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Evaluation of ceiling lifts: Transfer time, patient comfort and staff perceptions

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ABSTRACT

Mechanical lifting devices have been developed to reduce healthcare worker injuries related to patient handling. The purpose of this study was to evaluate ceiling lifts in comparison to floor lifts based on transfer time, patient comfort and staff perceptions in three long-term care facilities with varying ceiling lift coverage. The time required to transfer or reposition patients along with patient comfort levels were recorded for 119 transfers. Transfers performed with ceiling lifts required on average less time (bed to chair transfers: 156.9 seconds for ceiling lift, 273.6 seconds for floor lift) and were found to be more comfortable for patients. In the three facilities, 143 healthcare workers were surveyed on their perceptions of patient handling tasks and equipment. For both transferring and repositioning tasks, staff preferred to use ceiling lifts and also found them to be less physically demanding. Further investigation is needed on repositioning tasks to ensure safe practice.

Introduction

Mechanical lifting devices have been introduced in the healthcare setting in an effort to curb occupational injuries associated with patient handling. The majority of healthcare workers injuries are musculoskeletal in nature and incurred during patient handling.[17] Patient handling, in particular the lifting involved, is considered hazardous due to high physical demands and unexpected conditions that may arise possibly due to the patient's diagnosis.[6,9,12] Consequently, in British Columbia, Canada a Memorandum of Understanding was signed between healthcare employers and unions to introduce a "no-unsafe manual lifting" policy.[16] In order to comply with this policy, mechanical lifting devices such as floor lifts and ceiling lifts have been implemented and advocated. Originally, floor lifts were introduced to reduce the risks associated with patient transfer.[6,22] However, this method has been reported to require more time and space than manual methods.[18] According to Garg et al.,[6,7] patients perceived this method of transfer to be more uncomfortable and less secure than manual methods.

More recently ceiling lifts have been introduced as an alternative to floor lifts. The ceiling lift consists of a ceiling mounted track, electric motor and a patient sling.[5] This allows for minimal physical effort and more maneuverability. Ceiling lifts require less force to operate during transfer than floor lifts.[24] Previous literature has proven ceiling lifts to be effective in reducing injury rates and cost-effective.[3,5,20,23]

Staff perceptions have been used to evaluate the acceptance of mechanical lifting devices as an effective intervention to reduce patient handling related injuries. The majority of recent research suggests that healthcare workers' perceptions toward mechanical lifting devices are favourable. According to Nelson et al.,[15] equipment was deemed to be the most effective component of a safe patient handling program by staff. Yassi et al.[25] performed a randomised controlled trial with mechanical lifting equipment that resulted in decreased staff perceptions of how physically demanding their work was and their self-perceived fatigue. It has also been demonstrated that staff perceptions improve with repeated usage of lifting devices. Engst et al.[5] found that staff preferred ceiling lifts for bed to chair transfers and that healthcare workers perceived their risk of injury, pain and discomfort to decrease with increased ceiling lift usage. Miller et al.[13] reported that staff perceived that ceiling lifts made their job easier and that they preferred to use them over floor lifts and manual methods.

Healthcare workers frequently note increased time to transfer as a concern associated with the use of mechanical lifts.[4,8] Efficiency is important for healthcare workers. According to Yassi et al.,[25] this increase in transfer time is not only an inconvenience to extremely busy workers; it may also increase the amount of time staff spent in injury inducing forward flexed position. Despite the suggestion that time involved is a barrier to ceiling lift use, there is limited evidence comparing the duration of various

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transfer methods and tasks. There is evidence to suggest that floor lifts require more time than manual methods.[4] Keir and MacDonell[11] found that manual methods required the least time followed by ceiling lifts and that floor lifts required the most time. They also observed that experienced workers required less time than inexperienced workers to transfer patients using mechanical lifting devices. However, their results were only descriptive. To the best of our knowledge, there have been no studies comparing the time to reposition patients with ceiling lifts and manual techniques.

An advantage of ceiling lifts is the additional feature of the repositioning sling. Repositioning or boosting patients in bed is a very physically demanding task.[10] However, the effectiveness of ceiling lifts for repositioning has been questioned by researchers. Studies by both Engst et al.[5] and Ronald et al.[20] failed to show a reduction in compensation costs related to injuries incurred during repositioning tasks with the implementation of ceiling lifts. Furthermore, staff perceptions of the risk of injury, pain or discomfort when repositioning patients did not improve with the addition of ceiling lifts.[5]

Another concern in patient handling is the comfort of the patient/resident. As mentioned earlier floor lifts were not perceived as comfortable or secure by patients.[6,7] More recently, Pellino et al.[19] found that for lateral transfers mechanical lifting devices were more comfortable than manual methods. There have only been a few studies that have looked at patient comfort during ceiling lift transfers. Zhuang et al.[26] compared the comfort and security for floor lifts, ceiling lifts and manual methods and found no difference between the different methods.

