POSTER PRESENTATION SCHEDULE

10th Annual Johns Hopkins Critical Care Rehabilitation Conference

Time	Presenter(s)	Title	Institution
Friday, November 5, 2021 - AM Session [Facilitators - Annette Lavezza, OTR/L and Danny Ludwig, PT]			
7:30 AM - 8:30 AM	David McWilliams, PT, PhD	An Evaluation of the Clinical Use of an Early Mobility Device to Support Rehabilitation for Patients Admitted to ICU	University Hospitals Coventry & Warwickshire NHS Trust, Coventry, England
	Alessandra Lago, MSc	Effects of Physical Therapy With Neuromuscular Electrical Stimulation in the Acute and Late Septic Shock Patients: Randomised Crossover Clinical Trial	Ribeirão Preto Medical School, University of São Paulo, Ribeirão Preto, Brazil
	Marybeth Moscierella, OTD, OTR/L	Utilization of the Coma Recovery Scale - Revised Across Various Specialty ICUs to Optimize Patient Engagement	Johns Hopkins Hospital, Baltimore, MD, USA
	Caitlyn Anderson, PT, DPT, NCS, GCS	Non-Conventional Treatment in a Non-Conventional Time: Outcomes in a COVID-19 Ventilator Care Unit	University of Wisconsin - Milwaukee, Milwaukee, WI, USA
	Susan Piras, PhD, RN	The Use and Usefulness of ICU Diaries to Support Family Members of Critically Ill Patients	Tennessee Tech University, Cookeville, TN, USA
	David Zemmel, PT	Creative Re-Purposing of Common ICU Equipment to Facilitate Rehab Interventions	New York-Presbyterian Hospital/Columbia University Irving Medical Center, New York, NY, USA
	Avital Isenberg, CScD, MS	Assessing Daily Living Skills Among Critical Illness Survivors: Self-report or Performance-Based Measures?	University of Pittsburgh, Pittsburgh, PA, USA
	David Zorko, MD	Physical Rehabilitation Interventions in Pediatric Critical Care Research: a Scoping Review of Methodology and Reporting	Hospital for Sick Children, Toronto, Canada

An evaluation of the clinical use of an early mobility device to support rehabilitation for patients admitted to ICU.

D. McWilliams[1]

1. Centre for care excellence, University Hospitals Coventry and Warwickshire NHS Trust, UK

Objectives

Early mobility within the ICU is associated with positive outcomes. The exact definition of 'early' mobility is not defined, with ability to mobilise limited by several perceived factors.

A recent trial demonstrated an early mobility device (the Sara Combilizer® which is a combined tilt table and stretcher chair) allowed passive and earlier transfer of patients out of bed [1]. We sought to understand how this device is used in clinical practice and to identify potential areas for future investigation.

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Methods

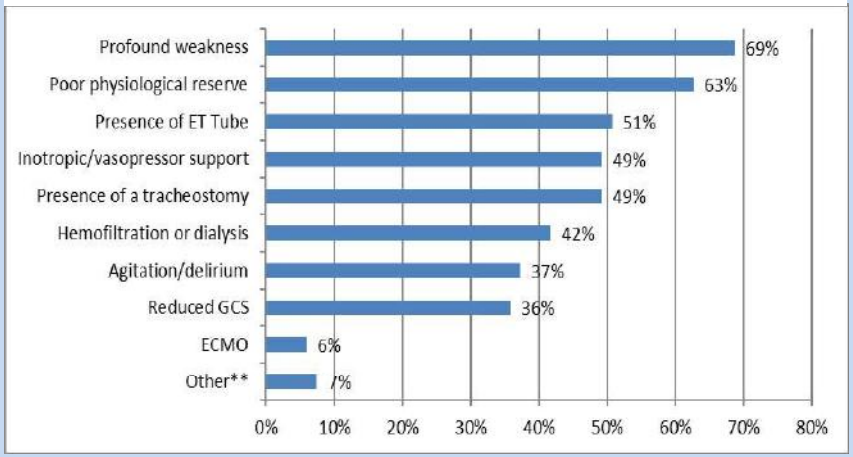
We developed, piloted and completed an on-line survey to evaluate the clinical use of the early mobility device. The survey was translated into 7 languages (Danish, Dutch, French, German, Norwegian, Swedish, and English) and sent to lead clinicians within ICU's who used the device identified using manufacturer/ distributor records. Data was collected between 15th April and 14th May 2021.

