Published in final edited form as:

Int J Orthop Trauma Nurs. 2015 November ; 19(4): 194–206. doi:10.1016/j.ijotn.2015.03.007.

Optimizing Physical Activity Among Older Adults Post Trauma: Overcoming System and Patient Challenges

Barbara Resnick, PhD, CRNP, FAAN, FAANP,

Professor, University of Maryland School of Nursing, 655 West Lombard Street, Baltimore, MD 21201, Tel: 410 706 5178

Elizabeth Galik, PhD, CRNP,

Associate Professor, University of Maryland School of Nursing, 655 West Lombard Street, Baltimore, MD 21201, Tel: 410 706 5178

Chris L. Wells PT, PhD,

Clinical Associate Professor, Physical Therapy and Rehabilitation Science 655 W. Baltimore Street, Baltimore MD 21201, Tel: 410 706 6663

Marie Boltz, PhD, RN, GNP-BC, FAAN, and

Boston College, William F. Connell School of Nursing, 140 Commonwealth Ave, Chestnut Hill, MA 02467, Tel: 617-552-6379

Lauren Holtzman, MS

Project Manager, University of Maryland, School of Nursing, 655 West Lombard Street, Baltimore, MD 21201, Tel: 410 706 5178

Barbara Resnick: Resnick@son.umaryland.edu; Elizabeth Galik: galik@son.umaryland.edu; Chris L. Wells PT: cwells@som.umaryland.edu; Marie Boltz: marie.boltz@bc.edu; Lauren Holtzman: echappe64@yahoo.com

Abstract

By 2050 it is anticipated that close to half (40%) of all trauma patients will be over the age of 65. Recovery post trauma for these individuals is more complicated than among younger individuals. Specifically there is an increased risk for: (1) functional decline; (2) higher mortality rates; (3) longer length of stay; (4) greater resource consumption; (5) nursing home placement; (6) adverse events such as infections, pressure ulcers and falls; and (7) rehospitalization post discharge. Early mobilization has been shown to improve outcomes. Unfortunately, there are many challenges to early mobilization. The Function Focused Care Intervention was developed to overcome these challenges. The purpose of this paper was to describe the initial recruitment of the first 25 participants and delineate the challenges and successes associated with implementation of this intervention. Overall the intervention was implemented as intended and recruitment rates were consistent with other studies. Most patients were female, white and on average 79 years of age. Optimizing physical activity of patients was a low priority for the nurses with patient safety taking

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

None of the authors has a conflict of interest with regard to this study.

precedence. Patients spent most of the time in bed. Age, depression and tethering were the only factors that were associated with physical activity and functional outcomes of patients. Ongoing work is needed to keep patients physically active in the immediate post trauma recovery period.

Keywords

trauma; Older adults; physical activity

By 2050 it is anticipated that close to half (40%) of all trauma patients will be over the age of 65 (Center for Disease Control, 2012; Mullins, 1999). Falls are the leading cause of trauma among these individuals with other causes including motor vehicle accidents, pedestrian-motor vehicle accidents, assault and environmental injuries (e.g., hyperthermia). Compared to younger adults, older trauma patients have higher mortality rates, longer hospital stays and increased long term morbidity, and are more likely to be readmitted to the hospital following discharge (Aitken, Burmeister, Lang, Chaboyer, & Richmond, 2010; Ayoung-Chee, McIntyre, Ebel, McCormick, & Maier, 2014; Grossman et. al., 2003; Taylor, Trac & Meyer, 2002).

Once hospitalized, older individuals tend to demonstrate a decrease in performance of activities of daily living (Aitken, et. al., 2010; Campbell, et.al., 2001; Covinsky, Palmer, Fortinsky, 2003; Ferrera, Bartfield, & D'Andrea, 2000; Fisher, et. al., 2011; Grossman, et. al., 2003; Kuys, Dolecka, & Guard, 2012; McGwin, Melton, May, & Rue, 2000; Palleschi, et. al., 2011; Van Aalst, Morris, Yates, 1991; Zelada, Salinas, & Baztan, 2007; Zisberg, et. al., 2011). This functional decline is associated with higher mortality rates, longer length of stay (LOS), greater resource consumption, nursing home placement (Chuang, et.al., 2003; McCusker, Kakuma, & Abrahamowicz, 2002; Mosenthal, Livingston, Lavery, 2004; Ponzetto, et. al., 2003; Volpato, Onder, Cavalieri, 2007; Winograd, et. al., 1997; Zarzaur, Magnotti, Croce, Haider, & Fabian, 2010), adverse events such as infections (Makris, Dulhunty, Paratz, Bandeshe, & Gowardman, 2010), pressure ulcers (Baumgarten et al., 2006; Cox, 2011) and falls (Tommasini, Talamini, Bidoli, Siculo, & Palese, 2008) and rehospitalization post discharge (McKevitt, Calvert, Ng, 2003; Nolan & Thomas, 2008).

A primary cause of functional decline among hospitalized patients is bedrest, with older patients spending the majority of time during their hospitalization in bed (Brown, Redden, Flood, & Allman, 2009; Edmonds & Smith, 2014; Fisher, et. al., 2011; Kuys, et. al., 2012; McRae, Peel, Walker, Looze & Mudge, 2014; Payne, Davies & Powell, 2014; Zisberg, et. al., 2011). Consistently, patients who engage in more physical activity, defined as any bodily movement produced by skeletal muscles that requires energy expenditure (World Health Organization, 2014), have better overall outcomes following an inpatient hospital stay (Bailey, et. al., 2007; Burtin, Clerckx, Robbeets, 2009; Hill, Dennis, & Patman, 2013; Hopkins & Spuhler, 2009; Jones, Skirrow, & Griffiths, 2003; Mundy, Leet, Darst, Schnitzler, & Dunagan, 2003; Palleschi, et. al., 2011; Pawlik, Esbrook, & Schweickert, 2008; Schweickert, et. al., 2009). Physical activity includes such things as participating in bed mobility, bathing and dressing, or walking to the bathroom. When nurses work in an interdisciplinary team and help patients remain physically active, deconditioning and loss of

functional skills such as bathing, dressing, transfers and ambulation can be prevented (Bailey, et. al., 2007; Zelada, et. al., 2007). Specifically, when nurses encouraged patients to be physically active there was less functional decline than what was found among patients not exposed to this type of encouragement (Boltz, Resnick, Capezuti, Shuluk & Secic, 2012; Zelada, et. al., 2007).

Reasons for limited time spent in physical activity include patient factors, acute care environments, medical and nursing interventions and insufficient communication between providers about patients' functional status (Boltz, Capezuti, & Shabbat, 2011; ; Brown, et. al., 2009; Brown, Williams, Woodby, 2007; Burdick, et.al., 2005; BATTERY & Martin, 2009; Crews, 2005; Edmonds & Smith, 2014; Hopkins, et al., 2012; Martin, Hart, Spector, Doyle, & Harari, 2005; Payne, Davies & Powell, 2014; Thomsen, Snow, Rodriguez, & Hopkins, 2008; Wakefield & Holman, 2007; Zelada, et al., 2007). Patient factors include age, sociodemographic characteristics, preexisting disability and disease states, fatigue, delirium, cognitive impairment, anemia, pain, fear of falling, depression, lack of motivation, nutritional status, sedation and polypharmacy.

The acute care environment generally provides limited opportunity for physical activity. The bed is often the only furniture in the hospital room and the height of the bed or chairs may limit the patient's ability to transfer. In addition, there are often no pleasant areas for walking or pleasant destination sites. Patients are further restricted from engaging in physical activity as part of ongoing care as mechanical lifts are routinely used to facilitate transfers and they are not allowed to walk or self-propel to tests and procedures.

