated. Qualitative accounts in this project reinforce prior qualitative studies showing that patients with obesity frequently experience embarrassment, discomfort, and loss of independence with traditional toileting methods (Hales, et.al., 2018).

The fiscal implications are also noteworthy. With the average cost of an inpatient fall estimated at over \$62,000 (Dykes et al., 2023), investments in equipment that prevent such events may quickly offset acquisition costs. Additionally, reducing staff injury risk may decrease absenteeism, workers' compensation claims, and turnover, thereby improving organizational sustainability.

Despite these promising findings, several limitations must be acknowledged. The study was conducted at a single site

with a small convenience sample, limiting generalizability. Data relied on self-reported surveys rather than objective measures of mobility or injury reduction.

Nonetheless, this project demonstrates the feasibility and acceptability of powered sit-to-stand toileting technology. These findings support the integration of powered toileting devices into SPHM programs as a practical strategy to address the dual challenges of bariatric patient care and staff safety. Broader implementation and further research are warranted to confirm benefits, assess cost-effectiveness, and establish best practices for deployment across diverse care settings.

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Table 2. Summary of Evaluation Responses

Category	Description	Responses
Patient Dignity & Independence	Responses to “This product improved the patient’s toileting dignity and independence.”	Most answered Strongly agree or Neutral
Ease of Use for Patient	Responses to “This product made using the toilet easier for the patient.”	Majority Strongly agree
Staff Injury Risk Reduction	Responses to “This product reduced my risk of getting injured by reducing the lifting forces associated with patient toileting.”	Agree or Strongly agree
Ease of Use for Staff	Responses to “This product was simple to use with the patient.”	Agree or Strongly agree
Safety & Comfort (Staff View)	Responses to “The wide seat surface improved my sense of safety, security, and comfort for my patient during toileting.”	Agree or Strongly agree
Best Features Mentioned	Positive aspects cited in open -ended feedback.	Lift feature, easy to use, helps both staff and patients, comfortable width
Suggested Improvements	Recommended design or functionality changes.	Adjustable height, higher backrest, more units available
Additional Comments	Other remarks and general feedback.	Requests for unit -wide implementation

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Implications for Practice

For Clinicians: Powered bariatric toilet lifts can enhance patient dignity and independence while reducing fall risk during toileting, supporting safer, more patient-centered care.

For Staff Safety: Use of powered lifts reduces caregiver physical strain and may lower the risk of musculoskeletal injuries associated with bariatric patient handling.

For Administrators: Investment in powered toileting equipment may reduce the financial burden of inpatient falls and staff injuries, offsetting acquisition costs and strengthening safe patient handling and mobility (SPHM) programs.

