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Community-based rehabilitation for people with disabilities in low- and middle-income countries: a systematic review and meta-analysis

Article (Accepted version)
(Refereed)

Original citation: Iemmi, Valentina, Blanchet, Karl, Gibson, Lorna J., Kumar, K. Suresh, Rath, Santosh, Hartley, Sally, Murthy, Gudlavalleti VS, Patel, Vikram, Weber, Joerg and Kuper, Hannah (2016) *Community-based rehabilitation for people with physical and mental disabilities in low- and middle-income countries: a systematic review and meta-analysis.* Journal of Development Effectiveness . ISSN 1943-9342

DOI: 10.1080/19439342.2016.1157623

Title:
Community-based rehabilitation for people with disabilities in low- and middle-income countries: a systematic review

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Acknowledgements

This review was supported by a grant from the International Initiative for Impact Evaluation (3ie). We thank the Campbell Collaboration (International Development Coordinating Group) for assistance throughout the review process. The authors of the review would like to thank Chapal Khasnabis (World Health Organization), Elena Schmidt (Sightsavers), Philippe Chervin (International Foundation of Applied Disability Research), Richard Wormald (London School of Hygiene and Tropical Medicine), Susie Miles (Institute of Education, Manchester), Sue Lukersmith (University of Sydney), Harry Finkenflügel and all the experts and authors we contacted for their valuable support.

Disclosure Statement

Professor Patel has a Wellcome Trust grant for a randomised controlled trial for a CBR intervention for schizophrenia in India. Several members of the group have previously undertaken systematic reviews on related subjects but not on this particular topic. There are no further conflicts of interest.

Title:

Community-based rehabilitation for people with disabilities in low- and middle-income countries: a systematic review

Abstract

We conducted a systematic review to assess the effectiveness of Community Based Rehabilitation (CBR) for people with physical and mental disabilities in low- and middle-income countries, and/or their family/carers, and community. We identified 15 eligible studies, 10 of which were randomised controlled studies. Overall, the studies suggested that CBR may be effective in improving the clinical outcomes and enhancing functioning and quality of life of the person with disabilities and his/her carer. However, this conclusion must be interpreted with caution due to the small number of studies, concerns about study quality, and lack of information on cost-effectiveness of the interventions.

Keywords

Community-based rehabilitation; mental disability; physical disability; developing countries; systematic review

1. Introduction and background

People with disabilities include those who have long-term physical, mental, intellectual or sensory impairments. (WHO and World Bank 2011; WHO 2001)There are over one billion people with disabilities worldwide, about 15% of the world's population, of whom 110-190 million experience very significant difficulties (WHO and World Bank 2011). Eighty per cent of people with disabilities live in low- and middle-income countries (WHO and World Bank 2011). People with disabilities are often excluded from education, health, employment and other aspects of society, potentially leading to or exacerbate poverty (WHO and World Bank 2011). For example, a recent survey across 30 countries found that children with disabilities were often ten times less likely to attend school and, when enrolled, they were often at a lower education level (Kuper *et al.* 2014). These exclusions are contrary to the UN Convention on the Rights of Persons with Disabilities (UNCRPD), and may make it more difficult for the Sustainable Development Goals to be achieved.

The UNCRPD states that comprehensive rehabilitation services including health, employment, education and social services are needed "to enable people with disabilities to attain and maintain maximum independence, full physical, mental, social and vocational ability, and full inclusion and participation in all aspects of life" (UN 2008, article 26). Community-based rehabilitation (CBR) is a strategy for the rehabilitation, poverty reduction, equalisation of opportunities, and social inclusion of people with disabilities, particularly in low- and middle-income countries (WHO, 2010a). The concept was first introduced in the late 1970s (WHO, 1976; Finkenflugel, 2004) and has since been endorsed by World Health Organization and other leading international organisations. A CBR programme comprises one or more activities in one or more of the five areas (health, education, livelihood, social, and empowerment) and delivered within the community using predominantly local resources (WHO 2010) (see Figure 1). CBR programmes are implemented through the combined efforts of people with disabilities, their families and communities, and the relevant governmental and non-governmental organisations (ILO, UNESCO & WHO 2004). While CBR is currently implemented in over 90 countries, the coverage remains very low (Meikle 2002). Furthermore, the evidence base on the efficacy and effectiveness of CBR programmes is weak (Finkenflugel, Wolffers & Huijsman 2005) and often limited in scope to specific geographical locations (e.g. Velema, Ebenso & Fuzikawa 2008), or types of disability (e.g. Robertson et al., 2012), single CBR interventions (e.g. Mayo-Wilson, Montgomery & Dennis 2008a), or single disability (e.g. Mayo-Wilson, Montgomery & Dennis 2008b).

<FIGURE 1>

CBR may improve the lives of people with disabilities and their carers, through enhanced inclusion into existing services, and/or creation of new interventions for people with disabilities and their carers. The way in which CBR might work varies depending on the specific components included in the programme. The health component aims to the achievement of the highest attainable standard of health and well being, through health promotion, prevention of impairment or illness, medical care provision, rehabilitation, and provision of assistive devices. The education component aims to enable access to education and lifelong learning, leading to fulfillment of potential and effective participation in society. The livelihood component aims to assure livelihood, access to social protection measures, income earning, through skills development, self-employment, wage employment, financial services and social protection. The social component aims to guarantee a meaningful social roles and responsibilities within families, communities, and the society, through personal assistance, support with relationships, marriage and family, inclusion in culture and arts, recreation, leisure and sports and access to justice. The empowerment component is a cross-cutting component aiming to allow people with disabilities and their carers to make their own decisions and take responsibility, through advocacy and communication, community mobilisation, supporting political participation, establishing self-help groups and disabled peoples organisations (DPOs). The theory of change presented in Figure 2 describes the pathways through which CBR may improve the lives of people with disabilities and their carers.

<FIGURE 2>

We undertook a systematic review to assess the effectiveness and cost-effectiveness of community-based rehabilitation for people with physical and mental disabilities in low- and middle-income countries, and/or their family, their carers, and their community. The detailed protocol of this review has been published elsewhere (Iemmi et al. 2013).

2. Methods

2.1. *Inclusion and exclusion criteria*

Intervention. We included studies evaluating CBR programmes. CBR was defined as a programme:

- for people with disabilities and/or their family, their carers, their community;
- delivered at the community level;
- implemented through the combined efforts of people with disabilities and/or their family/carer
- including at least one of the following stakeholder groups: the community, relevant governmental and non-governmental services
- implementing one or more activities in one or more of the five components: health, education, livelihood, social, empowerment
- forming part of local community development.

Studies were excluded if the CBR intervention took place only in health facilities (hospitals, clinics, outpatient care centres, specialised care centres) or schools or organised as outreach activities by the health facilities.

Population. We included papers focusing on studies evaluating CBR programmes for people with disabilities, and/or their family, their carers, and their community. Due to the lack of a recognised list of physical and mental disabilities, we consulted disability experts to create a list of long-term physical or mental health conditions associated with disability (Iemmi et al. 2015).

Geographical location. We included studies conducted in low- and middle-income countries defined using the World Bank Atlas method (World Bank 2012).

Study designs. We included randomised controlled trials, non-randomised controlled trials, controlled before-after studies (with one point of evaluation after the intervention), controlled interrupted time series studies (with multiple points of evaluation after the intervention), economic studies in which the outcome is measured before and after the intervention or an intervention is studied against another intervention with baseline data. We included studies where CBR programmes were compared with facility-based interventions, other types of CBR programmes, other interventions, any mix of the previous, or no intervention.

Publication date. We included studies published after 1976, year when the concept of CBR was first introduced (WHO 1976; Finkenflugel 2004)

Languages. We included studies in all languages.