Medical factors limiting physical activity and contributing to functional decline include the tethering effects of devices such as indwelling urinary catheters, sequential compression devices, continuous monitoring (e.g., cardiac; pulse oximetry) and intravenous infusions. Additional medical interventions limiting physical activity include prescribed bedrest, sedating medications, insufficient management of pain, and tests and procedures that limit food/fluid intake (Leditschke, 2012; Thomsen, et.al., 2008; Zelada, et.al., 2007). The culture and philosophy of care on a unit and/or within a facility further impacts patient's physical activity. For example, when nurses focus on and are rewarded for task completion (e.g., administering medications, monitoring vital signs) or limit a patient's opportunity for physical activity (e.g., give a bedpan versus transfer to a commode or walk to the bathroom) this can decrease physical activity and result in functional decline (Bailey, et.al., 2007; Brown, et. al., 2009; Leditschke, Green, Irvine, Bissett, & Mitchell, 2012; Resnick et. al., 2011; Volpato, et.al., 2007; Winograd, et. al., 1997).

Nurses in acute care settings tend to focus on physical assessment, medication administration and indirect care activities (Mittmann, Seng, Pisterzi, Isogai, & Michaels, 2008; Williams, Harris, & Turner-Stokes, 2009) with little time spent encouraging physical activity (Boltz, et.al., 2012; Hopkins, et. al., 2012). Nurses conceptualize their roles as "watching over" patients to protect them from falls and other adverse events (Leditschke, et.al., 2012; Schmidt, 2003) and encourage what are believed to be risk-free activities such as staying in bed (Boltz, Resnick, Capezuti, & Shuluk, 2014; Dykes, Carroll, Hurley, Benoit, & Middleton, 2009; Laybourne, Biggs, & Martin, 2011; Lindquist & Sendelbach, 2007).

This protective, custodial, task oriented care decreases physical activity, facilitates functional decline and contributes to deconditioning (Brown, et al., 2007; Buttery & Martin, 2009).

Interventions such as early initiation of rehabilitation (e.g., physical therapy), walking and exercise programs have been tested as ways to increase physical activity among hospitalized older adults (Bailey, et. al., 2007; Courtney et. al., 2009; de Morton, Keating, Berlowitz, Jackson, & Lim, 2013; Hanekom, et.al., 2011; Hopkins & Spuhler, 2009; Morris, et. al., 2008; Nolan & Thomas, 2008). The participation of patients in these activities has been limited due to patient symptoms such as pain, sedation or delirium and/or limited resources within the setting (e.g., insufficient number of therapists to provide rehabilitation services) (Dickinson, Tschannen, & Shever, 2013; Hopkins, et. al., 2012).

To overcome previously noted barriers to participation in physical activity among older patients following trauma, Function Focused Care for Acute Care (FFC-AC) was developed. Function Focused Care is based on social cognitive theory (Bandura, 1997) and the social ecological model (Gregson, et.al., 2003). The social ecological model considers intrapersonal, interpersonal, environment and policy factors associated with behavior. Social cognitive theory guides the interpersonal interactions in Function Focused Care. Social cognitive theory addresses self-efficacy expectations and outcome expectations. Self-efficacy expectations are beliefs that one is capable of completing a course of action. Outcome expectations are the beliefs that if a behavior is performed it will result in a certain outcome. Self-efficacy and outcome expectations are strengthened by performing the activity, verbal encouragement, role modeling, and decreasing unpleasant sensations associated with the activity (Bandura, 1997). FFC-AC is initiated and implemented by nurses with the goal of optimizing the patients' current abilities (post trauma) and integrating physical activity into all nursing care interactions. The purpose of this study was to describe the initial implementation process for FFC-AC, the status of the first 25 participants and to explore challenges to optimizing physical activity among these individuals.

Design

This study was developed and implemented as a feasibility trial testing the implementation of FFC-AC on trauma units. Two trauma hospitals were randomized to treatment (FFC-AC) or education only (FFC-ED). The facilities were similar in that each had designated trauma units, followed Maryland Institute for Emergency Medical Services Systems (MIEMSS) criteria and the American College of Surgeons Committee "Gold Book" to allocate resources, were teaching facilities and had similar staffing ratios and retention rates (1 nurse to 3–4 patients). The study was reviewed and approved by a University and hospital based Institutional Review Board.

Sample

Patients were eligible to participate in the study if they were 65 years of age or older, spoke English, and were admitted to either of two participating trauma hospitals for a first trauma admission for specific International Classification of Diseases (ICD). This classification

system is the international standard diagnostic tool for epidemiology, health management and clinical purposes. The ICD is maintained by the World Health Organization and helps to classify diseases. The ICD codes (at the time of recruitment ICD-9 codes) making patients eligible for the study included: 805–809 Fracture Of Spine, Trunk; 810–819 Fracture Of Upper Limb; 820–829 Fracture Of Lower Limb; 830–839 Dislocation; 840–848 Sprains and Strains of Joints/Muscles. Patients were excluded from the study if they were unable to recall at least one out of three words on the three word recall question within the Mini-Cog. The Mini-Cog is a brief cognitive screening tool with prior evidence of reliability and validity (Borson, Scanlan, & Chen, 2003). Additional reasons for exclusion included not having physician clearance, being in intensive care units, on a ventilator, previously in the study or beyond 48 hours post admission to a study unit. As per the Institutional Review Board (IRB) and the Health Insurance Portability and Accountability Act (HIPAA), patients consented to participate in the study prior to determining eligibility. If the patient did not pass the Evaluation to Sign Consent (Resnick, et.al., 2007), he/she was asked to sign an assent to participate and the proxy was contacted to provide consent.

Intervention

Hospitals were randomized to treatment, Function Focused Care for Acute Care (FFC-AC) or control, Function Focused Care Education Only (FFC-ED). FFC-AC included three components, Component I: Education and Training; Component II: Environment and Policy Assessments; and Component III: Ongoing Training and Motivation of Nurses as described in Table 1. The intervention was implemented by a Research Function Focused Care Nurse who worked with identified champions on trauma units to assure that a function focused care philosophy was incorporated into routine care. Component I was implemented in the FFC-AC site by providing two brief in-service education sessions at times that were anticipated by leadership on the units to be convenient for the nursing staff. The in-service sessions were provided by an advanced practice nurse and physical therapist. For those who were unable to attend any of the sessions, the Research Function Focused Care Nurse provided the information during informal one-on-one sessions scheduled individually with the nurse. At the end of the educational sessions understanding of function focused care was tested using a Knowledge of Function Focused Care test. The results of the 15-item multiple choice test were reviewed with the nurse at the time of testing and incorrect responses were corrected and appropriate responses reviewed.

Component II was conducted utilizing previously established reliable and valid measures for evaluation of the environment and policies. The assessments focused on how the environment and policies influenced physical activity of patients. The Environment Assessment includes 18 items, 14 of which reflect positive environmental features that encourage physical activity and 4 that reflect negative factors in the environment. Items include such things as the area being free of clutter and whether or not there are environmental cues to engage in physical activity. The Policy Assessment is a 15-item assessment that considers policies addressing restraint use, use of open space and response to falls including whether staff encourage or restrict physical activity.

Component III included having the Research Function Focused Care Nurse work with the champions and other staff nurses to help them evaluate patients and encourage the patient's participation in physical activity during care interactions. A major focus of Component III was to ensure that staff helped patients to be physically active throughout the hospital stay. The Research Function Focused Care Nurse was a role model for the other nurses, provided verbal encouragement and positive reinforcement for helping patients participate in physical activity and continually explored barriers to keeping patients physically active.

