



REHABILITATION SERVICE MODELS FOR PEOPLE WITH PHYSICAL AND/OR MENTAL DISABILITY LIVING IN LOW- AND MIDDLE-INCOME COUNTRIES: A SYSTEMATIC REVIEW

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Objective: To compare models of rehabilitation services for people with mental and/or physical disability in order to determine optimal models for therapy and interventions in low- to middle-income countries.

Data sources: CINAHL, EMBASE, MEDLINE, CENTRAL, PsycINFO, Business Source Premier, HINARI, CEBHA and PubMed.

Study selection: Systematic reviews, randomized control trials and observational studies comparing >2 models of rehabilitation care in any language.

Date extraction: Standardized forms were used. Methodological quality was assessed using AMSTAR and quality of evidence was assessed using GRADE.

Data synthesis: Twenty-four systematic reviews which included 578 studies and 202,307 participants were selected. In addition, four primary studies were included to complement the gaps in the systematic reviews. The studies were all done at various countries. Moderate- to high-quality evidence supports the following models of rehabilitation services: psychological intervention in primary care settings for people with major depression, admission into an inpatient, multidisciplinary, specialized rehabilitation unit for those with recent onset of a severe disabling condition; outpatient rehabilitation with multidisciplinary care in the community, hospital or home is recommended for less severe conditions; However, a model of rehabilitation service that includes early discharge is not recommended for elderly patients with severe stroke, chronic obstructive pulmonary disease, hip fracture and total joints. **Conclusion:** Models of rehabilitation care in inpatient, multidisciplinary and specialized rehabilitation units are recommended for the treatment of severe conditions with recent onset, as they reduce mortality and the need for institutionalized care, especially among elderly patients, stroke patients, or those with chronic back pain. Results are expected to be generalizable for brain/spinal cord injury and complex fractures.

Key words: disabled persons; rehabilitation; rehabilitation centres; activities of daily living; delivery of healthcare; mortality; quality of life; disability.

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MAIN MESSAGE

We reviewed the published scientific literature to identify the best rehabilitation models for the World Health Organization guideline of Rehabilitation in Health Systems, which was released in 2017. Rehabilitation can be delivered in various different settings, for people with major depression it is better to receive psychological interventions in primary care; for people with a severe disabling condition, it is better to be admitted to an inpatient, multidisciplinary or specialized rehabilitation unit; for people with less disabling conditions, they can receive rehabilitation in outpatient settings with a multidisciplinary team. Elderly people with severe stroke and other diseases should not be discharged early from hospital. These results are especially important for low- and middle-income countries to know which rehabilitation model is better so they can invest their human and financial resources appropriately.

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Strong evidence is needed to inform the development and implementation of rehabilitation services worldwide. According to the World Report on Disability produced by the World Health Organization (WHO) and the World Bank, there are more than 1 billion people with disabilities in the world, of which approximately 80% live in low- and middle-income countries (LMIC) (1). The WHO Disability Action Plan 2014–2021 emphasizes the need for guidance to develop and strengthen rehabilitation services. It prioritizes: removing barriers and improving access to health services and programmes; strengthening and extending rehabilitation, habilitation, assistive technology, assistance and support services; and strengthening the collection of relevant and internationally-comparable data on disability and related services (2).

Evidence-informed programmatic guidelines play a critical role in strengthening rehabilitation services and outcomes, as they provide guidance to ensure that

programmes and services are appropriately timed and targeted to support optimal health, quality of life (QoL) and functional ability. This is of particular relevance in LMIC, where infrastructure, access to trained personnel, and finance is often limited and must be efficiently utilized. It is even more important to improve availability, accessibility and affordability of rehabilitation services in order to overcome barriers to referral, such as inaccessible locations, inadequate services, and the high costs of private rehabilitation (1). Many barriers to implementation of the WHO Disability Action Plan 2014–2021 have been identified by LMIC; for example, engagement of health professionals and institutions using a multi-sectorial approach, new partnerships, strategic collaboration, provision of technical assistance, future policy directions, and research and development (3).

A variety of rehabilitation service models exist for those with physical and/or mental disabilities; however, it is unknown which models of care are optimal for specific populations, settings and conditions. Although it would be desirable to evaluate the intrinsic compo-

nents of each rehabilitation service model (e.g. care plans and presence of gatekeeping function), it would be a monumental task to assess these components individually, and therefore we opted to study rehabilitation service models from a wider perspective.

This systematic review was conducted in response to a call by the WHO to provide best available evidence to support the development of new WHO guidelines on health-related rehabilitation models and services for people with physical and/or mental disabilities. Rehabilitation models and services include the place where rehabilitation is delivered (community-, hospital-, clinic or facility-based rehabilitation), the distribution system (integrated, decentralized or centralized services), the professional interactions (multidisciplinary or non-multidisciplinary), the levels of expertise offered (specialized units or general wards), and leadership and governance (integrated into health services or into social and welfare services).

This review describes best available evidence on rehabilitation service models and their optimal use for the

Table I. Inclusion and exclusion criteria

	Include	Exclude
Population (P)	<ul style="list-style-type: none"> All physical and mental disabilities Low-, middle-, high-income countries 	<ul style="list-style-type: none"> Newborns and infants (0–12 months). Morbid obesity Pregnancy Palliative care and end-of-life care Addictions
Intervention (I)	<p>Rehabilitation services:</p> <ul style="list-style-type: none"> Rehabilitation settings: hospital, community, long-term care, and hospices Catchment area: local, regional or national (federal) Location: rural or urban Provider affiliation: independent or university-affiliated Levels of healthcare: primary, secondary or tertiary care Phases of healthcare: acute, sub-acute, post-acute and long-term care. Models of rehabilitation in acute care were classified according to the European Union of Medical Specialists section of Physical and Rehabilitation Medicine: rehabilitation beds in acute hospital, mobile rehabilitation team, rehabilitation consultation to acute wards, and acute rehabilitation centre Levels of complexity in rehabilitation: Local General Rehabilitation, District Specialist Rehabilitation, Tertiary Specialized Rehabilitation Models of service delivery: inpatients, outpatients, day hospital, home-based, and community-based Disciplines: single discipline, multidisciplinary, interdisciplinary, transdisciplinary. 	
Comparisons (C)	<ul style="list-style-type: none"> (a1) Community-based rehabilitation (WHO definition) compared with hospital/clinic- or facility-based rehabilitation (a2) Community rehabilitation services compared with hospital/clinic- or facility-based rehabilitation (b) Integrated and decentralized services compared with centralized services (c) Multidisciplinary rehabilitation (including 2 or more professions) compared with single discipline rehabilitation (d) Specialized hospitals and units for rehabilitation for complex conditions compared with rehabilitation for complex conditions in general wards or non-specialized units (e) Rehabilitation services integrated into the health service compared with rehabilitation services integrated into the social or welfare service 	
Outcome (O)	<ul style="list-style-type: none"> Access to rehabilitation services Utilization of rehabilitation services and continuity of care Rehabilitation outcomes (e.g. prevention or slowing of the loss of function, improvement or restoration of function, compensation for lost function) Health outcomes (e.g. mortality, morbidity, and QoL) 	
Study design	<ul style="list-style-type: none"> Systematic reviews and meta-analyses Randomized controlled trials Non-randomized trials with a before-and-after measure Observational epidemiological studies with a control group (cohorts, case-controls or cross-sectional studies) Studies without a control group: administrative databases or analytic studies with subgroup analyses Mixed methods 	<ul style="list-style-type: none"> Case series Letters Commentaries Opinion pieces

