

A UK Survey of Rehabilitation Following Critical Illness: Implementation of NICE Clinical Guidance 83 (CG83) Following Hospital Discharge

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DATA SUPPLEMENT

E1. Post hospital discharge follow-up services and rehabilitation programmes

Figure E1 reports available follow-up services and rehabilitation programmes for survivors of critical illness post hospital discharge.

E2. Detail on characteristics of available post hospital discharge rehabilitation programmes for survivors of critical illness

Leadership of, and enrolment into, post hospital discharge rehabilitation programmes

In the majority of cases (n=9) this was a senior ICU physiotherapist (median (IQR) duration ICU experience 7.0 (4.0-13.0) years). A rehabilitation physiotherapist led one programme. One programme reported additional involvement of an occupational therapist and a fitness instructor with three including critical care nurses. There were no other MDT members reported. Limited data were provided regarding enrolment criteria of patients into available rehabilitation programmes (*Table E1*).

Table E1. Enrolment criteria for post hospital discharge rehabilitation programmes

Eligibility criteria	n (%)	Detail of assessment measure
Duration mechanical ventilation	7 (70.0)	>5 days; >4 days; >3 days; 48hours
Duration ICU Admission	3 (30.0)	>5 days; >4 days
Duration hospital admission	2 (20.0)	“lengthened”
Physical function at ICU discharge	2 (20.0)	“reduced from pre-admission”
Muscle strength at ICU discharge	2 (20.0)	No detail provided
Exercise capacity at ICU discharge	2 (20.0)	No detail provided
HRQL at ICU discharge	0	-
Physical function at hospital discharge	4 (40.0)	No detail provided
Muscle strength at hospital discharge	3 (30.0)	No detail provided
Exercise capacity at hospital discharge	3 (30.0)	No detail provided
HRQL at hospital discharge	1 (10.0)	No detail provided
All patients eligible	1 (10.0)	“any ITU stay”
Other	2 (20.0)	“those with profound weakness or functional limitation regardless of LOS”; “screen for low or high risk throughout ICU/hospital stay. If high risk, exercise plan, goals and rehab class if suitable. All plus 2 day ICU are automatically sent SF8 and depending on score, either 1:1 follow up or group follow-up”

n=10 responses. Multiple criteria could be reported per response.

Abbreviations: ICU/ITU = intensive care/therapy unit. HRQL = health-related quality of life. LOS = length of stay. SF8 = Short Form-8 (health-related quality of life survey).

Format and structure of post hospital discharge rehabilitation programmes

Of the ten rehabilitation programmes, nine were hospital-based and one was home-based. Patients exercised under supervision in four programmes, and with a combination of supervised and independent exercise in the remaining six. Only one programme used an accompanying rehabilitation manual, however three others reported providing printed, individualised home exercises for patients. All programmes were designed specifically for post critical illness patients. None were combined with existing disease-specific services such as pulmonary or cardiac rehabilitation. Programmes started immediately (n=4), at one week (n=1), within two weeks (n=3), within one month (n=1) and at 2-3 months (n=1) post hospital discharge. The number of sessions in each programme varied from 6 to 12, excluding assessment sessions. Data were absent for two programmes. Three programmes had the capacity and flexibility to allow patients to continue until individual goals or target physical function level had been achieved. Typically sessions ran weekly (n=7) or twice-weekly (n=3). All programmes included sessions of one hour duration. Eight programmes were 'rolling' programmes and patients could start and finish the programme at any point in time. One was stand-alone such that cohorts of post critical illness patients all started and completed programmes together. No enrolment, initiation timing, frequency or duration data were reported for one programme.

Content and monitoring of post hospital discharge rehabilitation programmes

All rehabilitation programmes included an exercise component, involving a combination of cardiovascular, muscle strength, whole body balance and functional activity (*Table E2*). Nine programmes incorporated at least two different forms of exercise prescription during the programme usually based on clinician judgement, sometime informed by results of walking

tests and physical function assessment. All programmes included at least two forms of patient monitoring during exercise sessions, based on a range of physiological and clinical factors. Seven programmes used target rates of perceived exertion with four programmes using oxygen saturation levels and 3 programmes monitoring heart rate. In contrast, patient-related parameters were adopted in 8 programmes which monitored exercise performance based on verbal feedback of the patient, 6 based on clinician judgement of the patient and 2 based on visual analogue scales undertaken by the patient.

Surprisingly, less than half of all programmes included an education component (n=4). A range of topics were covered including exercise, stress management and relaxation, nutrition, return to work, energy conservation, medications, recovery following critical illness, smoking cessation, managing breathlessness and breathing control, delivered predominantly by physiotherapists but with additional input from occupational therapist and nursing colleagues.

Group size

Group size and staff-to-patient ratio was also highly variable between the 10 post rehabilitation programmes. One programme incorporated a 1:1 staff-to-patient ratio whilst another adopted a flexible approach that depended on the complexity of the patient and individual rehabilitation needs. Across the remaining programmes group sizes ranged from 5 to 14 patients with one qualified staff member for every 3 patients. Seven of the ten programmes adopted patient-specific exercise plans, whilst the remaining three reported that patients exercised in a pre-determined circuit.

