POSTER PRESENTATION SCHEDULE

12th Annual Johns Hopkins Critical Care Rehabilitation Conference

Time	Presentation Order	Presenter	Author(s)	Title	Institution
Facilitator - Hallie Lenker, Co-Moderator - Audun Huslid					
Saturday, November 11th, 2023 - PM Session					
12:20PM - 01:20PM	1	Jessica LaRosa, MD	Jessica M. LaRosa, MD; Sapna R. Kudchadkar, MD PhD	Impact of Indwelling Medical Equipment on Out of Bed Mobility for Critically Ill Children	Johns Hopkins University, Baltimore, USA
	2	Owen Gustafson, BSc, MSc Res	Owen Gustafson, MSc Res; Elizabeth King, BSc; Michael Schlussel, PhD; Amy Arnold, BSc; Carla Wade, BSc; Philippe Nico, BSc; Matthew Rowland, DPhil; Helen Dawes, PhD; Mark Williams, PhD.	Evaluating the musculoskeletal health state of intensive care unit survivors: an interim analysis of the MSK-ICU cohort study	Oxford University Hospitals, Oxford, UK
	3	Madeline Gilmore, DPT	Madeline Powers Gilmore PT, DPT, Demetrios Wilson PT, M.Div., Lynette DeFrancia OTR/L	Accidental ECMO Self-Decannulation Does Not Always Mean Death: an interdisciplinary case study for an individual with COVID-19, ECMO, and BOLT	Ronald Reagan UCLA Medical Center, Los Angeles, USA
	4	Ehizele Iyayi, BA	Ehizele Iyayi, BA; Autumn England, MM; Meagan Hughes, MA, LPMT, MT-BC, Dale Needham, MD, PhD, Megan Hosey, PhD with the Johns Hopkins Hospital MICU Sound Rounds Team	Case Study of Sound Rounds at the Johns Hopkins Hospital Medical Intensive Unit	Johns Hopkins University, Baltimore, USA
	5	Kathleen Webb, OTD, OTR/L	Kathleen Webb, OTD, OTR/L	Caregiver Education and Early Mobility in the Pediatric Intensive Care Unit	Stanford Childrens Health, Sunnyvale, USA
	6	Jasmine Smith, MSOT, MPH	Szu Mei Chien, MSOT, CLT, LSVT BIG Traci Embrack MEd, DPT Islam Kalouda, DPT Jasmine Gore Smith, MSOT, MPH	Washington DC Veterans Affairs Medical Center Progressive Early Mobility Protocol: An Interdisciplinary Approach	Washington DC Veterans Affairs Medical Center, Woodbridge, USA

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Impact of Indwelling Medical Equipment on Out-of-Bed Mobility for Critically Ill Children

Jessica M. LaRosa, MD [1]; Razvan Azamfirei, MS [1]; & Sapna R. Kudchadkar, MD, PhD [1,2,3]

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INTRODUCTION

- Early mobility is an important strategy to reduce immobility-associated morbidity for survivors of pediatric critical illness.[1]
- Medical equipment has been identified as a barrier to early mobility for critically ill children.[2]
- Providers are concerned about the safety of mobilizing children with indwelling medical equipment. [3]
- No indwelling medical equipment is associated with an increased likelihood of having a safety event during PICU early mobility.[4]
- In adult ICU patients, increased indwelling medical equipment is associated with increased resources needed to perform mobility. [5]

OBJECTIVE

- The aim of this study is to determine the impact of indwelling medical equipment on out-of-bed (OOB) mobility for critically ill children.

METHODS

- The study is a secondary analysis of the PICU Up! multicenter stepped-wedge randomized control trial pilot study.
- The parent study is a study of an early mobility intervention conducted in eight PICUs in the US.
- All children in the PICU who were hospitalized for at least 72 hours were eligible.

METHODS

- Patients with active or anticipated discontinuation of life support within 48 hours, open chest or abdomen, or ECMO were excluded.
- Subjects were followed for the duration of their hospitalization once enrolled.
- Covariates were defined a priori.
- Categorical variables are described as percentages and continuous variables are described as medians and interquartile ranges (IQR).
- Mixed effect logistic regression was used to estimate odds ratios (OR) and 95% confidence intervals (CIs) to account for repeat measures for subject and study site.

RESULTS

- 28,039 patient-days from 2363 individual patients were analyzed
- 32% of patient-days (9092/28039) included OOB mobility
- 75% of patient days (21182/28039) included indwelling medical equipment
- 64% of patient-days (5782/9092) in which a child was mobilized OOB included ≥ one piece of indwelling medical equipment (median 1; IQR 0-2)
- 85% of patient-days (15050/18436) in which a child was not mobilized OOB included ≥ one piece of indwelling medical equipment (median 2; IQR 1-4)
- For each 1 piece of indwelling medical equipment, there was an out-of-bed odds ratio reduction of 31% ($P < 0.001$). (**Table 1**)