As part of the intervention, during the first 2 months of the study period the Research Function Focused Care Nurse observed each nurse working with patients over a period of 30–60 minutes and completed an observation measure, The Function Focused Care Behavior Checklist for Nurses (Resnick, Rogers, Galik, & Gruber-Baldini, 2007). This 19-item measure includes such things as bed mobility, transfer, bathing, dressing, participating in rehabilitation, or helping a patient sit up in a chair. It was noted whether or not the nurse provided function focused care during the interaction or if he or she simply performed the task for the patient. The results of this observation were reviewed with the nurse using positive reinforcement and/or recommendations for alternative approaches to care to increase the patient's physical activity as appropriate.

In the hospital randomized to FFC-ED the nurses were exposed to Component I, education only. As in FFC-AC the education was provided by an advanced practice nurse and a physical therapist (educational materials available from the first author). Nurses that did not attend either of the classes were provided with a handout of the powerpoint. The nurses participating in the face-to-face sessions completed the post education Knowledge of Function Focused Care test and again results were immediately reviewed with the nurse to correct misunderstandings and reinforce learning.

Measures

Descriptive and Psychosocial Measures

The following data was obtained to describe the sample: age, race, gender, cognitive status (screening Mini-Cog) (Borson, et al., 2003), marital status, education, admission diagnoses, comorbidities, and use of tethering interventions (indwelling urinary catheters, sequential compression devices, intravenous, fall alarms, cardiac monitoring, restraints or negative pressure wound therapy devices). Delirium, fear of falling, pain, physical resilience and depression were also evaluated. Data collection was done within 48 hours following admission to the unit. All patient outcome measures were completed by a research evaluator via observation, input from staff, chart abstracting or patient interview.

Function and Performance

The Barthel Index (BI) (Mahoney & Barthel, 1965) was used as a measure of basic performance of activities of daily living (e.g., bathing, dressing). This measure includes 10 items and has been used repeatedly with older adults across all settings to evaluate function. Response options are weighted for each item and differentiate whether or not the individual is dependent, semi-dependent or independent. Total scores range from 0 to 100 with 0 being totally dependent and 100 totally independent. Prior use of this measure provided evidence

of internal consistency (Mahoney & Barthel, 1965), inter-rater reliability and validity (Crotty, Whitehead, Miller, & Gray, 2003; Di Monaco, Di Monaco, Manca, & Cavanna, 2002; Resnick & Galik, 2007). Physical performance was evaluated using the Physical Performance Mobility Exam (PPME) (Winograd, et al., 1994). This measure was used to evaluate performance as it was developed specifically for hospitalized patients and addresses six tasks that reflect balance and strength. Examples of items include timed ability to get up and down from a chair five times and the amount of time and number of steps it takes to walk a distance of six meters. Prior use provided evidence of intra- and inter-rater reliability and convergent and divergent validity (Winograd, et. al., 1994; 1997).

Physical Activity

The ActiGraph, an accelerometer, was used to objectively capture 24 hours of physical activity among patients. The ActiGraph is a triaxial accelerometer that is 5.1 by 4.1 by 1.5 cm with a weight of 42.4 grams. The device measures magnitudes of accelerations and deceleration at rates of 0.05 to 2 g (i.e. the acceleration of gravity) with a frequency range of 0.25 to 2.5 Hz. Measures of activity are provided as counts with one count being equivalent to 16 mg/second. Using activity counts, the ActiGraph provides minute and hourly reports of the amount of time the individual is engaged in low and moderate intensity physical activity using the Freedson calculation (Freedson, Melanson, & Sirard, 1998). The Actigraph is able to capture movements beyond just ambulation (e.g., bed mobility, transfers, self-propelling in a wheelchair) and has been shown to be reliable and valid (ActiGraph, 2004; Friedman, et. al., 2000; Grap, Borchers, Munro, Elswick, & Sessler, 2005; Kochersberger, McConnell, Kuchibhatla, & Pieper, 1996; Warms & Belza, 2004).

Survey data of physical activity was also obtained using the Physical Activity Survey for Long Term Care (PAS-LTC) (Resnick & Galik, 2007). The PAS-LTC is based on reports from the nurse providing care to the patient on the day of testing and addresses time spent in locomotion (e.g., walking, self-propelling); personal care (e.g., bathing, dressing); structured exercise (e.g., physical or occupational therapy); care taking (e.g., pushing someone else in a wheelchair); and repetitive activities (e.g., dressing and undressing oneself, repetitive moving of items on a bedside tray). Prior use of this measure provided evidence of inter-rater reliability and construct validity (Resnick & Galik, 2007).

Assessment of Psychosocial Status of Participants

Evidence of delirium was based on objective evaluation of the patient using the Delirium-O-Meter (DOM) (de Jonghe, Kalisvaart, Timmers, Kat, & Jackson, 2005). The DOM is an observation measure completed by the nurse providing care to the patient on the day of testing and involves assessing the patient for 12 symptoms of delirium. Scores range from 0 to 36 with higher scores indicative of a greater number of symptoms of delirium. Items include such things as being able to sustain attention, orientation and apathy with response options ranging from 0 to 3 across each symptom as individually described. For example, response options for the first symptom of delirium evaluation, sustained attention, include: 0 which is described as being able to concentrate; 1 which is absent-minded and needing reminders to respond; 2 which is easily distracted; and 3 which is not being able to sustain attention at all.

Screening for depression and evidence of depressive symptoms was done using the 5-Item Geriatric Depression Scale (GDS-5) (Rinaldi, et.al., 2003). This measure was used as it is brief and thus less burdensome for participants, has prior evidence of reliability and validity and the items reflect those symptoms most commonly reported among older adults (Rinaldi, et.al., 2003). A score of 2 or greater is indicative of screening positive for depression. Lastly, pain was evaluated using the Pain Verbal Descriptor Scale (VDS) (Herr, 2011; Herr & Mobily, 1993; Herr, Spratt, Mobily, & Richardson, 2004; Herr & Mobily, 1991). This measure has been shown to be reliable and valid when used with older adults who may have some cognitive impairment. These measures were all selected as they did not depend on the patient being able to recall prior activities or events.

Data Analysis

Descriptive analyses were done to describe the nurses Knowledge of Function Focused Care as well as baseline data for the first 25 study participants. Bivariate correlations were used to explore the relationships between patient baseline demographics, treatment factors (e.g., tethering) and psychosocial factors (e.g., mood, resilience) with function and physical activity.

Results

Intervention Implementation

The educational component of the intervention was delivered to all of the nurses in the FFC-AC hospital either during the group classes [N=38 out of 62 nurses (61%)] or by providing one-on-one education by the Research Function Focused Care nurse. In the FFC-ED only site, 20 (40%) of the 51 nurses were exposed to function focused care educational materials via the group classes and the remaining received the educational materials via a powerpoint handout. Mean scores on the test were quite similar across the groups with a mean of 10.09 (SD=.83) in the FFC-ED only group and a score of 10.54 (SD=1.57) in the FFC-AC group. Both groups had a mean percentage score of 70% correct, slightly lower than the anticipated 80% indicative of knowledge and understanding of function focused care.

The items most difficult for the nurses to answer correctly were items 2, 3 and 14. Item 2 was: "One way to motivate older adults to perform as much as possible for themselves is to...": (1) tell them they can do it!; (2) set them up and then just walk away; (3) tell them you will do it today and they can tomorrow; or (4) be certain to stabilize all acute medical problems first. The majority of the nurses correctly noted that patients should be verbally told "they can do it!". Fifteen percent of the nurses, however, perceived their roles as stabilizing the patient's medical problems first or simply telling the patient that it was okay if they got help today and they could do the task/activity tomorrow. Item 3 focused on the definition of minimum assistance and the majority of the nurses did know that minimum assistance was defined as having the patient perform 50–74% of the task. Lastly, close to 50% of the nurses responded incorrectly to Item 14 and did not know that it was only appropriate to use a mechanical lift with patients when the patient needed maximum assistance for sitting balance.

