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**The effectiveness of community-based rehabilitation for
providing services to people with stroke with functional
limitations and participation restriction:
A Systematic Review and implications.**

by

**STUDENT: LIONEL EDMUND NAIDOO
NDXLIO002**

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Supervisors: Mark Engel, Department of Medicine, University of Cape Town
Soraya Maart, School of Health and Rehabilitation Sciences, Division
of Physiotherapy, University of Cape Town

DECLARATION

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ii. List of abbreviations:

IBR:	Institution-based rehabilitation
CBR:	Community-based rehabilitation
WHO:	World Health Organisation
RCT:	Randomised controlled trial
MD:	Mean difference
SMD:	Standardised mean difference

iii. Glossary

Institution-based rehabilitation:

Incorporates rehabilitation delivered within a hospital, clinic, ward, stroke unit, rehabilitation institution or long term care facility. (Prvu Bettger JA and Stineman MG, 2007)

Community-based rehabilitation:

Incorporates community level rehabilitation aimed at providing rehabilitative services to people with stroke with disabilities in their home or community. (Evans PJ et al., 2001, Wade DT, 2003),

Mean difference:

The ‘difference in means’ is a standard statistic that measures the absolute difference between the mean value in the two groups in a clinical trial (Higgins et al., 2006).

Standardised mean difference:

The standardised mean difference is used as a summary statistic in meta-analysis when the trials all assess the same outcome, but measure it in a variety of ways (for example, all trials measure depression but they use different psychometric scales) (Higgins et al., 2006).

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1. Abstract

Objectives: We conducted a systematic review and meta-analysis of randomised and quasi-randomised trials to determine the effectiveness of community-based rehabilitation versus hospital/institution based rehabilitation in providing rehabilitative services to people with stroke with functional limitations and participation restriction.

Data sources: Using a highly sensitive search strategy, duplicate searches were conducted for the following databases from January 1976 to May 2010: MEDLINE via PubMed, African Wide Information via EBSCO, Academic Search Premier via EBSCO, Cochrane CENTRAL, CINAHL, PsycInfo, PEDro.

Review methods: Abstracts were scanned in duplicate for all randomised and quasi-randomised trials comparing the effectiveness of community-based rehabilitation with hospital/institution based rehabilitation in providing rehabilitative service to people with stroke with functional limitations and participation restriction. For this review, the primary outcome was functional independence while secondary outcomes included quality of life, physical, psychological and social functioning and, community participation of people with stroke and their caregivers.

Results: Twelve randomised controlled trials with 2707 people with stroke were included. Percentage of males included in studies ranged from 42% to 75% and the participants ranged in age from a mean or median of 52 years to 78 years for those receiving the intervention and 55 years to 80 years for control participants. The treatment duration of community-based rehabilitation programmes ranged from three weeks to six months. Overall the meta-analysis found no evidence for the effectiveness of community-based rehabilitation as compared with hospital/institution based rehabilitation with respect to functional outcome (Standardised Mean Difference (SMD) 0.09; 95% Confidence Interval (CI) -0.08 to 0.26) or quality of life (Mean Difference (MD) 1.32; 95% CI -4.30 to 6.93) or carer strain (MD 0.76; 95% CI -0.19 to 1.77). Subgroup analyses at three months showed a significant effect for community-based rehabilitation over hospital/institution based rehabilitation on quality of life (MD 5.00; 95% CI 0.82 to 9.18); however, this effect

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was not maintained at six months. Cost-effectiveness tended towards a cost reduction associated with community-based rehabilitation.

Conclusion: Use of community-based rehabilitation may be associated with positive and negative effects. However, there is currently insufficient supporting evidence to justify the implementation of community-based rehabilitation for stroke rehabilitation. A stronger evidence base is required to adequately inform health policy decisions and guide methods of service delivery to effectively improve stroke patient outcomes.

2. Introduction

Globally, stroke is the second commonest cause of death (Connor M and Bryer A, 2006), with the majority of these deaths (80%) occurring in the developing world (Wasserman S et al., 2009). It is estimated that stroke accounts for 4.5 million deaths a year in the world and over 9 million stroke survivors (Wolfe CDA, 2000). The burden of stroke lies not only in the mortality rate but in the high morbidity. (Connor M and Bryer A, 2006), as one third of all people with stroke are permanently disabled, making stroke one of the primary causes of disability (Spratt N et al., 2003). Stroke will soon be the leading cause of death and adult disability in the developing world (Epping-Jordan J E et al., 2004, Wasserman S et al., 2009). It is already the most dominant type of vascular disease in sub-Saharan Africa and the most common cause of death among people older the age of 50 in South Africa (Wasserman S et al., 2009). In these countries non communicable diseases develop at an earlier age when compared with developed countries, resulting in prolonged periods of disability before death (Alwan A and MacLean D R, 2009). It is thus evident that stroke places a huge demand on health care systems, patients and families (Epping-Jordan J E et al., 2004). In most developing countries resources for stroke care and rehabilitation are lacking and following an acute stroke, many patients are often discharged from hospital without an option of receiving adequate rehabilitation by trained health care professionals (Wasserman S et al., 2009). In addition, the high cost of institution-based rehabilitation (IBR) and increased pressure to shorten the length of hospital stay has raised the political profile of community-based rehabilitation (CBR), the aim of which is to reduce health expenditure while improving patient outcomes (Wade DT, 2003).