RESULTS

Table 1: Adjusted odds ratios for out-of-bed mobility *$P < 0.001$

	Adjusted OR of OOB Mobility (95% CI)
Age Category (vs. 0-2 years)	
3-6 years	1.1 (0.69-1.75)
7-12 years	0.57 (0.36-1.23)
13-17 years	1.52 (0.82-2.8)
≥ 18 years	2.2 (1.11-4.39)*
Female (vs. Male)	1.2 (0.82-1.73)
PRISM V Score Category (vs. 0-4)	
5-9	0.73 (0.43-1.23)
10-14	0.4 (0.15-1.07)
15-18	1.8 (0.49-6.71)
≥ 19	0.78 (0.37-1.64)
Baseline PCPC Score (vs. Normal)	
Mild Disability	1.22 (0.73-2.03)
Moderate Disability	0.58 (0.29-1.13)
Severe Disability	0.27 (0.14-0.54)*
Very Severe Disability	0.09 (0.01-0.53)*
Indwelling Medical Equipment (v. none)	1.33 (0.91-1.93)
Total number of indwelling medical equipment (per 1 increase)	0.69 (0.60-0.81)*
Any sedation in the last 24 hours (v. none)	0.37 (0.26-0.51)*
Respiratory Support (v. room air)	
Nasal Cannula	1.04 (0.7-1.56)
High Flow Nasal Cannula	0.95 (0.63-1.42)
Non-invasive Positive Pressure	0.52 (0.34-0.78)*
Mechanical Ventilation via endotracheal tube	0.13 (0.08-0.21)*
Mechanical Ventilation via tracheostomy	0.37 (0.19-0.71)*
Tracheostomy collar	0.3 (0.09-1.08)
Screened Positive for delirium (vs. negative)	0.64 (0.48-0.85)*
Family present at the bedside (vs. none)	1.39 (0.92-2.09)

CONCLUSIONS

- **An increase in the number of medical devices decreased the likelihood that a critically ill child was mobilized out-of-bed, regardless of illness severity.**
- **Further training is required to increase the interprofessional team's comfort mobilizing children with multiple medical devices.**

REFERENCES

1. Walker TC. et al. *Transl Pediatr.* 2018.
2. Hanna ES. et al. *Pediatr Crit Care Med.* 2020.
3. Joyce CL. et al. *J Pediatr Nurs.* 2018.
4. LaRosa JM. et al. *Pediatrics.* 2022.
5. Benjamin E. et al. *Hum Factors in Health.* 2022.

Evaluating the musculoskeletal health of intensive care unit survivors: an interim analysis of the MSK-ICU cohort study

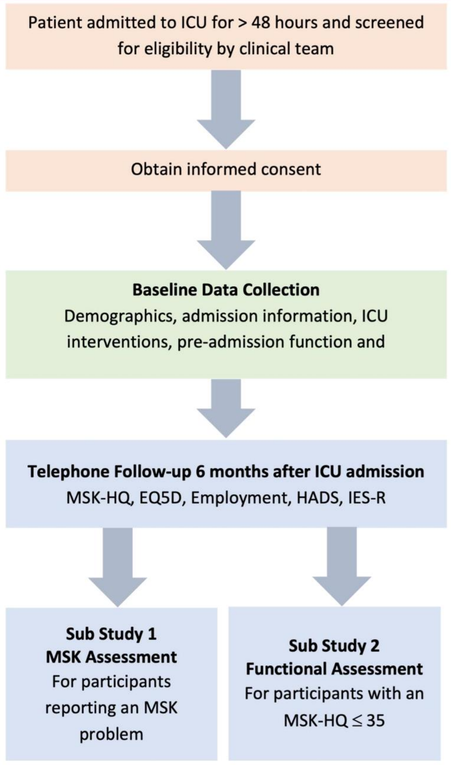
Owen Gustafson[1,2], Elizabeth King[1,2], Michael Schlussel[3], Amy Arnold[4], Carla Wade[5], Philippe Nicol[6], Matthew Rowland[3], Helen Dawes[7], Mark A Williams[1,2]

[1]Oxford University Hospitals [2]Oxford Brookes University [3]University of Oxford [4]Great Western Hospital [5]Milton Keynes Hospital [6]Royal Berkshire Hospitals [7]University of Exeter

Objectives

Long-term physical impairment, decreased health related quality of life and low rates of return to work are well-recognised post critical illness. However, musculoskeletal (MSK) complications and associated risk factors in this population remain largely unknown.

The aim was to characterise the MSK health state of intensive care (ICU) survivors six months following admission to ICU.



Methods

A UK based multicentre prospective cohort study of ICU survivors in ICU for >48 hours without MSK trauma or neurological insult.

MSK health state was assessed at six months following admission to ICU via telephone questionnaire using the Musculoskeletal Health Questionnaire (MSK-HQ). MSK-HQ provides a score between zero and 56, where 56 indicates no MSK problem.

Follow-up physical assessments (e.g. strength, range of movement, pain) were undertaken in participants reporting a MSK problem. An interim analysis of the first 100 participants followed-up was undertaken.

The full study protocol has been published and is available from the QR code.

Results

61% (n= 61) reported an MSK problem at six months.

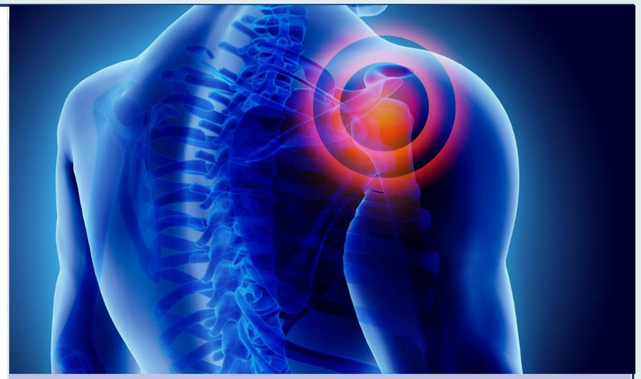
The mean MSK-HQ score was 38 (SD 10.8).