treatment of physical/mental disability in LMIC. Evidence was used to inform the development of the 2017 WHO guidelines: Rehabilitation in Health Systems (4).

METHODS

This systematic review was designed using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist (5). The review protocol, including eligibility criteria, is available on request from the authors.

Data sources

Nine electronic databases were searched: CINAHL, EMBASE, MEDLINE, CENTRAL, PsycINFO, Business Source Premier, HINARI, CEBHA, and PubMed. Hand searching was used to capture grey literature and relevant reports. All literature published during 1994–2014 that met the inclusion criteria was included.

The search strategy for this review is shown in Appendix S1¹. Key terms were identified to populate the PICO categories (Population, Intervention, Comparison and Outcomes) and were combined as follows: all terms within a category were combined using a Boolean “OR” operator. The 4 categories were then combined with a Boolean “AND” operator, ensuring that captured articles contained at least 1 term from each of the categories. Searches were not limited by study design. All searches were conducted by an experienced librarian with input from the research team.

Complementary searches to find primary studies (randomized controlled trials (RCTs) or observational studies) were conducted in PubMed. A focused website review was conducted to ensure the inclusion of relevant reports. Additional searches were conducted in key websites, such as the Spinal Cord Injury Rehabilitation Evidence (SCIRE) website (6). Any additional articles of relevance were screened along with the other sources of literature. Grey literature and online resources are shown in Appendix S1¹.

Search results were downloaded into Reference Manager[®] (7) to remove duplicates, and were then uploaded to DistillerSR[®] (8), a web-based systematic review software designed for screening and data extraction phases. Inclusion and exclusion criteria were developed and pilot tested by the research team before screening began. Pilot results were compared and conflicting responses discussed until everyone was comfortable with the inclusion/exclusion criteria.

Reviewers completed a single review of titles and abstracts with quality checks, followed by a duplicate and independent review of all full texts.

Study selection

Systematic reviews, meta-analyses, RCTs, and non-randomized studies comparing 2 or more service delivery models meeting the PICO criteria were included, as shown in Table I.

Data extraction

Standardized data extraction forms were developed in conjunction with WHO staff, and pilot-tested by the team, who met regularly.

Two independent reviewers conducted quality appraisal and data extraction using standardized data extraction forms. Reviewers compared appraisal forms, discussed discrepancies, and achieved consensus. The following items were extracted: authors, country, year, LMIC yes/no, population, models of

care, outcomes and results, as well as information required for assessing quality of the study. RCTs and observational studies were assessed for the following risk of biases: selection, performance, measurement and attrition.

Critical appraisal

All systematic reviews were assessed using the AMSTAR criteria (9) to judge their methodological quality. When a systematic review did not conduct or report adequate critical appraisal of the included articles, researchers conducted an independent assessment using the Cochrane Collaboration Risk of Bias tool for selection, performance, measurement, attrition, and reporting biases.

Quality of evidence was assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) tool (10). Pre-specified criteria were used to judge the quality of the evidence, including study design, study limitations, inconsistency, indirectness, imprecision, and publication bias. The GRADE assessment reviewer guide is shown in Appendix S1¹. Given that this review was conducted to support rehabilitation guidelines for LMIC, outcomes that included studies conducted in high-income countries were downgraded due to indirectness. The quality of evidence for each comparison was categorized as follows:

- *High*: further research is very unlikely to change our confidence in the estimates of the effect.
- *Moderate*: further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
- *Low*: further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
- *Very low*: any estimate of effects is very uncertain.

The evidence available to answer each sub-question began the grading process with a “High” grade when the evidence was based on RCTs, and “Low” grade when the evidence started with observational studies. GRADE tables are shown in Appendix SII¹.

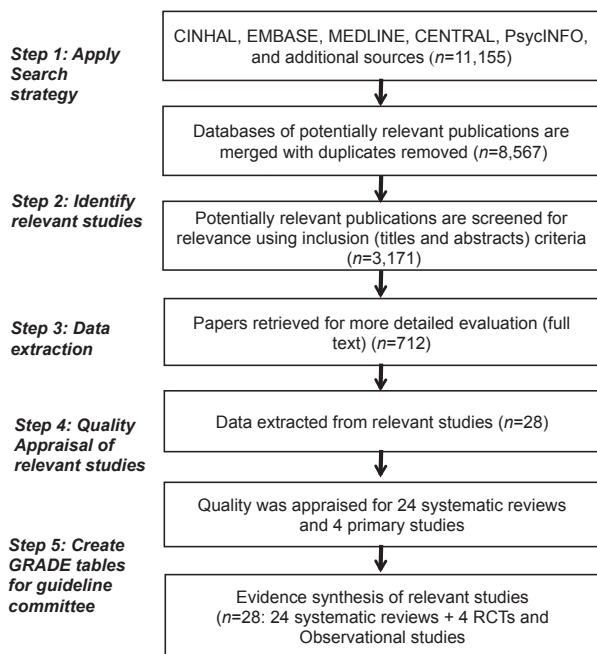


Fig. 1. Flowchart of studies for Population, Intervention, Comparison and Outcomes (PICO) question. RCT: randomized controlled trial.