Results

In total 69/312 (22%) of invited clinicians completed the survey. The most common respondents were physiotherapists (59%) or nursing staff (37%). 78% of responders reported the device helped with promoting earlier mobilisation, although a protocol for use was reported by 22% of responders.

The largest reported indications for use were profound ICU-acquired weakness (69%) and poor physiological reserve (63%) (see figure 1).

Figure 1. Indications to use the early mobility device



Approximately half of respondents reported using the device to overcome barriers including presence of an ET tube (51%), inotropic / vasopressor support (49%), and haemofiltration (42%). The device was predominantly used in mixed medical / surgical ICU's (94%), with lower use reported in neurological (25%), cardiothoracic (22%) and trauma (17%) ICU's.

Conclusion

Our survey showed regular use of the early mobility device to support programmes of early mobilisation. Whilst it was commonly used to overcome reported barriers to mobilisation, these indications varied between respondents and there was a lack of robust protocol to guide its use.

Future work is needed to evaluate the safety of utilising the early mobility device for high-risk populations and to develop guidelines to support its use.

References

1. McWilliams et al (2016) The Sara Combilizer as an early mobilisation aid for critically ill patients: A prospective before and after study. Australian Critical Care. http://dx.doi.org/10.1016/j.aucc.2016.09.001

Effects of physical therapy with neuromuscular electrical stimulation in the acute and late septic shock patients. Randomised crossover clinical trial.

Alessandra F. Lago, PT, MSc; Anibal Basile-Filho, MD, PhD; Anamaria S. de Oliveira, PT, PhD; Hugo Celso D. de Souza, PT, PhD; Daniele O. dos Santos, PT, MSc; Ada C. Gastaldi PT, PhD.

OBJECTIVES

To evaluate whether neuromuscular electrical stimulation (NMES) performed in septic shock patients within the first 72 hours of diagnosis of septic shock and in patients in sepsis and septic shock after 72 hours of diagnosis is metabolically and physiologically safe.

METHODS

This is the analysis of two randomised controlled crossover studies. Patients with acute septic shock (<72 hours of diagnosis) and sepsis and septic shock in the late phase (> 72 hours of diagnosis) were eligible and submitted in a random order to:

-The intervention protocol (dorsal decubitus position with the lower limbs raised and NMES) and

- The control protocol (dorsal decubitus position with the lower limbs raised without NMES).

The patients were allocated in group 1 (intervention and control) or group 2 (control and intervention) with a wash-out period of 4 to 6 hours. The metabolic and physiological variables were measured.

RESULTS

The main results are described in table 1.

CONCLUSIONS

As there were no alterations in the metabolic and physiological rate during neuromuscular electrical stimulation, it can be considered a safe intervention in the metabolic and physiological scope, even considering that septic shock patients present a higher metabolic demand during the acute phase of shock.

Table 1. Demographic and clinical data.

