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The Effect of an Educational Intervention on Early Mobility Compliance in Oncology Nurses

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The Effect of an Educational Intervention on Early Mobility Compliance in Oncology Nurses

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By

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Abstract

Background: Geriatric adult patients admitted into acute care hospital settings are at risk of functional decline in their capacity for activities of daily living and independent ambulation. Many of these patients fail to achieve pre-hospitalization levels of function and continue to decline, requiring additional support and care after discharge. Current literature supports early mobilization and ambulation during hospitalization. However, ambulation and patient mobilization has been shown to be the most missed item of nursing care. There is a gap in literature and patient outcome data regarding the impact of early mobilization on medical-surgical patient populations.

Purpose: The purpose of this DNP project was to examine the impact of a web-based audio-visual education module about early mobilization of geriatric adults in the inpatient setting on nursing staffs' knowledge and early mobility compliance in a 33-bed oncology medical-surgical unit.

Methods: This study used a retrospective into prospective cohort study design. Participants completed an electronic survey before and after viewing three web-based audio-visual education modules. Patient demographics and charted mobility interventions were collected from electronic medical records for 6 weeks retrospectively and prospectively. Independent Samples T-tests, Mann-Whitney U tests, and Spearman's Correlation Coefficient via SPSS software were used to analyze the data and interpret significance of impact.

Results: A statistically significant increase was found in nursing staff knowledge ($p < 0.001$) of early mobility after the education module. From charted data, there was a statistically significant increase in overall mobility activities ($p = 0.002$), average mobility activities per day ($p < 0.001$),

and ambulation ($p = 0.004$). There was no significant difference in patient length of stay or aggregate unit falls.

Conclusion: The findings from this project suggest that a web-based audio-visual presentation can increase nursing staff knowledge of early mobility and increase compliance with mobilization of patients in a medical-surgical unit. Given the negative impact of immobility on the geriatric adult population, there is an opportunity for educational interventions to be designed to improve compliance with the most missed element of patient care.

Keywords: nursing staff, web-based education, early mobility, geriatric inpatient, medical-surgical, medsurg, knowledge, ambulation

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Dedication

To my family, Anne, Christopher, and Benjamin Hacker:

Thank you for supporting and believing in me throughout the DNP educational journey.

To my friends, Dusty, Kevin, George, Billy, Jesse and Aaron:

Thank you for giving me reasons to smile and a space to be authentic and relaxed.

Each of you and many others provided the necessary support to help me navigate the stress of graduate school and a global pandemic. Thank you for all the love and support that has enabled me to achieve a Doctor of Nursing Practice Degree.

Table of Contents

List of Tables

List of Appendices

Background and Significance

Problem Statement

Within the United States, there are over 35 million patients hospitalized annually, many of whom will experience a functional decline in their ability to perform their activities of daily living (ADLs) independently (Hoyer et al., 2016). One third of all hospitalized patients are over 65 years of age (Smart et al., 2018), and up to 65% of older adults lose their ability to ambulate independently during a hospital stay (King et al., 2016). In multiple studies, ambulation has been reported as the most missed nursing care (Kalisch & Xie, 2014; Winsett et al., 2016; Jarošová et al., 2021). This paper will discuss the impact of missed or late mobilization of patients and will describe the implementation of a web-based educational intervention on the knowledge of medical-surgical nurses for the purpose of increasing compliance with early mobilization practices and protocols.

Context, Scope, and Consequences

In one study, the older adults were found to spend over 90% of their hospital stay in bed (Pavon et al., 2021) while another found that hospitalized adults spend only 3% of their admission standing or walking despite less than 5% of patients having strict bed rest orders (Hastings et al., 2014). Immobility has been found to be associated with increased length of stay, mortality, readmissions, and hospital acquired injuries (Dickinson et al., 2013; King et al., 2016; Needham et al., 2010; Schreiber et al., 2021; Teodoro et al., 2016). About one-third of older adults fail to achieve pre-hospitalization levels of function and continue to decline at one year follow-up (Cohen et al., 2019).

Older adults are particularly susceptible to accelerated loss of skeletal muscle mass which can begin in as few as four hours of bed rest (Goldfarb et al., 2021). Immobility can lead to a

pro-inflamatory state via cytokines that can contribute to muscle damage and loss (Truong et al., 2009). Furthermore, bed rest increases the risk of venous thromboembolic events by Virchow's triad: bed rest impairs blood flow, vascular injury occurs as a result of capillary compression, and muscular atrophy aids in venous pooling (Winkelman, 2009). In addition, prolonged compression of soft tissues over bony prominences against the surface of the bed can result in irreversible cutaneous damage after more than 2 hours of maintained external pressure such as the from the surface of the hospital bed (Winkelman, 2009).

Current Evidence-Based Interventions

Early mobilization and ambulation have been shown in multiple studies to improve patient outcomes in a variety of areas. The capacity for ambulation has been demonstrated to increase the likelihood of being discharged to home after critical illness (Tran et al., 2020). Patients who are examined by physical therapy early within the first 24 hours of admission are associated with decreased hospital length of stay (LOS) as well as reduced post-discharge care requirements (Hartley et al., 2019). Through early mobilization, hospitalized patients have a decreased risk for pneumonia and deep vein thrombosis (DVT) as well as improvements in pain, anxiety, and depression (Kalisch, Lee, & Dabney, 2014). At Norton Healthcare, the standard of care is to mobilize patients out of bed at least three times daily unless an MD order for medical bed rest is entered.

Unfortunately, mobilization of hospitalized patients has been shown to be the most frequently missed activity of nursing care (Kalisch & Xie, 2014). Missed nursing care is an act of omission that can be an intentional or unintentional act by staff for a variety of reasons including but not limited to: staff shortages, patient workloads, communication issues or missing materials (Kalisch & Xie, 2014). Missed nursing care can result in decreased patient satisfaction

as well as negative patient outcomes such as medication errors, urinary tract infections, patient falls, pressure ulcers, decreased quality of care, and patient readmissions (Recio-Saucedo et al., 2018; Kissane et al., 2023).

Purpose and Aims

Given the long-term consequences of immobility among geriatric adults, the purpose of this study was to determine the impact of an educational intervention on nursing compliance with early mobilization for nursing staff working in an acute care hospital oncology unit. The project's intervention utilized an evidence-based, audio-visual educational intervention to enhance the knowledge base, transform the attitudes, and modify the behavior of nursing staff regarding early mobilization in order to increase compliance with established protocols. Through the use of an education tool, the study expected to increase nursing compliance with early mobility protocols due to a greater understanding of their value.

After the three-week educational intervention period, the specific aims of this study were to measure:

1) Changes in knowledge regarding early mobilization

2) Increased compliance with early mobilization protocol as evidenced by any recorded mobility intervention that involves patient activity out of bed

3) Evaluate for any significant changes in patient outcomes that may result in changes in length of stay or any falls as a result of the intervention

Theoretical Framework

As a conceptual framework intended to translate evidence-based research into practice, the conceptual framework of the knowledge to action plan (KTA) will be utilized in this study (Graham et al., 2006). The KTA framework is divided into two parts: knowledge creation and

the action cycle (Graham et al., 2006). Within knowledge creation, evidence-based research inquiries are synthesized and distilled into knowledge tools and products for end-users (Graham et al., 2006). The action cycle flows in a circle: (1) assessing for barriers and facilitators to utilization (2) tailoring appropriate interventions to the context (3) monitor knowledge use (4) evaluate outcomes (5) sustain knowledge utilization (Graham et al., 2006). For this project, the identified problem is inadequate compliance with mobility orders during hospitalization. Knowledge of early mobilization among medical-surgical oncology nurses was assessed by survey and a tailored context-specific audio-visual, web-based training tool was created from the synthetization of the best evidence-based practices. Afterward, the knowledge usage was monitored through compliance rates as evidenced by electronic medical record charting, while secondary measures of patient outcomes were also evaluated. Through dissemination and discussion of results to stakeholders, additional plans can be created to sustain the knowledge utilization.