¹<http://www.medicaljournals.se/jrm/content/?doi=10.2340/16501977-2325>

Table II. Characteristics of included studies

Study	Study design	Population	Models of care
<i>PICO (A) Community rehabilitation services compared with hospital/clinic- or facility-based rehabilitation</i>			
A1. Shepperd 2009 (11) AMSTAR: 9	Cochrane systematic review with meta-analyses Individual patient data meta-analyses	Stroke, chronic obstructive pulmonary disease, mixed, hip fracture and total joints. Excluded: obstetrics, paediatrics and mental health	Hospital at home. Early discharge from hospital with rehabilitation at home. The types of services provided by early discharge to hospital at home are designed to care for patients and provide coordinated rehabilitation with specialist care; the aim is to provide a service that relieves the pressure on acute hospital beds.
A2. Forster 2008 (12) AMSTAR: 9	Systematic review with meta-analysis Best-evidence synthesis	Elderly Post in-patient stroke	Day hospital care vs domiciliary care – where control patients received an approximately equivalent rehabilitation input within their own home or social day centre. Community-based rehabilitation interventions delivered by allied health professionals and/or nursing staff.
A2. Taylor 2010 (13) AMSTAR: 10	Cochrane systematic review with meta-analyses (published in Cochrane Library, BMJ and PubMed Central)	Cardiac conditions Coronary heart disease	Includes self-manual cardiac rehabilitation. Home-based self-manual cardiac rehabilitation programme compared with hospital-based cardiac rehabilitation programmes. Home-based cardiac rehabilitation compared with supervised centre-based rehabilitation and usual rehabilitation care.
A2. Doig 2010 (14) AMSTAR: 6	systematic review	Acquired brain injury	Day hospital (clinic-based out-patient care) compared with home-care, community treatment group compared with out-patient treatment.
A3. Fens 2013 (15) AMSTAR: 6	Systematic review	Stroke	Multidisciplinary care in the community compared with usual care.
A3. Beswick 2008 (16) AMSTAR 5	Systematic review with meta-analysis	Elderly people	Community-based complex interventions used to preserve physical function and independence.
A4. Smith 2007 (17) AMSTAR: 8	Cochrane systematic review	Disability	Shared-care health service interventions compared with primary or specialty care alone.
A5. Bortolotti 2008 (18) AMSTAR: 7	Systematic review with meta-analysis	Mental health: Major depression in primary care	Psychological care provided in primary care delivered by general practitioner or other primary care personnel compared with usual general practitioner (GP) care.
A6. MacPherson 2009 (19) AMSTAR: 8	Cochrane systematic review	Schizophrenia	Twenty-four-hour residential rehabilitation in hospital setting (normal house, intensive staff input with individual treatment programmes, involvement in domestic activities, good access to community day care/therapeutic facilities) compared with standard treatment in hospital setting.
A7, A8. Dieterich 2011 (20) AMSTAR: 11	Cochrane systematic review	Severely mentally ill people	Community-based package of care (intensive case management; ICM) for long-term care, compared with standard community care and compared with no ICM.
A8. Kozma 2009 (21) AMSTAR: 4	Systematic review	People with intellectual disability	Community-based services compared with congregate arrangements (institution).
A9. McConachie 2000 (22)	Randomized controlled trial	Young children with cerebral palsy in Bangladesh	Urban children were allocated to a daily centre-based mother-child group or to monthly training of their parents along with a pictorial guidance manual. Rural children were allocated either to parent training or health advice.
A9. Tang (23)	Randomized controlled trial	Children with motor or global developmental delay	Home programme plus institution-based therapy compared with institution-based therapy alone.
<i>PICO (B) Integrated and decentralized services compared with centralized services</i>			
Kruis 2013 (24) AMSTAR: 10	Cochrane systematic review	Chronic obstructive pulmonary disease	Integrated disease management interventions: a group of coherent interventions, designed to prevent or manage 1 or more chronic conditions using a community-wide, systematic and structured multidisciplinary approach potentially employing multiple treatment modalities. Comparison groups: varying from usual care or no treatment to single interventions, mono-disciplinary interventions.
Dubuc 2011 (25)	Quasi-experimental design (pre-test, multiple post-tests with a control group)	Older adults	Coordination-type integrated-service-delivery (ISD) network designed to manage and better match resources to the complex and evolving needs of elderly patients.
Binks 2007 (26) AMSTAR: 5	Systematic review	Spina bifida and cerebral palsy	New models of "cooperative care" that link primary care providers and local services to regionalized adult-centred specialty services.
Lawson 2011 (27)	Cross-sectional study	Families with children with special healthcare needs	Individualize care coordination was compared with standard care delivered by paediatricians' offices.
<i>PICO (C) Multidisciplinary rehabilitation (including 2 or more professions) compared with non-multidisciplinary rehabilitation</i>			
C1. Forster 2008 (12) AMSTAR: 9	Systematic review with meta-analysis	Older adults	Day hospital care vs no comprehensive elderly care, where control patients did not routinely have access to outpatient rehabilitation services. Outpatient day hospital: facility where older patients attend for a full or near full day and receive multidisciplinary rehabilitation in a healthcare setting.
C1. Bachmann 2010 (28) AMSTAR: 9	Systematic review with meta-analysis	Older adults	Inpatient rehabilitation compared with usual care. Rehabilitation was consisted of inpatient multidisciplinary programmes with active physiotherapy or occupational therapy, or both, according the WHO ICF framework Such programmes include a multidimensional geriatric assessment, stringent assignment to therapies, regular team meetings with all health professionals involved in the care of the patient, goal-setting tailored to the individual patient, interventions tailored to the patient's needs, and regular treatment evaluation with the care team and the patient.