The environmental assessment performed in the FFC-AC site helped to recognize that the only furniture in the rooms was a bed for the patients to lie in. There was easy access to patient lifts. The toilets available for patients were inappropriate and unsafe in that they were too low to the ground and too small for most adults to sit on and had no grab bar support. The hallways were clear and handrails were available for patient use. The policies were reviewed and were generally neither supportive nor non-supportive of physical activity. There were no written guidelines or policies related to patient's ambulation on the unit, between units, to procedures or when being discharged. Common practice, however, required that any transfer off the unit was done via wheelchair. As per our treatment protocol these findings were shared with nursing administration and led to the purchasing of commode chairs for all trauma units.

The identification of champions on the units was done in coordination with the nurse managers on each unit and the Function Focused Care Research Nurse. Multiple champions were identified to cover the different shifts and days. The champions did not, however, respond to opportunities to meet with the Function Focused Care Nurse regularly as a group or individually and were not willing to develop unit activities such as Function Focused Care nursing rounds. Their reasons for inability to meet were patient or unit responsibilities and scheduling challenges made it impossible to hold the group meetings.

Recruitment of Participants

Of the first 126 eligible older adults admitted to the participating trauma units, 25 (20%) consented to participate, 55 (44%) refused or the Legally Authorized Representative (LAR) refused, the remaining 46 (36%) were either discharged prior to being approached, were too sedated to complete the Evaluation to Sign Consent, or the LAR simply could not be reached.

Description of Patients at Baseline

The majority of patients were female (N=18, 72%), white (N=24, 96%) and half were widowed (N=12, 50%) with the others married (N=10, 40%) or divorced (N=2, 8%). Patients had at least some high school education or were high school graduates (N=14, 58%). The remaining had some college and/or graduate school (N=11, 42%). The mean age of our first 25 participants was 79.58 (SD=8.80) and the participants had 3.71 (SD=3.34) comorbidities. Hip fracture was the most common admitting diagnosis (N=9, 36%), with 3 individuals (12%) sustaining spinal fractures, 2 (8%) sustaining rib fractures, 2 (8%) sustaining pelvic fractures, 2 (8%) sustaining upper extremity fractures, 2 (8%) sustaining tibia/fibula fractures and 1 (4%) individual sustaining a sternal fracture, 1 an acetabular fracture, 1 a calcaneus fracture and 1 a humeral fracture. Just over 50% of the participants had pain (N=13, 52%) with the pain described as generally mild or discomforting. A third of the patients had no fear of falling, and overall the mean fear was 2.42(SD= 2.0, range from 0 no fear to 4 fear all of the time).

As shown in Table 2, there was no evidence of delirium among the participants (mean 0.45, SD 0.86) or depression (mean=.50, SD =.51). Overall the patients had fair physical resilience with a mean 9.47 (SD=4.86 and range from 0 to 17 with 17 being strongly

resilient). The patients were functionally dependent with a mean score on the Barthel Index of 27.87 (SD=18.11, range 0–100). Based on reporting of physical activity by the nurse working with the patient, it was noted that overall the patients spent 37.25 (SD=34.14) minutes engaged in all types of physical activities over the past 24 hours (e.g., bathing, eating, going to therapy). Objective measures of physical activity based on actigraphy showed that over a 24 hour period a mean of 54,112 (SD=56,453) counts of physical activity were completed. Specifically, there were 2.40 (SD=2.50) minutes of moderate level physical activity, 674.73 (SD=619.21) minutes of sedentary behavior, 34.80 (SD=106.00) minutes of light intensity physical activity and participants burned 45.56 (SD=47.72) kilocalories.

Based on observations of nurse-patient care interactions done in the first 2 months following education the nurses only provided function focused care for 3.40 (SD=2.40) out of 19 care interactions. Patients had 2.80 (SD=1.83) tethers out of a possible 7 tethers considered. As shown in Table 3, the most common sources of tethering were cardiac monitoring, continuous intravenous infusions and sequential compression devices.

Table 4 provides the bivariate correlations between demographic (age and gender), descriptive (pain, number of comorbid diagnoses and number of tethering interventions) and psychosocial factors (mood, resilience and fear of falling) with function and physical activity. Age was associated with physical performance based on the PPME such that those who were older had lower physical performance ($r = -.42, p=.04$). Mood and tethering were associated with reported time spent in all activities on the PAS-LTC (bathing, dressing, eating, ambulation, toileting and going to therapy) such that those who had more symptoms of depression were less likely to engage in activity ($r = -.45, p = .03$). Those that had more tethers were more likely to engage in overall reported time in activity ($r = .49, p = .03$). Based on Actigraphy, there was not a significant association between counts of activity or time spent in different intensities of physical activity with any of the descriptive or psychosocial measures.

Discussion

The findings from this descriptive study reiterate prior challenges to recruitment of patients, engagement of nursing staff and the extremely low level of physical activity among older hospitalized patients. These findings can be used to help guide nurses and other members of the health care team in facilitation of intervention research in acute care settings and increasing the time older patients spend in physical activity.

Patient Recruitment

To accurately identify potentially eligible patients it was necessary to visit the sites daily and check admissions with the charge nurse. Despite trying to set up a working system, calling in to check with the staff to determine if there were potentially eligible patients was generally not received positively. The consent rate of 20% among those eligible and approached was consistent with, or better than, what has been reported by other studies (NeSmith, et. al., 2013; Richmond, Thompson, Kauder, Robinson, & Strumpf, 2006). The reasons for lack of participation among potentially eligible older adults were also similar to

prior work (NeSmith, et. al., 2013; Richmond, et. al., 2006; Weierbach, Glick, & Fletcher, 2010). Reasons included such things as the patient being too sedated to participate in the consent process, confusion or acute delirium, inability to reach the LAR and a lack of willingness to participate due to being overwhelmed by the acute nature of their situation.

As has been recommended in prior research (NeSmith, et al., 2013; Richmond, et al., 2006; Weierbach, et al., 2010), motivational interventions to increase nursing staff awareness of study activities were provided in both sites. Specifically the nurses were provided with small gifts (e.g., snack foods for the units, thank you mugs and bags) to acknowledge their help and support. In the treatment site, to keep the unit nurses focused on physical activity of patients the Research Function Focused Nurse initiated staff contests. Contests included such things as competitions to see who walked the most steps wearing an Actigraph during an 8 hour shift, and identification of the nurse who provided the most innovative example of function focused care on each unit.

Despite multiple planning meetings with nursing leadership in both sites, the number of nurses who attended educational sessions in both settings was disappointing. Moreover, when the nurses were in the educational sessions they were distracted by patient needs and anxious to return to the unit. Likewise the involvement of unit champions in study related activities was limited. While champions have been noted to be central to the success of implementation of innovative interventions (Aoun, Shahid, Le, & Packer, 2013; Waugh, Marland, Henderson, Robertson, & Wilson, 2011) it is difficult to identify the most appropriate champions and to have them participate fully in the implementation process. Generally the lack of involvement was due to competing responsibilities and more pressing priorities (e.g., preparing for or responding to hospital regulatory visits; competing initiatives within the hospital such as a focus on smoking cessation or vaccinations).