Characteristic	n= 100
Female n (%)	50 (50)
Age mean (SD)	57.6 (16.7)
ICU Length of stay mean (SD)	7.5 (6.9)
Clinical frailty scale med (IQR)	3 (2-4)
Functional comorbidity index med (IQR)	1.5 (1-3)
Previous MSK problem n (%)	13 (13)

The three most reported site for MSK problems were the shoulder (33/61, 54.1%), knee (18/61, 29.5%) and lower back (17/61, 27.9%).

Participants without an MSK problem reported undertaking 30 minutes of physical activity on more days per week (med 4 days, IQR 2-5.75) than those with an MSK problem (med 0 days, IQR 0-3).

Only 23% (n= 23) received physical therapy after discharge from hospital.



Conclusion

Interim analysis demonstrates that the MSK health state six months following critical illness is poor.

MSK problems are highly prevalent and severe.

MSK problems were most prevalent at the shoulder but presented at multiple other locations.

Participants with an MSK problem are less physically active than those without.

Less than one quarter of participants had accessed physical therapy following hospital discharge.

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This study was approved by the North of Scotland Research Ethics Committee ref: 21/NS/0143 and the protocol has been registered (ISRCTN24998809).

FUNDED BY
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Accidental ECMO Self-Decannulation Does Not Always Mean Death:
an interdisciplinary case study for an individual with COVID-19, ECMO, and BOLT

UCLA Health
Madeline Powers Gilmore, PT, DPT, Demetrios Wilson, PT, M. Div, Lynette DeFrancia, OTR/L
UCLA Health

BACKGROUND

- Patients with severe COVID-19 are at risk for high mortality, decreased quality of life, and physical, psychological, and cognitive impairments.[1-5] ECMO support followed by lung transplantation and intensive rehabilitation has been used for management of severe COVID-19 to optimize return to independence.[6-10]
- Early rehabilitation for patients with critical illness, including those on VV ECMO, has been shown to improve functional outcomes, minimize comorbidities, and facilitate home discharge.[11-14]
- Multidisciplinary collaboration is critical for patient safety and optimization of outcomes.[15-16]

OBJECTIVES

The purpose of this case study is to discuss the collaboration of PT and OT to expedite return to home for an individual with COVID-19 requiring ECMO, accidental decannulation, and bilateral orthotropic lung transplantation (BOLT).

METHODS

Retrospective chart review of individual patient (n=1), case study

OUTCOME MEASURES & INTERVENTIONS

Outcome Measures:

- OT – AM-PAC Daily Activity, modified Barthel Index- Shah version (mBI-S), Montreal Cognitive Assessment (MoCA) Blind
- PT – Activity Measure for Post-Acute Care (AM-PAC) "6 Clicks" Inpatient Short Form Basic Mobility, John Hopkins – Highest Level of Mobility (JH-HLM) Scale

Interventions:

- OT – BUE edema reduction, BUE strengthening, activity tolerance, sitting balance, standing balance, sitting tolerance, functional transfers, ability to self-perform ADLs, contracture prevention of IPs of R hand, tub/shower transfers, dynamic standing balance
- PT – Functional mobility (bed mobility, transfers, repeated sit to stands, gait training), therapeutic exercise (emphasis on proximal strengthening), BLE stretching, balance training, postural re-education in sitting and standing, endurance training, use of safe patient handling equipment (KREG catalyst bed to facilitate upright, Sara Stedy for sit to stand), diaphragmatic breathing, anxiety reduction, family training

RESULTS

- 55-year-old male with severe COVID-19, mechanical ventilation, and bilateral femoral VV-ECMO cannulation complicated by accidental ECMO self-decannulation, and requiring BOLT.
- Length of stay was 108 days.
- Frequent communication between PT, OT, respiratory therapy, nursing, perfusion, and physicians occurred. 17 multidisciplinary communication occurrences were formally documented.
- An increase in the following scores were seen during the patient's hospitalization: AM-PAC "6 Clicks" Basic Mobility (MDC 4.5) Daily Activity, mBI-S (52 points), and JH-HLM (MDC 0.6).
- Patient was discharged to home with home health PT and OT, use of a walker.

JH-HLM Functional Item	Days to accomplish (from admission)
Walk – 250+ feet	97
Walk – 25+ feet	86
Walk – 10+ steps	86
Stand – 1 minute	42
Chair – Transfer	86
Bed – Sit at Edge	37
Bed – Turn Self/Activity	37
Bed - Lying	0

Number of Visits (*no cotreatments)	PT	OT
Pre-transplant	45	25
Post-transplant	12	11
Total	57	36

This photograph is utilized with signed consent from the patient for education purposes.