Table II. *cont.*

Study	Study design	Population	Models of care
C1. Handoll 2009 (29) AMSTAR: 11	Cochrane systematic review with meta-analysis	Hip fracture in older adults	Co-ordinated multidisciplinary, specialized inpatient rehabilitation compared with usual (orthopaedic) care.
	Non-Cochrane systematic review		In-patient multidisciplinary rehabilitation supervised by a geriatrician or rehabilitation physician/clinician compared with ambulatory care settings. Multidisciplinary inpatient rehabilitation: services provided by a multidisciplinary team with the goal of reducing disability by improving task-oriented behaviour, for example, walking and dressing.
C2. Fens 2013 (15) (see also in PICO A) AMSTAR: 6	Systematic review	Stroke	Multidisciplinary care for stroke patients living in the community.
C2. Ng 2009 (30) AMSTAR: 10	Cochrane systematic review (observational studies only)	Amyotrophic lateral sclerosis or motor neurone disease (MND)	Multidisciplinary care compared with routinely available local services or lower levels of intervention. High- and low-intensity multidisciplinary rehabilitation: in "high-intensity", where there was input from at least 2 disciplines for a minimum of 30 minutes/session and total duration of at least 2–3 h of interrupted therapy/day for at least 4 days per week, and "low-intensity", where the intensity and duration was less than that provided in inpatient multidisciplinary care settings and was dependent on the type of setting and available resources.
C2. Turner-Stokes 2005 (31) AMSTAR: 9	Cochrane systematic review	Mixed population of acquired brain injury in younger adults	Organized multidisciplinary rehabilitation compared with absence of organized multidisciplinary rehabilitation.
C3. Kamper 2014 (32) AMSTAR: 10	Cochrane systematic review with meta-analysis	Chronic low back pain	Multidisciplinary biopsychosocial rehabilitation compared with usual care.
C3. Karjalainen 2010 (33) AMSTAR: 7	Cochrane systematic review	Neck and shoulder pain, working-age adults	Multidisciplinary biopsychosocial rehabilitation compared with other rehabilitation facilities. Biopsychosocial model: each intervention was executed by the professional of that discipline: psychologist with psychological or behavioural treatment, while a social worker, occupational nurse/therapist could perform the social intervention. An occupational nurse or physiotherapist specializing in occupational health could provide the vocational intervention. Multidisciplinary treatment is emphasized as a biopsychosocial treatment. The doctor needed to be part of the procedure, because he/she makes the diagnosis.
C3. Karjalainen 2008 (34) AMSTAR: 7	Cochrane systematic review	Sub-acute low back pain, working-age adults	Multidisciplinary biopsychosocial rehabilitation in-patient or out-patient (physician consultation in additional psychological, social, vocational intervention isolated or in combination) compared with other rehabilitation facilities. Graded 4-part activity programme: includes a measurement of functional capacity, work-place visit, back school education and a gradually intensifying exercise programme with operant-conditioning behavioural approach.
<i>PICO (D) Specialized hospitals and units for rehabilitation for complex conditions compared with rehabilitation for complex conditions in general wards or non-specialized units</i>			
D1. Stroke Unit Trialists' Collaboration 2013 (35) AMSTAR: 10	Cochrane systematic review with meta-analysis	Stroke	Organized inpatient multidisciplinary (provided by medical, nursing, and therapy staff) rehabilitation compared with: (1) no multidisciplinary team care, or (2) inpatient multidisciplinary care in a general rehabilitation ward.
	Non-Cochrane systematic reviews		Stroke unit (organized inpatient care) was characterized by: (1) coordinated multidisciplinary rehabilitation, (2) staff with a specialist interest in stroke or rehabilitation, (3) routine involvement of caregivers in the rehabilitation process and (4) regular programme of education and training.
D1. Wolfe 2012 (36)	Narrative review (grey literature)	Spinal cord injury (SCI)	Specialized rehabilitation units vs general non-specialized care units for people with SCI. SCI unit consists of an integrated, comprehensive system where expertise, facilities and equipment are focused on optimal patient care and cost-effectiveness.
D2. Puhan 2011 (37) AMSTAR: 9	Cochrane systematic review with meta-analysis	Chronic obstructive pulmonary disease (COPD)	In-patient or out-patient pulmonary rehabilitation vs convention community care (standard community care, general information about COPD) after acute exacerbation of COPD.
<i>PICO (E) Rehabilitation services integrated into the health service compared with rehabilitation services integrated into the social or welfare service</i>			
No study			

RESULTS

A total of 8,990 publications were screened and 740 articles were retrieved for full-text review. Of these, 24 systematic reviews and 4 primary studies were included. Fig. 1 shows the flow of articles according to the PRISMA guideline. The most common reason for exclusion was that 2 models of rehabilitation services

of interest were not compared. Included and excluded studies are listed in Appendix S1¹.

Study characteristics and assessment of risk of bias

Table II presents the characteristics of each systematic review and primary study including their individual AMSTAR appraisal outcomes. Table III shows extrac-