2.2. *Searches*

We searched 23 relevant electronic databases in biomedical and social sciences: AIM (African Index Medicus), CAB Abstract, CENTRAL (Cochrane Register of Controlled Trials), CINAHL Plus (Cumulative Index to Nursing and Allied Health Literature), Cochrane Database of Systematic Reviews, DARE (Database of Abstracts of Reviews of Effectiveness), EconLit, EMBASE, ERIC, Global Health, HTA Database, IBSS (International Bibliography of the Social Sciences), IMEMR (Index Medicus for the Eastern Mediterranean Region), IMSEAR (Index Medicus for South East Asia Region), LILACS (Latin American and Caribbean Health Sciences Literature), MEDLINE, NHSEED (NHS Economic Evaluation Database), PAIS International (Public Affairs Information Services), PsycINFO, The Campbell Collaboration Library of Systematic Reviews, Web of Science (Web of Knowledge), WHOLIS (World Health Organisation Library Information System), WPRIM (Western Pacific Region Index Medicus). The search strategy combined terms for community-based rehabilitation, physical and mental disabilities, and low- and middle-income countries. We designed the first search strategy in MEDLINE and then adapted for use in all other databases (Iemmi et al. 2015).

Additionally, we searched 50 relevant websites from governmental and non-governmental organisations, academics, and disabled people's organisations using Google Advanced Search (Iemmi et al. 2015). We searched the references of included studies and tracked their citations using Google Scholar. We also contacted key authors and institutions for information on ongoing studies.

2.3. *Data collection*

Selection of studies. Pairs of investigators independently screened the title and abstract of studies identified through the electronic searches. Then, the full-text of studies meeting inclusion criteria were retrieved and independently screened by pairs of authors. In the event of disagreement, a third author was consulted. Full-text of studies in languages other than English were screened only if available in the review author team (French, Spanish, Portuguese, German, Italian). Studies included after screening by title and abstract but with full-text in other languages were recorded in a separate list (Iemmi et al. 2015). Selection of studies was performed in EndNote and Zotero.

Data extraction. Pairs of investigators independently extracted data using data extraction forms designed for this purpose and including: methods (study design and duration of the study), participants (type of disability, age, sex, country), interventions (details on both intervention and comparison), outcomes (type of outcomes, measurement instruments, time-points measured), publication (publication type, publication language), and notes (additional comments). Data extraction from studies in languages other than English and available in the review author team (French, Spanish, Portuguese, German, Italian) was performed by one author only. Data extraction was recorded in Excel.

Primary outcomes were functional outcomes in education (e.g. education level), employment (e.g. employment status), social participation (e.g. number of social activities engaged in), empowerment (e.g. awareness of the condition); and disability outcomes, such as extent of disability, measured using validated instruments. Secondary outcomes were quality of life measured using validated instruments, use of health resources, economic impact, and adverse effects.

Assessment of risk of bias. Pairs of authors independently assessed the methodological quality of included studies: the first author assessing risk of bias using the appropriate tool and the second author verifying the correctness of data. In the event of disagreement, a third author was consulted. We used the 'Risk of Bias' tool from section 8.5 of the Cochrane Handbook for Systematic Reviews of Interventions (Higgins & Green, 2011) to assess the methodological quality of randomized controlled trials, using a seven-component rating system: random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting, and other sources of bias. We used the Effective Public Health Practice Project (EPHPP) quality assessment tool for quantitative studies (Armijo-Olivo, 2012) to assess the methodological quality of all other studies, using a six-component rating system: selection bias, study design, confounding, blinding, data collection method, withdrawals and dropouts. Assessment of risk of bias was performed in Review Manager for randomised controlled studies and in Excel for the other studies. Due to the small number of included studies, we were not able to produce funnel plots to visualize asymmetry and statistical testing for funnel plot asymmetry.

2.4. *Data analysis*

We used a narrative synthesis of the results to describe the CBR programmes evaluated in the included studies. We distinguished between impact on people with disabilities and impact on their carers separately. Results were presented separately for physical and mental disabilities. For dichotomous outcomes, we calculated the risk ratios of improvement over time or relative risk of a positive state at post-intervention (SMD). For continuous outcomes, we calculated the standardised mean difference. For effect sizes of SMD, values greater than 0.70 were treated as large, between 0.40 and 0.70 as moderate, and less than 0.40 but greater than 0.10 as small (Higgins & Green, 2011). We performed calculations using the effect-size calculator in the Campbell Collaboration website (Wilson, 2015). We performed meta-analysis only for studies for which the interventions, study designs and outcome measures were considered sufficiently consistent to allow pooling of data. We used a random effect model because grouped studies were not functionally equivalent, and we assessed homogeneity using Chi^2 test and I^2 statistic. We were not able to perform sensitivity analysis due to insufficient data. We contacted authors in order to obtain missing information, where necessary.

3. Results

3.1. *Study selection*

The searches of electronic databases identified 6153 references. They were reduced to 4591 after removal of duplicates, and 148 records after screening by title and abstract. Five more studies were identified through the other searches. Out of the 153 identified references, 60 were discarded before screening by full-text because in languages not available within the team of authors (31), not located (5), ongoing studies (3), or literature reviews (21). Out of the remaining 93 references, 78 were excluded after screening by full-text because not evaluating CBR programmes (48), not focusing on disability (1), not using controlled study designs (28). Fifteen studies were included in the final review. Figure 3 summarises the study selection process.

<FIGURE 3>

3.2. *Description of the included studies*

The 15 included studies comprised 3201 individuals in total. The main characteristics of the included studies are summarised in Table 1 for physical and mental disabilities. Nine studies evaluated CBR for people with mental disability (schizophrenia, dementia, intellectual impairment) and six for people with physical disability (stroke, arthritis, Chronic Obstructive Pulmonary Disease or COPD). None of the studies included participants with physical disability due to a sensory (vision or hearing) impairment. All the studies focused on the health component of the CBR, except one focusing on the education component (Shin et al. 2009). However, many studies included other aspects of CBR as minor components, such as social (Chatterjee et al. 2003; Chinchai, Bunyamark and Sirisatayawong 2010; Habibzadeh, Gofranipoor and Ahmadi 2007) and livelihood component (Chatterjee et al. 2003). Out of the 15 studies, ten were randomised controlled trials, two non-randomised controlled trials, two controlled before-after studies, and one interrupted time-series study.

The quality of the evidence was mixed. For the ten randomised controlled trials a final judgement was not possible due to the lack of information on one or more of the seven domains of the 'Risk of Bias' tool. Amongst the five non randomised controlled studies, three were considered of moderate quality (Chatterjee et al. 2003; Darmawan et al. 1992; Zhang et al. 1998) and two of high quality (Habibzadeh, Gofranipoor and Ahmadi 2007; Ozdemir et al. 2001). The quality of the evidence was hindered in several studies by the small sample size, reducing the power of study to detect a difference between intervention and control groups.

<TABLE 1>

3.3. *Brief description of the evaluated CBR programmes*

Physical disabilities.

Stroke. Four studies evaluated CBR programmes for stroke survivors. Chinchai, Bunyamark and Sirisatayawong (2010) in Thailand investigated the impact of home health care and rehabilitation on stroke survivors discharged less than 18 months previously. The educational programme for carers was provided by experienced occupational therapists one day per week over three weeks. The lectures covered health care (e.g. medication, nutrition) and stroke rehabilitation (e.g. therapeutic exercise, socialising, home, environmental modification). During the two months of the programme, health service volunteers visited the carers at home once per week to encourage the use of the knowledge learned.

Yu et al. (2009) in Shanghai, China, evaluated the impact of five months' additional home-based rehabilitation for stroke survivors. The home-based rehabilitation consisted of a hierarchical training scheme, with experienced rehabilitation medical professionals training general practitioners, who then trained family members and carers at home in simple rehabilitation techniques. Stroke survivors were instructed to practice functional exercises with the help of carers for 45 minutes, a minimum of three times per week. Stroke survivors were followed up by their general practitioner 10 times and telephoned by their therapist for supervision of the functional exercises.

Ozdemir et al. (2001) in Edirne in Turkey investigated the impact of home-based rehabilitation on stroke survivors (e.g. convenient bed positioning, exercises). Stroke survivors were visited for two hours weekly by a rehabilitation clinician and physiotherapist, orthotics were provided, and medical care offered if necessary.

Habibzadeh, Gofranipoor and Ahmadi (2007) in Iran evaluated the impact of planned self-care home-based education on stroke survivors. The intervention consisted of six to eight sessions delivered at home (including components on self-care, physical, psychiatric and social dimension, and final evaluation). Participants had 45 days to carry out the home-based plan. Stroke survivors were visited by a researcher twice per week.