Review of Literature

Search Methods

To determine the evidence supporting an educational intervention on nurses for compliance with evidence-based practices on early mobilization, a review of the literature was conducted. The research databases of CINAHL and PubMed were employed for this literature search. In the initial search, articles were included that had full English text available and those that were published within the past five years. Articles were excluded if the location was a nursing home or if the population included nursing students. Qualitative and single case studies were also excluded. With the above criteria, the search terms were: “early mobility”, “early ambulation”, mobility, education, training, web-based, online, and nursing. A total of 252 results

were returned that were further screened for pertinence to educational interventions and mobilization.

Synthesis of the Evidence

After review, seventeen articles were found to have relevance including 2 randomized control trials, one stepped wedge cluster randomized trial, and 13 quasi-experimental studies. Though located within multiple different countries, all studies took place within hospital inpatient settings. Eight of the studies took place in the critical care setting (Anderson et al., 2018; Falkenstein et al., 2020; Hart et al., 2021; Hauff et al., 2023; Hsieh et al., 2019; Loberg et al., 2022; Negro et al., 2018; Schallom et al., 2020). Five of the studies featured a post-surgical patient population (Hart et al., 2021; Ganer Herman et al., 2020; Huang et al., 2021; Lei et al., 2021; Ni et al., 2018). Two of the studies featured only patient education interventions (Efford & Samuel, 2023; Kim et al., 2022). Only one study was focused on a medical-surgical level of care (Dewitt et al., 2019).

Summary of Findings

The evidence from these studies supports the conclusion that educational interventions can lead to increased mobilization of patients. Two studies featured multimodal and multidisciplinary approaches to improving mobility (Hart et al., 2021; Schallom et al., 2020). In two other studies, online educational modules were shown to improve patient outcomes (Anderson et al., 2018; Frampton & Wells, 2023). In one critical care study, Facebook posts, online graphic posts, and videos did demonstrate increased mobility outcomes, but they were not significant after adjustment for patient covariates (Hauff et al., 2023). There are both studies supporting decreased LOS with mobility educational interventions (Dewitt et al., 2019; Efford & Samuel, 2023; Hart et al 2021; Hsieh et al., 2019; Huang et al., 2021; Kim et al., 2022; Lei et al.,

2021; Ni et al., 2018) as well as some studies that did not demonstrate a change in LOS (Falkenstein et al., 2020; Hastings et al., 2023; Ganer Herman et al., 2020; Loberg et al., 2022; Schallom et al., 2020). Two studies demonstrated sustained improvements in mobilization after a year (Schallom et al., 2020; Frampton & Wells, 2023). Improvements in mobilization after an intervention were shown to either increase the rate of discharge to home or to the same level of care as at admission (Anderson et al., 2018; Dewitt et al, 2019; Schallom et al., 2020). Four of the studies demonstrated reduced hospital costs (Anderson et al., 2018; Falkenstein et al., 2020; Hsieh et al., 2019; Lei et al., 2021). Other outcomes included decreased incidence of deep vein thrombosis (Lei et al., 2021), decreased incidence of pressure ulcers (Hsieh et al., 2019), improved post-surgical pain (Huang et al., 2021), and improved quality of life scores after 30 days (Hart et al., 2021).

Gaps in Practice

Since early patient mobilization has been shown in multiple studies to be the most missed element of care (Kalisch & Xie, 2014; Winsett et al., 2016; Jarošová et al., 2021), there is a need to design interventions to address this issue in order to avoid the loss of function in the older adult population (Cohen et al., 2019). A great deal of the research on this topic is focused on increasing early mobility for the critical care population in order to reduce critical care delirium (Anderson et al., 2018; Falkenstein et al., 2020; Hart et al., 2021; Hauff et al., 2023; Hsieh et al., 2019; Loberg et al., 2022; Negro et al., 2018; Schallom et al., 2020). From the review of recent literature, only a single study was found focusing on the mobilization of patients on a medical-surgical unit (Dewitt et al., 2019). Given the higher patient-to-nurse ratios on medical-surgical units when compared with critical care units, nursing staff on these units have different barriers to mobilizing patients based upon their workload. In addition, no studies have focused on the

medical-surgical oncology patient population who have additional potential risk factors for immobility in the form of cancer and frequent chemotherapy and biotherapy treatments. This project sought to address these gaps in early mobilization practices on an oncology medical-surgical unit.

Methods

Design

The Doctor of Nursing practice (DNP) project used a retrospective into prospective cohort study design to evaluate the impact of a knowledge to action educational intervention on nursing compliance with early mobility protocols for registered nurses working in an oncology medical-surgical unit (Graham et al., 2006). Knowledge of early mobility interventions by staff was evaluated by a test before, and a test immediately after the training module. Compliance rates with patient appropriate early mobility activities were assessed by nursing staff entries into the electronic medical record and compared for a six-week retrospective period and the six weeks immediately following the intervention using de-identified chart data. Mobility interventions include any physical activities performed by the healthcare team beyond range of motion, turning and dangling including: standing at bedside, out of bed to chair or restroom, and ambulation in the room or hallway.

Setting

The project took place within a single oncology medical-surgical unit at the Norton Women's and Children's Hospital (373-bed community hospital) located in Louisville, Kentucky. This facility offers inpatient and outpatient medical-surgical care, full diagnostic services, and 24-hour emergency care for children and adults.

Agency Description

Norton Healthcare's mission is to provide quality healthcare to all served in a manner responsive to the needs of the community and honoring their rich faith heritage. Norton Women's and Children's Hospital provides specialist care for orthopedics, pelvic health services, migraine treatments, breast health diagnostics, surgical weight loss services as well as comprehensive cancer prevention, detection, and treatment. In addition, this facility includes a wide range of pediatric and gynecological services and has been designated by the accreditation organization Det Norske Veritas (DNV) as an orthopedics and spine center of excellence as well as an acute stroke ready center. The surgical review committee has designated the hospital as a center of excellence in minimally invasive gynecologic surgery, robotic surgery, and surgical services. Norton Healthcare seeks to be the region's most comprehensive healthcare organization setting the standard for quality of care (Norton Healthcare, 2024).

Congruence of Project with Organization Mission and Goals

As part of Norton Healthcare's vision, Norton Women's and Children's Hospital values continual improvement in care and service and accepting accountability for results (Norton Healthcare, 2024). In support of these values, the project sought to enhance the compliance rate of current early mobility interventions to improve patient outcomes. The results of the project will be presented to the administrative team of the pilot unit and the medical-surgical nursing staff in order to disseminate the evidence-based intervention to other units and other facilities within Norton Healthcare.

Stakeholders

For this project, there were many stakeholders involved. The DNP project committee consisted of Dr. Sheila Melander and Dr. Candice Falls (Committee Co-chairs), Jonathan Hacker

(DNP student and Primary Investigator), and Aimee McCaa (Clinical Mentor). Additional stakeholders at Norton Women's and Children's hospital were the pilot unit's nurse manager Emily Jenkins and the Director of Patient Care Jennifer Taylor. The unit's nursing staff were the target of the intervention and were also key stakeholders. As the intended beneficiaries for the project's outcomes, patients and their families were also essential stakeholders.