Table III. Data from included studies

Study	Data/results
<i>PICO (A) Community rehabilitation services compared with hospital/clinic- or facility-based rehabilitation</i>	
A1. Shepperd 2009 (11)	Risk of re-admission: 5 trials, 969 elderly people with a mix of conditions (RR: 1.35, 95% CI 1.03–1.76); for patients recovering from stroke there was no significant difference. Odds of death or dependency: Moderate stroke severity (OR 0.73, 95% CI 0.57–0.93). Severe stroke severity (OR 1.41, 95% CI 0.83–2.41). Risk of death or re-admission: 3 RCTs, 179 older people with stroke (RR 1.06, 95% CI 0.47–2.38); 4 RCTs, 357 older people with COPD (RR 0.83, 95% CI 0.61–1.13). Poor functioning (e.g. activities of daily living): 4 RCTs, 639 older people with a mix of health conditions (SMD 0.14 higher, 95% CI 0.02–0.3). Mortality: 6 RCTs, 1084 people with mixed conditions (RR 1.12, 95% CI 0.77–1.63) 4 RCTs, 416 people with COPD (RR 0.50, 95% CI 0.23–1.09).
A2. Forster 2008 (12)	Utilization of rehabilitation services (OR 0.87, 95% CI 0.54–1.4). Functional outcomes (OR 1.34, 95% CI 0.9–1.99). Health outcomes (OR 0.86, 95% CI 0.52–1.42).
A2. Taylor 2010 (13)	Adherence to treatment: 13 RCTs, 1620 patients (RR 1.02, 95% CI 0.99–1.06). Short-term – prevention or slowing of the loss of function: 14 RCTs, 1557 patients (SMD 0.11 lower, 95% CI 0.35–0.13). Long-term – Prevention or slowing of the loss of function: 3 RCTs, 1074 patients (SMD 0.11 higher, 95% CI 0.01–0.23). Mortality: 4 RCTs, 909 patients (RR 1.31, 95% CI 0.65–2.66).
A2. Doig 2010 (14)	Rehabilitation outcomes: 2 observational studies, 195 patients (no estimate provided).
A3. Fens 2013 (15)	Rehabilitation outcomes (function): 11 RCTs (no estimate provided). Health outcomes (QoL): 8 RCTs (no estimate provided).
A3. Beswick 2008 (16)	Reducing admissions to nursing homes: (RR 0.77 95% CI 0.64–0.91). Hospital admissions with usual care: (RR 0.95 95% CI 0.90–0.99). Not living at home after usual care: (RR 0.90 95% CI 0.82–0.99).
A4. Smith 2007 (17)	Access to rehabilitation (perception of met and unmet needs): 1 RCT, 322 people (intervention (mean) 1.49, control group (mean) 1.31, no standard deviation available, absolute difference 0.18, relative difference 14%). Continuity of care (proportion of patients attending pulmonary rehabilitation as per recommendations): 1 RCT, 135 people (OR 0.46, 95% CI 0.22–0.98). Utilization of rehabilitation services (hospital admissions): 6 RCTs, 1668 people (no estimate provided). Rehabilitation outcome (functional impairment and disability): 4 RCTs, 2877 people (no estimate provided). Health outcome (quality of life): 5 RCTs, 2717 people (no estimate provided).
A5. Bortolotti 2008 (18)	Short-term health outcome: 6 RCTs, 647 people (SMD 0.42 lower, 95% CI 0.59–0.26). Long-term health outcome: 6 RCTs, 727 people (SMD 0.3 lower, 95% CI 0.45–0.14).
A6. MacPherson 2009 (19)	Utilization of services and continuity of care, rehabilitation outcomes and health outcomes: 1 trial, 22 people (no estimate is provided).
A7. A8. Dieterich 2011 (20)	Intensive case management (ICM) Access to services: 9 RCTs, 1633 people (RR 0.43, 95% CI 0.3–0.61). Global assessment of functioning: 5 RCTs, 818 people (MD 3.41 higher, 95% CI 1.66–5.16). Utilization of services (days in hospital per month): 24 RCTs, 3595 people (MD 0.86 lower, 95% CI 1.37–0.34). Health outcome (mortality): 9 RCTs, 1456 people (RR 0.84, 95% CI 0.48–1.47). Access to rehabilitation services (reducing rate of loss to follow-up): 9 RCTs, 2195 people (RR 0.72 (95% CI 0.85–0.99). Community living: Semi-independent supporting living arrangements Utilization of rehabilitation services: 13 observational studies: 11 cross-sectional and 2 quantitative (no estimate provided). Resettlement from institution to community setting Health outcome (mortality): 7 observational studies (no estimate provided). Community setting vs institution Health outcome (mortality): 3 observational studies, 28,562 people (no estimate provided).
A8. Kozma 2009 (21)	Health outcome (QoL): 6 observational studies: 2 cross-sectional and 4 quantitative (no estimate provided).
A9. McConachie 2000 (22)	Health outcome (measured with Independent Behaviour Assessment Scale; IBAS) showed that distance training is no different from the control groups in rural or urban groups (mean difference (MD) 0.22 lower (1.02 lower to 0.57 higher)).
A9. Tang 2011 (23)	Rehabilitation outcomes (measured by the Comprehensive Developmental Inventory for Infant and Toddlers (CDIIT) and by the Pediatric Evaluation of Disability Inventory (PEDI): home activity programme added to institutional-based therapy is better at 12 weeks.
<i>PICO (B) Integrated and decentralized services compared with centralized services</i>	
Kruis 2013 (24)	Hospital admissions: (OR 0.68, 95% CI 0.47–0.99). Quality of Life: (MD 4.22 points, 95% CI 2.3–6.14). Mortality: (OR 0.96, 95% CI 0.52–1.74)
Dubuc 2011 (25)	Unmet needs: integrated-service-delivery (ISD) network reduces the number of elderly people with unmet needs and reduces the prevalence of unmet needs. Utilization of rehabilitation services and continuity of care: living in a community where there is an ISD network is better than living in a community without an ISD network.

Table III. cont.

Study	Data/results
Binks 2007 (26)	Meaningful transition experience: 2 qualitative studies (no estimate provided).
Lawson 2011 (27)	Unmet needs: no difference. Utilization of rehabilitation services: coordinated care is better.
<i>PICO (C) Multidisciplinary rehabilitation (including 2 or more professions) compared with non-multidisciplinary rehabilitation</i>	
C1. Forster 2008 (12)	Utilization of rehabilitation services and continuity of care (institutional care): 3 RCTs, 411 patients (OR 0.52, 95% CI 0.38–0.71). Rehabilitation outcomes (deterioration in activities of daily living): 2 RCTs, 262 patients (OR 0.76, 95% CI 0.56–1.05). Health outcomes (mortality): 3 RCTs, 530 patients (OR 0.86, 95% CI 0.6–1.22).
C1. Bachmann 2010 (28)	Utilization of rehabilitation services and continuity of care (admissions to nursing homes): 13 RCTs, 4033 people (RR 0.84, 0.72–0.99). Rehabilitation outcomes (functional status): 12 RCTs, 4039 people (RR 1.36, 95% CI 1.36–1.71). Measures of health outcomes (mortality): 15 RCTs, 2206 people (RR 0.87, 95% CI 0.77–0.97).
C1. Handoll 2009 (29)	Utilization of rehabilitation services and continuity of care (length of stay): 8 RCTs, 1663 people (no estimate provided). Utilization of rehabilitation services and continuity of care (re-admission to hospital): 6 RCTs, 629 people (RR 0.99, 95% CI 0.82–1.19). Rehabilitation outcomes (functional outcomes): 2 RCTs (The results for each study is given separately: Chinese Barthel Index (SD) – 90.53 (19.4); Modified Barthel Index – 95.3(9.8); Barthel scores at long-term follow-up: mean difference (95% CI): 6.17 (–0.86 to 13.20); mean difference (95% CI): 6.30 (–0.53 to 13.13)). Health outcomes (death or deterioration of function): 8 RCTs, 817 people (RR 0.89, 95% CI 0.78–1.01). Health outcome (mortality): 11 RCTs, 1143 people (RR 0.9, 95% CI 0.76–1.07). Accelerated discharge: Rehabilitation services (length of hospital stay): 1 RCT, 66 people (no estimate provided). Rehabilitation outcomes (function): 1 RCT, 56 people (no estimate provided). Health outcomes (mortality): 1 RCT, 66 people (no estimate provided).
C2. Fens 2013 (15) (See also in A)	Rehabilitation outcomes (function): 11 RCTs (no estimate provided). Health outcomes (QoL): 8 RCTs (no estimate provided).
C2. Ng 2009 (30)	<i>Low-intensity:</i> Rehabilitation services and continuity of care (fewer re-admissions and shorter length of stay): 2 observational studies (no estimate provided). Rehabilitation for health outcomes (QoL): 1 observational study (no estimate provided). Health outcomes (survival): 3 observational studies (no estimate provided). <i>High-intensity:</i> Rehabilitation outcomes (impairment and activity limitation): 1 observational study (no estimate provided).
C2. Turner-Stokes 2005 (31)	Rehabilitation outcomes (function): 1 RCT and 1 observational study (no estimate provided).
C3. Kamper 2014 (32)	Rehabilitation services and continuity of care: 2 RCTs, 226 patients (SMD 0.06 lower, 95% CI 0.32–0.2). Rehabilitation outcomes (function) in the short-term: 13 RCTs, 1879 patients (SMD 0.39 lower, 95% CI 0.68–0.1). Rehabilitation outcomes (function) in the long-term: 10 RCTs, 1169 patients (SMD 0.68 lower, 95% CI 1.19–0.16). Health outcomes (return-to-work): 8 RCTs, 1006 patients (OR 1.87, 95% CI 1.39–2.53).
C3. Karjalainen 2010 (33)	Rehabilitation outcomes (disability): 1 RCT, 66 people (SMD 0.6 higher, 95% CI 4.3–5.5).
C3. Karjalainen 2008 (34)	Rehabilitation outcomes (subjective disability): 1 RCT, 103 patients (MD 1.2 lower, 95% CI 1.98–0.42). Health outcomes (return-to-work): 1 RCT, 103 people (MD 5.1, 95% CI 10.59–0.39).
<i>PICO (D) Specialized hospitals and units for rehabilitation for complex conditions compared with rehabilitation for complex conditions in general wards or non-specialized units</i>	
D1. Stroke Unit Trialists' Collaboration 2013 (35)	Health outcomes (being alive): 23 RCTs, 4591 people (OR 0.81, 95% CI 0.69–0.94). Rehabilitation outcomes (being independent): 20 RCTs, 3510 people (OR 0.78, 95% CI 0.68–0.89). Rehabilitation outcomes (being at home): 17 RCTs, 5855 people (OR 0.78, 95% CI 0.68–0.89).
D1. Wolfe 2012 (36)	Rehabilitation services and continuity of care (length of hospital stay): 4 observational studies, 2,743 people (no estimate provided). Rehabilitation outcomes (functional status, including need for assistance in eating, grooming and impairment measured with the Barthel Index): 2 observational studies, 1138 people (no estimate provided). Health outcomes (reducing the occurrence of secondary complications such as pressure ulcers): 1 observational study, 800 people (no estimate provided).
D2. Puhan 2011 (37)	Utilization of rehabilitation services and continuity of care (reduce hospital admissions): 5 RCTs, 250 people (OR 0.22, 95% CI 0.08–0.58). Health outcomes (mortality): 3 RCTs, 110 patients (OR 0.28, 95% CI 0.1–0.84). Health outcome (QoL): 5 RCTs, 259 patients (MD 0.97 higher, 95% CI 0.35–1.58).
<i>PICO (E) Rehabilitation services integrated into the health service compared with rehabilitation services integrated into the social or welfare service</i>	
No study.	