3. Literature Review

Rehabilitation for stroke survivors

The main objective of post-stroke treatment and rehabilitation is to improve the independence of stroke survivors (Kwon S et al., 2004). The WHO defines rehabilitation as the ‘combined and co-ordinated use of medical, social, educational and vocational measures for training or retraining the individual to the highest possible level of functional ability’ (Anderson C et al., 2002). Bryer (2009) defines stroke rehabilitation as “a goal-orientated process that attempts to obtain maximum function in patients who have had strokes and who suffer from a combination of physical, cognitive and language disabilities (Bryer A, 2009). Many scales measure functional independence in performing activities of daily living (Dombovy ML et al., 1986), in an attempt to quantify disability in patients (Kwon S et al., 2004). Hence, functional outcome measures are used as they provide accurate and precise assessment of activities of daily living, which are important for assessing quality care and measuring effectiveness of stroke rehabilitation (Kwon S et al., 2004).

Community-based rehabilitation

For decades, CBR has been the strategy of choice by the World Health Organisation (WHO) to provide rehabilitation services to people with disabilities (Sharma M, 2004). CBR was introduced in an attempt to provide/extend appropriate medical care and rehabilitation services to an estimated 80% of the world’s disabled population largely in low- and middle-income countries (WHO, 2006). The main goals of CBR were to provide primary care and rehabilitative assistance to persons with disabilities by utilising human and physical resources that pre-existed in the community (Sharma M, 2004). CBR thus aims to address the needs of persons with disability in respect of their social integration, enhancing their quality of life, improving functional independence (in the context of their regular roles and routines) as well as enabling an increased rehabilitation coverage at an affordable cost (Eldar R, 2000, Evans L and Brewis C, 2008).

There has been shift in emphasis within the definition of disability, moving from the biomedical paradigm towards a social paradigm (Finkelflügel H et al., 2008, Hartley S et al., 2009). This has resulted in the expansion of the medically-orientated model

on which CBR was originally based, to include a socially-oriented rights-based approach (Hartley S et al., 2009). Due to these changes, CBR was redefined in 2004 in a joint position paper between the International Labour Organisation (ILO), the United Nations Educational, Scientific and Cultural Organisation (UNESCO) and the WHO resulting in CBR being fine-tuned in its definition as “a strategy within community development for rehabilitation, equalisation of opportunities, and social inclusion of all people with disabilities. CBR is implemented through the combined efforts of people with disabilities themselves, their families, organisations and communities, and the relevant governmental and non-governmental health, education, vocational, social and other services.” (ILO et al., 2004), (Penny N et al., 2007)

There is a wide diversity of working definitions currently attached to the term CBR. As a result, there are variations of CBR which exist under different names such as: socio-economic rehabilitation; community integration programmes; community rehabilitation services; or community-based support with a commonality to support the person with disabilities within and by their own community (Finkenflugel et al, 2008). Helander (1993) describes CBR as a strategy for enhancing the quality of life of disabled people by improving access to services and by promoting their human rights. In an attempt to achieve outcomes (Helander, 1993), CBR programmes differ to a great extent in its design, from attempting to improve the living standards of people with disabilities to providing treatment while others focus either on socio-economic rehabilitation, or empowerment and promotion of the involvement of people with disabilities.(Velema et al, 2008).

There are many different interpretations as to the nature or classification of CBR. Some authors will based the classification on the setting where rehabilitation is provided, such as in hospital or on an ambulatory basis or domiciliary/home rehabilitation (Eldar R, 2000). Wade (2003) suggests that the classification may be the specialised skills of the service, the geographic location of the service, the management organisation that runs the service and lastly, or, based upon the location of service delivery (Wade DT, 2003). Turmusani et al (2002) highlighted 6 common interpretations to the nature of CBR namely: (1) home-based programmes, (2) community-based programmes that aim to ensure that people with disability (PWD)

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are included in the community e.g. attitude-changing, (3) development programmes that focus on disability as an issue of poverty, (4) poverty alleviation through income generating activities (5) disabled people organisations (6) those employing a human rights approach to the inequity (Turmusani M et al., 2002). While the understanding of CBR is incongruous, most CBR programmes nevertheless, recognise that need to include one or more of these aspects in their programme activities (Turmusani M et al., 2002)

CBR, is no longer seen as a cheap alternative to rehabilitation within under resourced areas, however many developing countries are investing resources on developing CBR in order to improve access to rehabilitation services in both urban and rural areas. This concept of CBR sees the interchange between institution and community based services. CBR as a core component of the Primary Health Approach emphasizes intersectoral collaboration and community development in its implementation to address the needs of people with disabilities.