Arthritis. Darmawan et al. (1992) in rural Java in Indonesia investigated the impact of a community-based education programme through traditional puppet shadow plays (wayang) for people with arthritis. The community-based education programme using wayang, the most popular entertainments of rural Java, consisted in a special session, providing simple instructions for coping with neck and back pain, and stiff, swollen or painful joints.

COPD. Noonill et al. (2007) in Thasala district, Thailand, evaluated the impact of a community-based care programme for people with COPD. The community-based care programme aimed to support people with COPD managing the chronic condition with the support of the family and the community. The programme consisted of education of people with COPD their carers, and health volunteers, individualised home-based care and skill training, psychosocial support by community nurses (monthly home visit) and by health volunteers (twice monthly home visit), and family supervision.

Mental disabilities.

Schizophrenia. Five studies evaluated CBR programmes for people with schizophrenia. Botha et al. (2010) in Cape Town in South Africa investigated the impact of assertive community treatment tailored to people with schizophrenia's needs. The programme consisted of the allocation of a key worker (senior social worker or chief professional nurse) working with the individual with disability and his/her carers mainly at home, focussing on engagement and adherence to treatment. Participants were often referred to occupational therapy and psychology services.

Ran et al. (2003) in Chengdu, China, evaluated the impact of family psycho-education with drug treatment for people with schizophrenia and their carers. Family psycho-education included family education once a month for nine months in which people with schizophrenia were encouraged to join, family workshops every three months to share carers' experiences, health education via local village radio during the first two months, and crisis intervention. The programme was provided at home or the health centre by psychiatrists and village doctors.

Zhang et al. (1994) in Jiangsu, China, investigated the impact of a family intervention for men with schizophrenia during their first admission and for their carers. The family intervention consisted of group counselling sessions, including one session on treatment management and a group session on management of people with schizophrenia and medication adherence after three months. Families with common problems received group counselling over an 18-month period - focusing on family attitudes, realisation that schizophrenia was an illness, management of people with schizophrenia – while families with unique or complex problems were supported through individual counselling, both every three months. The programme was delivered at an outpatient department and home visits were made for those who did not attend the sessions.

Zhang et al. (1998) in Shanghai, China, compared the impact of psychosocial education programme for families of people with schizophrenia in addition to usual care in community mental health services, to usual care. The psychosocial education programme was delivered at the health centre over three years and included 16 one-hour lectures by trained psychiatrists and nurses plus seven group discussions. The lectures focussed on illness, medications, detection and prevention of relapse, management of the person with disabilities, strategies to help both the person with schizophrenia and his/her carer.

Chatterjee et al. (2003) in Madhya Pradesh in India investigated the impact of a

CBR programme with a three-tiered service-delivery system for people with schizophrenia and their carers. The community-based rehabilitation programme was delivered through outpatient care (first tier), community health workers (second tier), and family and community members forming local village health groups (third tier). The outpatient treatment consisted of a monthly follow-up at one clinic, with revision of the drug regimen, education about schizophrenia, and discussion on rehabilitation strategies.

Dementia. Three studies evaluated CBR programmes for people with dementia, all focusing on the same programme "Helping Carers to Care" delivered in three different settings. Dias et al. (2008) in Goa in India evaluated the impact of a flexible stepped home-care programme for people with dementia and their carers. The flexible stepped home-care programme was tailored to the needs of the individual with dementia and his/her family, and was delivered over six months, with twice monthly (at least) visits by a community team of two home care advisors, a part-time local psychiatrist, and a part-time lay counsellor, over six months. Visits were made at home but people with dementia and their carers were encouraged to visit the psychiatrist at the clinic in order to minimise cost. The programme focused on carer's knowledge of dementia, emotional support, and skills.

Gavrilova et al. (2009) in Moscow in Russia investigated the impact of education and training for carers of people with dementia. The programme included three modules with weekly sessions of 30 minutes: assessment (one session), education (two sessions), and management of problem behaviour (two sessions). It was delivered in a health centre by newly qualifies clinicians with no experience of dementia.

Guerra et al. (2011) in Lima in Peru evaluated the impact of education and training for carers of people with dementia in addition to usual care. As in the previous study (Gavrilova et al., 2009), the programme included three modules with weekly sessions of 30 minutes: assessment (one session), education (two sessions), and management of problem behaviour (two sessions). It was delivered at a local memory clinic by junior psychologists and social workers.

Intellectual impairment. Shin et al. (2009) in Vietnam evaluated the impact of a home-based programme for young children with intellectual impairments and their carers. The home-based programme included three months of weekly training of teachers with at least four years' experience working with children with mental disabilities by experienced supervisors. Once trained, the teacher delivered a one-hour weekly training for parents, focusing on strategies to work with children.

3.4. *Effectiveness of the evaluated CBR programmes*

Physical disabilities.

Table 2 summarises the effects of CBR for people with physical disabilities per each outcome evaluated in the included studies for people with physical disabilities.

Stroke. Among the four studies evaluating CBR programmes for stroke survivors, two were randomised controlled trials. The randomised controlled study by Chinchai, Bunyamark and Sirisatayawong (2010) evaluated a home health care and rehabilitation programme for stroke survivors discharged less than 18 months previously, against usual care. After two months, the intervention group showed improvement in quality of life, measured using the WHOQOL-BREF: large in the physical (SMD=1.56, 95% CI=0.98-2.13), psychological (SMD=1.33, 95% CI=0.77-1.89), and environment dimensions (SMD=0.88, 95% CI=0.36-1.42), and moderate in the social relation dimension (SMD=0.59, 95% CI=0.07-1.11).

The randomised controlled study by Yu et al. (2009) evaluated a home-based rehabilitation for stroke survivors, against no intervention. After five months, the intervention group showed a moderate improvement in the Clinical Neurological Function Deficit Scale (SMD=-0.42, 95% CI=-0.57- -0.27).

The non-randomised controlled trial by Ozdemir et al. (2001) evaluated a home-based rehabilitation, against acute inpatient hospital-based rehabilitation. Participants supported by the acute inpatient hospital-based rehabilitation had therapeutic exercises, neuromuscular exercises, and occupational therapy. The intervention group showed smaller mean change in different scores, with large differences in mean change for motor and functional outcomes (all SMD>-1.39) and moderate change in cognitive outcomes (SMD=-0.73, 95% CI=-1.25- -0.20).

The controlled before-after study by Habibzadeh, Gofranipoor and Ahmadi (2007) evaluated a planned self-care home-based education on stroke survivors after discharge, against a control group for which details were not provided. After 45 days from the end of the programme, the intervention group showed better improvement in Activities of Daily Living (ADL) score (SMD=1.46, 95% CI=0.89-2.03).

Meta-analysis was not conducted as the studies used three different study designs (randomised controlled trial, non-randomised controlled trial, controlled before-after study) and the outcomes of the two randomised controlled trials were not conceptually comparable.

Arthritis. No randomised controlled trials was found evaluating CBR for arthritis. The controlled interrupted time series study by Darmawan et al. (1992) evaluated community education programme by wayang, against no intervention. Knowledge of correct ways of performing ADL was assessed by a questionnaire. After six months, the intervention group showed an increase in people giving a correct response (7.9% across the domains) against a decrease in the control group (-1.7%). Amongst participants in the intervention group, illiterates (Risk ratio=1.15, 95% CI=1.01-1.31) and those with the highest level of education (Risk ratio=1.04, 95% CI=1.02-1.06) showed a significantly higher correct knowledge on performance of ADL.

COPD. One randomised controlled trial evaluated CBR for COPD against a control group for which details were not provided. (Noonill et al., 2007). After the three months of the programme, the intervention group showed large improvements in exercise tolerance, *dyspnoea*, HRQL and satisfaction with care (all SMD>0.77). However, no difference was found in hospital utilisation between the two groups.

<TABLE 2>

Mental disabilities.