TIMELINE

12/22/20
Presented to OSH w/ SOB
COVID-19 (+)

12/27/20
Symptoms worsened
HFNC
Intubation

1/14/21
Readmitted to OSH

1/16/21
VV ECMO placed at OSH
Transferred to UCLA

1/28/21
Tracheostomy

2/12/21
ECMO circuit change

2/24/21
COVID-19 recovered

3/4/21
Accidental dislodgement of ECMO outflow cannula
CPRx 20-30 seconds
Emergent ECMO placement
Sedated, paralyzed

4/7/21
B lung transplant
Cryo nerve block therapy
ECMO decannulation

4/23/21
Passed MBSS

4/28/21
Trach decannulation

4/29/21
Transferred to step down unit

5/3/21
Discharged home

1/29/21
OT Consult

2/1/21
Initial OT Evaluation

2/18/21
1st time sitting up @ EOB w/ OT

3/3/21
1st time standing w/ OT

3/5/21
D/C'd from OT due to ECMO dislodged

3/8/21
OT Re-Evaluation #1

3/17/21
1st time taking lateral steps at side of the bed

4/7/21
DC'd from OT due to going to OR for lung transplant

4/9/21
OT Re-Evaluation #2

4/22/21
Started to work on tub & shower transfers

4/27/21
Able to stand at sink to perform ADLs, stand to don pants

4/30/21
Changed DC recommendations to home health OT w/ transition to outpatient hand therapy for R hand, walker

5/3/21
DC'ed from OT & from hospital

1/26/21
PT Consult

1/28/21
Initial PT Evaluation

1/29/21
Initiation of EOB

1/30/21
Initiation of sit to stand trials

2/3/21
Started pre-gait

3/5/21
DC'd from PT due to ECMO dislodgement and code

3/7/21
PT Re-evaluation #1

3/17/21
1st time marching in place, 2 steps anterior and posterior

3/18/21
1st time transferring to/from wheelchair and ambulating (40ft in total)

4/2/21
PT Re-Evaluation #2

4/8/21
PT Re-Evaluation #3

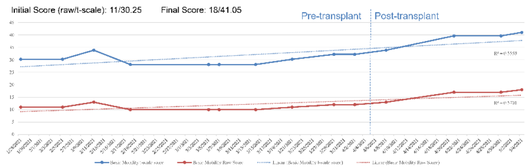
4/26/21
1st time trialing stairs (4 with modA)

4/30/21
Family training in preparation for discharge to home setting with home health PT with transition to outpatient PT, walker. Pt planned to stay on 1st level to avoid steps.

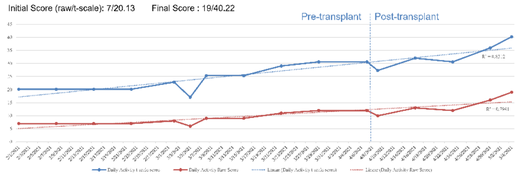
5/3/21
Family training for fall recovery. Discharged to home and discharged from PT.

RESULTS (Continued)

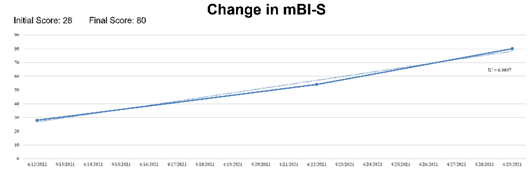
Change in AM-PAC "6 Clicks" Inpatient Short Form – Basic Mobility



Change in AM-PAC "6 Clicks" Inpatient Short Form – Daily Activity



Change in mBI-S



Change in MoCA Blind

4/21/22	4/29/21	
Unable to test 2/2 on ventilator during the day, patient's voice sounds faint	MoCA Blind 7.1	18/22

LIMITATIONS

- Oozing from cannulas (required reinforcement and dressing changes with perfusionists and nurse practitioners), Anxiety/participation, Nausea, Fatigue.
- Progess was somewhat limited pre-transplantation.

CONCLUSIONS

Consistent treatment and collaboration between rehabilitation professionals facilitated home discharge and avoided rehabilitation placement for a patient with severe COVID-19 requiring mechanical ventilation, VV-ECMO support, and BOLT after accidental self-decannulation.

REFERENCES

Sound Rounds in the Johns Hopkins Medical Intensive Care Unit: A Case Study

Ehizele Iyayi, BA [1]; Autumn England, MM [2]; Meagan Hughes, MA, LPMT, MT-BC [2], Dale Needham, MD, PhD [1], Megan Hosey, PhD [1] with the Johns Hopkins Hospital MICU Sound Rounds Team

[1] Outcomes After Critical Illness and Surgery (OACIS) Group and Pulmonary and Critical Care Medicine, School of Medicine, Johns Hopkins University, Baltimore, MD USA; [2]Peabody Institute, School of Medicine, Johns Hopkins University, Baltimore, MD USA

Background

- ~50% Critically ill patients report anxiety
- Peabody Sound Rounds Program – collaboration between Johns Hopkins Healthcare and the Peabody Institute (music conservatory)
- Introduced in Johns Hopkins Medical Intensive Unit (MICU) in April 2023

Objectives

- To evaluate whether a Sound Rounds session is associated with lower anxiety and better vital signs in a critically ill patient

Methods

- 56-year old woman with multi-organ failure secondary to Hereditary Hemorraghic Telangelectasia
- 15 minute Sound Round session
- 2 songs chosen by the patient; 2 songs chosen by the musician
- Measures
  - Visual Analog Scale (VAS-A)
  - Respiratory rate (RR) in breaths per minute
  - Heart rate (HR) in beats per minute
  - Qualitative feedback about her experience with the visit

Results

The measured outcomes were lower post-Sound Rounds session compared to pre-session

Variable	Pre-Session	Post-Session
Visual Analog Scale – Anxiety (VAS-A)	50	12
Respiratory Rate (bpm)	20	16
Heart Rate (bpm)	103	99

Qualitative Feedback

- In an open-ended response, the patient reported that she felt calm after the visit
- She also reported the session “filled her with joy and made her float”
- She also reported that she felt some “good” sadness as the songs reminded her of meaningful moments in her life

Scan QR code to watch the session

Conclusion

- Sound Rounds is feasible in the MICU
- There might be clinical utility for patients experiencing anxiety.
- The patient experienced less anxiety after the Sound Rounds visit, as evidenced by patient-reported and objective physiological measures
- More research is needed to determine if these outcomes are statistically significant and generalizable.