Table E2. Exercise component and evaluation of post hospital discharge rehabilitation programmes

Category of exercise	Specific exercise	n (%)
Cardiovascular	Static bike	10 (100.0)
	Step-ups	9 (90.0)
	Treadmill	7 (70.0)
	Cross-trainer	2 (20.0)
Strength	Lower limb	10 (100.0)
	Upper limb	10 (100.0)
	Theraband/resistance	9 (90.0)
	Free weights	7 (70.0)
Balance	Dynamic	9 (90.0)
	Static	5 (50.0)
Functional	Sit-to-stand	8 (80.0)
	Walking	6 (60.0)
	Timed Up And Go	2 (20.0)
Outcome	Detail of outcome measure	n (%)
HRQL	SF-36, HADS, EQ5D, FIM, SF-8	10 (100.0)
Exercise capacity	6MWT; ISWT	9 (90.0)
Other	Achievement of patient-specific goals; BMI; Impacts of Events Score	3 (30.0)
Functional	TUAG; patient-specific goals	2 (20.0)
Strength	2 minute step-ups	1 (10.0)
Mental/cognitive	-	0

For exercise component and outcome measures, n=frequency of reported occurrence out of 10 responses. Multiple options could be listed per response.

Abbreviations: HRQL = health-related quality of life. 6MWT = Six Minute Walk Test. ISWT = Incremental Shuttle Walk Test. SF-36 = Short Form 36. HADS = Hospital Anxiety and Depression Scale. EQ5D = EuroQol 5 Dimensions. FIM = Functional Independence Measure. SF-8 = Short Form 8. TUAG = Timed Up And Go. BMI = body mass index.

Evaluation of post hospital discharge rehabilitation programmes

Four of the programmes reported reassessment of baseline measures as a form of evaluation of the programme. However, subjective clinician judgement was the most commonly utilised form of evaluation followed by the objective changes in walking tests and physical function. Physiological parameters, such as target perceived rate of exertion and heart rate, and results of balance assessments were used infrequently in the evaluation of the response to the rehabilitation programme. Exercise capacity and health-related quality of life outcome measures were the most commonly utilised. Interestingly, none of the programmes incorporated the use of the repetition maximum principle to prescribe strengthening exercises.

E3. Individual comments made by respondents regarding barriers to offering post hospital rehabilitation discharge services and use of alternative rehabilitation streams.

The following free-text comments were made by respondents regarding barrier to offering specific post hospital discharge rehabilitation programmes and further elucidate the themes of funding restriction, resource allocation/availability (including staffing) and strategic management priorities as key limiting factors. (Note: words in italics added by the author for full interpretation):

"...we at times struggle to fight for staff for in pt rehab (*in-patient rehabilitation*) let alone fight for a budget for op (*out-patient*) care

"...we run a voluntary f-u (*follow-up*) clinic but have had to withdraw the rehab (*rehabilitation*) and psych (*psychology*) elements due to no (sic) support from therapy managers

"...despite extensive work the business case was declined

"...a rehab (*rehabilitation*) programme was run for 12m using charitable funds money. Ongoing funding was not secured as it was not deemed a Trust priority

"...historically no service available, no need established by current ICU services

"...and not considered required at managerial level; Some years ago charitable funding was available to open follow-up clinic to include rehab (*rehabilitation*) service but Trust board refused the 2 year funding as they could not commit to continuing to fund the service once the charitable monies expired. So the reason we didn't introduce the service at that time was a mix of funding and managerial issues. Currently I would think staffing would be another issue.

"...previously ran post ICU rehab (*rehabilitation*) class but had to stop because reduced staffing (prioritising in-pt) and difficult to get numbers (no transport provided)

"...The main barriers to this aspect are time constraints, lack of staff and funding alongside limited knowledge of potential co-morbidities following ICU stay. Critical Care follow up clinics do not take place in an adequate time frame in this trust and as such many people do not attend, therefore we are missing potential problems. Additionally the clinic is not an MDT run clinic, limiting clinical identification of potential problems.

"...absence of vertical integration of health and social care

"...not so much not considered as required - sure the team believe it's required just not enough resources

"6.5WTE PT (*6.5 whole-time equivalent physiotherapists*) in team covering 7 different ward specialities, 3x critical care areas, resp o/p (*respiratory out-patients*), resp pts (*respiratory patients*) in A&E/admissions

Other comments described the interaction between acute and primary care services, which in some cases offer a route for ongoing rehabilitation input, and clinical and logistical factors for consideration in determining need for specific critical care services:

"...inpt (in-patient) and outpt (out-patient) services are provided by two separate organisations, therefore although the inpt (*in-patient*) team would like to provide a service the community team will not lend support

"...pt (*patient*) needs met by other community services available

"...not sure if we would have individual class therefore combined with PR (*pulmonary rehabilitation*); we would like to set one-up

"...numbers are very small and tends to be post-op (*post-operative*); back to baseline 5/7 (*at five days*). not seen need to provide service separate to our IRS (*in-patient rehabilitation or integrated respiratory service*)

"...We have a follow up clinic run by our CCORT (*critical care outreach team*), but no physical rehab (*rehabilitation*) post D/C (*discharge*) home (unless needing regular community physio (*physiotherapy*) input)

"...very structured in hospital critical care rehab (*rehabilitation*) service to maximise pt (*patient*) status at hospital d/c (*discharge*), has significantly reduced LOS (*length of stay*), readmissions to critical care, QOL (*quality of life*) scores and ongoing co-morbidity/health problems. Insufficient numbers for group rehab (*rehabilitation*) specific to CCD (*critical care disease*) post d/c (*discharge*)

"...patients who need long-term rehab (*rehabilitation*) are followed up by community staff

"...we use PR (*pulmonary rehabilitation*) programme for many post ITU patients

"...cardiac patients go to CR (*cardiac rehabilitation*)