Table 3 and Table 4 summarises the effects of CBR for people with mental disabilities and their carers respectively, per each outcome evaluated in the included studies for people with mental disabilities

Schizophrenia. Among the five studies evaluating CBR programmes for schizophrenia, three were randomised controlled trials. Higher PANSS and DAS scores indicate increasing clinical severity. The randomised controlled trials by Botha et al. (2010) evaluated an assertive community treatment tailored to the needs of people with schizophrenia, against standard community care. After 12 months, the intervention group showed a large improvement in clinical status, measured using PANSS score (SMD=-0.88, 95% CI=-1.47- -0.29) and SOFAS scores (SMD=0.72, 95% CI=0.14-1.30). Hospital readmissions were substantially lower in the intervention (34.48%) compared to the control group (71.43%). There was no difference in quality of life, measured using the WHO-QOL score, and in the ESRS rating scale except for ESRS-parkinsonism (SMD=1.05, 95% CI=0.45-1.65).

The randomised controlled trial by Ran et al. (2003) evaluated a family psycho-education programme with drug treatment for people with schizophrenia and their carers, against drug treatment alone or no intervention. After nine months, when compared against no intervention, the intervention group was more likely to be fully recovered (Risk ratio=1.85, 95% CI=1.22-2.82). The control group showed a four-fold higher relapse rate (Risk ratio=0.27, 95% CI=0.17-0.41), and a six-fold higher treatment compliance (Risk ratio=6.71, 95% CI=2.78-16.22). No difference was found in the participant's ability to work full time or to have mild disability. Relatives' beliefs on illness generally improved.

The randomised controlled trial by Zhang et al. (1994) evaluated a family intervention for men with schizophrenia during their first admission and their carers, against standard care. Participants receiving standard care were seen *at libitum* at the outpatient department, but not necessarily by the same clinician and not actively followed-up. After 18 months, the intervention group showed large improvements for those who were not readmitted to hospital in clinical status measured using the BPRS (severity of clinical symptoms – SMD=-1.21, 95% CI=-1.70- -0.74), and overall level of functioning measured using GAS (SMD=1.42, 95% CI=0.92-1.92). Moreover, the intervention group showed lower non-compliance with treatment (20.5% v 43.6%; Risk ratio=0.47, 95% CI=0.23-0.96) and risk of readmission (15.4% v 53.8%; Risk ratio=0.29, 95% CI=0.13-0.63).

The non-randomised controlled trial by Zhang et al. (1998) evaluated a

psychosocial education programme for families of people with schizophrenia in addition to usual care in community mental health services, against usual care. After three years, the intervention group showed lower rate of relapse (10.4% versus 15.2%) and hospitalisation (6.4% versus 10.2%), although no statistically significant differences. No difference was found in mean WHO-DAS score (SMD=-0.13, 95% CI=-0.33-0.07).
The controlled before-after study by Chatterjee et al. (2003) evaluated a CBR programme for people with schizophrenia and their carers, against outpatient treatment. After 12 months, the intervention group showed a small greater increase in DAS occupation (SMD=0.40, 95% CI=0.11-0.68) and DAS social scores (SMD=0.34, 95% CI=0.06-0.62).

Meta-analysis was not conducted as the studies used different study designs and the outcomes of the three randomised controlled trials were not conceptually comparable, or comparable outcomes were measured at two different time points, or comparable outcomes were measured for two different populations.

Dementia. Three randomised controlled trials evaluated the same CBR programme for dementia, called “Helping Carers to Care”. Dias et al. (2008) evaluated the programme against a control group for which the programme was delayed of six months. After six month, no difference was found in behaviour or activities of daily living, and the decreased mortality in the intervention group was not statistically significant (Odds ratio=0.34, 95% CI=0.01 to 1.03). No difference was found in carers’ outcomes, with respect to carer mental health, perceived burden or psychological quality of life.

Gavrilova et al. (2009) evaluated the programme against usual medical care. After six months, no difference was found in quality of life that did not improve in both groups. The intervention group showed a small improvement in carer psychological morbidity and carer distress, carer burden, and carer quality of life, although no statistically significant.

Guerra et al. (2011) evaluated the programme against usual care. After six months, no difference was found in change of quality of life between groups. The intervention group showed a higher improvement in carer burden, although no statistically significant.

<TABLE 3-4>

Due to the homogeneity of the three studies, meta-analyses were performed for both people with dementia and their carers, on outcomes that were consistently measured across the studies only. The low number of studies hindered the reliability of the measures of heterogeneity. Table 5 summarises the meta-analysis results for people with dementia and their carers respectively. Results from the meta-analysis for people with dementia and their carers are as follow:

- Clinical status: At six month, the intervention group showed better clinical status (NPI-Q), although no statistically significant (SMD=-0.09, 95% CI=-0.47-0.28). No statistical heterogeneity was found between trials (Chi2=0.11, df=1 (P=0.75); I2=0%).

- Quality of life: At six month, the intervention group showed better quality of life (DEMQOL), although not statistically significant (SMD=0.22, 95% CI=-0.33 -0.77) across two trials. (Gavrilova et al. 2009; Guerra et al. 2011) Moderate statistical heterogeneity was found between trials (Chi2=2.10, df=1 (P=0.15); I2=52%).
- Carer burden: At six months, the intervention group showed lower burden (ZBS), although not statistically significant (SMD=-0.85, 95% CI=-1.24--0.45). No statistical heterogeneity was found between trials (Chi2=0.62, df=1 (P=0.43); I2=0%). Similarly, at six months, the intervention group showed lower distress (NPIQ-D), although not statistically significant (SMD=-0.16, 95% CI=-0.54-0.22). No statistical heterogeneity was found between trials (Chi2=0.97, df=1 (P=0.33); I2=0%).
- Carer clinical status: At six months, the intervention group showed better carer clinical status (SRQ-20) across two trials, (Gavrilova et al. 2009; Guerra et al. 2011) although the statistical significance was small (SMD=-0.37, 95% CI=-1.06-0.32). Substantial statistical heterogeneity was found between trials (Chi2=3.24, df=1 (P=0.07); I2=69%).
- Carer quality of life: After six months, the intervention group showed an improvement in physical (SMD=0.51, 95% CI=0.09-0.94) and social scores (SMD=0.54, 95% CI=0.12-5.97) of WHOQOL-BREF across two trials (Gavrilova et al. 2009; Guerra et al. 2011). Moreover, the intervention group showed an improvement in psychological (SMD=0.11, 95% CI=-0.31-0.53) and environmental scores (SMD=0.07, 95% CI=-0.35-0.49), although not statistically significant. No statistical heterogeneity was found between trials (physical: Chi2=0.42, df=1 (P=0.52); I2=0%; psychological: Chi2=0.00, df=1 (P=0.97); I2=0%; social Chi2=0.00, df=1 (P=0.96); I2=0%; or environment Chi2=0.39, df=1 (P=0.53); I2=0%).

Intellectual impairment. One randomised controlled trial evaluated a home-based programme for young children with intellectual impairments and their carers, against a control group for which details were not provided (Shin et al., 2009). No difference in outcomes were found at 12 months.

<TABLE 5>

4. Discussion

4.1. *Summary of findings*

We reviewed the literature on the effectiveness and cost-effectiveness of CBR for people with physical and mental disabilities in low- and middle-income countries, and/or their family, their carers, and their community. We identified 15 studies that met our inclusion criteria, of which six focusing on physical and nine on mental disabilities. The evidence suggests that CBR may be effective in improving the clinical outcomes and enhancing functioning and quality of life of people with disabilities and their carers. However the interpretation of results ask for cautiousness due to both the heterogeneity of the interventions and the scarcity of good-quality evidence. Furthermore, none of the studies provided evidence on cost-effectiveness of the intervention.

While CBR stresses the need to include up to five components in order to meet the needs of people with disabilities and their carers, fourteen studies focused on the health component and only one on the education component (Shin et al. 2009). The other components were sometimes included as minor elements of CBR programmes. This showed important gaps in our understanding of the impact of CBR on the lives of people with disabilities and their carers.

While CBR is addressed to people with all physical and mental disabilities, and we included a wide definition of disability, we found a limited range of disabilities for both mental (schizophrenia, dementia, intellectual impairment) and physical disabilities (stroke, arthritis, COPD). None of the studies included people with sensory impairments (hearing or vision). Moreover, while CBR is addressed to both children and adults, only one study focused on children (Shin et al., 2009).

Notwithstanding CBR was developed as a strategy to provide services for people with disabilities in low- and middle-income countries, the geographical coverage of the studies was limited, the majority being in Asia. Despite the emphasis on CBR programmes in Africa, only one study was based in Africa (Botha et al., 2010).

