

Early Rehabilitation Program in Critical Patients: Effects on Length of Stay and Mortality. A Literature Review

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Background

Immobilisation and prolonged hospitalization predict adverse outcomes in critically ill patients.

Aims

The aim of this review was to assess if early mobilisation and rehabilitation, in Intensive Care unit or Acute care unit, could reduce the length of stay. The secondary outcomes evaluate the efficacy of intra-hospital and 3-months mortality after discharge and the health-related quality of life.

Methods

A literature search in Pub Med, Cochrane, PEDro, Web of Science, and Scopus was performed from March 2021 to March 11, 2023. Preferred Reporting Items for Systematic reviews and Meta- Analyses PRISMA was used. Results were expressed as a risk ratio (RR) with 95% confidence interval. Randomized and non- randomized study designs involving an adult patient population (age range 16-85 years) were included. The "Modified Cochrane Risk of Bias Tool" was used to evaluate the risk of bias in the various studies. Data were extracted from two reviewers, while statistical analysis was performed using Review Manager 5.4.3.

Results

From a total of 115 articles, through the inclusion criteria, 19 studies were selected (Tables 1 & 2). Pooled estimates suggested that early rehabilitation program reduced the length of hospital stay of 2.63 days (fourteen studies, 2183 total patients, 95% CI -2.42 to -1.78, $p < 0.05$) (Graph 1) The same program did not demonstrate statistical significance for in-hospital mortality (seven studies, 872 total patients, relative risk 0.79, 95% CI 0.55 to 1.15 $p 0.22$) (Graph 2). In contrast, for mortality 3 months after discharge, the efficacy is statistically significant (six articles, 1042 total patients, RR 0.74, 95% CI 0.56 to 0.97 $p 0.03$) (Graph 3). A high risk of Bias was calculated for the different items and in particular for the blinding of therapists and patients (Table 3) [1-10]. Concerning health related quality of life (hrqol) a qualitative analysis was carried out because of the lack of homogeneity of the data and the diversity of evaluation scales used in the articles. There are five studies evaluating hrqol. Four, as a rating scale, use the SF-36 (Chih-Cheng Lai, Geetha Kayambu, Neil J Greening, Willy Chou) and one uses the EuroQol-5D (Brummel) (Table 4) [11-19].

Table 1.

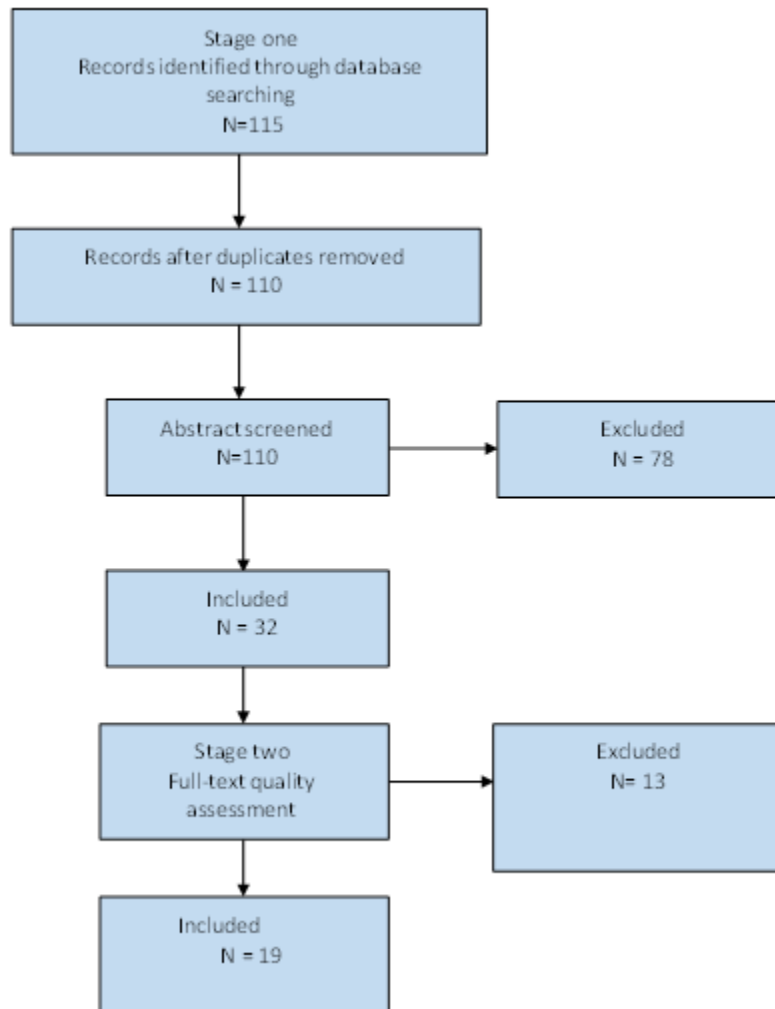


Table 2.