Caregiver Education and Early Mobility in the Pediatric Intensive Care Unit

Kathleen Webb, OTD, OTR/L

Stanford Children's Health | Lucile Packard Children's Hospital Stanford

Background and Setting

- Early mobilization refers to the initiation of rehabilitation services and engagement in mobility activities as soon as a patient has reached predetermined levels of hemodynamic and respiratory stability, often within the first 24-48 hours[5].
- Research demonstrates that early mobilization in the pediatric intensive care unit (PICU) can be effective for decreasing length of stay and improving overall health outcomes[1].
- Barriers to mobility can be overcome with caregiver education and interdisciplinary team communication and collaboration[8].

Setting
- Pediatric Children's Hospital in a large metropolitan city with a 24-bed pediatric intensive care unit
- Ages of patients age from 3 months to 21 years of age
- The hospital uses an early mobility pathway protocol
- Each pathway protocol score have associated safe and appropriate mobility activities that can be completed with therapy, nursing, and caregivers

Population:
- Caregivers of children admitted to the PICU
- Caregivers defined as individuals ages 18 year or older present at the patient's bedside and who are listed as the patient's legal guardian in the electronic medical record

PICO Question

Does early mobility education provided to caregivers of children in the pediatric intensive care unit (PICU) increase their engagement in early mobility activities and in their occupation of caregiving?

Significance

- As early mobility is shown to be feasible and safe throughout literature, the next identified barrier to early mobility is caregiver stress and deferment of early mobility activities[6].
- The impact of caregivers having their role shifted from caregiver to bystander can lead to increased stress and decreased participation at bedside[2,3].
- This project is an occupation-based project with the focus on the occupation of caregiving for caregivers and mobility for patients[4]
- This project focused on a caregiver's occupation of providing care and comfort for their child as well as secondarily work on functional mobility and out of bed activities for patients.
- Caregiver education regarding early mobility led to a caregiver reclaiming their role as the child's caregiver while supporting their child's engagement in early mobility which could positively improve health outcomes[1].

Literature Review

Early Mobility:
- Patients who engage in early mobility activities have been show to demonstrate improvement in mental and physical outcomes as well as decrease the length of stay in the intensive care unit[1]

Barriers to Early Mobility:
- Caregivers desire clear and constant education regarding their child during their stay in the PICU[7].
- Caregivers can act as an essential partner in early mobility practices[2]
- It also demonstrates that engagement in early mobility may help with caregiver stress and engagement in their child's care[3,8].

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Methods

- The researcher reviewed new PICU OT evaluation orders between 7/5/22 and 7/9/22.
- Seven caregivers and patients who meet the inclusion criteria were identified.
- The nurse for each patient filled out two paper surveys, the first one prior to caregiver education and a second one to be fill out throughout the day following education.
- The semi-structured surveys asked the nurse to rate perceived stress on a scale of 0-10, 0 being "no stress" and 10 being "highest level of stress"
- A five-point rating scale was used to determine how much prompting caregivers needed to engage in early mobility or caregiving activities at the bedside
- Any identified barriers to caregivers engaging in mobility and general caregiving tasks along with what activities caregivers did engage in at bedside were also reported
- Standardized caregiver education was provided to caregivers. The researcher provided caregiver education related to early mobility activities that each patient was appropriate for based on their age, current medical status, respiratory needs, and early mobility pathway score. Teaching was completed using a combination of handouts, demonstration, and hands on practice.

Inclusion Criteria:
- Patients who have been scored a two or three on the PICU early mobility protocol and not on extracorporeal membrane oxygenation support will be considered for this project.

Exclusion Criteria:
- Caregivers who do not speak English
- The child does not live primarily with the caregiver at bedside
- Caregivers over the age of 65 years of age