4.2. *Strengths and limitations*

To our knowledge, this is the first systematic review literature on the effectiveness and cost-effectiveness of CBR for people with physical and mental disabilities in low- and middle-income countries, and/or their family, their carers, and their community. We attempted to reduce the publication bias through searching a large number of electronic databases and performing supplementary searches (searching websites, contacting authors, searching references of included studies, citation tracking). Time lag was minimised by searching trials repository and contacting authors. Multiple publication bias was reduced by running the analysis by project, instead of publication. Location bias was addressed by searching databases and websites specialised in both high-income, and low- and middle-income countries. Citation bias was minimised by searching reference lists of included studies and also literature reviews identified during the process (Iemmi et al. 2015). Language bias was addressed by including studies published not only in English but also in other languages available in the author team (French, Spanish, Portuguese, German, Italian) and reporting the list of references which full-text we were not able to screen as in other languages (Iemmi et al. 2015). While we summarised all outcomes reported in the studies, we could not exclude the possibility of outcome reporting bias. A further contribution of our review is with respect to the methodology, establishing an operational definition for CBR and disability (Iemmi et al. 2015) through consulting the international literature for CBR (WHO, 2001; WHO, 2010; Lukersmith et al., 2013) and disability (WHO & World Bank, 2011) followed by consultations with international experts. Although definitions of both CBR and disability are available in the international literature, their operationalisation was needed.

However, the limited number of included studies and scarcity of good-quality evidence implies the need for care in interpreting and generalising the results. This paucity of data made it difficult to pool the results and perform meta-analyses. Moreover, potential criticisms of this review may be the broad definition used of both CBR and disability. In this view, some of the included programmes could arguably be classified as community-based care programmes, rather than CBR, and so contributing to the emphasis on the health component. Similarly, some of the included studies could arguably be classified as focusing on a health condition rather than a disability (e.g. schizophrenia, stroke). Despite those broad definitions, the majority of excluded studies were discarded because their intervention was not defined as CBR or targeted people with disabilities. Using a more restrictive definition of CBR or disability would have substantially reduced the pool of eligible studies.

4.3. *Implications for research*

Further research is needed focusing beyond the health component of CBR in order to capture the impact of all aspects of CBR. Further evaluations of CBR programmes are needed for a broader number of physical and mental disabilities, and not only in adults and elderly people, but also in children. More studies are needed in regions with scarce evidence, such as Africa. More well-designed and well-reported randomised controlled trials are needed to build a stronger evidence-base, while recognising the methodological challenges not only due to the complexity of CBR and the variety of disabilities, but also to the additional challenges in undertaking research in low- and middle-income countries. This would also permit pooling the results and performing meta-analyses. In this view, the use of a common clear definition of both CBR and disability need to be adopted. Economic evaluation is paramount to supplement and strengthen the evidence on effectiveness in order to support resource allocation in resource limited low- and middle-income countries.

4.4 Conclusion

The evidence on the effectiveness of CBR for people with disabilities in low- and middle-income countries suggests that CBR may be effective in improving the clinical outcomes and enhancing functioning and quality of life of the person with disabilities and his/her carer. However the heterogeneity of the interventions and scarcity of good-quality evidence means that we should interpret these findings with caution.

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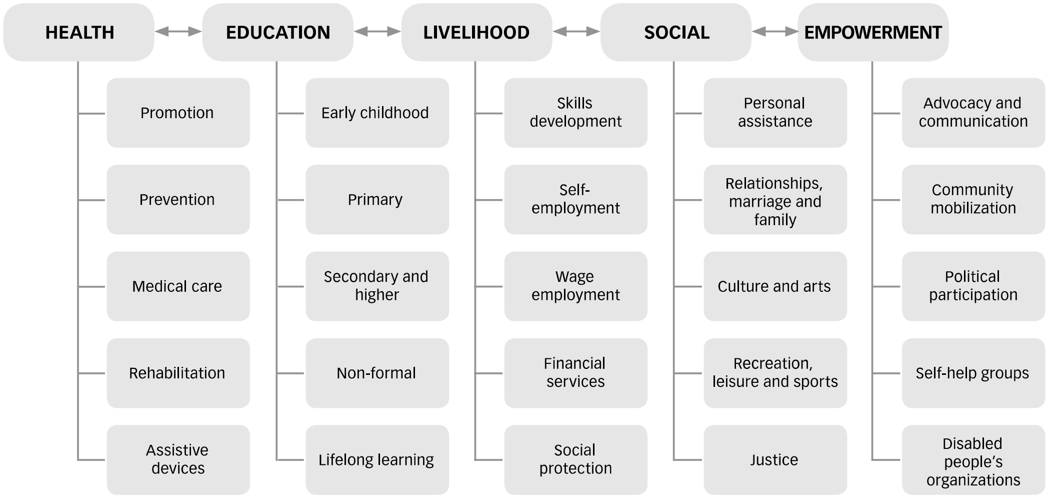
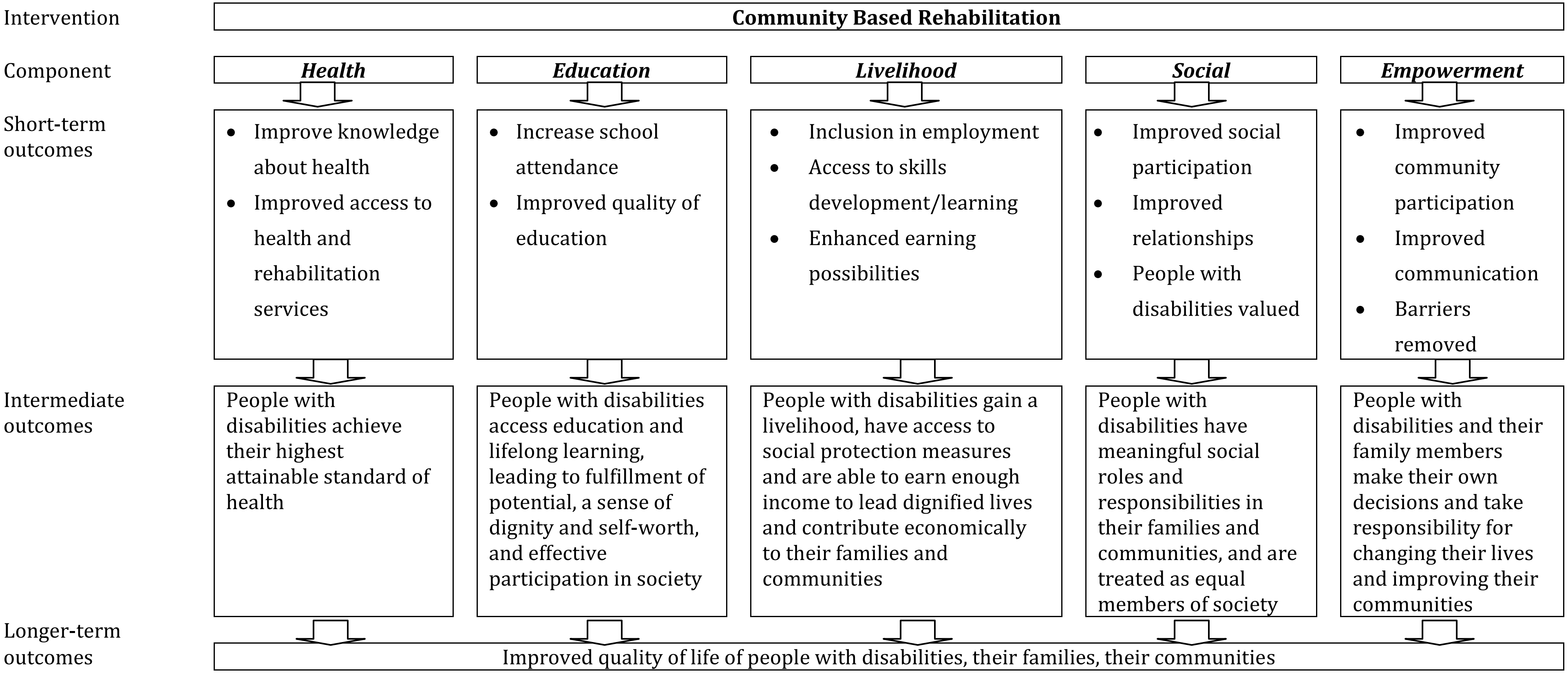
Figure 1: CBR Matrix



Note: From WHO (2010), Figure 1, page 25.