Nursing leadership on participating units was involved in the implementation of the project. This involvement, however, was not sufficient to fully engage the staff. Future work should consider using a pragmatic approach such as that guided by the Evidence Integration Triangle (EIT) (Glasgow, 2013). The EIT was designed to engage stakeholder groups and to focus attention on the needs of the stakeholders. Three components are necessary for this approach, an evidence-based intervention, practical measures and ongoing implementation of partnership principles among the stakeholders. This approach allows for flexibility in the intervention to best fit the needs of the stakeholders. For example, the unit nurses could provide feedback about the timing and delivery mode for training and identify methods of developing and communicating function-focused goals for patients. In the current study, stakeholders (i.e., the unit nurses) goals were not considered in terms of patient care and patient outcomes. Moreover, the fear of adverse events during the hospital stay (e.g., medical errors, falls, pressure sores, infections) was of greater importance, relevance and direct concern to the staff than optimizing physical activity. Ongoing consideration and engagement at the stakeholder level is needed.

Physical Activity of Trauma Patients

Despite repeated evidence of the benefits associated with increased time spent in physical activity among older adults post trauma (Bailey, et. al., 2007; Burtin, et. al., 2009; Hill, et. al., 2013; Hopkins, & Spuhler, 2009; Jones, et. al., 2003; Mundy, et. al., 2003; Palleschi, et. al., 2011; Pawlik, et. al., 2008; Schweickert, et. al., 2009), the findings from this study confirm the persistently low level of physical activity patients actually perform. Further, even after educational sessions about the importance of optimizing physical activity among patients the nurses tended to recommend such things as mechanical lifts even when not clinically indicated/necessary. Education is likely not sufficient to change beliefs and behavior among nurses and continued intervention activities are needed to reiterate the importance of physical activity and help nurses integrate physical activity into routine daily activities.

One of the major challenges nurses and other health care providers face in engaging hospitalized patients in physical activity is resistance on the part of the patient (Cleary, LaPier, & Beadle, 2011; Dickinson, et. al., 2013; Resnick, Galik, Boltz, & Pretzer-Aboff, 2011; Resnick, Wells, Brotemarkle, & Payne, 2014). It has been shown that, despite “constant encouragement and cajoling” to participate in a low level early mobility program in post-surgical patients (e.g., range of motion, sitting), for example, there was only a 71% compliance rate (Dickinson, et. al., 2013). Patient resistance incorporates many factors including such things as care expectations, fear, beliefs about the benefits and risks associated with the activity, depression, lack of motivation, pain, fatigue and other associated disease and treatment related symptoms.

At a bivariate and descriptive level, age, depression and tethering were the only factors that were associated with physical activity and function among study participants. As would be expected those who were older and depressed were less likely to engage in activity. This suggests a need to focus particularly on these individuals as soon as possible post trauma so as to optimize the recovery process.

In contrast to prior research (Boltz, et.al., 2012; Leditschke, et.al., 2012) reporting the negative impact of tethering on physical activity, study participants with more tethers actually spent more time in physical activity (subjectively reported by nurses). It is possible that tethering may have been appropriately provided and removed when needed. For example, continuous compression devices were used to prevent deep vein thrombosis and removed when the patient was out of bed. It is also possible that the use of tethers required more nursing interaction with the patient and thus the nurses observed more physical activity during these interactions than what was observed among those that were untethered.

Study Limitations and Conclusion

This study was limited by being a very small descriptive study addressing early implementation of an intervention to increase physical activity among hospitalized older adults post trauma. In addition, the measures were largely based on subjective report from nurse caregivers about patient activity. The findings support prior work and challenges identified in the recruitment of patients in trauma settings and the challenges of

implementing interventions in real world settings. Likewise, the findings reinforce the low level of physical activity that persists among patients in acute care. Future work in this area should consider using a more pragmatic approach, such as the Evidence Integration Triangle, to facilitate implementation of innovative care approaches in acute care settings.

Acknowledgments

This study was funded by the National Institutes of Health, National Institute of Nursing Research (1R21NR013736-01A1).

The funders were not involved with the study implementation, data collection or write up of the findings.

References

- ActiGraph. Actigraph Analysis Software. 2004. Available at <http://www.theactigraph.com/>. Last accessed January, 2015
- Aitken L, Burmeister E, Lang J, Chaboyer W, Richmond T. Characteristic and outcomes of injured older adults after hospital admission. *Journal of the American Geriatrics Society*. 2010; 58:442–449. [PubMed: 20163484]
- Aoun S, Shahid S, Le L, Packer T. The role and influence of ‘Champions’ in a community-based lifestyle risk modification programme. *Journal of Health Psychology*. 2013; 18(4):528–541. [PubMed: 22791139]
- Ayoung-Chee P, McIntyre L, Ebel B, Mack CD, McCormick W, Maier R. Long-term outcomes of ground level falls in the elderly. *Journal of Trauma and Acute Care Surgery*. 2014; 76:498–503. [PubMed: 24458057]
- Bailey P, Thomsen GE, Spuhler VJ, Blair R, Jewkes J, Bezdjian L, Hopkins RO. Early activity is feasible and safe in respiratory failure patients. *Critical Care Medicine*. 2007; 35(1):139–145. [PubMed: 17133183]
- Bandura, A. *Self-efficacy: The Exercise of Control*. New York, New York: W.H. Freeman and Company; 1997.
- Baumgarten M, Margolis D, Localio A, Kagan S, Lowe R, Kinosian B, Ruffin A. Pressure ulcers among elderly patients early in the hospital stay. *Journal of Gerontology A Biological Sciences Medicine and Science*. 2006; 61(7):749–754.
- Boltz M, Capezuti E, Shabbat N. Nursing staff perceptions of physical function in hospitalized older adults. *Applied Nursing Research*. 2011; 24(4):215–22. [PubMed: 20974088]
- Boltz M, Resnick B, Capezuti E, Shuluk J, Secic M. Functional decline in hospitalized older adults: Can nursing make a difference? *Geriatric Nursing*. 2012; 33(4):272–279. [PubMed: 22401985]
- Boltz M, Resnick B, Capezuti E, Shuluk J. Activity restriction vs. self-direction: older adults’ response to fear of falling. *International Journal of Older People Nursing*. 2014; 9(1):44–53. [PubMed: 23295109]
- Borson S, Scanlan J, Chen P. The Mini-Cog as a screen for dementia: Validation in a population-based sample. *Journal of the American Geriatrics Society*. 2003; 51:1451–1454. [PubMed: 14511167]
- Brown CJ, Redden DT, Flood KL, Allman RM. The underrecognized epidemic of low mobility during hospitalization of older adults. *Journal of the American Geriatrics Society*. 2009; 57(9):1660–1667. [PubMed: 19682121]
- Brown CJ, Williams BR, Woodby LL. Barriers to mobility during hospitalization from the perspective of the patient, their nurses and physicians. *Journal of Hospital Medicine*. 2007; 2:305–331. [PubMed: 17935241]
- Burdick D, Rosenblatt A, Samus QM, Steele C, Baker A, Harper M, Lyketsos CG. Predictors of Functional impairment in residents of assisted living facilities: The Maryland Assisted Living Study. *Journal of Gerontology A Biological Sciences Medicine and Science*. 2005; 60(2):258–264.
- Burtin C, Clerckx B, Robbeets C. Early exercise in critically ill patients enhances short term functional recovery. *Critical Care Medicine*. 2009; 37:2499–2505. [PubMed: 19623052]