CBR vs IBR

CBR needs to be distinguished from the institutional based rehabilitation (IBR) model. IBR provides intensive rehabilitation to people with disabilities with the use of modern equipment by professionally trained health workers (Lightfoot, 2004). Consequently IBR is very costly and provides only 3% of the rehabilitation needs of people with disabilities requiring long-term institutional care in either a hospital or special rehabilitation centre (Mitchell, 1999). Furthermore, the long term institutionalization resulted in the isolation of many disabled persons from the mainstream of community life and activities (Mitchell, 1999). IBR also reinforced the idea of disability as a medical model, as health and rehabilitation are viewed as a medical problem and not a social one (Lightfoot, 2004).

Health systems in developed countries are facing increasing pressure to improve their health services at community level in an attempt to counterbalance the escalating cost of hospital services (Kendall E et al., 2009). Thus, an efficient and effective alternative to IBR for people with disabilities need to be explored. This has increased the popularity of CBR as it has the potential to address these challenges by utilising community resources (Kendall E et al., 2009). Furthermore, CBR is a

strategy which is accepted internationally and promoted by the WHO with the implementation of thousands of projects around the world (Kuipers P and Hartley S, 2006). A clear evidence base for CBR interventions is necessary, as reliance on opinions of respected authorities to plan services and formulate policy is no longer acceptable (Kuipers P and Hartley S, 2006). However, CBR is rarely planned or implemented on the basis of clear evidence in developing countries. Therefore by delineating the evidence of effectiveness it will help determine whether CBR will produce better outcomes than IBR (Prvu Bettger JA and Stineman MG, 2007).

Services in South Africa

The South African National Department of Health has endorsed CBR as a strategy and the National Rehabilitation Policy, “Rehabilitation for all” adopted CBR as an integral component of Primary Health Care (PHC) to ensure accessibility and affordability of appropriate services to people with disabilities (National Rehabilitation Policy, 2000). Challenges remain in implementing the strategy in communities, especially in integrating CBR into existing PHC structures.

Systematic Review Methods

Evidence based practice is a collection of methods designed to integrate research evidence into the clinical reasoning process for health professionals and it involves an intensive review of the best available evidence for specific interventions (Siu AMH et al., 2009) . One such method of synthesising evidence is systematic reviews. Systematic reviews provide rigorous, objective evidence to assess the literature relating to a condition. This rigour is gained through the use of protocols developed *a priori* and through conducting extensive literature searches using a variety of database search engines. Data relating to pre-defined objectives are extracted onto a purpose-designed form and thereafter, captured into software capable of producing clear and concise synopses of the data. Where appropriate, graphic representation of the data summaries are produced as a visual aid. Systematic reviews are regarded as being superior to traditional reviews as it involves the application of scientific strategies to reduce bias and to critically appraise and synthesise all relevant studies that address a specific healthcare/clinical question (Cook DJ et al., 1995). Systematic reviews generally incorporate RCT’s and quasi randomised trials as the study designs of choice, given the high quality of evidence generated by these studies

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(Higgins JPT and Green S, 2008). Randomised trials are as the “gold standard” for research, the evidence of which is used to guide practice, given that they are designed to examine causal relationships between rehabilitation interventions and objective outcomes while ruling out alternative explanations (Siu AMH et al., 2009).

CBR has been a changing concept since its introduction and for this study the working definition of CBR has focussed on CBR programmes that provide treatment with objective outcomes to evaluate the effect CBR has on functional outcomes.

To date, there is no published systematic review on the effectiveness of CBR in providing rehabilitation services to people with stroke with functional limitations and participation restriction. However, some research has assessed the effectiveness of therapy based rehabilitation services for people with stroke living at home. The first Cochrane review on the Cochrane Database identified 14 trials including 1617 patients (Outpatient Service Trialists, 2003). Authors of this review concluded that therapy based rehabilitation services (physiotherapy, occupational therapy and multidisciplinary team input) may reduce the likelihood of deterioration in the ability to perform activities of daily living and to improve patient’s ability to perform personal activities of daily living. Therapy-based rehabilitation services reduced the odds of a poor outcome and increased personal activity of daily living scores. The review also highlighted that further research is needed to define the most effective interventions, their economic benefit and the most appropriate level of service delivery. A second systematic review focussed on services to help acute stroke patients avoid admission to hospital (‘hospital-at-home’) which concluded that there is no evidence to support a radical shift in the care of acute stroke patients from hospital based services to “hospital at home” (Langhorne P et al., 1999).

