Physical Rehabilitation Interventions in the Intensive Care Unit: A Scoping Review of 96 Prospective Studies

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Rationale: Physical rehabilitation (PR) interventions in the intensive care unit (ICU) can improve patients' functional outcomes. Yet, a systematic review (SR) of 7 ICU PR randomized clinical trials (RCTs) identified discordant effects, which could be due to intervention differences (PLoS One. 2015.1;10(7):e0130722). Authors cited inconsistencies in PR reporting and measurement as barriers to understanding the types and amounts of PR provided in the ICU in these trials. While SRs of ICU PR interventions evaluate focused questions of effectiveness, scoping reviews address broader questions of the extent of research activity in a field. We conducted a scoping review to understand the range of PR interventions in ICU patients. Methods: We searched 5 electronic databases from inception to May 2016 for prospective studies including adults with critical illness receiving mechanical ventilation, reporting PR initiated in the ICU, with or without a comparator. Eligible interventions included neuromuscular electrical stimulation (NMES), passive/active exercises, sitting, cycling, progressive mobility, or multicomponent (2 or more). Two reviewers independently screened all titles, abstracts, and full-texts for inclusion. We abstracted characteristics of studies and interventions. For RCTs, we used CONSORT (Consolidated Standards of Reporting Trials) and CERT (Consensus on Exercise Reporting Template) to assess the reporting quality of studies and interventions, respectively. For CERT, we assessed intervention and control groups separately. An independent reviewer assessed abstracted data for accuracy. Results: We identified 58,839 citations and reviewed 1,284 in full-text. Ninety-six studies met inclusion criteria; 35% were from the United States (US) and 93% were single-center with a median [1st,3rd quartiles] sample size of 50[23,105] patients. We identified 33 RCTs, 25 case series, 8 two-group comparison, 11 before-after, and 19 cohort studies. The most common interventions were (n,% overall, [n,% RCTs]): NMES (17,18%, [14,82%]), progressive mobility (31,32%, [3,10%]), and multi-component (29,30%, [11,38%]). No study reported the same intervention protocol. By CONSORT, the best reported items in 33 RCTs were (%) eligibility (97%) and baseline data (97%). The worst reported were harms (52%) and intervention/control group descriptions (39%). By CERT, we identified important reporting discrepancies. Table 1 highlights 8 of 19 CERT items important for both clinicians and researchers to replicate interventions. Conclusions: Of 96 ICU PR intervention studies, many were from the US, were single-centered, and had small sample sizes. We identified important RCT reporting deficiencies that limit understanding of intervention and control groups. These limitations present challenges for clinicians implementing evidence-based interventions and for

researchers designing new trials.

CERT Item (Number)	Studies reporting item, n (%)	
	Intervention	Control
Description of intervention (8)	25 (76%)	13 (39%)
Intervention Provider (2)	21 (64%)	16 (48%)
Adherence measurement[a] (5)	10 (32%)	5 (16%)
Decision rules for determining progression[b] (7a)	10 (36%)	5 (18%)
Type and number of adverse events (11)	19 (58%)	13 (39%)
Dosage: Frequency (13)	31 (94%)	17 (52%)
Dosage: Intensity (13)	22 (67%)	9 (27%)
Dosage: Timing (13)	22 (67%)	18 (55%)
Dosage: Duration (13)	28 (85%)	15 (45%)
Decision rules for starting level (15)	20 (61%)	9 (27%)
Assessment of intervention delivery (16b)	17 (52%)	9 (27%)

Table 1. Adherence to selected CERT reporting items for 33 RCTs of PR in the ICU by intervention and control groups. All items have a denominator out of 33 unless otherwise indicated. [a] Adherence reporting not assessed for trials evaluating a single session of PR (denominator =31). [b] Reporting of decision rules for progression not assessed for studies evaluating passive interventions only (denominator =28). Abbreviations: CERT - Consensus on Exercise Reporting Template; RCTs - randomized clinical trials; PR - physical rehabilitation; ICU - intensive care unit

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