Figure 2. Pathways through which CBR may improve the lives of people with disabilities and their carers



Intervention	Community Based Rehabilitation				
Component	***Health***	***Education***	***Livelihood***	***Social***	***Empowerment***
Short-term outcomes	• Improve knowledge about health • Improved access to health and rehabilitation services	• Increase school attendance • Improved quality of education	• Inclusion in employment • Access to skills development/learning • Enhanced earning possibilities	• Improved social participation • Improved relationships • People with disabilities valued	• Improved community participation • Improved communication • Barriers removed
Intermediate outcomes	People with disabilities achieve their highest attainable standard of health	People with disabilities access education and lifelong learning, leading to fulfillment of potential, a sense of dignity and self-worth, and effective participation in society	People with disabilities gain a livelihood, have access to social protection measures and are able to earn enough income to lead dignified lives and contribute economically to their families and communities	People with disabilities have meaningful social roles and responsibilities in their families and communities, and are treated as equal members of society	People with disabilities and their family members make their own decisions and take responsibility for changing their lives and improving their communities
Longer-term outcomes	Improved quality of life of people with disabilities, their families, their communities				

Note: From Iemmi et al. (2015), Figure 3, pages 19-20.

Figure 3. Flow chart of the study selection process

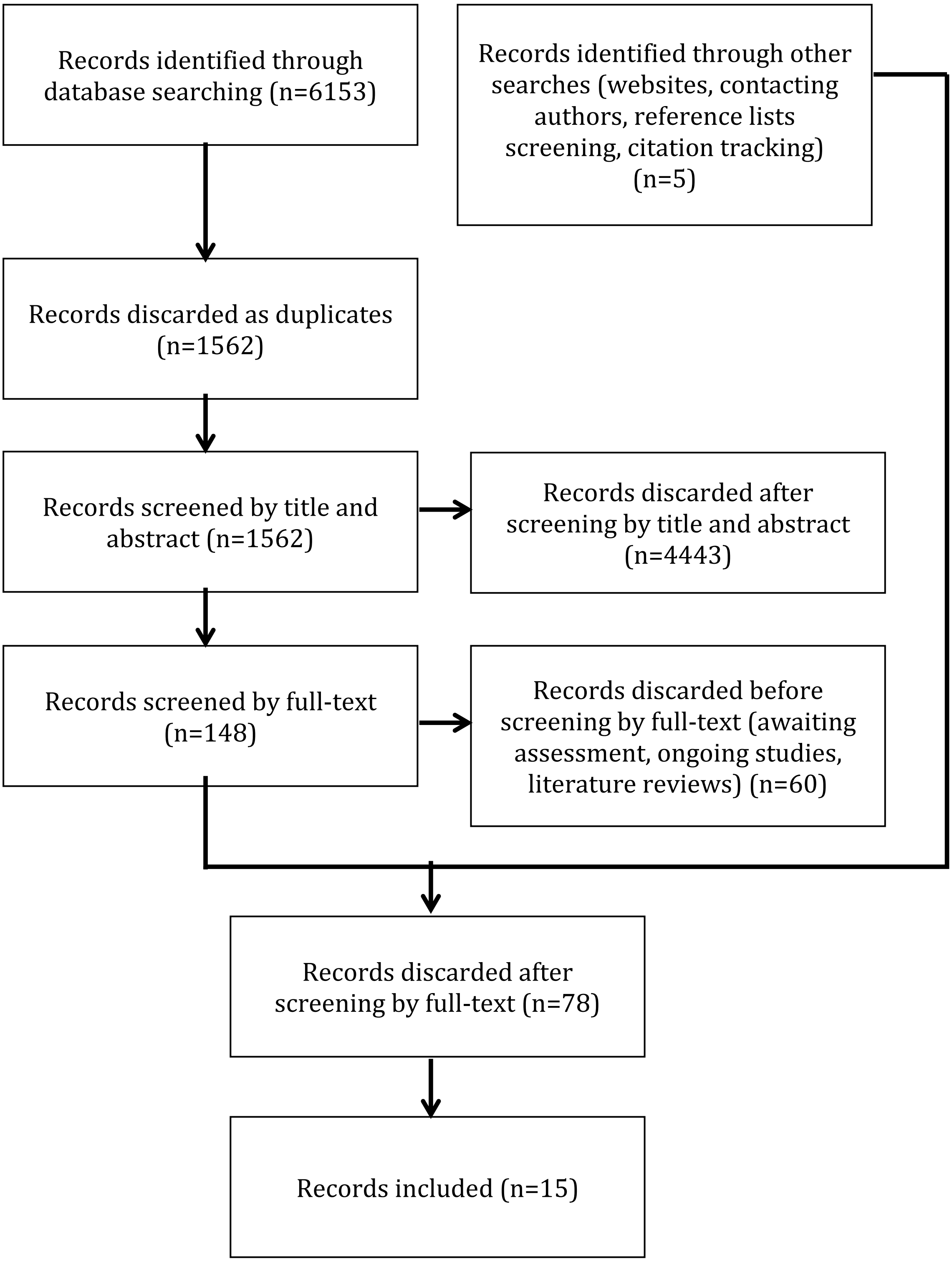


Table 1. Summary of included studies

Author, publication year	Country of study	Region of study	Target group	Study design	No. of subjects	Follow-up	Primary component of CBR matrix assessed
PHYSICAL DISABILITIES							
Stroke							
Chinchai 2010	Thailand	EAP	Adults	RCT	60	2 months	Health
Yu 2009	China	EAP	Adults	RCT	737	5 months	Health
Ozdemir 2001	Turkey	ECA	Adults	Non-RCT	60	64 days	Health
Habibzadeh 2007	Iran	MNA	Adults	CBA	60	45 days	Health
Arthritis							
Darmawan 1992	Indonesia	EAP	Adults	ITS	844	6 months	Health
COPD							
Noonill 2007	Thailand	EAP	Adults	RCT	88	3 months	Health
MENTAL DISABILITIES							
Schizophrenia							
Botha 2010	South Africa	SSA	Adults	RCT	60	12 months	Health
Ran 2003	China	EAP	Adults	RCT	357	9 months	Health
Zhang 1994b	China	EAP	Adults	RCT	83	18 months	Health
Zhang 1998	China	EAP	Adults	Non-RCT	409	36 months	Health
Chatterjee 2003	India	SAS	Adults	CBA	207	12 months	Health
Dementia							

Dias 2008	India	SAS	Older people	RCT	81	6 months	Health
Gavrilova 2009	Russia	ECA	Older people	RCT	60	6 months	Health
Guerra 2011	Peru	LAC	Older people	RCT	58	6 months	Health
Intellectual impairment							
Shin 2009	Vietnam	EAP	Children	RCT	37	12 months	Education

Note: Adapted from Iemmi et al. (2015), Table 1, page 35. EAP East Asia and Pacific. ECA Europe and Central Asia. LAC Latin America & the Caribbean. SAS South Asia. SSA Sub-Saharan Africa. RCT Randomised Controlled Trial. Non-RCT Non-Randomised Controlled Trial. CBA Controlled Before-After study.