OR: odds ratio; 95% CI: 95% confidence interval; QoL: quality of life; RCT: randomized controlled trial.

ted data and results for each PICO question. Individual GRADE tables are shown in Appendix SIII¹.

A. Community rehabilitation services compared with hospital-, clinic- or facility-based rehabilitation

A1. Hospital at home: Early discharge from hospital with rehabilitation at home. There is “moderate qua-

lity” evidence that providing services at home after being discharged early is associated with an increased risk of re-admission for people with severe stroke, chronic obstructive pulmonary disease, hip fracture and total joints (11). Subgroup analyses demonstrated a significant interaction ($p=0.04$) for stroke severity: there was a reduced likelihood of death or dependency in people with moderate stroke severity (initial Barthel

Index >9), but not in the severe subgroup (initial Barthel Index 0–9). There was also a significant interaction ($p=0.0002$) for the reduction in duration of hospital stay, which was much greater for the severe stroke subgroup (38). There is “low-quality” evidence that providing services to people at home after being discharged early is not associated with increased risk of death or re-admission in the subgroup of people with stroke, and older people with chronic obstructive pulmonary disease (COPD) (11). There is “low-quality” evidence that providing services to people at home after being discharged early is not associated with poor function, such as dressing or activities of daily living for older people with a mix of health conditions (11). There is “low-quality” evidence that providing services to people at home after being discharged early is not associated with increased mortality in people with mixed conditions, and in those with COPD (11).

- *A2. Domiciliary therapy provided in the patient's home.* There is “low-to-moderate quality” evidence that rehabilitation service utilization, functional outcomes, and health outcomes are not different between domiciliary therapy and hospital-based rehabilitation for elderly patients and for those with stroke after inpatient rehabilitation (12). There is “low-quality” evidence that home-based cardiac rehabilitation is similar to centre-based cardiac rehabilitation for outcomes in the long-term for the prevention or slowing of the loss of function (13). There is “very-low-quality” evidence that home-based cardiac rehabilitation is similar to centre-based cardiac rehabilitation for adherence to treatment, rehabilitation outcomes in the short-term for prevention or slowing of the loss of function, and mortality (13). There is “very-low-quality” evidence that an outpatient rehabilitation programme, delivered at home for patients with acquired brain injury recently discharged from hospital, is equivalent to a day-hospital-based outpatient rehabilitation programme in terms of rehabilitation outcomes (14).
- *A3. Community-based multidisciplinary rehabilitation teams.* There is “moderate-quality” evidence that community-delivered complex intervention is better than usual care with minimum intervention for reducing admissions to nursing homes in elderly people after hospital discharge. There is “low-quality” evidence of more hospital admissions with usual care compared with community delivered rehabilitation services. There is “moderate-quality” evidence for more people not living at home after usual care. There is “low-quality” evidence that there is no difference for physical function or mortality (16). There is “very-low-quality” evidence that there is no difference in measures of rehabilitation outcomes or health outcomes between the intervention and routine care for people with stroke (15).
- *A4. Shared care involving joint participation of primary care physicians and specialty care physicians.* There is “very-low-quality” evidence that shared care is not different from either primary or specialty care alone for a variety of chronic conditions (asthma, COPD, depression, cancer, congestive heart failure) on perception of met and unmet needs. There is “very-low-quality” evidence that shared care is better than either primary or specialty care alone on proportion of patients attending pulmonary rehabilitation recommended to them as part of the intervention. There is “very-low-quality” evidence that there are conflicting results regarding hospital admissions, functional impairment, disability and QoL outcomes (17).
- *A5. Psychological intervention in primary care settings for people with mental disability.* There is “moderate-quality” evidence for short-term health outcomes, and “low-quality evidence” for long-term health outcomes, that psychological intervention in primary care setting is better than usual care from the general practitioner for people with major depression (18).
- *A6. Residential care.* There is “very-low-quality” evidence that 24-h supportive housing improves utilization of services and continuity of care, rehabilitation outcomes, and health outcomes for people with schizophrenia (19).
- *A7. Intensive case management (ICM).* There is “moderate-quality” evidence that ICM improves access to services (i.e. remaining in contact with psychiatric services), and “moderate-quality” evidence that ICM improves global assessment of functioning. There is “low-quality” evidence that ICM reduces the mean number of days in hospital per month. There is “low-quality” evidence that there is no difference in mortality. There is “low-quality” evidence that ICM is better than less intensive ICM where people receive the same package of care, but the professionals have caseloads of more than 20 people for reducing rate of loss to follow-up (20).
- *A8. Community living.* There is “very-low-quality” evidence that semi-independent supported living arrangements improve outcomes of utilization of rehabilitation services in people with intellectual disability (20). There is “very-low-quality” evidence that resettlement from institutions to community settings is not associated with increased risk of mortality. However, there is “very-low-quality” evidence that the risk of mortality in community settings was greater than in institutions (20). There is “very-low-quality” evidence that QoL is better after moving from a long-stay hospital to community homes (21).
- *A9. Home-based or institution-based rehabilitation.* There is “low-quality” evidence that distance training