Facilitators and Barriers

The pilot unit's multiple assistant nurse managers were key facilitators in encouraging pilot unit staff to participate in the project. Additionally, some members of the nursing staff acted as facilitators by also encouraging their colleagues to participate. Norton's administrative and human resources staff facilitated the project by permitting time spent participating in the intervention to be reimbursed by Norton Healthcare at standard hourly rates. The greatest barrier to participation in the project were the security measures in place after a cyber threat against Norton Healthcare in the summer of 2023. As a result of the security event, email access was disabled for a time which delayed initiation of the project. Furthermore, after internal email access was restored, access to external links was forbidden from Norton computer systems. This resulted in participating staff needing to use home computers or personal cell phones in order to participate in the project as all educational and survey links were external to Norton Healthcare's network. An additional barrier was the availability of nursing staff to participate due to work obligations and interference with staff schedules.

Sample and Recruitment

The target population for this project were the 59 registered nurses (RN) and 26 patient care associates (PCA) who were either nursing staff of the pilot unit 5 East or long-term contracted staff on the payroll at the time of the intervention. A convenience sample was created

consisting of those staff who consented to participate in the web-based educational training and surveys. Inclusion criteria were: 1.) RN or PCA and 2.) English fluency. Exclusion criteria were 1.) Non-nursing staff, 2.) Minors, and 3.) Nursing students.

Nursing staff were notified by email and by unit assistant managers of the project ahead of the initial intervention. The PI attended and explained the intention of the project at the monthly unit meeting. Initially, recruitment was intended to occur primarily by email. However, after a three-week period of emailed consents, links and reminders, there was no staff participation. Due to the external link barrier established previously, the PI recruited staff by providing printouts containing the IRB approved cover letter and URLs with scannable QR codes for the pre- and post- surveys as well as the three educational videos. The PI was present to recruit staff twice daily for two weeks.

Research Procedure

Consent and IRB Approval

Approval from the Norton Healthcare Research Office (NHRO) was obtained prior to initiation of the project (Refer to Appendix A for NHRO approval letter). In addition, further review and approval was obtained from the University of Kentucky (UK) Institutional Review Board (IRB) prior to the project implementation (Refer to Appendix B for IRB approval letter).

Evidence-Based Intervention

Three web-based educational modules were created using Microsoft PowerPoint software on the PI's password encrypted home computer using information from a literature review of recent research results regarding topics including missed care, impact of patient immobility, evidence-based interventions for patient mobilization, and benefits, barriers, and impacts of patient mobilization in geriatric hospitalized patients. The content for the slides was formed

from the literature review. Twenty-five slides were created across the three modules. A presentation by the PI was scripted and recorded for each module resulting in three separate videos with lengths of 3:24, 4:36, and 3:23. By breaking the videos into three short sections, it would be more likely for nursing staff to be able to view each module without interruption. The survey questions reflected specific content within the education modules to evaluate for the increase in knowledge scores after completing the education modules. The question content was highlighted by the PI both visually on the slides and verbally in the recorded audio.

Measures and Instruments

The pre- and post-intervention surveys were created by the PI since there were no validated educational modules that included questionnaires in the literature for mobility that were both relevant and specific to the context of the pilot unit. The online audio-visual education modules were created by factoring in the key features of modules found to be effective in similar research on educational interventions (Moehead et al., 2020; Martos-Cabrera et al., 2019). The education was broken up into three separate, short in duration videos that were made context specific to Norton Healthcare's practices and electronic medical record charting system. Each video covered different topics relevant to patient mobilization: the prevalence and impact of immobility on elderly patients, evidence-based interventions for mobilizing patients, and how to chart mobilization to receive credit for actions taken. The pre- and post-intervention survey also reflected these three topics by having five questions for each of the education modules. All possible responses to the survey were multiple choice single response items. There were six nursing demographic questions and fifteen questions covering the education modules. See Appendix C for the survey tool.

Data Collection

The pre- and post-intervention survey data were collected through REDCap (Research Electronic Data Capture), a secure web-based survey tool designed for research studies that keeps data securely on UK servers. The web-based software was used to create a fifteen question, multiple choice survey covering knowledge of early mobilization, methods for mobilization, and documenting mobilization in the electronic medical record. Basic demographic information was also requested from participants at the beginning of the survey. The pre- and post-intervention survey links contained the same questions, but data was collected separately and anonymously.

Initial email-based recruitment began on June 12, 2023, with the approved IRB cover letter attached (See Appendix D) and links to the opened surveys and the educational module videos posted online on YouTube. One email was sent per week with a final reminder three days before the close of the third week. In addition, the PI attended two online Zoom unit meetings the week of June 26 to advertise the study and encourage participation. On July 3, 2023, the recruitment window ended; however, the electronic recruitment was unsuccessful as participants were unable to access any links external to Norton Healthcare's internal network. No connections were made to the surveys or the videos by any of the potential subjects' personal devices during this time period.

To overcome the network barriers to participation, the PI created a two-sided handout containing the IRB approved cover letter on the front side and web URL and QR code links to both surveys and the three educational modules on the opposite side. Permission to recruit in person was received from the unit manager and in person recruitment was performed on both day

and night shifts for a two-week period beginning on September 20, 2023 to October 4, 2023. After October 4, no further survey responses were accepted.

A request was sent to the Norton Research Data Analyst department to retrieve records of nursing staff charting in the electronic medical record for patients on the pilot unit during two six-week periods. The retrospective period included charting data between December 12, 2022 and January 17, 2023, and the prospective period included charting data between October 5, 2023 and November 16, 2023. Only data charted on patients for their days on the pilot unit were requested. The requested data included demographic information for the patients as well as charting by nursing staff in the "Daily Cares and Safety" flowsheet relevant to mobilization. In addition, aggregate falls and mortality data for the pilot unit was requested for both time periods. As Norton Healthcare does not automatically generate a patient acuity score in the electronic medical record, the nursing acuity score was also requested. Nursing acuity score is a calculated value that estimates the nursing workload of a given patient based upon the sum values for their written orders and personal assistance needs. The data request was fulfilled in the form of an excel spreadsheet on January 17, 2024. For the data from the electronic medical record, all protected health information (PHI) was kept on Norton Healthcare's internal network servers. All PHI was removed from the document and a separate excel file was created to contain copied tallied information from the original spreadsheet in order to remove any chance of PHI leak by edit history. The REDCap pre- and post-intervention survey data as well as the tallied electronic medical record data was stored on the PI's two-factor secured UK Microsoft One Drive. The College of Nursing statistician was provided access to the data to assist the PI with data analysis.

Data Analysis

Data from both the REDCap surveys as well as the complied medical record charting tallies was downloaded and saved on the PI's and statistician's password encrypted hard drives. All collected data was loaded into IBM SPSS software, version 23, for analysis with an alpha of 0.05 used to indicate significance. Of the 32 pre-intervention survey records, two records were discarded as they only contained answers to demographic questions while one record was discarded of the 24 post-intervention survey records. Partially completed responses were included in analysis for any questions that were completed. Nursing staff demographic data underwent descriptive cross tabulation. Knowledge questions were subjected to independent samples t-test. For pre- and post-intervention medical record data, Pearson chi-square tests were performed for demographic data. Depending on the type of data, the nursing flowsheets charting data was analyzed using independent sample t-tests, Mann-Whitney U tests, and Spearman's rho.

Results

Sample Characteristics

A total of 30 participants completed the pre-intervention survey; and the post-intervention survey participants included a 23-person subset of the pre-intervention participants. The overwhelming majority (90%) of participants were RNs, identified their race/ethnicity as White/Caucasian (83%), identified their gender as female (86.7%), and were between the ages of 18 and 45 years (83.3%). Most reported a bachelor's degree (63.3%). For years of practice, 36.6% reported between 0 and 3 years, 26.7% reported between 3 and 5 years, and 23.3% reported between 5 and 10 years (see Table 1).