While these reviews show that therapy based rehabilitation services undertaken in the community do equally well. It thus indicates that while specialist resources provided in hospitals and clinics are not essential for outcome, it nevertheless still requires the expensive human resource of a hospital trained therapist. Thus, there is a need to evaluate community based rehabilitation using both professional and non professional staff especially in terms of cost saving and community empowerment. The use of lay healthcare workers, such as home based carers, has been constructive in other spheres of medicine, for example tuberculosis (TB) and HIV/AIDS

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management, and some authors argue that community health workers or community rehabilitation facilitators and carers could be trained to be more active in the rehabilitation process following stroke incidents (Chappell P and Johannsmeier C, 2009, Wasserman S et al., 2009).

We present the latest evidence on the impact of CBR for people with stroke who have functional limitations and participation restriction. We believe that this information will assist healthcare providers in considering community-based programmes for stroke survivors.

4. Aim

The aim of this systematic review was to determine the effectiveness of CBR interventions as compared with IBR, in providing rehabilitative services to people with stroke with functional limitations and participation restrictions. Specific objectives included evaluating functional independence, quality of life, carer strain, community participation and cost-effectiveness. (The outcome variables along with definitions of CBR and population of interest are presented in more detail under 4 Methods). This was achieved by exploring the outcomes of CBR interventions, taking into account differences in methodological design and quality.

5. Methods

5.1. Inclusion criteria

5.1.1. Studies

This review considered all randomised controlled trials (RCTs) and quasi-randomised trials that evaluated the effectiveness of CBR in providing rehabilitation services to people with stroke with functional limitations and participation restrictions. We excluded non RCTs.

5.1.2. Participants

We included all adult patients with a confirmed diagnosis of a stroke resulting in functional limitations and participation restrictions.

5.1.3. Interventions

Community based rehabilitation interventions are aimed at providing rehabilitative services to people with stroke with disabilities in their home or community. For this review, interventions were defined as rehabilitation provided by the community, family, lay and/or professional person at community level. We included any CBR programme intended to improve the functional independence, quality of life and community participation of people with stroke with disabilities and their carers. We included all studies evaluating CBR as compared with IBR which refers to rehabilitation delivered within a hospital, clinic, ward, stroke unit, or rehabilitation institution. Interventions delivered in hospital, including day units and outpatient departments with no CBR component were excluded from this review.

5.1.4. Outcome measures

There is no unanimously agreed upon gold standard for evaluating neurological rehabilitation research (Evans L and Brewis C, 2008). For this review, we considered the following primary and secondary outcomes:

- Primary outcome: functional independence (as a proxy for clinical effectiveness of CBR)

- Secondary outcome: Any one or a combination of quality of life, carer strain, community participation and, cost-effectiveness.

5.2. Search strategy

Figure 1 details the process by which articles were selected for inclusion. We searched PubMed databases, using a combination of stroke, rehabilitation, patient care management, community limited to human, clinical trial, randomised controlled trial and controlled clinical trial. We restricted the search to the English and Afrikaans language (peculiar to SA) from the earliest available date until May 2010 (see *Table 1* for search results). This process was complemented by reviewing citations, searching with Google Scholar, expert referrals and scanning reference lists of articles. Additional articles were included as they became available.