- Buttery AK, Martin FC. Knowledge, attitudes and intentions about participation in physical activity of older post acute hospital inpatients. *Physiotherapy*. 2009; 95(3):192–198. [PubMed: 19635339]
- Campbell R, Evans M, Tucker M, Quilty B, Dieppe P, Donovan JL. Why don't patients do their exercises? Understanding non-compliance with physiotherapy in patients with osteoarthritis of the knee. *Journal of Epidemiology and Community Health*. 2001; 55(2):132–138. [PubMed: 11154253]
- Center for Disease Control. National Center for Injury Prevention and Control. 2012. Available at: <http://webappa.cdc.gov/sasweb/ncipc/nfirates2001.html>. Last accessed September, 2014
- Chuang KH, Covinsky KE, Sands LP, Fortinsky RH, Palmer RM, Landefeld CS. Diagnosis-related group-adjusted hospital costs are higher in older medical patients with lower functional status. *Journal of the American Geriatrics Society*. 2003; 51(12):1729–1734. [PubMed: 14687350]
- Cleary K, LaPier T, Beadle C. Exercise adherence issues, behavior change readiness, and self-motivation in hospitalized patients with coronary heart disease. *Journal of Acute Care Physical Therapy*. 2011; 2(2):55–63.
- Courtney M, Edwards H, Chang A, Parker A, Finlayson K, Hamilton K. Fewer emergency readmissions and better quality of life for older adults at risk of hospital readmission: a randomized controlled trial to determine the effectiveness of a 24-week exercise and telephone follow-up program. *Journal of the American Geriatrics Society*. 2009; 57(3):395–402. [PubMed: 19245413]
- Covinsky KE, Palmer RM, Fortinsky RH. Loss of independence in activities of daily living in older adults hospitalized with medical illnesses: Increased vulnerability with age. *Journal of the American Geriatrics Society*. 2003; 51(4):451–458. [PubMed: 12657063]
- Cox J. Predictors of pressure ulcers in adult critical care patients. *American Journal of Critical Care*. 2011; 26(8):364–374.
- Crews DE. Artificial environments and an aging population: Designing for age-related functional losses. *Journal of Physiological Anthropology*. 2005; 24(1):103–109.
- Crotty M, Whitehead C, Miller M, Gray S. Patient and caregiver outcomes 12 months after home-based therapy for hip fracture: A randomized controlled trial. *Archives of Physical Medicine and Rehabilitation*. 2003; 84(8):1237–1239. [PubMed: 12917867]
- de Jonghe J, Kalisvaart K, Timmers J, Kat M, Jackson J. Delirium-O-Meter: A nurses' rating scale for monitoring delirium severity in geriatric patients. *International Journal of Geriatric Psychiatry*. 2005; 20:1158–1166. [PubMed: 16315151]
- de Morton NA, Keating JL, Berlowitz DJ, Jackson B, Lim WK. Additional exercise does not change hospital or patient outcomes in older medical patients: A controlled clinical trial. *Australian Journal of Physiotherapy*. 2007; 53(2):105–111. [PubMed: 17535146]
- Di Monaco M, Di Monaco R, Manca M, Cavanna A. Functional recovery and length of stay after recurrent hip fracture. *American Journal of Physical Medicine and Rehabilitation*. 2002; 81(2):86–89. [PubMed: 11807341]
- Dickinson S, Tschannen D, Shever L. Can the use of an early mobility program reduce the incidence of pressure ulcers in a surgical critical care unit? *Critical Care Nursing Quarterly*. 2013; 36(1):127–140. [PubMed: 23221449]
- Dykes P, Carroll D, Hurley A, Benoit A, Middleton B. Why do patients in acute care hospitals fall? Can Falls be prevented? *The Journal of Nursing Administration*. 2009; 39(6):299–304. [PubMed: 19509605]
- Edmonds C, Smith H. Observational pilot study of physical activity on an acute older person's unit. *Age & Ageing*. 2014; 43(Supplement 1):i33.
- Ferrera P, Bartfield J, D'Andrea C. Outcomes of admitted geriatric trauma victims. *American Journal of Emergency Medicine*. 2000; 18:575–580. [PubMed: 10999573]
- Fisher S, Goodwin J, Protas E, Kuo Y, Graham J, Ottenbacher K, Ostir G. Ambulatory activity of older adults hospitalized with acute medical illness. *Journal of the American Geriatrics Society*. 2011; 59(1):91–95. [PubMed: 21158744]
- Freedson PS, Melanson E, Sirard J. Calibration of the Computer Science and Applications, Inc. accelerometer. *Medicine and Science in Sports and Exercise*. 1998; 30(5):777–781. [PubMed: 9588623]

- Friedman L, Benson K, Noda A, Zarcone V, Wicks DA, O'Connell K, Yesavage JA. An actigraphic comparison of sleep restriction and sleep hygiene treatments for insomnia in older adults. *Journal of Geriatric Psychiatry and Neurology*. 2000; 13(1):17–27. [PubMed: 10753003]
- Glasgow R. What does it mean to be pragmatic? Pragmatic methods, measure, and models to facilitate research translation. *Health Education and Behavior*. 2013; 40:257–264. [PubMed: 23709579]
- Grap MJ, Borchers CT, Munro CL, Elswick RW, Sessler CN. Actigraphy in the critically ill: correlation with activity, agitation and sedation. *American Journal of Critical Care*. 2005; 14(1):52–60. [PubMed: 15608109]
- Gregson J, Foerster S, Orr R, Jones L, Benedict J, Clarek B, Zoltz K. System, environment and policy changes: Using the Social Ecological Model as a framework for evaluating nutrition education and social marketing programs with low income audiences. *Journal of Nutrition Education*. 2003; 33:S4–S15. [PubMed: 12857540]
- Grossman M, Scaff DW, Miller D, Reed J, Hoey B, Anderson HL. Functional outcomes in octogenarian trauma. *Journal of Trauma Injury, Infection and Critical Care*. 2003; 55:26–32.
- Hanekom S, Gosselink R, Dean E, Aswegen HV, Roos R, Ambrosino N, Louw Q. The development of a clinical management algorithm for early physical activity and mobilization of critically ill patients: Synthesis of evidence and expert opinion and its translation into practice. *Clinical Rehabilitation*. 2011; 25(9):771–787. [PubMed: 21504951]
- Herr K. Pain assessment strategies in older patients. *Journal of Pain*. 2011; 12(3 Suppl 1):S3–S13. [PubMed: 21396599]
- Herr K, Mobily P. Comparison of selected pain assessment tools for use with the elderly. *Applied Nursing Research*. 1993; 6(1):39–46. [PubMed: 8439177]
- Herr K, Spratt K, Mobily P, Richardson G. Pain intensity assessment in older adults: use of experimental pain to compare psychometric properties and usability of selected pain scales with younger adults. *Clinical Journal of Pain*. 2004; 20(4):207–219. [PubMed: 15218405]
- Herr KA, Mobily PR. Complexities of pain assessment in the elderly. Clinical considerations. *Journal of Gerontological Nursing*. 1991; 17(4):12–19. [PubMed: 2010600]
- Hill K, Dennis D, Patman S. Relationships between mortality, morbidity and physical function in adults who survived a period of prolonged mechanical ventilation. *Journal of Critical Care*. 2013; 28:427–432. [PubMed: 23618778]
- Hopkins R, Spuhler VJ. Strategies for promoting early activity in critically ill mechanically ventilated patients. *AACN Advanced Critical Care*. 2009; 20:277–289. [PubMed: 19638749]
- Hopkins R, Spuhler VJ, Miller R, Rodriguez L, Spuhler V, Thomsen G. Physical therapy on the wards after early physical activity and mobility in the intensive care unit. *Physical Therapy*. 2012; 92(12):1518–1523. [PubMed: 22491481]
- Jones C, Skirrow P, Griffiths RD. Rehabilitation after critical illness: A randomized controlled trial. *Critical Care Medicine*. 2003; 31(10):2456–2461. [PubMed: 14530751]
- Kochersberger G, McConnell E, Kuchibhatla MN, Pieper C. The reliability, validity, and stability of a measure of physical activity in the elderly. *Archives of Physical Medicine and Rehabilitation*. 1996; 77(8):793–795. [PubMed: 8702373]
- Kuys S, Dolecka U, Guard A. Activity level of hospital medical inpatients: An observational study. *Archives of Gerontology and Geriatrics*. 2012; 55(2):417–422. [PubMed: 22417401]
- Laybourne A, Biggs S, Martin FC. Predicting habitual physical activity using coping strategies in older fallers engaged in falls prevention exercise. *Journal of Aging and Physical Activity*. 2011; 19:189–200. [PubMed: 21727300]
- Leditschke A, Green M, Irvine J, Bissett B, Mitchell IA. What Are the Barriers to Mobilizing Intensive Care Patients? *Cardiopulmonary Physical Therapy Journal*. 2012; 23(1):26–29. [PubMed: 22807652]
- Lindquist R, Sendelbach SE. Maximizing safety of hospitalized elders. *Critical Care Nursing Clinics of North America*. 2007; 19(3):277–284. [PubMed: 17697949]
- Mahoney F, Barthel D. Functional evaluation: The Barthel Index. *Maryland State Medical Journal*. 1965; 14(2):61–66. [PubMed: 14258950]