Characteristics	**Sepsis and septic shock (>72h) n=21**	**Septic shock patients (<72h) n = 16**
Age, yrs[a]	57 ± 15.97	56 ± 15.48
SAPS 3 score[a]	75 ± 17.39	82.54 ± 19.21
SOFA on day of intervention[a]	8 ± 4.04	11 ± 3.17
ICU mortality[b]	5 (23%)	6 (38%)
Metabolic values[a]		
*$\dot{V}O_2$(mL/kg/min) *rest*	186.59 ± 46.10	224.22 ± 53.09
*$\dot{V}O_2$(mL/kg/min) *intervention*	183.64 ± 41.39	226.20 ± 49.64
*$\dot{V}O_2$(mL/kg/min) *control*	188.97 ± 44.88	226.79 ± 58.25
***EE** (kcal/day) *rest*	1265.66 ± 282.00	1482.85 ± 357.39
***EE** (kcal/day) *intervention*	1243.58 ± 249.94	1488.58 ± 346.12
***EE** (kcal/day) *control*	1274.95 ± 278.71	1492.43 ± 398.15
$\dot{V}CO_2$ (mL/kg/min) *rest*	149.88 ± 25.78	155.78 ± 41.59
$\dot{V}CO_2$ (mL/kg/min) *intervention*	144.97 ± 21.37	152.61 ± 45.10
$\dot{V}CO_2$ (mL/kg/min) *control*	148.10 ± 27.44	153.86 ± 48.86
*†**RQ** *rest*	0.82±0.15	0.70±0.05
***RQ** *intervention*	0.82±0.15	0.68±0.05
***RQ** *control*	0.80±0.15	0.68±0.06
Physiological values[a]		
***MAP**(mmHg) *rest*	84.09 ± 12.76	75.43 ± 9.15
***MAP**(mmHg) *intervention*	84.95 ± 13.39	76.06± 10.52
***MAP**(mmHg) *control*	83.7619 ± 13.61	75.18 ± 9.50
HR (bpm) *rest*	88.24 ± 11.48	88.24 ± 19.82
HR (bpm) *intervention*	90.95 ± 14.73	84.81 ± 18.79
HR (bpm) *control*	89.90 ± 13.18	87.19 ± 20.27
MV (L/min) *rest*	8.47 ± 1.98	9.68 ± 2.92
MV (L/min) *intervention*	8.34 ± 1.99	9.42 ± 2.75
MV (L/min) *control*	8.16 ± 2.04	9.79 ± 2.84
SpO_2 *rest*	96.57 ± 2.13	96.37 ± 1.89
SpO_2 *intervention*	96.90 ± 1.99	96.68 ± 1.85
SpO_2 *control*	97.23 ± 2.36	96.62 ± 1.78

SAPS: Simplified Acute Physiology Score; **SOFA**: Sepsis-related Organ Failure Assessment; **ICU**: intensive care unit; **$\dot{V}O_2$**: Oxygen consumption, **EE**: Energy expenditure; **$\dot{V}CO_2$**:Carbon dioxide production; **RQ**: Respiratory Quotient; **MAP**: Mean Arterial Pressure; **HR**: Heart Rate; **MV**: Minute ventilation; **SpO_2**: Oxygen Saturation.

[a] Values expressed as mean ± SD

[b] Values expressed as number (percentage)

*p<0.005 comparisons between groups sepsis and septic shock >72h and septic shock<72h.

†p<0.005 comparisons between RQ rest and intervention in septic shock <72 hours.

Utilization of the Coma Recovery Scale – Revised Across Various Specialty ICUs to Optimize Patient Engagement

Marybeth Moscirella, OTD, OTR/L and Kelly Casey, OTD, OTR/L, BCPR, ATP, CPAM
Department of Physical Medicine and Rehabilitation, The Johns Hopkins Hospital

Background:

- The Coma Recovery Scale – Revised (CRS-R)[1] is an interdisciplinary standardized assessment used with patients with disorders of consciousness (e.g., minimally conscious state, emerging conscious state, coma).
  - The CRS-R has been more commonly utilized in the neurological critical care population.
  - In the critical care environment, the CRS-R can be utilized for patients with decreased arousal, awareness, and/or responsiveness, even without a formal disorder of consciousness.[2]
- The CRS-R measures auditory function, visual function, motor function, oral motor/verbal function, communication skills, and arousal levels in a hierarchical manner, all of which are necessary to optimize patient engagement.
  - Research shows these functions return in hierarchical manner.[3] This assessment helps guide clinical decision machining in terms of recovery.[4]

Assessment:

AUDITORY FUNCTION SCALE
4 – Consistent Movement to Command▪
3 – Reproducible Movement to Command▪
2 – Localization to Sound
1 – Auditory Startle
0 – None
VISUAL FUNCTION SCALE
5 – Object Recognition▪
4 – Object localization: Reaching*
3 – Visual Pursuit*
2 – Fixation*
1 – Visual Startle
0 – None
MOTOR FUNCTION SCALE
6 – Functional Object Use†
5 – Automatic Motor Response*
4 – Object Manipulation*
3 – Localisation to Noxious Stimulation*
2 – Flexion Withdrawal
1 – Abnormal Posturing
0 – None

OROMOTOR/VERBAL FUNCTION SCALE
3 – Intelligible Verbalization▪
2 – Vocalization/Oral Movement
1 – Oral Reflexive Movement
0 – None
COMMUNICATION SCALE
2 – Functional: Accurate†
1 – Non-functional: Intentional▪
0 – None
AROUSAL SCALE
3 – Attention
2 – Eye Opening w/o Stimulation
1 – Eye Opening with Stimulation
0 – Unarousable

Assessment areas examined during CRS-R administration

An OT completing the visual function section of the CRS-R with a patient

Patient Cases:

- **Oncological ICU Case**: thrombotic thrombocytopenic purpura complicated by stroke and aspiration pneumonia
  - Initial CRS-R score: 11/23
  - Final CRS-R score: 17/23
- **Medical ICU Case**: acute decompensated heart failure complicated by acute respiratory failure
  - Initial CRS-R score: 4/23
  - Final CRS-R score: 13/23
- **Surgical ICU Case**: spinal cord injury complicated by microinfarcts in brain due to fat embolism syndrome
  - Initial CRS-R score: 4/23
  - Final CRS-R score: 15/23
- Additional potentially relevant diagnoses
  - COVID-19 (e.g., s/p prone positioning and medically-induced paralysis, s/p ECMO)
  - Encephalopathy due to liver failure (pre- or post-transplant)
  - Septic shock and/or infection

Treatment Ideas:

Assessment Area	Example Interventions
Auditory function	Follow one-step commands ~50% trials
Visual function	Track care partner in room
Motor function	Grasp call bell
Oral motor/verbal function	Lip closure around toothbrush
Communication skills	Respond to ~50% yes/no questions
Arousal	Eyes open in response to voice

Clinical Implications:

- In all types of ICUs the CRS-R benefits patients with low levels of arousal regardless of medical etiology.
- The CRS-R assesses performance and guides treatment for patients with low levels of arousal to optimize patient engagement and document sensitive changes tracking progress and guiding rehabilitation.
- The CRS-R can also be considered for patients on sedation, depending on the purpose and type of sedation. Documentation of the medication (type, dose, and time administered) present at the time of CRS-R administration is beneficial to reflect overall patient presentation.

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Non-Conventional Treatment in a Non-Conventional Time: Outcomes in a Covid-19 Ventilator Care Unit

Caitlyn Anderson, PT, DPT, NCS, GCS

BACKGROUND & PURPOSE

The purpose of this report is to outline the unique scenario in which the interdisciplinary team required innovative thinking to manage early best patient (pt) care practices in the COVID-19 ventilator care unit (VCU) at a large, urban teaching hospital. The VCU consisted of critically-ill pts who required continued weaning from mechanical ventilation (MV) while receiving therapy services. Utilization of bi-daily team rounds with coordination between physicians, respiratory therapists (RT), nursing, and physical therapy (PT) allowed for creation of new clinical practices to maximize pt mobility despite no guiding literature.