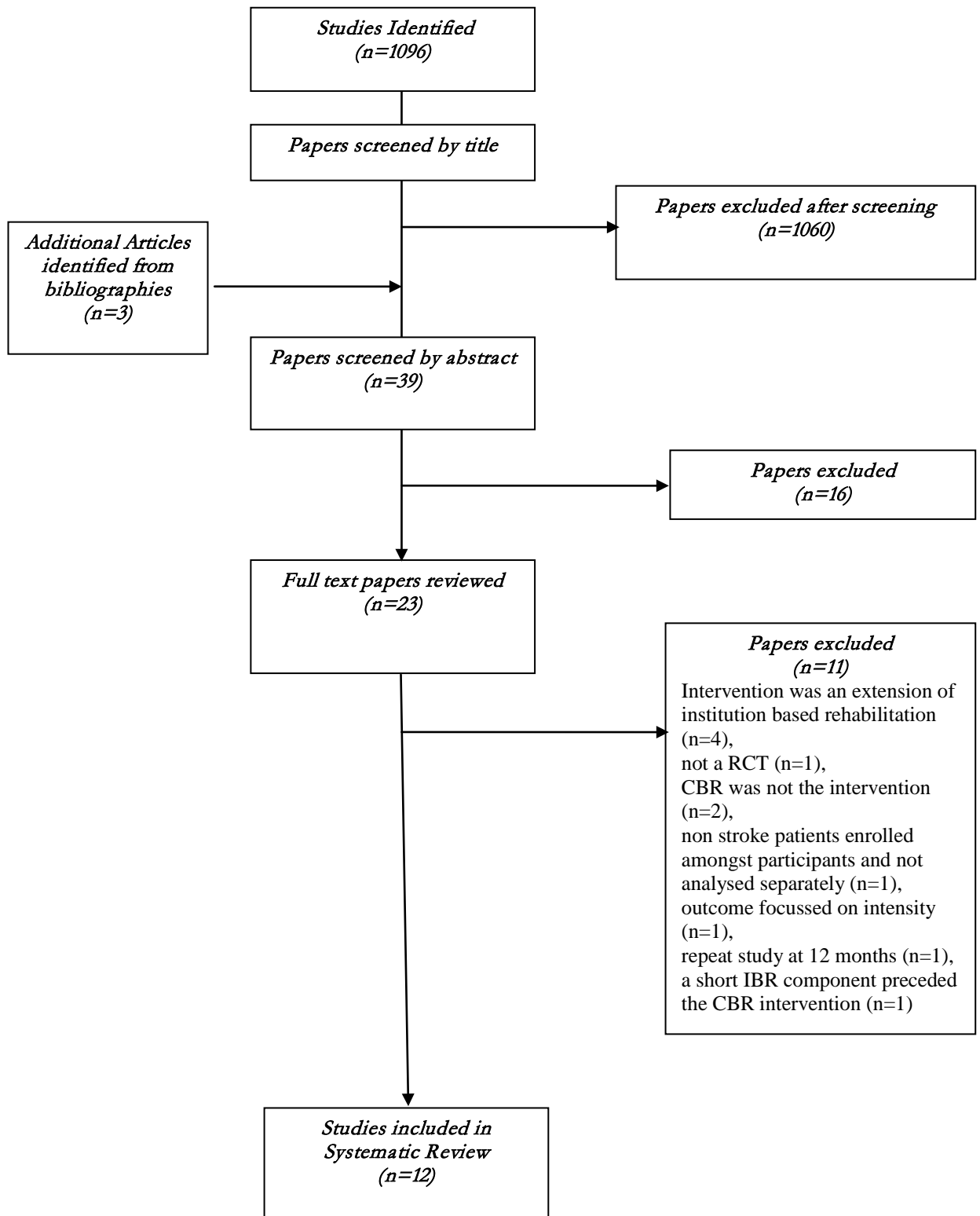
5.3. Study selection

The initial results from the database searches were screened by two reviewers (LN and SM) by title, after which abstracts for potentially relevant studies were retrieved. Thereafter, we evaluated the abstracts and full text versions of articles where available. The third reviewer (SMT) acted as arbitrator where necessary. Reasons for the exclusion of studies are listed in *Table 2*, briefly these included not having CBR as the intervention, inappropriate patients enrolled, outcome not of interest, not randomised or quasi-randomised or repeated reporting of study.

5.4. Data extraction

During May 2010, using a predefined protocol, two investigators LN and SM independently extracted data onto the prescribed data extraction form. Amongst other, information pertaining to: administrative details, details of the study design, details of intervention, details of outcomes, and details of study ethics were recorded. We considered study quality according to reporting of randomisation method, adjustment of experimental confounders, method of treatment allocation, allocation concealment, blinding of analysts, objectivity of outcome measures, use of intent-to-treat analysis and blinding assessment of final outcome, loss-to-follow-up. We did not blind the reviewers conducting the data extraction.

Figure 1: Identification process for eligible studies



5.5. Data appraisal

To assess the methodological quality of the articles, we used the PEDro scoring system (Moseley AM et al., 2002). (See Table 3: 'PEDro scores for included studies'). Briefly, the PEDro Scale consists of 10 quality criteria, each receiving a yes or no score. A single point is awarded for each of the following items: randomisation; concealment of allocation; comparison of baseline characteristics; blinding of patient, therapist, and assessor; adequacy of follow-up; intention-to-treat analysis; and, between-group statistical comparisons using point estimates and measures of variability. LN and SM independently assessed each article and assigned a quality score. Scoring discrepancies were resolved by the third reviewer, whose scoring decision was final. Based on the Evidence-based Review of Stroke Rehabilitation, scores of 4/10 and 5/10 can be regarded as fair, 6/10 to 8/10 as good and 9/10 to 10/10 as excellent RCTs (Teasell R et al., 2006). *A priori*, trials that received a Pedro score of 4 or lower were excluded from the analysis (Teasell RW et al., 2003). The PEDro scale has been shown to be reliable and acceptable based on consensus judgments (Maher CG et al., 2003).