- Makris N, Dulhunty JM, Paratz JD, Bandeshe H, Gowardman JR. Unplanned early readmission to the intensive care unit: A case-control study of patient, intensive care and ward-related factors. *Anaesthesia Intensive Care*. 2010; 38(4):723–731. [PubMed: 20715738]
- Martin FC, Hart D, Spector T, Doyle DV, Harari D. Fear of falling limiting activity in young-old women is associated with reduced functional mobility rather than psychological factors. *Age and Ageing*. 2005; 34:281–287. [PubMed: 15863412]
- McCusker J, Kakuma R, Abrahamowicz M. Predictors of functional decline in hospitalized elderly patients: a systematic review. *Journal of Gerontology A Biological Sciences Medicine and Science*. 2002; 57(9):M569–577.
- McGwin G, Melton S, May A, Rue L. Long term survival in the elderly after trauma. *Journal of Trauma*. 2000; 49:470–476. [PubMed: 11003325]
- McKevitt E, Calvert E, Ng A. Geriatric trauma: Resource use and patient outcomes. *Canadian Journal of Surgery*. 2003; 46(3):211–215.
- McRae P, Peel N, Walker P, Looze J, Mudge A. Geriatric syndromes in individuals admitted to vascular and urology surgical units. *Journal of the American Geriatrics Society*. 2014; 62:1105–9. [PubMed: 24801947]
- Mittmann N, Seng S, Pisterzi L, Isogai P, Michaels D. Nursing workload associated with hospital patient care. *Disease Management & Health Outcomes*. 2008; 16(1):53–61.
- Morris PE, Goad A, Thompson C, Taylor K, Harry B, Passmore L, Haponik E. Early intensive care unit mobility therapy in the treatment of acute respiratory failure. *Critical Care Medicine*. 2008; 36(8):2238–2243. [PubMed: 18596631]
- Mosenthal A, Livingston D, Lavery R. The effect of age on functional outcome in mild traumatic brain injury: 6 month report of a prospective multicenter trial. *Journal of Trauma*. 2004; 56(5):1042–1048. [PubMed: 15179244]
- Mullins RJ. A historical perspective of trauma system development in the United States. *Journal of Trauma*. 1999; 47:S8–S14. [PubMed: 10496604]
- Mundy LM, Leet TL, Darst K, Schnitzler MA, Dunagan WC. Early mobilization of patients hospitalized with community acquired pneumonia. *Chest*. 2003; 124(3):883–889. [PubMed: 12970012]
- NeSmith E, Medeiros R, Ferdinand C, Hawkins M, Holsten S, Zhu H, Dong Y. “It takes a village” to raise research productivity: Impact of a Trauma Interdisciplinary Group for Research at an urban Level 1 trauma center. *Journal of Trauma and Acute Care Surgery*. 2013; 75(1):173–178. [PubMed: 23940865]
- Nolan J, Thomas S. Targeted individual exercise programmes for older medical patients are feasible, and may change hospital and patient outcomes: A service improvement project. *BMC Health Services Research*. 2008; 8:250. [PubMed: 19068135]
- Palleschi L, Alfieri W, Salani B, Fimognari F, Marsilli A, Pierantozzi A, Zuccaro S. Functional Recovery of Elderly Patients Hospitalized in Geriatric and General Medicine Units. The PROgetto DImissioni in GERiatria Study. *Journal of the American Geriatrics Society*. 2011; 59:193–199. [PubMed: 21288230]
- Pawlik AJ, Esbrook CL, Schweickert WD. A randomized trial of early physical and occupational therapy in the management of critically ill patients undergoing mechanical ventilation. *American Journal of Respiratory Critical Care Medicine*. 2008; 177:A817.
- Payne S, Davies K, Powell N. Frailty scores to target at risk acute surgical admissions. *Age & Ageing*. 2014; 43 ISSN: 0002-729, available online.
- Ponzetto M, Maero B, Maina P, Rosato R, Ciccone G, Merletti F, Fabris F. Risk factors for early and late mortality in hospitalized older patients: the continuing importance of functional status. *Journal of Gerontology A Biological Sciences Medicine and Science*. 2003; 58(1):1049–1054.
- Resnick B, Galik E, Boltz M, Pretzer-Aboff I, editors. *Implementing Restorative Care Nursing in All Setting*. 2. Springer Publishing; New York, New York: 2011.
- Resnick B, Gruber-Baldini A, Aboff-Petzer I, Galik E, Russ K, Zimmerman SI. Reliability and validity of the Evaluation to Sign Consent measure. *The Gerontologist*. 2007; 47(1):69–77. [PubMed: 17327542]