Adjustments to Mechanical Vent Parameters for PT Treatment

Non-COVID/ Conventional Parameters	→	COVID
FiO2 40-70%	→	FiO2 80-100% with 15L Non-rebreather for recovery
PEEP 5-8	→	PEEP up to 10
Pressure Support	→	Pressure Support <–> Pressure Control

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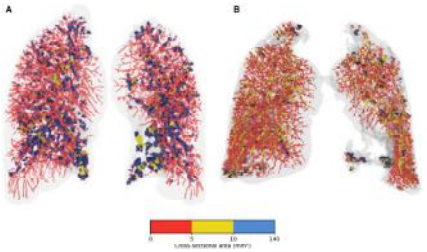
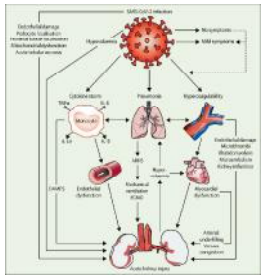
For a full list of references please email: caitand21@gmail.com

Blood Flow and Oxygen Exchange in Normal vs. Covid-19 Lungs



Wauters et al 2020

Multi-system Effects of Covid-19



Ronco C,et al. 2020

Prolonged inflammatory and infectious state of lungs → Decreased blood flow + Decreased oxygen exchange + Fibrotic changes → Prolonged ventilation

In the complex COVID-19 patient population, PT intervention was tolerated despite unconventionally high mechanical vent settings

OUTCOMES

- 10 patients successfully weaned to tracheostomy mask/supplemental oxygen within 2 weeks & passey-muir valve in 3 weeks despite >80 day ICU length of stay
- Increased tolerance to bi-daily treatment, increased mobility outside of therapy sessions
- Improved AMPAC scores, decreased incidence of delirium
- Improved mood, cognition, participation
- Able to be discharged to acute inpatient rehabilitation instead of long-term acute care hospital

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The Use and Usefulness of ICU Diaries to Support Family Members of Critically Ill Patients

Susan E. Piras PhD, RN, CNE; Kristin Storey, RN, BSN, CCRN; Linda Brown RN, BSN, CCRN; and Carisa Carlile RN, BSN

Tennessee Tech University and Cookeville Regional Medical Center

Background

- Cognitive impairment occurs in 30-80% of Intensive Care Unit (ICU) survivors.[1]
- Up to 30% of family members of critical illness survivors experience stress, anxiety, depression, and complicated grief. [2]
- ICU diary use can reduce symptoms of psychological distress in patients and family members.[3]
- There is a lack of evidence to guide the design of ICU diary interventions.

An adaptation of the Systems Engineering Initiative for Patient Safety (SEIPS) 2.0 model guided this study aimed to identify opportunities to optimize the structure, content, and process of ICU diary interventions.

The purpose of the study is to analyze and describe the use and usefulness of the ICU diary to support family members of critically ill patients.[5]

Methods

This qualitative content analysis study used triangulated data sources from three ICUs at two hospitals located in the Southeastern U.S. Data were collected from August 2018 through April 2019.

Triangulated sources included: (a) family member semi-structured interviews guided by the Family Interview Guide; (b) ICU unit field observations; and (c) ICU diary photographs.

Data were content analyzed using QSR International's NVivo 12 software with iterative category development for person, task, tool, and context.[5]

Results

	Site 1	Site 2
		
Purpose	Benefit the patient	Benefit the family and patient
Initiation	High risk for PICS	All ICU patients
Users	Staff, some family	Family members, some staff
Entries	Dependent on staff	Dependent on family
Perceived use	Benefits the patient	Benefits the family and the patient
Format	Unstructured, open	Structured, directive
Iterations	One diary	Can have multiple diaries
Portability	Not portable	Portable
Adaptability	Highly adaptable	Less adaptable
Control	Controlled by staff	Controlled by family members
Instructions	Verbal, textual	Verbal, diary structure
Distribution	Nurse	Unit Secretary

Usefulness of the ICU Diary

Barriers & Facilitators of ICU Diary Use

Person-Patient		**Tool**	
Biomedical	10 (53)	Access and Availability	14 (74)
Attitudes, Limitations	6 (32)	Usability	13 (68)
		Completeness	8 (42)
Person-Family			
Knowledge, Experience	15 (78)	**Context**	
Availability	14 (74)	Rules, Roles, Routines	11 (58)
Relationship Patient	9 (47)	Ownership, Control	9 (47)
		Physical Environment	8 (42)
Person-Staff		Concerns for Privacy	5 (26)
Supportiveness	9 (47)	Family Relationships	4 (21)
Task			
Task Instructions	10 (53)		
Task Difficulty, Ambiguity	10 (53)		
Task Timing	9 (47)		
Task Conflicts	8 (42)		

Discussion

1. The ICU diary is a multifunctional tool for patients and family members that reduces stress, tracks information, and communicates with staff and the patient survivors.