Survey Results

The independent samples t-test comparing the pre- and post-intervention knowledge demonstrated a statistically significant overall increase ($p < 0.001$). Each of the three knowledge question groupings demonstrated a statistically significant increase in knowledge: mobility questions ($p < 0.001$), intervention questions ($p = 0.003$), and charting questions ($p < 0.001$) as shown in Table 2. The greatest increases in correct responses were seen in questions 4, 5, 12, and 15 (see Table 3).

Additional Findings

In order to evaluate changes in patient outcomes, data was analyzed from 266 pre-intervention and 250 post-intervention chart audits. A Pearson Chi-Square test was performed for patient demographics and clinical characteristics between the pre-intervention and post-intervention periods, and there were no statistically significant differences. There were only two nurse documented instances of physician mandated medical bed rest, therefore bed rest was excluded from data analysis. Only reported falls in the past 6 months approached significance ($p = 0.055$) as shown in Table 4. The majority of patients were female (pre-intervention 62%) and white or Caucasian (pre-intervention 73.3%). The mean age was 60.7 (pre); the mean BMI was 28.5 (pre); and the mean Nursing acuity score was 47.9 (pre). The John Hopkins Fall Risk mean was 11 (pre) and 31.6% (pre) of patients had a recorded fall in the past 6 months. There was no statistically significant difference ($p = 0.773$) in LOS between pre- and post-intervention time periods (see Table 4). There were 3 falls and 13 deaths in the pre-intervention time period and 3 falls and 6 deaths in the post-intervention time period (see Table 8).

For charted mobility interventions, the Mann-Whitney U test was utilized to compare pre- and post-intervention time periods. The overall median mobility activities documented

increased significantly ($p = 0.002$) from 7(IQR 3-13) to 9(IQR 4-15). There was also a statistically significant increase ($p < 0.001$) in average mobility activities per day from 1(IQR 0.5-2) to 1.6(IQR 0.7-2.5) in the post-intervention period. Documented transfers to chair did not increase significantly ($p = 0.081$) nor did total transfers of any sort ($p = 0.645$). Documented standing at the side of the bed increased from a median 0(IQR 0-1) to 1(IQR 0-2) in the post-intervention period. There were also statistically significant increases in documented ambulation to the bathroom ($p = 0.0019$), ambulated ($p = 0.002$), and total ambulation ($p = 0.004$). The change in total distance ambulated per patient approached statistical significance ($p = 0.056$) but the difference in average distance ambulated was not statistically significant ($p = 0.239$) as shown in Table 5.

For correlations between patient characteristics and charted patient mobility outcomes, Spearman's rho test was performed on BMI, fall risk, nursing acuity for mobility activities, total times ambulated, and average distance ambulated. There was a statistically significant, positive association between fall risk score and charted mobility activities (rho = 0.16, $p = 0.01$), although the magnitude was small. There was a small in magnitude but statistically significant, negative association between nursing acuity score and average distance ambulated (rho = -0.191, $p = 0.01$). There was an almost statistically significant, negative association between fall risk score and average distance ambulated (rho = -.143, $p = 0.054$) as shown in Table 6.

For correlations between length of stay and patient characteristics, Spearman's rho test was performed for nursing acuity score, fall risk, BMI, average distance ambulated, and average activities per day. There were three small magnitude correlations to length of stay: there was a statistically significant, positive association between LOS and nursing acuity score (rho = 0.264, $p < 0.001$); a statistically significant, positive association between LOS and fall risk score (rho =

0.275, $p < 0.001$); and a statistically significant, positive association between LOS and average distance ambulated (rho = 0.164, $p = 0.027$) as shown in Table 7.

Discussion

The purpose of this project was to determine the effect of an educational intervention on nurses' knowledge about mobilization of hospitalized patients and on nurses' mobilization of admitted patients as evidenced by documented outcomes in the electronic medical record. The project was successful in demonstrating a significant increase ($p < 0.001$) in nurses' knowledge scores after viewing web-based audio-visual education modules. All three education modules demonstrated significant increases in knowledge between the pre- and post-intervention surveys. The educational module about the impacts of immobility on hospitalized patients demonstrated that an overall low knowledge base can be significantly improved with an audio-visual presentation that is under five minutes. In the pre-intervention survey, all five questions on the impact of patient immobility had less than 10 correct responses, whereas after the education module, the post-intervention survey had at least 10 correct responses to every question in that section. This is consistent with prior research on the efficacy of web-based and audio-visual e-learning training for nurses (Martos-Cabrera et al., 2019; Mistraletti et al., 2017; Moehead et al., 2020; Van de Steeg et al., 2014). As a voluntary project, the overall participation rate was low with only 30 participants completing all or part of the survey questions out of 85 nursing staff that were active on the unit during the education intervention window.

The patients admitted during the pre-intervention time period when compared to the post-intervention time period were similar in the reported demographic and clinical characteristics as there were no statistically significant differences. The aggregate counts for patient falls and deaths on the unit were small for both the pre- and post-intervention time periods; nevertheless,

neither statistic increased in the post-intervention time period. The chart audit demonstrated statistically significant increases in the documented activities for all types of ambulation, standing at the side of the bed, and total charted mobility activities and average activities per day. The data suggests that online audio-visual education modules may result in increased nursing compliance with patient mobilization. These findings are similar to the results of other studies featuring education-based interventions to improve mobilization of patients (Dewitt et al., 2019). One confounding variable is that a physical therapy driven mobility initiative launched in the final two weeks of the post-intervention data collection period. This may have had an impact on the mobilization of patients by nursing staff since there was an increased awareness during the time period of the chart audit.

Since documentation of ambulation increased, it would be expected that the average distance ambulated might stay the same while the total distance ambulated during a hospital visit would increase with the number of repetitions. However, the analysis of the chart audit was unable to show any statistically significant changes in documented total distance ambulated or average distance ambulated. There were many patient records that did not have any documentation for feet ambulated during their stay, including several records for patients that were admitted for a week or more. In addition, the documentation on patient in room transfers was not significantly different between the pre- and post-intervention periods either. This may be at least partially the result of not including documentation of "chair", since this could be used to denote either the patient's present position or a mobilization to the chair. There is a separate notation for transfer to chair, but nursing documentation has a degree of freedom such that not all nurses will chart the same actions in the same way.

There was no significant change in length of stay between the pre-intervention period and the post-intervention period. This mirrors the result of several of the research studies from the literature review (Falkenstein et al., 2020; Hastings et al., 2023; Ganer Herman et al., 2020; Loberg et al., 2022; Schallom et al., 2020). The pilot unit's focus is on oncology medical-surgical patients but does serve a mixture of general medical-surgical patients. Since some of the patients are admitted for fixed periods of time to receive and recover from chemotherapy, it is possible that there was no significant change in patient length of stay due to the patient population or because the practice change is significant but small in effect.