5.6. Data Analysis

We analysed the outcome data using weighted mean difference for identical outcome measures and the standardised mean difference when different measurement scales were used. For each outcome, a test of heterogeneity was performed (Higgins JPT and Green S, 2005); p values < 0.10 were considered as significant for heterogeneity. We applied a random-effects meta-analysis model throughout according to the recommendation of Higgins and Green (2005). We did not assume that results expressed as medians approximated the mean and hence, we excluded these from the meta-analysis (Higgins JPT and Green S, 2005). Where it was not possible to perform a meta-analysis due either to significant heterogeneity or a lack of evidence, we provide a narrative summary of the data for each study. The analysis was performed using RevMan5®.

5.7. Role of the Funding Source

We did not receive funding for this study.

5.8. Ethics

Systematic reviews draw on publicly available data and do not directly involve human subjects, and therefore do not require formal ethical review. Nevertheless ethical principles have been incorporated in conducting this review. The results of this review will be disseminated through submission of an article to a peer-review journal.

6. Results

6.1. Identification and selection of studies

The process by which articles were selected for our systematic review is detailed in *Figure 1*. *Table 1* summarises the key characteristics of the included studies. The database searches yielded 1096 citations. These records were screened by title after which 39 articles were deemed to be potentially relevant. Abstracts were evaluated by 2 investigators, LN and SM independently and a further 16 studies were excluded. Following full-text scrutiny, a further 11 studies were excluded for the following reasons: intervention was an extension of institution-based rehabilitation (n=4) (Askim T et al., 2004, Fjaertoft H et al., 2004, Fjaertoft H et al., 2003, Indredavik B et al., 2000), not a RCT (n=1) (Hartman-Maeir A et al., 2007), CBR was not the intervention (n=2) (Bautz-Holter E et al., 2002, Ronning OM and Guldvog B, 1998), no people with stroke enrolled amongst participants and not analysed separately (n=1) (Crotty M et al., 2008), outcome focussed on intensity (n=1) (Ryan T et al., 2006) and a repeat study at 12 months (n=1) (von Koch L et al., 2001). In one study, a short IBR component preceded the CBR intervention, and thus was excluded (Suwanwela NC et al., 2002). (*See Table 2: 'Characteristics of excluded studies'*) The remaining 12 studies included in the review contained outcome information on a total of 2,707 patients. The trials were conducted across six countries (Australia, Canada, China, Ireland, Sweden and United Kingdom).

6.2. Description of studies

The studies included in this review spanned a period of 17 years from 1993 – 2009. Articles were all published in peer-reviewed journals; we did not find any grey literature. The mean/median ages of participants ranged from 52 years to 78.3 years for those receiving the intervention, and from 55 years to 79.6 years for controls. One study (Yu J et al., 2009) presented the age as a range from 40 – 65 (35% and 33%) and 66 – 85 (65% and 67%) for participants receiving the intervention and controls, respectively. The lowest median age for a single study for the intervention and control groups was 52 and 55 respectively (Bjorkdahl A et al., 2006). Percentage males included in studies ranged from 42% to 75%. Data were not provided on gender characteristics in one trial (Donnelly M et al., 2004). Full details are included in *Table 1: 'Characteristics of included studies'*.

RESULTS

Only one study (Donnelly M et al., 2004) reported on all the outcome measures chosen for this review. All twelve studies reported on the primary outcome measure of this review. A variety of standardised assessment tools and self-reported measures were used to evaluate the effectiveness of CBR. The pre-defined 34 patient outcome measures were categorised into seven broad entities as global outcomes, functional independence, quality of life, participation, mood, cognition and cost-effectiveness. Full details are provided in *Table 4: 'Patient outcome measures'*. Similarly, the eight carer outcome measures were categorised into four broad entities as mood, carer strain, quality of life and participation. Full details are provided in *Table 5: 'Carer outcome measures'*.

For the review, we reported only on those outcomes as stated in our protocol:

Primary outcome:

Functional independence (n=9)

The Barthel Index (n=7) and Modified Barthel Index (n=2) were the most frequently used measures for functional outcome.

Secondary outcomes:

Quality of life (n=7)

The short form (SF-36) (n=4) and the Nottingham Health Profile (n=3) were the most frequently used health related quality of life (HRQL) or health status measure.

Carer strain (n=4)

The carer strain index was the only measure used for carer strain (n=4)

Participation (n=3)

Adelaide Activities Profiles and the McMaster Family Assessment Device were the most frequently used measure of participation.

Cost effectiveness (n=3)

A variety of comparisons was performed; unfortunately there was no consistency in the reporting of economic parameters.

6.3. Inclusion and exclusion criteria

All 12 studies clearly defined inclusion criteria for participants. Some studies did not specify exclusion criteria (Anderson C et al., 2000, Bjorkdahl A et al., 2006, Donnelly M et al., 2004, Wolfe CDA et al., 2000). Full details are provided in *Table 6: 'Detailed Characteristics of included studies'*.