2. The two hospitals approached diary design, initiation, ownership, and availability differently.

ICU diary use is supported by several factors:

- Person factors: patient distress and family support
- Task factors: who, what, and when to journal?
- Tool factors: ease of use. and adaptability
- Context factors: privacy and control

Recommendations for ICU design include:

- Structure for privacy, adaptability, and usability
- Support information tracking, emotional expression, communication, and tracking medical information
- Include protocols for accessibility, prompt initiation, and staff instruction and support.[5]

Conclusion

Our systems approach suggests the ICU diary (tool) is useful to support emotional coping (person), information management (task), and communication (organization).

During the Covid 19 pandemic, staff entries to the diary may be more meaningful to the family due to patient isolation.

References

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Creative Re-purposing of Common ICU Equipment to Facilitate Rehab Interventions

David Zemmel, PT, MS, CCS

INTRODUCTION

It can be said that one of the hallmarks of a great clinician is not only clinical skill, knowledge, and experience but the ability to "think outside the box". Creative thinking can help overcome problems and obstacles thereby improving patient care and outcomes.

OBJECTIVES

To demonstrate that items, supplies, devices , and equipment commonly found in the ICU can be re-purposed to facilitate and enhance early mobility in the ICU.

Fig 1. Air Tap patient positioning device used in conjunction with a standing bed becomes a leg press machine. Difficulty is adjusted by changing the angle of the bed. The Air Tap eliminates friction between the patient and the bed.

MATERIALS AND METHODS

Saline bags become dumbbells, splint material and pulse oximeter forehead sensor straps are fabricated into cannula stabilization devices, spare parts from AMBU bags are fabricated into PEEP masks, and the Air Tap patient transfer device is enlisted to become an in bed leg press machine.

Fig 2. Splint material is molded into an "ECMO Snorkel" cannula stabilization device.

Fig 3. Pulse oximeter forehead sensor strap is used to secure an ECMO cannula increasing patient comfort and safety.

Fig 4. PEEP mask fabricated from AMBU bag spare parts allows the clinician to adjust PEEP and deliver O2 as indicated. Used successfully in COPD patients with severe air trapping.

RESULTS

Utilizing readily available re-purposed items in the care of highly complex patients has allowed for improved mobility, strengthening, and enhanced safety, while saving time and money.

CONCLUSIONS

Re-purposing commonly found items is an effective and efficient means of enhancing patient care in the ICU. It can also serve to fill a void when needed equipment is not available. Necessity is indeed the mother of invention.

Fig 5. Saline bags become "Salt Water Dumbbells". Easy to hold and soft if accidentally dropped. 250cc=0.5lb 500cc= 1.1lb 1000cc=2.2lb

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NewYork-Presbyterian | COLUMBIA

Assessing Daily Living Skills Among Critical Illness Survivors: Self Report or Performance-Based Measures?

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BACKGROUND

- Critical illness survivors exhibit deficits in physical, cognitive, and mental health for months or years after acute illness.

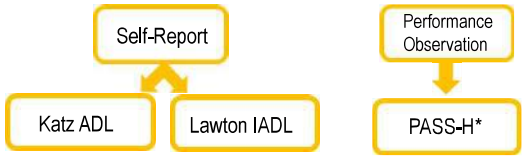
- Critical illness recovery clinics assess survivors for deficits in mobility, self-care, and cognition.
- Self-report assessments are often administered due to low cost and ease of administration.
- Accurate assessment of deficits is essential to ensure patients receive appropriate services to limit long-lasting disability.
- Little is known about the agreement between self-report and performance observation measures in critical illness survivors.