Table 2. Effects of CBR for people with physical disabilities

	CBR	Control	
Randomised controlled trials			
STROKE: **Chinchai 2010**	Mean (SD) at 2 months	Mean (SD) at 2 months	Standardised mean difference (95% CI)
WHOQOL-BREF-THAI: physical	23.73 (2.23)	20.50 (1.89)	1.56 (0.98-2.13)
WHOQOL-BREF-THAI: psychological	20.90 (1.88)	18.07 (2.36)	1.33 (0.77-1.89)
WHOQOL-BREF-THAI: social	8.60 (0.89)	7.90 (1.42)	0.59 (0.07-1.11)
WHOQOL-BREF-THAI: environmental	25.90 (2.23)	23.67 (2.76)	0.88 (0.36-1.42)
STROKE: **Yu 2009**	Mean (SD) at 5 months	Mean (SD) at 5 months	Standardised mean difference (95% CI)
Clinical Neurological Function Deficit Scale: total group	10.14 (7.54)	13.56 (8.70)	-0.42 (-0.57- -0.27)
Clinical Neurological Function Deficit Scale: cerebral infarction	10.31 (7.41)	14.03 (9.15)	-0.45 (-0.62- -0.28)
Clinical Neurological Function Deficit Scale: cerebral haemorrhage	9.53 (7.98)	11.95 (6.79)	-0.32 (-0.64- -0.01)
COPD (RCT): **Noonill 2007**	Mean (SD) at 3 months	Mean (SD) at 3 months	Standardised mean difference (95% CI)
6MWD	342.77 (106.06)	265.07 (94.35)	0.77 (0.34-1.21)
DVAS	4.46 (2.21)	6.22 (1.83)	-0.87 (-1.31- -0.43)
HRQL	30.27 (19.4)	52.40 (21.34)	-1.09 (-1.54- -0.64)
PSCQ	91.09 (10.67)	74.93 (15.36)	1.22 (0.77-1.68)
HU: ER visit (Z-score)	Not reported	Not reported	
HU: not hospitalised (Z-score)	Not reported	Not reported	
HU: did not stay (Z-score)	Not reported	Not reported	
Non-randomised controlled studies			
STROKE: **Ozdemir 2001**	Mean change (SD) at 64 days	Mean change (SD) at 64 days: inpatient	Standardised mean difference (95% CI)

	CBR	**Control**	
ADL: FIM	12.30 (13.38)	59.63 (14.19)	-3.43 (-4.23- -2.64)
MMSE	2.03 (2.12)	4.83 (5.03)	-0.73 (-1.25- -0.20)
Ashworth Scale lower extremity	23(0.50)	0.46 (1.22)	24.18 (19.82-28.53)
Ashworth Scale upper extremity	0.10 (0.30)	0.20 (1.21)	-0.11 (-0.62-0.39)
Brunnstrom Motor Evaluation Scale upper extremity	0.33 (0.60)	2.00 (1.20)	-1.76 (-2.36- -1.16)
Brunnstrom Motor Evaluation Scale lower extremity	0.83 (0.59)	2.36 (1.18)	-1.64 (-2.23- -1.06)
Brunnstrom Motor Evaluation Scale hand	0.36 (0.85)	1.86 (1.27)	-1.39 (-1.95- -0.82)

STROKE: **Habibzadeh 2007**	Mean score (SD) at 3 months	Mean score (SD) at 3 months	Standardised mean difference (95% CI)
ADL score (mean change after versus before)	74 (25.7)	38 (23.4)	1.46 (0.89-2.03)
Individual hygiene	3.8 (1.27)	2.5 (1.54)	0.92 (0.39-1.45)
Bathing	3.6 (1.40)	2.4 (1.58)	0.80 (0.28-1.33)
Feeding	7.7 (2.5)	4.6 (2.7)	1.19 (0.64-1.74)
Water and closet	7.1 (2.9)	3.9 (3.2)	1.05 (0.51-1.59)
Hair combing	8.7 (2.2)	5.0 (2.6)	1.54 (0.96-2.11)
Wearing clothes	7.4 (2.8)	4.1 (2.6)	1.22 (0.67-1.77)
Bowel control	7.6 (3.0)	3.3 (2.6)	1.53 (0.96-2.11)
Bladder control	7.1 (3.5)	3.7 (3.2)	1.01 (0.48-1.55)
Moments	11.3 (3.9)	5.4 (4.5)	1.40 (0.84-1.97)
Moving from bed to chair	10.5 (4.2)	4.2 (3.6)	1.61 (1.03-2.19)

ARTHRITIS: **Darmawan 1992**	Total correct responses at 6 months	Total correct responses at 6 months	Risk ratio (95% CI)
Correct knowledge on performance of ADL: all participants	77.5%	not given	Not applicable
Correct knowledge on performance of ADL: illiterates	57.6%	50.0%	1.15 (1.01-1.31)

	CBR	Control	
Correct knowledge on performance of ADL: attended primary school	77.1%	72.2%	1.07 (0.98-1.16)
Correct knowledge on performance of ADL: attended junior high school	78.6%	76.3%	1.03 (0.95-1.11)
Correct knowledge on performance of ADL: attended senior high school	80.0%	77.8%	1.03 (0.96-1.11)
Correct knowledge on performance of ADL: attended academy or university	100.0%	96.4%	1.04 (1.02-1.06)

Note: From Iemmi et al (2015), Table 6, pages 47-50.

Table 3. Effects of CBR for people with mental disabilities

	CBR	Control	
Randomised controlled studies			
SCHIZOPHRENIA: Botha 2010	Mean (SD) at 12 months	Mean (SD) at 12 months	Standardised mean difference (95% CI)
PANNS total	57.52 (17.4)	73.52 (19.2)	-0.88 (-1.47- -0.29)
PANNS positive	12.52 (6.0)	19.38 (8.8)	-0.94 (-1.53- -0.35)
PANNS negative	16.55 (6.1)	19.33 (4.6)	-0.50 (-1.07-0.07)
PANNS general	28.45 (8.2)	34.81 (9.1)	-0.74 (-1.32- -0.16)
SOFAS	61.97 (9.1)	54.90 (10.8)	0.72 (0.14-1.30)
CDSS total	0.69 (1.4)	0.81 (3.3)	-0.05 (-0.61-0.51)
ESRS-questionnaire	1.90 (1.23)	1.90 (1.51)	0 (-0.56-0.56)
ESRS-parkinsonism	9.03 (8.20)	0.48 (8.07)	1.05 (0.45-1.65)
ESRS-dyskinetic	0.55 (1.24)	0.57 (1.57)	-0.01 (-0.58-0.55)
Number readmissions	0.41 (0.63)	1.19 (0.98)	-0.98(-1.58- -0.39)
Days in hospital	24.69 (47.43)	67.19 (76.31)	-0.70 (-1.27- -0.12)
Non-psychiatric days in hospital	0.07 (0.37)	2.33 (5.65)	-0.62 (-1.19- -0.04)
Medication	Not reported	Not reported	Not significant (text only)
WHO-QOL	Not reported	Not reported	Not significant (text only)
			Risk ratio (95% CI)
Remission	44.83%	28.57%	1.57 (0.71-3.45)
Readmission	34.48%	71.43%	2.07 (1.10-3.90)

SCHIZOPHRENIA : Ran 2003	Score at 9 months	Score at 9 months	Risk ratio (95% CI)
Clinical status Fully recovered	42.1%	22.7%	1.85 (1.22-2.82)
Patient's working ability Full-time	57.9%	54.6%	1.06 (0.84-1.34)
Relapse rate	16.3%	61.5%	0.27 (0.17-0.41)
Treatment compliance regular treatment	34.9%	5.2%	6.71 (2.78-16.22)
Mental disability Mild	18.3%	20.6%	0.89 (0.52-1.52)

SCHIZOPHRENIA: Zhang 1994	Mean (SD) at 18 months	Mean (SD) at 18 months	Standardised mean difference (95% CI)
BPRS (not readmitted)	25.5 (3.6)	30.6 (4.7)	-1.21 (-1.70- -0.74)
GAS (not readmitted)	66.5 (8.2)	54.6 (8.5)	1.42 (0.92-1.92)
			Risk ratio (95% CI)
Readmission	15.4%	53.8%	0.29 (0.13-0.63)
Medication non-compliance	20.5%	43.6%	0.47 (0.23-0.96)

DEMENTIA: Dias 2008	Mean (SD) at 6 months	Mean (SD) at 6 months	Standardised mean difference (95% CI)
EASI	8.5 (2.3)	8.7 (2.2)	-0.09 (-0.60-0.43)
NPI-Q severity	6.7 (4.8)	8.4 (5.1)	-0.34 (-0.86-0.17)

DEMENTIA: Gavrilova 2008	Mean difference (SD) at 6 months	Mean difference (SD) at 6 months	Standardised mean difference (95% CI)
NPI-Q severity	-1.0 (2.1)	-0.6 (2.8)	-0.16 (-0.70-0.38)
DEMQOL	3.3 (7.5)	-0.4 (7.0)	0.51 (-0.04-1.06)