6.4. Definition of stroke

Four studies (Gladman JR et al., 1993, Holmqvist LW et al., 1998, Kalra L et al., 2000, Rudd AG et al., 1997) used the WHO definition of stroke, while three (Anderson C et al., 2000, Bjorkdahl A et al., 2006, Donnelly M et al., 2004) used their local institutions clinical definition of stroke. One study used the diagnosis criteria of the Fourth National Cerebrovascular Academic Conference (Yu J et al., 2009). Four trials (Lincoln NB et al., 2004, Mayo NE et al., 2000, Roderick P et al., 2001, Wolfe CDA et al., 2000) did not specify the definition of stroke.

6.5. Recruitment of participants

Nine studies (Anderson C et al., 2000, Bjorkdahl A et al., 2006, Donnelly M et al., 2004, Gladman JR et al., 1993, Holmqvist LW et al., 1998, Kalra L et al., 2000, Mayo NE et al., 2000, Roderick P et al., 2001, Rudd AG et al., 1997) recruited patients at discharge from inpatient facilities. One study (Lincoln NB et al., 2004) largely recruited patients at discharge but also included patients not admitted to hospital if they were referred to the community stroke team. One study (Wolfe CDA et al., 2000) only recruited patients not admitted to hospital i.e. patients who remained at home after a stroke. One study (Yu J et al., 2009) failed to document the source of enrolment of their participants.

6.6. Duration of follow up

Authors report duration of follow up ranging from three to 12 months across the studies. No mention is made of follow-up periods differing between IBR and CBR groups within a particular study. For full details of periods of follow up refer to *Table 1: 'Characteristics of included studies'*.

6.7. Nature of the intervention

All 12 studies evaluated community-based rehabilitation programmes provided by a multi-disciplinary team comprising a combination of a physiotherapists (PT), occupational therapists (OT), consultants in rehabilitation, speech therapists (ST), speech and language therapists (SLT), social workers (SW), rehabilitation nurses (RN) and dieticians. None of the studies focussed on a single intervention within a discipline; three studies (Kalra L et al., 2000, Lincoln NB et al., 2004, Yu J et al., 2009) did not describe the individual members of the team. One study (Yu J et al., 2009) utilised a “standardised programme of CBR” provided by trained GPs and therapists. In six trials (Bjorkdahl A et al., 2006, Gladman JR et al., 1993, Holmqvist LW et al., 1998, Kalra L et al., 2000, Roderick P et al., 2001, Wolfe CDA et al., 2000) CBR was provided by a “domiciliary stroke team”, while in three trials (Anderson C et al., 2000, Mayo NE et al., 2000, Rudd AG et al., 1997) CBR was provided by a “community rehabilitation team”. In the remaining two trials (Donnelly M et al., 2004, Lincoln NB et al., 2004) CBR was provided by a “multidisciplinary community stroke team”. See *Table 1: 'Characteristics of included studies'* for full details.

The delivery of the interventions were not standardised and in most studies, was not described in sufficient detail. The majority of studies reported interventions as “individualised to patient needs”. Furthermore, the intensity of the intervention was poorly defined most of the time. The intensity and treatment duration of CBR varied considerably among studies and many of the studies did not provide data on intensity. Due to the variation in the details provided it was not possible to establish the number of therapy hours per week for the treatment duration for all the studies. Treatment duration varied from three weeks to six months according to the patients' requirements to reach their full potential. See *Table 1: 'Characteristics of included studies'* for full details.

6.8. Nature of the control

For all studies, the control intervention was usual care/conventional care/routine care. The definition of usual care varied across a range of approaches that included any one, or a combination of, rehabilitation in a stroke, medical or geriatric ward, day care, day hospital care and outpatient care.