is not different from minimal training in rural or urban groups for children with cerebral palsy (22). There is “low-quality” evidence that home programme added to institution service is better than institution service alone for rehabilitation outcomes (23).

B. Integrated and decentralized services compared with centralized services

There is “moderate-quality” evidence that integrated rehabilitation is better than usual care for patients with COPD, measured according to hospital admissions. There is “low-quality” that integrated rehabilitation is better than usual care for the rehabilitation outcome of 6-Minute Walk Distance (6MWD). There is “moderate-quality” evidence that integrated rehabilitation is better than usual care for QoL. There is “very-low-quality” evidence that integrated rehabilitation is no different from usual care for mortality (24). There is “very-low-quality” evidence that living in a community with an Integrated Service Delivery (ISD) network is better than living in a community without one, for elderly people (>75 years old) with moderate level of disability and mild cognitive problems, with outcomes of utilization of rehabilitation services and continuity of care. An ISD network reduces the number of elderly people with unmet needs and also reduces the prevalence of unmet needs (25). There is “very-low-quality” evidence that new models of “cooperative care” that link primary care providers and local services with regionalized adult-centred specialty services may make it possible to offer a meaningful transition experience to young people with chronic conditions. The authors identified 5 key elements that support a positive transition to adult-centred healthcare: preparation, flexible timing, care coordination, transition clinic visits, and interested adult-centred healthcare providers. Overall, there is limited empirical evidence related to the process and outcomes of the transition to adult-centred healthcare for people with cerebral palsy and spina bifida (26). There is “very-low-quality” evidence that there is no difference between individualized care coordination and standard care delivered by paediatrician’s offices for families with complex healthcare needs in terms of reducing unmet needs (27). However, there is “very-low-quality” evidence that the care coordination model is better than standard care for utilization of rehabilitation services assessed with the use of specialist care (27).

C. Multidisciplinary rehabilitation compared with non-multidisciplinary rehabilitation

- *C1. Evidence for multidisciplinary rehabilitation for older adults.* There is “high-quality” evidence that an inpatient rehabilitation programme specifically desig-

ned for geriatric patients is better than usual care for adults (older >55 years old) for measures of utilization of rehabilitation admissions to nursing homes, for functional status, and mortality (28). There is “moderate-quality” evidence that multidisciplinary day hospital is better than non-multidisciplinary rehabilitation in decreasing the deterioration in activities of daily living (rehabilitation outcomes), by decreasing the number of patients sent to institutional care, and overall mortality for older adults with medical comorbidities (12). There is “very-low-quality” evidence of conflicting results for coordinated multidisciplinary specialized inpatient rehabilitation in length of stay for older adults with hip fractures. There is “low-quality” evidence that there is no difference between coordinated multidisciplinary specialized inpatient rehabilitation compared with usual (orthopaedic care) for outcomes of re-admission to hospital. There is “low-quality” evidence of conflicting conclusions for functional outcomes. There is “low-quality” evidence of no difference between coordinated multidisciplinary specialized inpatient rehabilitation and usual care (orthopaedic care) for death or deterioration of function. There is “low-quality” evidence of no difference between coordinated multidisciplinary specialized inpatient rehabilitation and usual care (orthopaedic care) for mortality (29). One trial in this systematic review looked at accelerated discharge for older people with hip fracture plus multidisciplinary home-based rehabilitation and compared this with usual inpatient rehabilitation. There is “low-quality” evidence that the accelerated discharge had better utilization of rehabilitation services (length of hospital stay) than the usual group. There is “low-quality” evidence that accelerated discharge is similar to usual care for function and mortality for older adults with hip fractures (29).

- *C2. Evidence for multidisciplinary rehabilitation for populations with neurological conditions.* There is “low-quality” evidence to support multidisciplinary specialized rehabilitation services over local non-specialized rehabilitation services or home-based rehabilitation services for improved function in adults of working age with acquired brain injury (31). There is “very-low-quality” evidence to support no difference in function or QoL among stroke patients discharged from hospital receiving multidisciplinary care vs routine care (15). There is “very-low-quality” evidence that low-intensity multidisciplinary rehabilitation is better than general neurology clinics with fewer re-admissions and shorter length of stay for adults with amyotrophic lateral sclerosis (ALS) or motor neurone disease (MND). There is “very-low-quality” evidence in favour of low-intensity rehabilitation for QoL and there is “very-low-quality” evidence of conflicting conclusions for survival. There is “very-low-quality”

evidence that high-intensity rehabilitation is better for impairment and activity limitation (30).

- *C3. Evidence for multidisciplinary rehabilitation for populations with musculoskeletal problems.* There is “moderate-quality” evidence that multidisciplinary rehabilitation is better than non-multidisciplinary rehabilitation for promoting return-to-work for people with chronic low-back pain. There is “low-quality” evidence that multidisciplinary rehabilitation is not different from non-multidisciplinary rehabilitation for outcomes of utilization of rehabilitation services and continuity of care. There is “very-low-quality” evidence that multidisciplinary rehabilitation is better than non-multidisciplinary care for short- and long-term function (32).

There is “very-low-quality” evidence that multidisciplinary rehabilitation involving a graded 4-part activity programme is better than traditional care for disability and for return-to-work for people with sub-acute low-back pain (34).