Using the available data, additional correlational analysis was performed to determine if the characteristics of the patients in the post-intervention period had any impact on the charted mobility outcomes. There was a surprising small, positive association between higher fall risk scores and documented mobilization activities. It is possible that those with higher fall risk scores had more documented activities because the nursing staff were present more often to assist with mobility than with a patient with little to no fall risk who may mobilize independently. However, the increased mobility activities did not result in a greater number of falls in the post-intervention period despite those with higher risk scores having a greater number of documented interventions. This finding aligns with a recent study where a single hospital mobility project involving 28,075 patients demonstrated that increased mobility did not result in a greater number of falls (Kissane et al., 2023). On the contrary, patients with greater immobility and deconditioning during their hospitalization were at a higher risk of fall than those mobilized (Kissane et al., 2023). Higher fall risk scores may represent a confounding variable; however, further analysis of this was not within the purview of this project. There was an anticipated small, negative association between nursing acuity score and average distance ambulated. Those

with higher nursing acuity scores are more likely to have a greater burden of illness and disability, and therefore less likely to ambulate as far. There was an expected small, positive correlation between higher nursing acuity scores and fall risk scores and longer patient length of stays. However, the small, positive correlation between length of stay and average distance ambulated was unexpected. With the data available, there is no way to explain how longer lengths of stay are correlated with higher acuity scores, but higher acuity scores are correlated with decreased average distance ambulated.

Cost Analysis

In a literature review of 36 peer-reviewed studies, immobility during hospitalization has been shown to be associated with negative physical, psychological, social, and organizational outcomes such as increased costs (Kalisch et al., 2014). Increased length of stay (LOS), DVT, hospital-acquired pneumonia (HAP), and hospital-acquired pressure injuries (HAPI) are some of the contributing factors to the increased costs (Kalisch et al., 2014, Winkelman, 2009). From a 17,819 patient multi-hospital database study, the estimated cost for each non-ventilator associated hospital-acquired bacterial pneumonia (nvHABP) infection was $39,911 (Zilberberg et al., 2022). In addition, nearly one-quarter of the nvHABP patients were readmitted within 30 days (Zilberberg et al., 2022). In another study of 13,292 post-surgical patients, HAP was associated with a mean increase of $28,160.95 in total hospital charges and approximately 11 more days longer length of stay (Thompson et al., 2006). In a 2024 review of the impact of HAP on the Medicare program, patients with HAP added 6.6 days and $14,148 per episode while being 2.8 times more likely to die within 90 days (Baker et al., 2024).

Medicare cost estimates for HAPI vary according to severity from a few hundred dollars for Stage I and II ulcers up to $5,000 to $151,700 for healing advanced Stage III and Stage IV

ulcers (Meddings et al., 2015). Approximately 2.5 million HAPI occur in the United States acute care facilities annually (Padula & Delarmente, 2019). The estimated costs from HAPI in the United States may have exceeded $26.8 billion in 2016, with each HAPI episode ranging from $500 to $70,000 (Padula & Delarmente, 2019). The annual incidence of VTE in adult populations is estimated to be 1 in 1000 patients that results in an annual healthcare cost of $7 to $10 billion. Patients diagnosed with VTE are at risk of developing pulmonary embolisms and approximately 6% of VTE and 12% of pulmonary embolism patients die within a month of diagnosis (Lin et al., 2023).

With an estimated 700,000 to 1 million hospital falls per year, inpatient falls are a significant adverse patient event that can result in fracture, head injury, and death (Kissane et al., 2023). In addition, inpatient falls are no longer subject to reimbursement for care since 2008 and therefore represent a significant financial burden to organizations with one study reporting an average total cost of $64,526 for each fall with injury (Dykes et al., 2023). Dykes et al. (2023) also found that the costs of falls with injury were not significantly increased when compared with the costs of falls without injury, most likely due to the required testing and exams after any fall event. By decreasing falls from 2.3 to 1.9 per 1000 patient-days, two healthcare systems were able to save an estimated $22 million over a five-year period (Dykes et al., 2023).

It is clear that the high costs to both patients and organizations from the hospital-acquired conditions associated with immobility of acute care patients poses a significant financial burden. Any significant reduction in cases that can be obtained is potentially worth tens of thousands of dollars in savings. Successful patient mobilization initiatives have the potential to reduce the incidence of hospital-acquired conditions.

Limitations

There are multiple factors that limit the generalizability and strength of this DNP project. As a single unit study, small staff sizes combined with a relatively small number of educational intervention participants reduces the power of the pre- and post-education survey analysis. Also, as a single unit study, the presence of float staff from other units or travel nurses working on the unit who did not receive the opportunity for intervention could have an impact on the results. Any floating of staff from other units not involved in the education would dilute the impact of the intervention on the pilot unit. As the study was voluntary and less than half the staff participated, there is no way to account for respondent bias. The survey demographics did not solicit the nursing staff's position within the unit and therefore could not account for the presence of travel nurses within the sample population. Contracted full-time staff were included as part of the potential sample population. Any turnover of staff, particularly if there was a high number of contracted travel nurses, could potentially reduce the size of any study results. While the overall length of the data collection period was short enough to include the entire contract duration of some travel nurses, it is possible that some finished their contracts before the data collection period ended while others began during the same period. During the retrospective period of data collection which occurred months before the educational intervention, if there were high numbers of travel staff, it is possible that full integration into the unit's mobility culture and practices would not occur within the time of a single contract.

In addition, the prospective elements of this study covered only the following six-week period limiting the ability to determine if the practice changes were sustained; and the survey was not repeated afterward so there was no assessment of knowledge retention. Furthermore, as a retrospective and prospective chart review, only documented mobility interventions could be

measured. Differences in the reason for admission between the retrospective and prospective time periods cannot be ruled out with data collected. Finally, the ill-timing of the increased cyber security on campus made it more difficult for both the primary investigator to recruit subjects and the nursing staff to participate in the project.

Implications for Future Practice

This project demonstrated that even a short form online audio-visual educational module can result in significant changes in both nursing staff knowledge and practice. Since even a small intervention can have a significant impact on knowledge and practice, the data suggests expanding the educational intervention to other units within Norton Women's and Children's Hospital. In the future, a more comprehensive multimodal educational intervention would further improve nursing knowledge and evidence-based practice adherence as is shown in two systematic reviews (Jones et al., 2019; Martos-Cabrera et al., 2019). If similar or expanded education modules were added to required nursing staff training, the reach and impact would be greater since less than half of the nursing staff on the pilot unit participated in this project. In addition, further education regarding documentation practices for patient mobilization would aid in tracking improvements in nursing staff adherence in future chart audits.

Implications for Future Nursing Research

There is room for future research to expand upon the initial results of this project within Norton Healthcare. If this project were to continue in 2024 and into 2025, expanding the educational intervention and chart audit to additional units within Norton Women's and Children's Hospital, both the power of the research results and the generalizability could be improved. By expanding future research into a full-scale Norton Healthcare quality improvement quasi-experimental research project, the educational intervention could have a

greater audience if participation was a requirement for nursing staff. It is possible that more widespread increases in nursing staff knowledge of mobilization may lead to significant changes in patient length of stay, particularly on units where the patient populations are not kept for fixed durations due to oncology treatment plans. This would also include hosting the knowledge surveys and audio-visual education modules within Norton Healthcare's internal network, making participation easier for nursing staff, reducing the impact of external links as a barrier to entry.

The unexpected correlation between high fall risk scores and more documented mobilization activities presents an opportunity for future research on variables that impact patient mobilization. Some variables worth further examination that were not included in this study but could be examined in future research could be patient acuity, patient co-morbidity scores, and shift or time of mobilization. Future studies could also include collection of additional unit aggregate statistics such as the incidence of pressure injuries, hospital acquired pneumonia and venous thromboembolisms (VTE). A Norton Healthcare specific cost analysis for hospital length of stay, pressure injuries, and VTE could be performed to evaluate the financial burden and savings of further interventions.

Additional focus could be made on expected charting practices to improve both the consistency of nursing staff being credited for their labor but also to improve the accuracy of future mobility chart audits. There is room for improvement in the electronic medical records flowsheet for documenting mobilization of patients. As it stands, nursing staff documentation of mobility interventions can be charted in multiple different fields to reflect the same action. Future research could implement better, more measurable charting fields to denote out-of-bed

activities as the current setup contains a mix of options that are not specific to mobilizing patients such as turning in bed.