- Resnick B, Rogers V, Galik E, Gruber-Baldini A. Measuring restorative care provided by nursing assistants: Reliability and validity of the restorative care behavior checklist. *Nursing Research*. 2007; 56(6):387–398. [PubMed: 18004185]
- Resnick B, Wells C, Brotemarkle R, Payne A. Exposure to therapy of older patients with trauma and factors that influence therapy opportunities. *Physical Therapy*. 2014; 94(1):40–51. [PubMed: 24029298]
- Resnick B, Galik E. Reliability and validity testing of the Physical Activity Survey in Long Term Care (PAS-LTC). *Journal of Aging and Physical Activity*. 2007; 15:439–458. [PubMed: 18048947]
- Resnick B, Galik E, Enders H, Sobol K, Hammersla M, Boltz M, Trotman S. Functional and physical activity of older adults in acute care settings: Where we are and where we need to go. *Journal of Nursing Care Quality*. 2011; 26(2):169–177. [PubMed: 20686422]
- Richmond T, Thompson H, Kauder D, Robinson K, Strumpf N. A feasibility study of methodological issues and short term outcomes in seriously injured older adults. *American Journal of Critical Care*. 2006; 15(2):158–165. [PubMed: 16501135]
- Rinaldi P, Mecocci P, Benedetti C, Ercolani S, Bregnocchi M, Menculini G, Cherubini A. Validation of the five-item geriatric depression scale in elderly subjects in three different settings. *Journal of the American Geriatrics Society*. 2003; 51(5):694–698. [PubMed: 12752847]
- Schmidt L. Patients' perceptions of nursing care in the hospital setting. *Journal of Advanced Nursing*. 2003; 44(4):393–399. [PubMed: 14651711]
- Schweickert WD, Pohlman MC, Pohlman A, Nigos C, Pawlik AJ, Esbrook CL. Early physical and occupational therapy in mechanically ventilated, critically ill patients: A randomised controlled trial. *The Lancet*. 2009; 373:1874–1199.
- Taylor M, Trac J, Meyer W. Trauma in the elderly: Intensive care unit resource use and outcome. *Journal of Trauma*. 2002; 53(3):407–414. [PubMed: 12352472]
- Thomsen GE, Snow GL, Rodriguez L, Hopkins RG. Patients with respiratory failure increase ambulation after transfer to an intensive care unit where early activity is a priority. *Critical Care Medicine*. 2008; 36(4):119–1124.
- Tommasini C, Talamini R, Bidoli E, Siculo N, Palese A. Risk factors of falls in elderly population in acute care hospitals and nursing homes in north Italy: a retrospective study. *Journal of Nursing Care Quality*. 2008; 23(1):43–49. [PubMed: 18281875]
- Van Aalst J, Morris J, Yates H. Severely injured geriatric patients return to independent living: A study of factors influencing function and independence. *Journal of Trauma*. 1991; 31:1096–1102. [PubMed: 1875435]
- Volpato S, Onder G, Cavalieri M. Characteristics of nondisabled older patients developing new disability associated with medical illnesses and hospitalization. *Journal General Internal Medicine*. 2007; 22(5):668–674.
- Wakefield B, Holman J. Functional trajectories associated with hospitalization in older adults. *Western Journal of Nursing Research*. 2007; 29(2):161–177. [PubMed: 17337620]
- Warms C, Belza B. Actigraph as a measure of physical activity wheelchair users with spinal cord injury. *Nursing Research*. 2004; 53(2):136–143.
- Waugh A, Marland G, Henderson J, Robertson J, Wilson A. Improving the care of people with dementia in hospital. *Nursing Standard*. 2011; 25(32):44–49. [PubMed: 21563540]
- Weierbach F, Glick D, Fletcher K. Nursing research and participant recruitment. *Journal of Nursing Administration*. 2010; 40(1):43–48. [PubMed: 20010377]
- Williams H, Harris R, Turner-Stokes L. Work sampling: A quantitative analysis of nursing activity in a neuro-rehabilitation setting. *Journal of Advanced Nursing*. 2009; 65(10):2097–2107. [PubMed: 19674172]
- Winograd CH, Lemsky CM, Nevitt MC, Nordstrom TM, Stewart AL, Miller CJ, Bloch DA. Development of a physical performance and mobility examination. *Journal of the American Geriatrics Society*. 1994; 42(7):743–749. [PubMed: 8014350]
- Winograd CH, Lidenberger EC, Chavez CM, Mauricio MP, Shi H, Bloch DA. Identifying hospitalized older patients at varying risk for physical performance decline: A new approach. *Journal American Geriatrics Society*. 1997; 45(5):604–609.

- World Health Organization. Definition and description of physical activity. 2014. Available at: <http://www.who.int/dietphysicalactivity/pa/en/>. Last accessed January, 2015
- Zarza BL, Magnotti LJ, Croce MA, Haider AH, Fabian TC. Long-term survival and return on investment after nonneurologic injury: Implications for the elderly trauma patient. *Journal of Trauma*. 2010; 69(1):93–98. [PubMed: 20622584]
- Zelada M, Salinas R, Baztan J. Reduction of functional deterioration during hospitalization in an acute geriatric unit. *Archives of Gerontology & Geriatrics*. 2007; 48:35–39. [PubMed: 18022709]
- Zisberg A, Shadmi E, Sinoff G, Gur-Yaish N, Srulovici E, Admi H. Low mobility during hospitalization and functional decline in older adults. *Journal of the American Geriatrics Society*. 2011; 59:266–273. [PubMed: 21314647]

Table 1

Function Focused Care for Acute Care (FFC-AC) exposes staff nurses and patients to the following three components. Although initiated sequentially they are provided simultaneously throughout the implementation process.

Components of the Intervention	Description of Function Focused Care Components
Component I Education and Training	<ul style="list-style-type: none"> - Education and training included two classes done a week apart. The classes provided an overview of Function Focused Care and how to evaluate and establish function focused care goals for patients. The second class provided information about motivation among older adults and techniques to optimize motivation and safely engage older adults in function and physical activity while hospitalized. - Classes were held for approximately 20 minutes at times that were convenient for the nursing staff across all shifts and schedules.
Component II Environmental and Policy Assessment:	<ul style="list-style-type: none"> - The Research Function Focused Care Nurse worked with identified unit champion(s) to complete an assessment of the Environment and Policies - Findings from the assessments were reviewed with appropriate individuals within the administration so that interventions could be implemented to optimize the environment and alter policies to facilitate functional and physical activity among patients.
Component III Ongoing Training and Motivation of Nurses:	<ul style="list-style-type: none"> - Following education of nurses, the Research FFC Nurse mentored champions and staff nurses to integrate FFC into routine patient care. This included oversight during patient admissions to help evaluate function and physical activity, establish patient goals and engage the patients in functional and physical during the course of the admission. - Nurses who engaged in function focused care activities with patients were recognized in contests and received positive reinforcement for these activities.

Table 2

Means, Range and Standard Deviations of Descriptive Variables

Descriptive Outcome Variables	Sample Range	Measure Range	Mean	Standard Deviation
Barthel Index	3–67	0–100	27.87	18.11
Pain	1–6	0–6	2.42	1.44
Fear of falling	0–4	0–4	1.96	1.65
Depression	0–1	0–5	.50	.51
Delirium	0–3	0–36	.45	.85
Physical Performance and Mobility Examination	0–2	0–12	.13	.44
ActiGraph Counts	0–171,050	NA **	54,112	56,453
ActiGraph Minutes of Moderate Intensity *	0–8	NA **	2.40	2.50
ActiGraph Minutes of Light Intensity *	0–106	NA **	34.80	37.47
ActiGraph Minutes of Sedentary Intensity *	0–1,434	NA **	674.73	619.22
ActiGraph Kilocalories Used	0–146.97	NA **	45.56	47.02
Observed Participation in Functional Activities	0–3	0–19	.45	.93
Resilience	2–16	0–17	9.47	4.86
Physical Activity Survey: Total	0–133	NA **	37.25	34.14
Tethering	0–6	0–10	2.80	1.82

* ActiGraph Adult Cut Point Defaults

** NA=Not Applicable

Sedentary = 0–100 counts per minute; Light 760–1953 counts per minute; moderate 1953–5724 counts per minute.

Table 3

Tethering of Patients

	Yes	No
Tethering Exposure	N(%)	N(%)
Urinary Catheter	5(20%)	20(80%)
Continuous intravenous	9(36%)	16(64%)
Sequential compression devices	13(52%)	12(48%)
Bed and Chair alarms	1(4%)	24(96%)
Continuous cardiac monitoring	15(60%)	10(40%)
Negative pressure wound therapy	4(16%)	21(84%)
Restraints	1(4%)	24(96%)

Table 4

Baseline Correlations Between Demographic and Outcome Variables

Variable	PPME*	Actigraph Counts	Actigraph Moderate Intensity time	PAS-LTC**	Barthel Index Function
Gender	-.27 (.20)	.38(.16)	.39(.15)	.08(.74)	-.24(.26)
Age	-.42 (.04)	-.15(.60)	-.05(.88)	.37(.11)	.16(.46)
Depression	.29 (.18)	-.14(.62)	-.46(.08)	-.45 (.03)	-.33(.12)
Physical Resilience	-.18(.49)	.05(.90)	.01(.99)	.42(.14)	-.09(.74)
Pain	.25(.24)	-.02(.94)	-.31(.26)	.11(.63)	-.16(.47)
Fear of falling	-.17(.43)	-.17(.54)	-.21(.45)	.06(.81)	.16(.45)
Diagnoses	.01(.97)	-.06(.82)	-.05(.86)	.01(.98)	.27(.24)
Tethering	-.15(.48)	.24(.83)	-.29(.29)	.49(.03)	-.08(.70)

* PPME: Physical Performance and Mobility Examination

** PAS-LTC: Physical Activity Survey total score