Lead author	Release date	Study type	Intervention carried out	Primary outcome	Secondary outcome	Operator who carried out the intervention Respiratory therapist
C.Burtin	2009	RCT	Respiratory therapy and mobilization	LOS	Functional state	Respiratory therapist
C.C Lai	2017	Observational and retrospective study	Early mobilization	LOS	QoL	Respiratory therapist
C. Sarfati	2018	RCT	Early mobilization	LOS	In-hospital mortality	Physical therapist
D. McWilliams	2018	RCT	Early physical therapy	LOS	In-hospital mortality and at 3 month	Physical therapist
W.D.Sche-weickert	2009	RCT	Early mobilization	LOS	-	Respiratory therapist and occupational therapist
C.M. Dantas	2012	RCT	Early mobilization	LOS	In-hospital mortality	Physical therapist
S.J.Schaller	2016	RCT	Early mobilization	LOS	Mortality at 3months	Physical therapist

G. Kayambu	2015	RCT	Early physical therapy, mobilization ed electrostimulation	QoL	Mortality at 3 months	Physical therapist
N.J.Greening	2014	RCT	Early physical therapy Early	LOS	Mortality at 3months; QoL	Physical therapist
Y. Pang	2019	RCT	Early mobilization	LOS	-	Unspecified
Z. Dong	2016	RCT	Early physical therapy	LOS	In-hospital mortality	Unspecified
N.E.Brummel	2013	RCT	Physical therapy and cognitive rehabilitation	QoL	-	Physical therapist and occupational therapist
Y.R. Silva	2012	RCT	Early mobilization, respiratory therapy	LOS	-	Physical therapist
S.M. Parry	2012	RCT	Early physical therapy	Muscular strength	-	Physical therapist
S.Eggmann	2018	RCT	Early mobilization	QoL	In-hospital mortality and at 3 months	Physical therapist
R.Camargo	2015	Observational and retrospective study	Early mobilization and respiratory therapy	LOS	In-hospital mortality and at 3 months	Physical therapist
W. Chou	2019	Observational and retrospective study	Respiratory therapy	LOS	-	Respiratory therapist
J.R. Corcoran	2016	Performance improvement project	Early mobilization	LOS	-	Respiratory therapist
P.E.Morris	2018	Prospective study of cohort	Multidisciplinary rehabilitation	LOS	-	Physical therapist

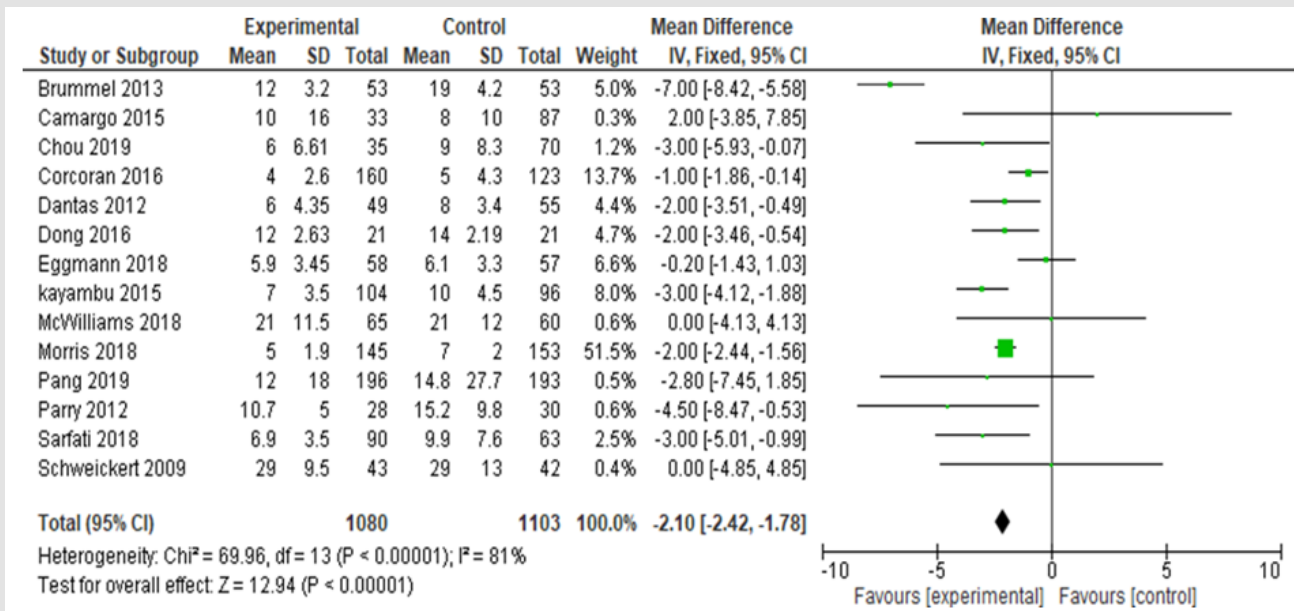
Table 3.