There is “very-low-quality” evidence that multidisciplinary biopsychosocial rehabilitation (psychological coaching setting) is no better than a biopsychosocial rehabilitation with psychologist contact only for disability for people with neck and shoulder pain (32). There is “very-low-quality” evidence that active multidisciplinary rehabilitation is no better than traditional rehabilitation for sick leave (33).

D. Specialized unit for rehabilitation for complex conditions compared with rehabilitation for complex conditions in general wards or non-specialized units

- *D1. Specialized hospitals and units for rehabilitation of neurological conditions.* There is “moderate-quality” evidence that patients with stroke who receive organized in-patient care in a specialized rehabilitation unit are more likely to be alive, independent and living at home (35). There is “very-low-quality” evidence that specialized rehabilitation units reduce length of hospital stay for people with spinal cord injuries. There is “very-low-quality” evidence that specialized rehabilitation units improve functional status, including the need for assistance with eating and grooming (impairment measured with the Barthel Index). There is “very-low-quality” evidence that specialized units reduce the occurrence of secondary complications, such as pressure ulcers (36).
- *D2. Specialized hospitals and units for rehabilitation of unstable medical conditions.* There is “low-quality” evidence that pulmonary rehabilitation is an effective and safe intervention to reduce hospital admissions, mortality and improve QoL in patients who have recently had an exacerbation of COPD (37).

E. Integrated rehabilitation services compared with rehabilitation services integrated into the social or welfare services

This comparison was not made, as no systematic reviews or primary studies were found.

DISCUSSION

This review provides evidence to support a variety of service delivery models for complex cases of disability. Stroke is one of the most complex conditions for rehabilitation because it can affect motor, sensory, cognitive, affective, and coordination systems. Moreover, rehabilitation of elderly patients is one of the most challenging situations, given that co-morbidities are more frequent in this age group, and their home environment may not be conducive for discharge after rehabilitation. Evidence was found on rehabilitation services for many other conditions causing physical and/or mental disability, such as those affecting cardiac (CHF), pulmonary (COPD, asthma), neurological (brain injury, spinal cord injury, ALS, MND) and musculoskeletal systems (hip fractures, low-back pain, neck pain, shoulder pain), as well as those for paediatric populations (cerebral palsy, spina bifida), and populations with cancer and mental health conditions (intellectual disability, depression, schizophrenia).

This review highlights a need for high-quality research in a number of areas. First, there is an urgent need for more research conducted within LMIC. This is extremely important to assist in judgements of feasibility and resource needs for the implementation of recommendations in resource-limited settings. Specifically, there is a need for RCTs and systematic reviews assessing different models of rehabilitation care in a variety of care settings. For example: community rehabilitation services offered at home compared with services offered at the general practitioner’s office. Future research should also focus on measuring outcomes of access to rehabilitation, utilization of services, continuity of care, functional ability and QoL.

Secondly, many conditions have been poorly studied regarding rehabilitation models. These conditions are: spinal cord injury, amputees, paediatrics, cancer and acquired brain injury. There were no studies comparing service models for populations with amputations. However, various authors, drawing from experiences with the Veteran Affairs and Departments of Defense, suggest that the rehabilitation of a person with an amputation should be carried out by a multidisciplinary rehabilitation team in a specialized centre (39–41).

Thirdly, as part of our PICO question, we searched for literature on rehabilitation services integrated into

health services compared with rehabilitation services integrated into social and welfare services; however, no relevant literature was found on this topic because no comparative studies exist in this area. At the time of this review, another team prepared a realist synthesis for the WHO rehabilitation guideline on the topic of leadership and governance of health-related rehabilitation (42). One principle that emerged from their research findings was to “institutionalize” rehabilitation programmes by aligning programmes with well-known, pre-existing Ministerial models of healthcare, similar to other Ministerial programmes, in order to support programme sustainability. It is also recognized that governance, political will and a common understanding of disability and rehabilitation are crucial for implementation of the recommendations in the rehabilitation guideline (43).

Finally, of the outcomes extracted, very few studies measured whether a specific service model improved access to rehabilitation services. There were many gaps in the provision of, and access to, rehabilitation services, and this is important for people with disabilities, given the many barriers to accessing healthcare. No high-quality direct evidence was found that some service delivery models increase access to rehabilitation services. There is a need for more research in this area, especially for studies that compare community-based services with specialized centres, where access to rehabilitation services may require travel, transportation and lead to caregiver burden.

This review paper relies primarily on evidence from systematic reviews published in the last 20 years. In cases where no systematic review was found, primary studies (trials and observational studies) retrieved by our main search strategies were included. Despite the range of strategies to find studies, no evidence was found of rehabilitation models for a variety of disabling conditions, such as amputations and cancer, and very few observational studies were found for spinal cord injury, acquired brain injury, and paediatric conditions, such as spina bifida or cerebral palsy. Although our searches were comprehensive, a possible limitation could be the electronic searches used in this review. A further limitation of this review is that most of the evidence came from high-income countries, and therefore the application to LMIC needs to be assessed. Lastly, the recommendations are based on RCTs, many of which had a lack of blinding. This was expected given the nature of these interventions, but the lack of blinding introduces a risk of performance and measurement biases. Measurement bias is less likely for objective measures, such as mortality and hospital re-admissions; however, such bias can be reduced by blinding outcome assessors on other rehabilitation outcome measures. Many studies also had high risk of selection, attrition and reporting

biases. In a few instances, it was possible to assess for publication bias, and there was no indication that this was a problem in this review.

Conclusion

There is moderate-to-high-quality evidence to support that those experiencing the recent onset of a severe condition (with the potential for major and complex disability) should be admitted to an inpatient, multidisciplinary, specialized rehabilitation unit, and continue rehabilitation as an outpatient until the rehabilitation goals are achieved. This approach will reduce mortality and the number of people admitted into institutional care. The evidence is stronger for elderly patients, stroke patients, and those with chronic low-back pain, but it is expected these outcomes are generalizable for people with brain injury, spinal cord injury, and complex fractures (e.g. fragility fractures in older adults). There is moderate-quality evidence that people with less severe or complex conditions should be rehabilitated in outpatient settings with a multidisciplinary team (including 2 or more professions), either in a community service or clinic-, hospital-based service (day hospital) or in-home (domiciliary) rehabilitation. For those with mental health conditions, multidisciplinary care, including psychological interventions and intensive case management, is recommended. Early discharge from hospital with rehabilitation at home is not recommended for elderly patients or those with mixed conditions, as evidence suggests it is more harmful than beneficial.

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Excluded studies: Available on request.

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