Current evidence clearly supports the use of ceiling lifts for injury prevention in staff. This paper introduces new information to the field of injury research by examining the impact of ceiling lifts on transfer time, patient comfort and staff perceptions. The specific objectives of this research were: (1) to measure and compare the time spent to perform various patient transfer tasks using ceiling lifts or floor lifts, (2) to determine the impact of ceiling lifts on patient comfort levels compared to floor lifts in long-term facility. In respect to staff perceptions, the objectives were (3) to determine healthcare workers' perceptions on patient handling by identifying key barriers and achieved successes in the optimal use of patient transfer devices in facilities with varying levels of ceiling lift coverage.

Materials and methods

A two part investigation into the use of ceiling lifts was conducted at three long-term care facilities in different stages of patient handling equipment implementation in British Columbia, Canada. The study took place in the later half of 2007. The ceiling lift coverage rates were 100% for facility 1, 33% for facility 2 and no coverage for facility 3. The ceiling lifts available in the facilities were permanent and from the same manufacturer. The floor lifts used in the facilities were all full body lifts, but varied by manufacturer and age. Ethics approval was obtained from the Ethical Board of Simon Fraser University and informed consent was gained from all healthcare staff and patients/residents who participated in the study.

Transfer time and patient comfort

A prospective observational design was adopted to measure and compare patient handling tasks performed with ceiling lifts, floor lifts or manual lifting methods. Only residents requiring mechanical aides for transfer were included. Three types of the most frequent patient handling tasks were identified and investigated in this study: (1) transfers from bed to chair, (2) transfers from chair to bed and (3) repositioning on bed/boosting patient up in bed.

A pilot study was performed to refine the methods after which the data collection was performed in facility 1 on four separate days and facility 2 on two separate days and at facility 3 over a 3-day period. Researchers recorded transfer time using a watch and rated patient comfort for real patient transfers that occurred in the facilities. Data on number of staff involved in the transferring, as well as the age, gender and weight of the resident were also collected.

Definition of timing measurement

Preparation time started when any of the following activities indicated the beginning of a patient handling activity: obtained help from other staff; informed and explained the task to the patient/resident; obtained transfer/reposition equipment (ceiling lift, floor lifts and sliding sheets); positioned transfer device or reposition sling under patient/resident or prepared environment for transfer (wheelchair, stretcher and commode).

Actual transfer time started when the staff pressed the ceiling or floor lift remote control button or started to lift the patient manually to perform the actual transfer/repositioning.

End point is defined as when the patient/resident is transferred appropriately and safely to the new surface or position.

Total time for transfer was calculated by summing the cumulative time for preparation time and actual transfer time.

Comfort and pain scale

The particular comfort scale used is a behavioural, unobtrusive method of measuring patients through non-verbal clues. The scale is a standard measure of discomfort and pain originally developed for paediatrics,[1] but has since been used for adults.[2] This scale has eight indicators; we chose 5 of them for the feasibility of our observational study. Trials were completed by all researchers to develop congruency in subjective scoring. Each patient was assessed on alertness, calmness/agitation, physical movement, muscle tone and facial tension during transfer and was given a score from 1 to 5 with increased agitation and discomfort evaluated with increased scores. Total scores ranged from 5 to 30.

Staff survey

A comprehensive survey questionnaire was designed to provide both quantitative and qualitative evidence directly from healthcare workers' perspectives. A convenience sample was obtained by administering the survey to 143 volunteers in the three long-term care facilities. The response rate was 100%. The survey was designed to gather information relevant to patient handling including: staff demographics (unit, job title, gender, age, full-time status and employment history); job activities, physically demanding tasks, perceptions on the use of patient handling equipment (safety, technology, ease of use, availability, accessibility, versatility, storage and maintenance), and knowledge of policies and procedures related to the prevention of patient handling injuries, safety culture, job satisfaction and further comments. The workers were asked to rate various aspects of patient handling tasks and equipment on a 1–5 scale with 5 representing a more favourable perception and 1 representing a less acceptable perception.

The three facilities were selected in discussion with the health authority. The data were analysed separately for each facility and then in combination as the facilities had differential extent of ceiling lift coverage and there could be other organisational and cultural differences. The study took place over a short time and there were no educational or training initiatives undertaken on