First Author	Year	Type of Study	Random Sequence Generation	Allocation Concelment	Selective Reporting	Other Sources of bias	Blinding (participants and personnel)	Blinding (outcome assessment)	Incomplete outcome data
1. Chris Burtin	2009	RCT							
2. Chih-Cheng Lai	2017	Retrospective observational study							
3. Céline Sarfati	2018	RCT							
4. DavidMcWilliams	2018	RCT							
5. William D Schweickert	2009	RCT							
6. Camila Moura Dantas	2012	RCT							
7. Stefan J Schaller	2016	RCT							
8. Geetha Kayambu	2015	RCT							
9. Neil J Greening	2014	RCT							
10. Yatao Pang	2019	RCT							
11. Zehua Dong	2016	RCT							
12. N. E. Brummel	2013	RCT							
13. Y.R. Silva	2012	RCT							
14. Selina M Parry	2012	RCT							

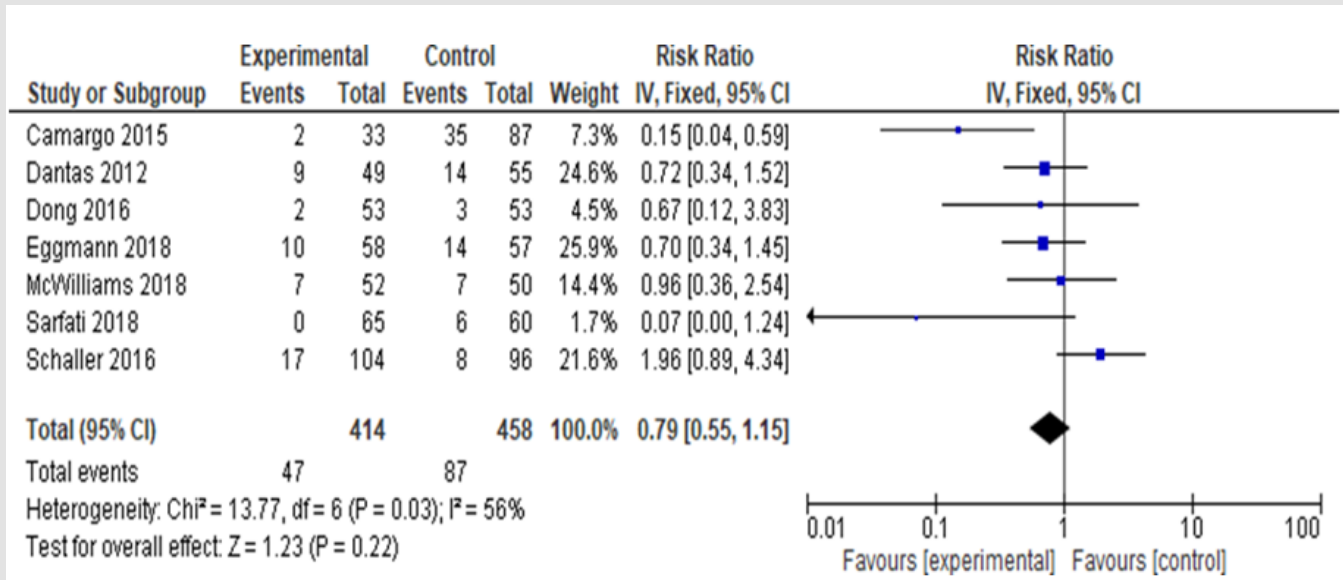
15. Sabrina Eggmann	2016	RCT							
16. Ruy Camargo Pires- Neto	2015	Observational study							
17. Willy Chou	2019	Observational study							
18. John R. Corcoran	2017	Performance Improvement Project							
19. Peter E. Morris	2008	Prospective cohort study							