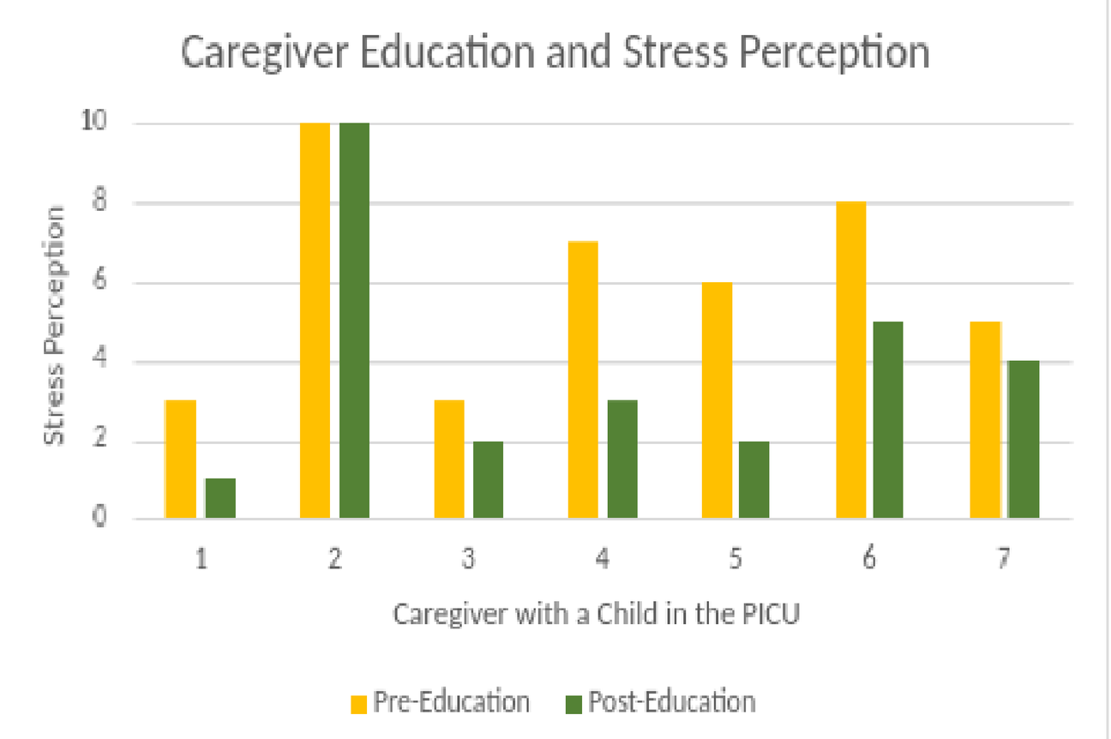
Results

Comparison between the pre and post education surveys demonstrated an overall improvement in caregiver engagement at the bedside and a decrease in caregiver stress.

Three themes emerged: 1) parental stress and anxiety limited their engagement at bedside, 2) comforting their child was the most common activity caregivers engaged in, 3) concrete activities, such as range of motion programs, showed the greatest carryover following the occupational therapy session.

Figure 1 Word Cloud
- All seven caregivers were observed to provide "comfort" to their child and support engagement in ADLs
- No change observed in providing comfort and ADL support pre and post education
- Five out of seven caregivers were reported to engage in more mobility activities post education
- Caregiver education helped build trust and partnership with the medical team

Table 1 Caregiver Education and Stress Perception
- The median change in stress scores was a two-point reduction with a range of no change to a four-point reduction seen
- Six of seven caregivers had an improvement in their stress scores
- Five out of seven caregivers were reported to have stress related to causing their child pain.



Summary

Caregiver education was shown to:
- Decrease caregiver stress leading to an increase in their participation in caregiving and early mobility activities at the bedside
- Reduce the prompting and support needed from nurses to engage in early mobility activities along with caregiving tasks
- Increase caregiver participation at the bedside
- Help caregivers reclaim their role of caregiving with the help of occupational therapists

This project:
- Identified gaps in caregiver education and caregiver engagement at the bedside
- Provided occupational therapists with insights on how to better support caregivers
- Assisted in the understanding of caregivers and their needs to help develop caregiver education protocols and further expand the role of occupational therapy in the PICU

Limitations:
- Sample size of this study was small (7 participants)
- Study was completed at a single hospital
- High acuity of the patients admitted during the study period limited number of patients who met the inclusion criteria
- Staffing challenges due to the ongoing COVID-19 pandemic limited staff availability
- Delayed IRB approval limited direct caregiver interviews

Table 2 Prompting Needed Pre-Survey
- Nurses were asked to rate how much prompting each caregiver needed to engage in caregiving and mobility tasks
- Caregivers were scored on a five-point scale
- Three out of seven caregivers needed maximum prompting (prompting 75-100% of the time) prior to caregiver education
- Two caregivers needed minimal prompting (prompting 25% of the time) and three caregivers required no prompting