METHODS

PARTICIPANTS

Community- dwelling adults, aged 18+, followed at the Critical Illness Recovery Center, UPMC Mercy. Recent admission to ICU (>4 days) with a diagnosis of sepsis, delirium, or respiratory failure.

MEASURES



STATISTICAL ANALYSIS

Percent agreement between Katz ADL and Lawton IADL items and PASS-H items were computed using SPSS Software. An a priori benchmark for meaningful agreement was set at or above 80%.

* PASS-H = Performance Assessment of Self Care Skills – Home

Objective:

To compare self-report and performance-observed disability in daily living skills in critical illness survivors.

RESULTS

Percent agreement between self-report and performance observation assessment was low to moderate in critical illness survivors.

n = 6 participants

Mean age, years 58.5 (23.18)

Race (n) Black, African Am (3) White (3)

No participants lived alone

Domain	Item	Percent Agreement
Mobility	Bed Mobility	50%
Self-Care	Dressing	60%
CIADL	Shopping	0%
	Bill pay by check	0%
	Checkbook balancing	33%
	Medication management	17%
	Telephone use	50%
PIADL	Sweeping	50%

Shaded items indicate ability to perform task was **underreported** during self-report assessment

Critical illness survivors **performed** tasks with greater independence than they **self-reported.**

Lowest agreement was found with cognitive instrumental activities of daily living, such as medication management, shopping, and bill pay

KEY TAKEAWAYS

When assessing disability of daily living skills, keep in mind:

- Self report ≠ performance observation
- Critical illness survivors underreport functional ability
- Lowest agreement when assessing cognitive daily living skills

Why is this important?

Accurate assessment is imperative to detecting disability and ensuring appropriate follow-up services. Rehabilitation interventions can be designed effectively when clinicians are aware of existing disability.

Implications for practice:

1. Self-report & performance observation assessment differ in critical illness survivors.
2. Clinicians & researchers should interpret self-report measures of daily living skills with discretion, specifically cognitive daily living skills.
3. Performance observation measures can assess ability to perform cognitive daily living activities with critical illness survivors.

FUTURE DIRECTIONS

Future research should explore the relationship between learned helplessness from critical illness and under-reporting the ability to complete daily activities.

LIMITATIONS

Small sample size limits the generalizability of these results and conclusions. However, these findings are similar to larger samples of older adults with acute and chronic conditions.

ACKNOWLEDGEMENTS

Thank you to our participants and their families. Thank you to the University of Pittsburgh's Occupational Therapy Department and UPMC Mercy Critical Illness Recovery Center.
*References available upon request

Physical Rehabilitation Interventions in Pediatric Critical Care Research: A scoping review of methodology and reporting

Take a picture to download the full paper

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INTRODUCTION

- There is **significant interest in physical rehabilitation (PR) interventions** and their efficacy in minimizing PICU-acquired complications and optimizing functional outcomes in critically ill children
- **PR interventions are complex**, multifaceted, and tailored within patients when applied to a heterogenous population of critically ill children
- **PR interventions are not reported in a consistent manner** in critical care publications. This **variability in reporting** has been identified as a **barrier to evaluating PR intervention efficacy.**[1-3]

AIMS

- To describe the **extent and nature of PR research in critically ill children**
- To describe the **outcomes** evaluated and **completeness of PR intervention reporting**

METHODS

Study Selection

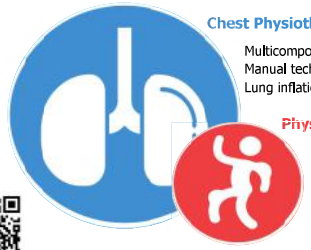
- **5 databases** (MEDLINE, CINAHL, AMED, EMBASE, PEDro) from inception to December 2018
- Prospective studies evaluating **any PR intervention in the PICU**
- Citation screening and data abstraction was performed in duplicate