Due to the short-term nature of the project's scope, there is no provision for knowledge maintenance and sustainability which is a key element of the Knowledge-to-Action framework (Graham et al., 2006). Future research could both reassess for sustained changes in adherence to mobilization practices, but also reassess nursing staff for knowledge retention.

This project also narrowly focused on nursing staff. By including providers and therapy staff, a multidisciplinary approach that includes a protocol for nursing staff to follow to request appropriate mobility orders for admitted patients could improve overall patient mobilization. Other research studies demonstrated improvements in the timing of first mobilization and decreased length of stays when online video education was provided to patients (Dewitt et al., 2019; Efford & Samuel, 2023; Kim et al., 2022). Enrolling patients and their families in educational interventions that increase knowledge and provide expectations for mobilization during hospitalization could further increase the impact of mobility on patient outcomes.

The next logical steps for future mobility research in the Norton Healthcare setting would be to collect additional patient characteristics, modify charting flowsheet fields to include options for assessing improvement of measurable outcomes, and provide interventions and provisions to better enable sustained improvement.

Conclusion

In 2020, adults over the age of 65 comprised 17% of the population of the United States, and it is projected that the share of adults over 65 will increase to 25% in 2060 (Carr et al., 2024). With an ever-increasing percentage of the population over 65 years of age, the geriatric population in the acute care setting can be expected to rise along with it, presenting new

challenges for healthcare systems. When one third of hospitalized geriatric adults fail to achieve their pre-hospitalization levels of function (Cohen et al., 2019), there is an urgent need to address the factors that contribute to post-hospitalization disability. Current evidence-based interventions to improve functional capacity after hospitalization include early mobilization and ambulation which have been shown to reduce post-discharge care needs (Hartley et al., 2019; Tran et al., 2020) and decrease the risk of hospital-acquired complications including pneumonia, falls and DVT (Kalisch, Lee, & Dabney, 2014; Kissane et al., 2023). However, patient ambulation has been shown in multiple studies to be the most missed item of nursing care (Kalisch & Xie, 2014; Teodoro et al., 2016).

The purpose of this project was to determine the impact of a web-based, audio-visual educational intervention on the compliance of nursing staff with early mobilization in an acute care hospital oncology unit. Two of the three aims of this project demonstrated statistically significant improvements after the educational intervention. First, the educational intervention was successful in producing a significant increase in knowledge scores on completed surveys by nursing staff before and after viewing the three educational videos. Second, there was a significant increase in overall out-of-bed patient activities as well as ambulation between the pre-intervention period and the post-intervention period as evidenced by charting in the electronic medical record. There was no statistically significant change between the patient length of stay or falls between the pre- and post-intervention periods. This outcome is consistent with the mixed findings of the research review with eight studies demonstrating a change in LOS and five that did not. Unit specific characteristics and lower staff participation may have contributed to a lack of significance in the change of LOS for this project.

The problem of geriatric patient immobility remains a major issue for the well-being of patients as well as the financial outcomes of organizations. Further studies and actions need to be taken to address the problem of ambulation as the most missed element of nursing care. Improvements in mobility intervention documentation within the electronic medical record would assist in the assessment of measurable outcomes of future interventions. Within Norton Healthcare and other acute care hospital organizations, there remains an opportunity to increase nursing knowledge of the consequences of immobility and to implement education and programs that sustain increased compliance with mobilization and ambulation of admitted patients.

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Table 1

Nursing Staff Demographics (N = 30)

	n(%)
Gender	
Male	4(13.3%)
Female	26(86.7%)
Age	
18-25 years of age	7(23.3%)
26-35 years of age	12(40.0%)
36-45 years of age	6(20.0%)
46-55 years of age	2(6.7%)
56-65 years of age	3(10.0%)
Ethnicity	
White/Caucasian	25(83.3%)
Black/African American	3(10.0%)
Other	2(6.7%)
Prefer not to say	0
Highest Education Level	
High School Diploma/GED	2(6.7%)
Associates Degree	7(23.3%)
Bachelors Degree	19(63.3%)
Masters Degree	2(6.7%)
Role	
PCA	3(10.0%)
RN	27(90.0%)
Years of Practice in Role	
0-1 year	4(13.3%)
1-2 years	4(13.3%)
2-3 years	3(10.0%)
3-5 years	8(26.7%)
5-10 years	7(23.3%)
10-20 years	2(6.7%)
20-30 years	2(6.7%)

Table 2

Pre- and Post-Educational Intervention Survey Results

	Pre-intervention *n* mean(SD)	Post-intervention *n* mean(SD)	*p*
Knowledge Score	*n* = 27 4.8(1.3)	*n* = 22 9.9(3.4)	<0.001
Mobility Questions	*n* = 30 0.67(0.76)	*n* = 23 2.9(1.5)	<0.001
Intervention Questions	*n* = 28 1.3(0.67)	*n* = 22 2.6(1.7)	0.003
Charting Questions	*n* = 27 2.7(1.1)	*n* = 22 4.2(1.3)	<0.001

Table 3

Pre- and Post-Educational Intervention Survey Question Responses

	Pre-intervention *n* correct responses(%)	Post-intervention *n* correct responses(%)
Question 1	30 5(16.7%)	23 10(43.5%)
Question 2	30 1(3.3%)	23 11(47.8%)
Question 3	30 9(30.0%)	23 15(65.2%)
Question 4	30 0(0%)	23 14(60.9%)
Question 5	30 5(16.7%)	23 17(73.9%)
Question 6	28 10(35.7%)	22 11(50.0%)
Question 7	28 1(3.6%)	22 8(36.4%)
Question 8	28 4(14.3%)	22 11(50.0%)
Question 9	28 18(64.3%)	22 17(77.3%)
Question 10	28 4(14.3%)	22 11(50.0%)
Question 11	27 11(40.7%)	22 19(86.4%)
Question 12	27 5(18.5%)	22 16(72.7%)
Question 13	27 26(96.3%)	22 20(90.9%)
Question 14	27 24(88.9%)	22 19(86.4%)
Question 15	27 6(22.2%)	22 18(81.8%)

Table 4

Patient Demographic and Clinical Characteristics from Chart Audits

	Pre-intervention	Post-intervention	Significance
Charts Reviewed	*N*=266	*N*=250	
Sex *n*(%) Female Male	 165(62.0%) 101(38.0%)	 144(57.6%) 106(42.4%)	Pearson Chi-Square 0.305
Race *n*(%) American Indian / Alaskan Native Asian Black or African American Hispanic or Latino Other Patient Refused Unknown White or Caucasian	 1(0.4%) 3(1.1%) 50(18.8%) 12(4.5%) 0(0%) 1(0.4%) 4(1.5%) 195(73.3%)	 0(0%) 4(1.6%) 23(9.2%) 14(5.6%) 2(0.8%) 1(0.4%) 3(1.2%) 203(81.2%)	Pearson Chi-Square 0.070
BMI mean(SD)	28.5(7.3)	28.7(6.1)	$p = 0.831$
Age mean(SD)	60.7(17.4)	59.4(17.4)	$p = 0.396$
Nursing Acuity mean(SD)	47.8(17.9)	46.5(15.1)	$p = 0.405$
Falls in the Last 6 months n(%)	84(31.6%)	60(24.0%)	$p = 0.055$
Fall Risk median(IQR)	11(5.8-25)	9(5.0-22)	$p = 0.184$
Length of Stay median(IQR)	3.3(1.9-6.1)	3.8(2.1-5.7)	$p = 0.773$