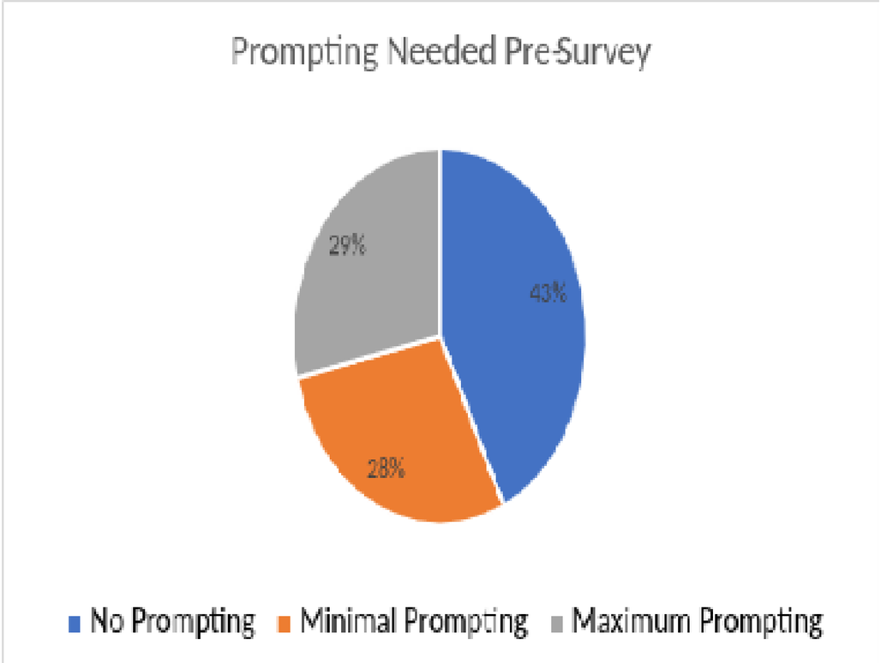
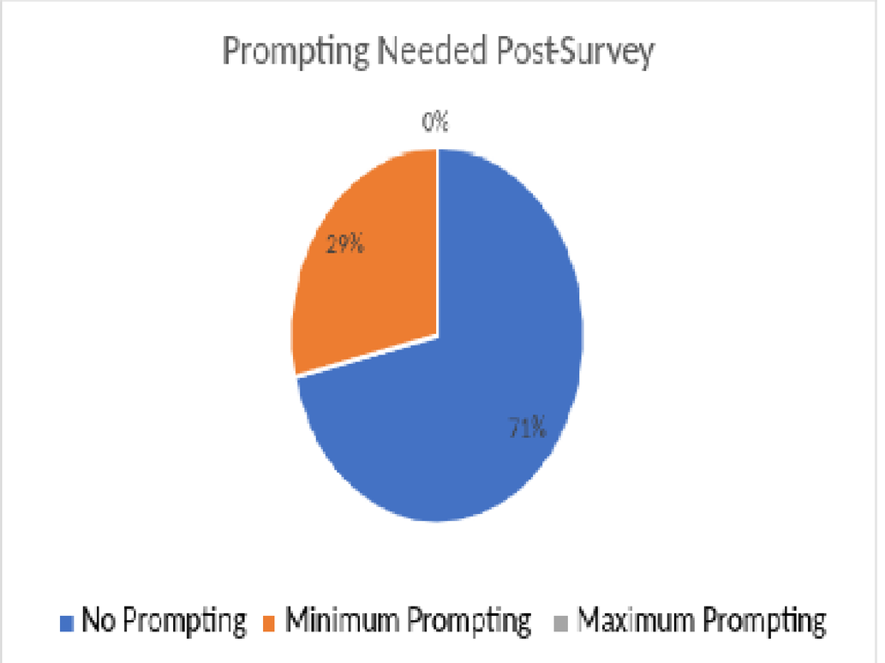


Table 3 Prompting Needed Post-Survey
- Following caregiver education, no caregivers needed maximum prompting
- The number of caregivers who needed no prompting to engage in caregiver or mobility activities increased by 30%
- Concrete activities, such as a stretching program, were the most engaged in activity post-education



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Washington DC Veterans Affairs Medical Center
Progressive Early Mobility Protocol:
An interdisciplinary approach

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PURPOSE

Early mobility protocols play an important role in minimizing deconditioning, medical complications, and functional loss in intensive care unit (ICU) settings. This Special Interest Report outlines the implementation of a Progressive Early Mobility Protocol (PEMP) developed at the Washington DC VA Medical Center. The primary purposes of the PEMP were to examine clinician perspectives, length of stay (LOS), and change in functional status.

DESCRIPTION

PEMP was developed by an interdisciplinary team of professionals consisting of nurses, respiratory therapists, physical therapists, occupational therapists, physicians, and speech therapists using information gathered from other early mobility protocols and modified for use in Veterans in the medical intensive care unit (MICU). Contraindications were established by physicians and once resolved patients became eligible for participation in PEMP. Each stage categorizes the patient's mobility level ranging from bed rest, bed mobility, edge of bed activities, bed to chair activities, ambulation inside the room, and ambulation outside the room. Elements of each stage include a patients' arousal level, passive range of motion (ROM), active and active assistive ROM, and patient participation. Stage progression was determined by functional assessments consisting of mobility, ADLs, and graded activities. Richmond Agitation Sedation Scale (RASS) was used to assess each patient's level of arousal, readiness to follow commands, and active participation. PEMP in-person instructional sessions and training modules were provided for MICU nursing staff on upper and lower extremity passive ROM and transfer techniques. Nursing champions were identified to act as advocates for the program on the unit and to train new nursing staff. Nursing staff and respiratory therapists provided training sessions for the rehabilitation staff on ventilator and line management. At the completion of training, all MICU staff participated in an interdisciplinary mock demonstration implementing the PEMP protocol.