Primary Outcomes

- **Types of PR interventions**
- **Stated study primary outcomes** – Where possible, outcomes were coded according to the WHO International Classification of Functioning, Disability and Health Framework (Child and Youth version; ICF-CY)
- **Completeness of PR intervention reporting** – Assessed using the Consensus on Exercise Reporting Template (CERT)
- **Quality of study reporting** – Assessed using standardized tools: CONSORT for RCTs and non-randomized trials; STROBE for observational studies; and SQUIRE for QI studies.
- Reporting classified as good (≥70%), moderate (50-70%), or poor (≤50%)

RESULTS

FIGURE 1. Physical Rehabilitation Interventions Studied, n (%)



Chest Physiotherapy	**11 (55.0)**
Multicomponent	8 (72.7)
Manual techniques	2 (18.2)
Lung inflation	1 (9.1)
Physical Activity	**9 (45.0)**
Progressive mobility	5 (55.6)
Active intervention	1 (11.1)
Passive intervention	1 (11.1)
In-bed cycling	1 (11.1)
Multicomponent	1 (11.1)

Scan this QR code for detailed intervention category descriptions

We identified **only 20 studies** evaluating PR interventions in critically ill children

PR studies were **small**, **single-centered**, focused on **chest physiotherapy** interventions, and evaluated **surrogate functional outcomes**

PR interventions are inadequately reported in PICU studies—especially in control groups—impacting appraisal and replication of interventions in clinical practice

Quality of intervention reporting in future research may be improved by using **standardized reporting frameworks for rehabilitation interventions** (e.g. CERT)

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RESULTS

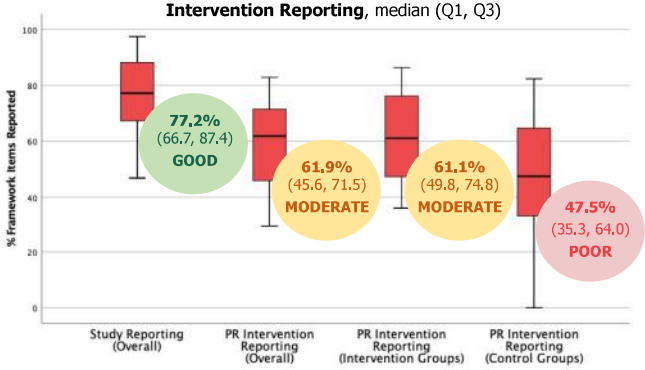
TABLE 1. Study Designs and Stated Outcomes

Study Design, n (%)	
RCT	7 (35.0)
Observational	7 (35.0)
Quality improvement	5 (25.0)
Non-randomized trial	1 (5.0)
Stated Outcomes, n (%)	
ICF-CY Categorized Outcomes	
Body structure and function	20 (50.0)
Environmental factors	5 (12.5)
Personal factors	1 (2.5)
Other Outcomes	
Methodology	5 (12.5)
Safety	5 (12.5)
Process measures	4 (10.0)

- **1,886** full texts screened for eligibility. **20 pediatric studies** met eligibility criteria, enrolling **2,644 participants.**
- Median (Q1, Q3) sample size was **57** (44, 104) and participant age was **19.2 months** (9.8, 57.1)
- **All studies** were single-centered

- **40 outcomes** reported amongst included studies: **10 studies reported a single primary outcome**, 4 reported co-primary outcomes, and 6 reported multiple outcomes without specifying a primary outcome.
- Most outcomes assessed the ICF-CY domain "Body Structure and Function," commonly by **physiologic markers** of cardiorespiratory function. **No studies** evaluated the "Activity and Participation" ICF-CY domain.
- **Only 2 studies** reported on any outcomes after PICU discharge, of which **only 1 study** reported on a functional outcome.

FIGURE 2. Quality of Study and Physical Rehabilitation Intervention Reporting, median (Q1, Q3)



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