DEMENTIA: Guerra 2011	Mean difference (SD) at 6 months	Mean difference (SD) at 6 months	Standardised mean difference (95% CI)
NPI-Q severity	-1.7 (3.3)	-1.6 (2.6)	-0.03 (-0.56-0.49)
DEMQOL	1.0 (8.0)	-2.0 (22.8)	0.17 (-0.35-0.70)

INTELLECTUAL: Shin 2009	Mean (SD) at 12months	Mean (SD) at 12 months	Standardised mean difference (95% CI)
Vineland scale: adaptive behaviour composite	57.4 (13.7)	56.3 (11.2)	0.09 (-0.63-0.80)
Vineland scale: communication	55.1 (23.3)	52.4 (18.8)	0.13 (-0.59-0.84)
Vineland scale: daily living skills	68.9 (28.5)	66.3 (24.5)	0.10 (-0.62-0.82)
Vineland scale: social skills	53.2 (18.4)	52.7 (13.7)	0.03 (-0.69-0.75)
Vineland scale: motor skills	53.9 (16.4)	52.9 (16.3)	0.06 (-0.66-0.78)

Non-randomised controlled studies			
SCHIZOPHRENIA: Zhang 1998	Mean (SD) at 3 years	Mean (SD) at 3 years	Standardised mean difference (95% CI)
WHO-DAS: total score	16.5 (8.2)	17.7 (10.9)	-0.13 (-0.33-0.07)
			Risk ratio (95% CI)

Annual relapse rate %	10.4	15.2	0.68 (0.41-1.15)
Hospitalisation rate %	6.4	10.2	0.63 (0.32-1.22)

SCHIZOPHRENIA: Chatterjee 2003	Mean change (95% CI) at 12 months: ITT	Mean change (95% CI) at 12 months: ITT	Standardised mean difference (95% CI)
PANNS general	26.4 (24-29)	24.6 (23-27)	0.14 (-0.14-0.42)
PANNS negative	13.9 (12-15)	12.3 (11-13)	0.22 (-0.06-0.50)
PANNS positive	15.6 (14-17)	14.1 (13-15)	0.20 (-0.08-0.48)
DAS behavioural	9.6 (9-11)	8.6 (8-9)	0.21 (-0.07-0.48)
DAS occupation	6.8 (6-8)	4.7 (4-6)	0.40 (0.11-0.68)
DAS social	10.7 (9-12)	8.2 (7-9)	0.34 (0.06-0.62)

Note: From Iemmi et al (2015), Table 7, pages 51-53.

Table 4. Effects of CBR for carers of people with mental disabilities

	CBR	Control	
Randomised controlled studies			
DEMENTIA: Dias 2008	Mean (SD) at 6 months	Mean (SD) at 6 months	Standardised mean difference (95% CI)
Zarit Burden Scale	19.0 (13.0)	21.4 (6.7)	-0.04 (-0.55-0.47)
NPIQ-D	4.4 (3.8)	7.1 (6.4)	-0.10 (-0.62-0.41)
GHQ	2.6 (2.3)	3.3 (3.6)	-0.04 (-0.53-0.44)
DEMENTIA: Gavrilova 2008	Mean difference (SD) at 6 months	Mean difference (SD) at 6 months	Standardised mean difference (95% CI)
Zarit Burden Scale	-2.6 (7.7)	2.8 (7.7)	-0.14 (-0.68-0.40)
SRQ-20	-1.2 (1.3)	-0.5 (2.9)	-0.06 (-0.60-0.48)
NPIQ-D	1.8 (4.3)	-0.2 (4.5)	0.14 (-0.40-0.68)
WHOQOL-BREF: physical	1.1 (4.3)	-3.1 (8.1)	0.12 (-0.42-0.66)
WHOQOL-BREF: psychological	4.0 (9.3)	2.7 (12.0)	0.02 (-0.52-0.56)
WHOQOL-BREF: social	2.5 (6.8)	-0.7 (1.6)	0.14 (-0.40-0.68)
WHOQOL-BREF: environment	1.3 (9.3)	-0.6 (8.2)	0.04 (-0.50-0.58)
DEMENTIA: Guerra 2011	Mean difference (SD) at 6 months	Mean difference (SD) at 6 months	Standardised mean difference (95% CI)
Zarit Burden Scale	-3.6 (4.6)	0.3 (2.9)	-0.20 (-0.72-0.33)
SRQ-20	-3.1 (4.0)	-3.0 (3.1)	-0.01 (-0.53-0.52)
NPIQ-D	-2.3 (4.7)	-2.4 (4.6)	0.004 (-0.52-0.53)
WHOQOL-BREF: physical	-9.7 (18.7)	-15.5 (13.9)	0.07 (-0.46-0.59)
WHOQOL-BREF: psychological	10.0 (11.5)	8.9 (11.1)	0.02 (-0.51-0.54)
WHOQOL-BREF: social	7.1 (12.6)	1.7 (15.2)	0.07 (-0.45-0.60)
WHOQOL-BREF: environment	7.6 (11.4)	9.5 (13.0)	-0.03 (-0.55-0.49)
Non randomised controlled studies			
SCHIZOPHRENIA : Zhang 1998	Mean (SD) at 3 years	Mean (SD) at 3 years	Standardised mean difference (95% CI)

GHQ total: mean	2.8 (4.4)	3.1 (4.3)	-0.005 (-0.20-0.19)
FIS total: mean	9.7 (10.1)	13.6 (10.3)	-0.03 (-0.23-0.17)
Lack of knowledge concerning:			Risk ratio (95% CI)
Diagnosis of illness	1.2%	1.9%	-0.26 (-1.15-0.63)
Symptoms of illness	4.0%	8.2%	-0.42 (-0.89-0.05)
Effects of medication	4.0%	8.9%	-0.47 (-0.93- -0.009)
Side effects of Medication	13.9%	26.6%	-0.45 (-0.72- -0.17)
Early signs of relapse	8.4%	16.5%	-0.42 (-0.76- -0.09)
Coping with odd behaviour	13.5%	21.5%	-0.31 (-0.60- -0.02)

Note: From Iemmi et al (2015), Table 8, pages 54-55.

Table 5. Effects of CBR for people with dementia and their carers: CBR vs. treatment as usual

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate
1.1 Clinical status: Neuro-Psychiatric Inventory (NPI-Q severity), at 6 months	3	168	Std. Mean Difference (IV, Random, 95% CI)	-0.09 [-0.47, 0.28]
1.2 Quality of life:dementia-specific health-related quality of life (DEMQOL) at 6 months	2	109	Std. Mean Difference (IV, Random, 95% CI)	0.22 [-0.33, 0.77]
2.1 Carer burden: Zarit Burden Scale (ZBS), at 6 months [higher scores indicate higher levels of burden]	3	168	Std. Mean Difference (IV, Random, 95% CI)	-0.85 [-1.24, -0.45]
2.2 Carer distress: Neuro-Psychiatric Inventory (NPIQ-D), at 6 months	3	168	Std. Mean Difference (IV, Random, 95% CI)	-0.16 [-0.54, 0.22]
2.3 Carer psychological morbidity: Self-Reporting Questionnaire 20 (SRQ-20) at 6 months [higher scores indicate higher levels of morbidity]	2	109	Std. Mean Difference (IV, Random, 95% CI)	-0.37 [-1.06, 0.32]
2.4 Carer quality of life: WHO Quality of Life questionnaire (WHOQOL- BREF, physical) at 6 months	2	88	Std. Mean Difference (IV, Random, 95% CI)	0.51 [0.09, 0.94]
2.5 Carer quality of life: WHO Quality of Life questionnaire (WHOQOL- BREF, psychological) at 6 months	2	88	Std. Mean Difference (IV, Random, 95% CI)	0.11 [-0.31, 0.53]
2.6 Carer quality of life: WHO Quality of Life questionnaire (WHOQOL- BREF, social) at 6 months	2	88	Std. Mean Difference (IV, Random, 95% CI)	0.54 [0.12, 0.97]
2.7 Carer quality of life: WHO Quality of Life questionnaire (WHOQOL- BREF, environment) at 6 months	2	88	Std. Mean Difference (IV, Random, 95% CI)	0.07 [-0.35, 0.49]

Note: Adapted from Iemmi et al. (2015), Table 9, page 58 and Table 10, pages 59-61.