INCLUSION/EXCLUSION

RASS Scale

Score Term Description

+4 Combative: Overtly combative, violent, immediate danger to staff

+3 Very agitated: Pulls or removes tube(s) or catheter(s); aggressive

+2 Agitated: Frequent non-purposeful movement, fights ventilator

+1 Restless Anxious: but movements not aggressive vigorous

0 Alert and calm

-1 Drowsy: Not fully alert, but has sustained awakening

(eye-opening/eye contact) to voice (>10 seconds)

-2 Light sedation: Briefly awakens with eye contact to voice (<10 seconds)

-3 Moderate sedation: Movement or eye opening to voice (but no eye contact)

-4 Deep sedation: No response to voice, but movement or eye opening to physical stimulation

-5 Unarousable: No response to voice or physical stimulation

Contraindications for bed mobility

- SpO2 <90% or RR >35 while on FiO2 >80% and PEEP >12
- Femoral central lines
- CRRT
- MAP <65 on NE > 0.2ug/kg/min
- Spinal injury or new/unstable fracture
- Acute coronary syndrome with active chest pain or balloon pump
- HR >130

Contraindications for ambulation

- MAP <65 on any vasopressors
- Symptomatic or orthostatic hypotension
- SpO2 <90% or RR >30 while on FiO2 >60% and PEEP >12
- Active GI bleed
- HR >110

PEMP SCALE

	Nursing		Nursing/PT/OT				
Stages	**Stage 1 Bed Rest**	**Stage 2** Bed Mobility	**Stage 3 Bed Mobility**	**Stage 4 Edge of Bed (EOB)**	**Stage 5 OOB to Chair**	**Stage 6 Walks in room**	**Stage 7 Walks out of Room**
Arousal Level	Unconscious RASS -5/-4	Minimally Conscious RASS -3/-2	Conscious RASS -1/+1 or above	Conscious RASS -1/+1 or above	Conscious RASS -1/+1 or above	Conscious RASS -1/+1 or above	Conscious RASS -1/+1 or above
Patient Participation	Not required to <25%	Patient participation encouraged >=25%	Required				
Range of Motion	Passive ROM	Passive/Active Assistive ROM	Active Assistive/ Active ROM	Active ROM			
Positioning	Turn Q2 Hr		Assist with turns every 2 hours	Remind patient to turn every 2 hours			
New Activity	• HOB 30 degrees or reverse Trendelenburg • Dependent hygiene	• Patient assist to initiate rolling in bed • Patient assist to initiate scooting to HOB • Patient assist with light grooming • Tolerate chair position in bed	• Able to lift arms and legs against gravity • Assist with scooting to HOB • Assist with grooming/hygiene /feeding • Tolerate OOB to chair via ceiling lift	• Dangle on side of bed • Initiate participation in resistive theraband exercises	• Stand at side of bed • Participate in seated ADL • Assist to transfer to bedside chair	• Ambulate in room with hand-held assist or use of assistive device as needed	• Ambulate in hallway with RN/Tech/PT/OT supervision
Progress when	• Participate in Care Clinical stability	• Able to perform active assistive movement • Tolerate chair position >20-30 mins • ***MD consult for PT/OT obtained as needed**	• Assist with bed mobility • Can lift arms/legs off bed	• Able to sit at EOB w/o dizziness • Able to dangle 5-10 mins	• Stand with minimal assist • Tolerate OOB in chair BID • Participate in UB ADL's • Able to march in place x 10	• Ambulate in room with supervision of one person with device • Complete bathroom ADL with minimal assist	• Ambulate Independently Encourage increased distance • Complete ADL's independently or with increased assist

RESULTS

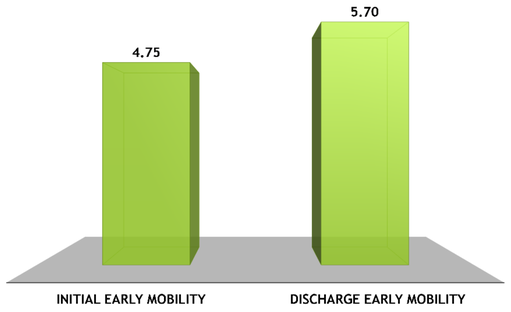

Fig. 1. Depicts the initial average PEMP score was between stage 4 and stage 5 (see PEMP Scale). The discharge PEMP score was between stage 5 and stage 6 (see PEMP Scale). The average change in stage at discharge was ~ 1 stage.

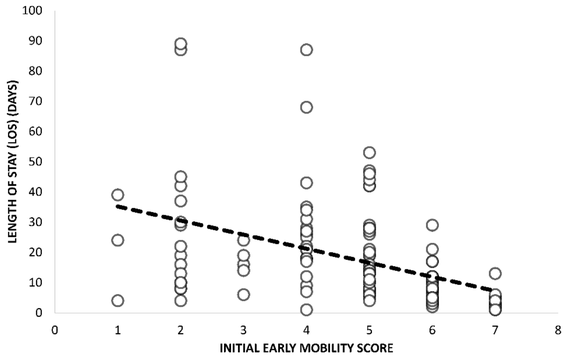

Fig. 2. Depicts the relationship of the initial PEMP stage with LOS. We were able to see that on average patients with a lower stage (less function) stayed in the hospital longer than patients with a higher stage (more functional). (r=0.44)

SUMMARY

The PEMP developed at the Washington DC VA Medical Center was viewed positively by medical staff. Increases in out of bed mobilization by nursing staff and number of PEMP consults were observed. An inverse relationship was detected between initial PEMP stage and LOS. Improvements in functional outcomes were also noted. Barriers to implementation of PEMP included a decreased in treatment frequency due to medical center demands and turnover among staff.

IMPORTANCE TO MEMBERS

The early mobility initiative aims to increase awareness of the importance of early therapeutic intervention in hospitalized patients with acute or chronic illness within the Veteran population. The development of the PEMP is an initial step to understand how early mobility programs are received by staff, identify potential barriers to implementation, and refine protocol elements and outcome measures.

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