Table 5

Charted Mobility Interventions from Chart Audits Pre- and Post-Education

	Pre-intervention median(IQR)	Post-intervention median(IQR)	Significance
Mobility Activities	7(3-13)	9(4-15)	p =0.002
Distance Ambulated	95(30-315)	76(25-390)	p = 0.056
Average Distance Ambulated	25(15-70.8)	28.1(15.5-74.7)	p = 0.239
Transferred to Chair	0(0-0)	0(0-0)	p = 0.081
Total Transfers	0(0-2)	0(0-2)	p = 0.645
Ambulated to Bathroom	4(1-8)	4(2-10)	p = 0.019
Ambulated	5(1-10)	7(2-12)	p = 0.002
Ambulated Total	9(2-18)	11(4-22)	p = 0.004
Stood	0(0-1)	1(0-2)	p < 0.001
Average Mobility Activities per Day	1(0.5-2)	1.6(0.7-2.5)	p < 0.001

Table 6

Correlations between Patient Characteristics and Charted Outcomes

	Mobility Activities	Ambulated Total	Average Distance
BMI	rho = 0.010 p = 0.882	rho = 0.036 p = 0.587	rho = -0.076 p = 0.324
Fall Risk	rho = 0.163 p = 0.010	rho = 0.034 p = 0.595	rho = -0.143 p = 0.054
Nursing Acuity	rho = 0.060 p = 0.348	rho = -0.075 p = 0.235	rho = -0.191 p = 0.010

Table 7

Correlations between Length of Stay and Patient Characteristics

	Correlation Coefficient rho	Significance *p*
Nursing Acuity Score N = 250	0.264	<0.001
Fall Risk N = 250	0.275	<0.001
BMI N = 229	-0.028	0.670
Average Distance Ambulated N = 183	0.164	0.027
Average Activities per Day N = 250	0.048	0.447

Table 8

Aggregate Falls and Deaths for the Pre- and Post-Intervention periods

	Pre-intervention *n*	Post-intervention *n*
Falls	3	3
Deaths	13	6

Appendix A. Norton Healthcare Research Office Approval

NORTON HEALTHCARE
Research Office (RO)

224 E. Broadway
Louisville, KY 40202
(502) 629-3501 Phone
(502) 629-3480 Fax
RO@nortonhealthcare.org
www.nortonhealthcare.org

May 9, 2023

Jonathan A. Hacker, RN, BSN
University of Kentucky, College of Nursing
751 Rose Street
Lexington, KY 40536

RO# 22-N0037 / IRB# 84822 / Title: The Effect of an Educational Intervention on Early Mobility Compliance in Oncology Nurses

Dear Researcher:

The Norton Healthcare Research Office (RO) is pleased to notify you that your application to conduct the research study referenced above in the following Norton Healthcare (NHC) facility has been approved.

- **Norton Women's and Children's Hospital**

Please note: Additional institutional approvals, such as from practice managers, HR, and/or Norton Medical Group, may be necessary based upon the type of study you are conducting. It is your responsibility to work with your advisors to ensure that all institutional permissions have been obtained prior to initiating your research project.

The following items must be submitted to the RO if your study continues to be conducted in a NHC facility and are applicable to your study:

- **Annual and Amendment Approval letters and all current documents approved by the IRB, if applicable**
- **Changes in the Conflict of Interest status**
- **Status change of study, i.e. closed to enrollment, study termination etc.**

To comply with HIPAA regulations copies of:

- **Partial Waiver of Authorization must be filed with the medical record of every patient screened for the study, if applicable.**
- **Complete Waiver of Authorization must be filed with the medical record of every patient chart reviewed for the study.**

A signed copy of the Informed Consent Form and Research Authorization must be filed with the medical record of each subject enrolled in your study in a NHC facility.

If applicable, the Research Patient ID form must be submitted to NHC Research Billing daily with reportable activity. Please email the form to ResearchBilling@nortonhealthcare.org.

In the event your study will utilize personal and/or sponsor provided equipment, please contact NHC Clinical Engineering.

If you have any further questions or need assistance, please contact the RO at (502) 629-3501.

Please let us know how we are doing. Follow the link https://www.surveymonkey.com/s/NHORAsatisfaction to complete the RO Satisfaction Survey in less than two minutes. Your feedback helps the RO improve the services we provide and meet the needs of the research community.

Sincerely,

Stephen W. Wyatt

Stephen W. Wyatt, DMD, MPH
Chief Research Executive

Norton Hospital • Norton Brownsboro Hospital • Norton Women's and Children's Hospital • Norton Audubon Hospital
Norton Children's Hospital • Norton Children's Medical Center • Norton Immediate Care Centers

Appendix B. University of Kentucky Institutional Review Board Approval

University of Kentucky | Office of Research Integrity
IRB, RDRC

XP Initial Review

Approval Ends:
4/20/2024

IRB Number:
84822

TO: Jonathan Hacker, BSN
College of Nursing
PI phone #: 8593968003

PI email: jonathan.hacker@uky.edu

FROM: Chairperson/Vice Chairperson
Medical Institutional Review Board (IRB)

SUBJECT: Approval of Protocol

DATE: 4/24/2023

On 4/21/2023, the Medical Institutional Review Board approved your protocol entitled:

The Effect of an Educational Intervention on Early Mobility Compliance in Oncology Nurses

Approval is effective from 4/21/2023 until 4/20/2024 and extends to any consent/assent form, cover letter, and/or phone script. If applicable, the IRB approved consent/assent document(s) to be used when enrolling subjects can be found on the approved application's landing page in E-IRB. [Note, subjects can only be enrolled using consent/assent forms which have a valid "IRB Approval" stamp unless special waiver has been obtained from the IRB.] Prior to the end of this period, you will be sent a Continuation Review (CR)/Annual Administrative Review (AAR) request which must be completed and submitted to the Office of Research Integrity so that the protocol can be reviewed and approved for the next period.

In implementing the research activities, you are responsible for complying with IRB decisions, conditions and requirements. The research procedures should be implemented as approved in the IRB protocol. It is the principal investigator's responsibility to ensure any changes planned for the research are submitted for review and approval by the IRB prior to implementation. Protocol changes made without prior IRB approval to eliminate apparent hazards to the subject(s) should be reported in writing immediately to the IRB. Furthermore, discontinuing a study or completion of a study is considered a change in the protocol's status and therefore the IRB should be promptly notified in writing.

For information describing investigator responsibilities after obtaining IRB approval, download and read the document "PI Guidance to Responsibilities, Qualifications, Records and Documentation of Human Subjects Research" available in the online Office of Research Integrity's IRB Survival Handbook. Additional information regarding IRB review, federal regulations, and institutional policies may be found through ORI's web site. If you have questions, need additional information, or would like a paper copy of the above mentioned document, contact the Office of Research Integrity at 859-257-9428.

Appendix C. Pre- and Post-Intervention Survey Tool

Welcome

Thank you for participating in this research study. All of your responses will be recorded anonymously and without any form of IP tracking.

[Section 1]

Demographics

What is your Gender?

A. Male

B. Female

C. Non-binary / third gender

D. Prefer not to say

What is your Age?

A. < 18 years of age

B. 18 – 25 years of age

C. 26 – 35 years of age

D. 36 – 45 years of age

E. 46 – 55 years of age

F. 56 – 65 years of age

G. > 65 years of age

How would you describe your Ethnicity?

A. American Indian/ Alaskan Native

B. Asian

C. Black/African American

D. Hispanic/Latino

E. Native Hawaiian/Pacific Islander

F. White/Caucasian

G. Other

H. Prefer not to say

What is the highest education level you have achieved?