Table 4.

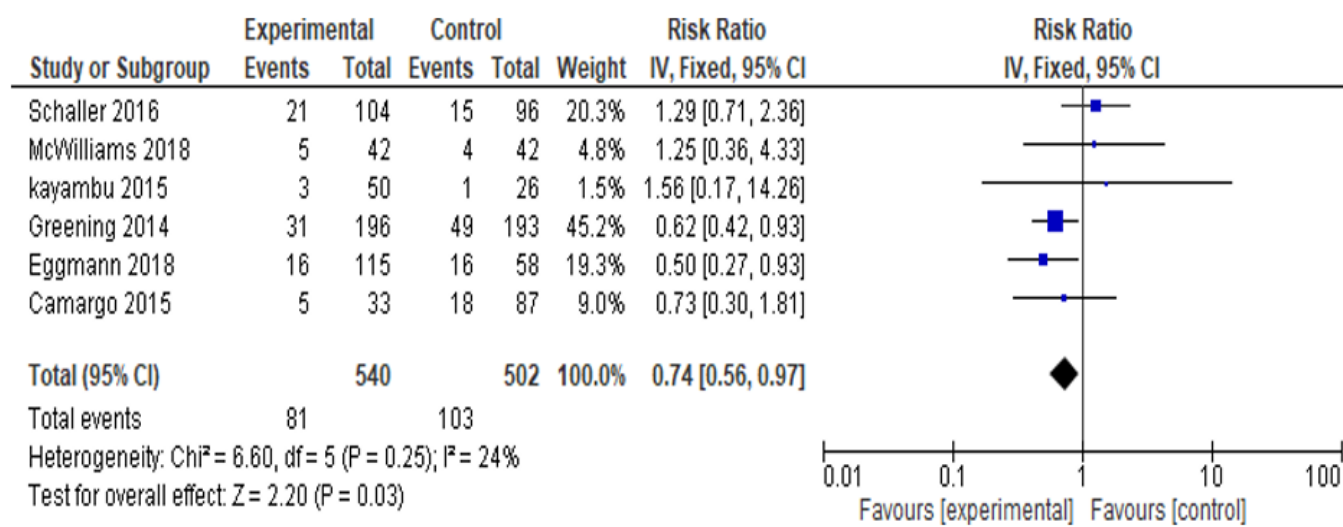
Chin-Cheng	Study	Control	Mean difference (95%CI)	P-value
Physical function SF 36	71 (68-73)	65(64-73)	6.00 [4.19, 7.81]	<0,01
Kayambu	Study	Control	Mean difference (95%CI)	P-value
Physical function SF 36	61.3 (18,4)	63 (19,9)	-1,7 [4.19, 7.81]	0,69
Greening	Study	Control	Mean difference (95%CI)	P-value
Physical function SF 36	81,8(22,2)	60,0(29,4)	21.80 [3.18, 40.42]	0,04
Willy Chou	Study	Control	Mean difference (95%CI)	P-value
Physical function SF 36	75(45,0-85,0)	75(50-85)	0.00 [-9.29, 9.29]	0,676
Brummel	Study	Control	Mean difference (95%CI)	P-value
Physical function HRQOL MCID	80(62-89)	75(54-80)	5.00 [-11.21, 21.21]	0,44



Graph 1: Length of stay.



Graph 2: In-hospital mortality.



Graph 3: Mortality after 3 months discharge.

Conclusion

Early rehabilitation was effective in reducing the length of stay and mortality 3 months after discharge, although it had no effect on in-hospital mortality and health-related quality of life. Early rehabilitation should be part of good clinical practice in intensive and acute care units.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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