A. High School Diploma/GED

B. Associate's Degree

C. Bachelor's Degree

D. Master's Degree

E. Doctoral Degree

What is your role?

A. PCA

B. LPN

C. RN

How long have you been in practice in your role?

A. 0-1 year

B. 1-2 years

C. 2-3 years

D. 3-5 years

E. 5-10 years

F. 10-20 years

G. 20-30 years

H. >30 years

[Section 2]

Role of Early Mobility

1. In multiple studies, ambulation three times daily as ordered has been found to be the most missed nursing care task. What percentage of older adults lose their ability to ambulate independently during a hospital stay?

A. 15%

B. 25%

C. 35%

D. 45%

E. 55%

F. 65%

2. For elderly patients without delirium or dementia who were able to walk prior admission, how many hours on average were spent **out of bed** during a 5-day hospitalization?

A. 1

B. 2

C. 3

D. 4

E. 5

F. 6

3. It is often misconstrued that PT/OT must clear patients to mobilize out of bed. After how many days from admission have PT/OT worked with only 50% of patients?

A. 2

B. 3

C. 4

D. 5

E. 6

F. 7

4. On average, how many days of bedrest does it take for an older patient to lose 40% of their strength in their legs and trunk?

A. 3

B. 5

C. 7

D. 9

E. 13

5. Compared to patients who ambulate two or more times per day, how much more likely are hospitalized older adults with low physical mobility to need to be institutionalized?

A. 2x

B. 3x

C. 4x

D. 6x

E. 8x

F. 10x

[Section 3]

Early Mobility Interventions

6. All of the following are **absolute** contraindications to the use of Gait Belts **except**:

A. Abdominal Aortic Aneurysm

B. Behavioral Aggression

C. Colostomy

D. Multiple Rib Fractures

E. Suicidal Ideation

7. What are the odds of falling when mobilizing a patient **without** a Gait Belt when compared to using a Gait Belt?

A. 2

B. 3

C. 5

D. 7

E. 9

8. When properly using a foldable 2-Wheel walker, a patient without leg injury should:

A. Set the walker height to wrist level with arms hanging to sides and push the walker ahead before stepping back into it.

B. Set the walker height to wrist level with arms hanging to sides and push the walker ahead of them without falling behind the rear supports.

C. Set the walker height to finger level with arms hanging to sides and push the walker ahead of them without falling behind the rear supports.

D. Set the walker height to finger level with arms hanging to sides and push the walker ahead before stepping back into it.

9. According to the John Hopkins Highest Level Mobility Scale (JH-HLM) after a patient can safely dangle unsupported and pivot transfer to a chair with assistance, what would be the next mobility goal?

A. Walk with assistance to chair or restroom.

B. Stand in place for 1 minute with assistance

C. March in place at bedside or in front of chair with assistance

10. When performing the modified 30-second Sit-to-Stand test, how many repetitions are required to predict someone as unlikely to fall in the next 6 months?

A. 2

B. 4

C. 6

D. 8

E. 10

F. 12

[Section 4]

Charting Mobility Interventions

11. How many feet of distance does each ceiling tile count when determining feet walked?

A. 1

B. 2

C. 3

D. 4

12. For a stand-pivot-sit transfer of a patient to a chair or commode, how many feet should be entered under feet walked?

A. 0

B. 1

C. 2

13. For a patient with active, strict bedrest orders, what number should be charted under feet walked once per shift?

A. 0

B. 1

C. 2

14. If a patient who had bedrest orders gets new orders for mobility and feet walked was already charted on my shift, I do not need to chart any further numbers for feet walked later in my shift.

A. True

B. False

15. For a patient that is only able to dangle or stand, how many feet walked should be charged after mobilizing the patient?

A. 0

B. 1

C. 2

Appendix D. Institutional Review Board Approved Cover Letter

IRB Approval
4/21/2023
IRB # 84822
IRB1

To Potential Research Participants:

Researchers at the University of Kentucky are inviting you to take part in a pre-/post- survey about value and practice of early mobility interventions in the inpatient setting. The goal of the education that will be provided is to increase the knowledge of nursing staff on early mobility thereby increasing early mobility interventions with patients.

Although you may not get personal benefit from taking part in this research study, your responses may help us understand more about nursing early mobility practices. Some volunteers experience satisfaction from knowing they have contributed to research that may possibly benefit others in the future.

If you do not want to be in the study, there are no alternatives except not to take part in the study. Declining to participate in the survey will not influence job status or performance evaluation.

Completing the education modules is expected to take no more than 15-20 minutes. The survey will take about 5 minutes or less to complete and it will be available for a three-week window. Norton Healthcare has agreed to reimburse at employees at their standard hourly rate for time spent on this so long as it is not within overtime. Afterward, chart reviews will be conducted to evaluate changes in recorded patient mobility.

There are no known risks to participating in this study. Your response to the survey is anonymous which means no names, IP addresses, email address, or any other identifiable information will be collected with the survey responses. We will not know which responses are yours if you choose to participate. All data entries will be automatically de-identified and will only analyzed in aggregate format. All research data including survey responses will be stored for a minimum of 6 years after the study is over per IRB protocol; then it will be deleted using UK Policy A13-050 and A05-055.

We hope to receive completed surveys from about 50 people, so your answers are important to us. Of course, you have the choice about whether or not to complete the survey, but if you do not participate, you are free to skip any questions or discontinue at any time. You will not be penalized in any way for skipping or discontinuing the survey.

If you have questions about the study, please feel free to ask; my contact information is given below.

Thank you in advance for your assistance with this project. To ensure your responses will be included, please complete your survey within three weeks from receipt of this email.

Pre-Test: *Hyperlink to RedCap Pre Survey*

Education Module 1: *Hyperlink to Video 1*

Education Module 2: *Hyperlink to Video 2*

Education Module 3: *Hyperlink to Video 3*

Post-Test: *Hyperlink to RedCap Post Survey*

Sincerely,

Jonathan A Hacker, RN, BSN

College of Nursing, University of Kentucky

Phone: 859-396-8003

Email: Jonathan.hacker@uky.edu

84822

If you have complaints, suggestions, or questions about your rights as a research volunteer, contact the staff in the University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 1-866-400-9428.

Appendix E. Institutional Review Board Waiver of Authorization Approval Letter

University of Kentucky
Office of Research Integrity
IRB, RDRC

WAIVER OF AUTHORIZATION APPROVAL LETTER

In Compliance with section 164.512(i)(2)(iv)(C) of the HIPAA privacy rules, a representative from Medical **IRB#_1_** has reviewed the use of Protected Health Information (PHI) by expedited review.

The expedited review was conducted in accordance with 45CFR 46.110 (b)(2), the minor changes provision.

The IRB protocol# 84822 meets the criteria for the waiver of authorization according to 164.512(i)(2)(ii), which are as follows:

The use or disclosure of protected health information involves no more than a minimal risk to the privacy of the individual based on:

-An adequate plan to protect the identifiers from improper use/disclosure

-An adequate plan to destroy the identifiers at the earliest opportunity consistent with the research justification unless health, research or legal justifications to retain the identifiers.

-An adequate written assurance that the PHI will not be reused or disclosed to any other person unless required by law, authorized oversight or as permitted by the following subpart:

-the research could not practicably be conducted without the waiver or alteration;
and
-the research could not practicably be conducted without access to and use of the PHI.

(per J. Smith)
IRB CHAIRMAN OR DESIGNEE

4.24.23
DATE

seeblue.
315 Kinkead Hall | Lexington, KY 40506-0057 | P: 859-257-9428 | F: 859-257-8995 |
www.research.uky.edu/ori/