RESULTS

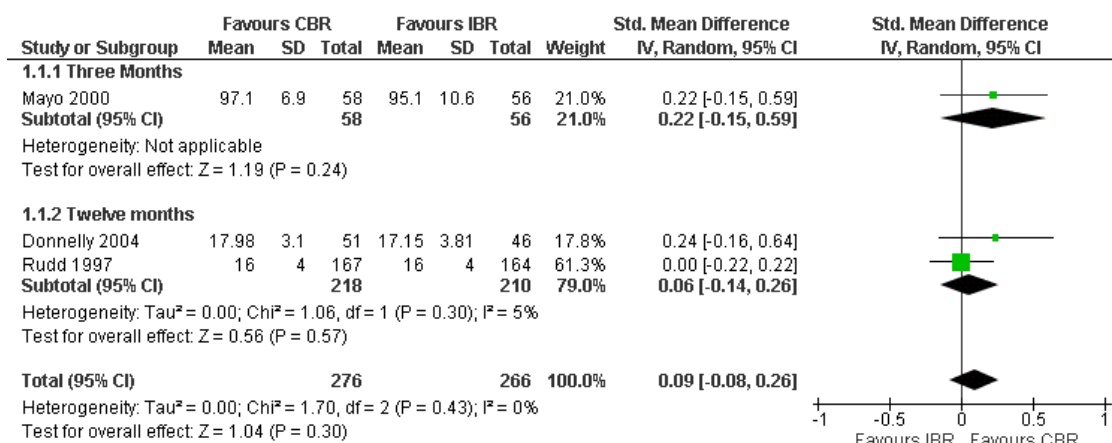
6.9. Effects of intervention

Overall the meta-analysis of the effect of CBR showed no increased benefit over IBR with respect to functional outcomes, quality of life and carer strain.

6.9.1. Effect of community-based rehabilitation on functional outcomes

The effect of CBR on functional outcome was examined by pooling post-intervention data. The Barthel Index was presented as the measure for functional independence in nine of the studies analysed. Six of the studies reported data deemed as inappropriate for statistical pooling, in terms of medians as opposed to (geometric) means. Although medians can be pooled, it is advised that medians are not suitable for pooling because they preclude the derivation of means and SDs (Higgins JPT and Green S, 2005). Therefore, the six trials using this form of reporting results could not be included in this meta-analysis. All six studies (Anderson C et al., 2000, Gladman JR et al., 1993, Kalra L et al., 2000, Lincoln NB et al., 2004, Roderick P et al., 2001, Wolfe CDA et al., 2000) reported that the Barthel Index score did not differ significantly between groups at the end of the follow up period (six months and 12 months). The remaining three studies (Donnelly M et al., 2004, Mayo NE et al., 2000, Rudd AG et al., 1997) used mean scores to assess the outcome, and were amenable to a meta-analysis. Using a random effects model, the pooled result from the three studies found that CBR had no significant effect on the Barthel index score (SMD 0.09; 95% CI -0.08 to 0.26, 542 participants; Figure 2) as compared with IBR. Subgroup analysis indicate that CBR had no significant effect at three months on the Barthel Index score (SMD 0.22; 95% CI -0.15 to 0.59, 114 participants) or 12 months (SMD, 0.06; 95% CI -0.14 to 0.26, 428 participants) as compared with IBR. No statistically significant heterogeneity was detected between the studies ($P = 0.43$).

Figure 2: Functional Outcomes at follow-up > three months: Barthel Index.

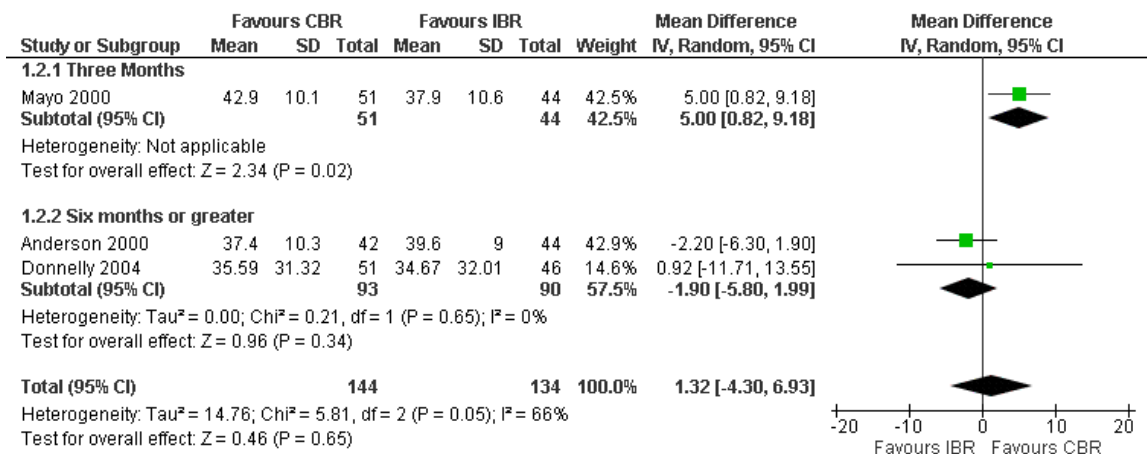


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6.9.2. Effect of CBR on Quality of life: Physical Activity

The SF-36 Physical Activity was reported as a mean score in three of the four studies having quality of life as an outcome (Anderson C et al., 2000, Donnelly M et al., 2004, Mayo NE et al., 2000). CBR had no statistically significant effect on Physical Activity (MD 1.32; 95% CI -4.30 to 6.93; 277 participants; Figure 3). Subgroup analysis indicated that at three months, CBR had a statistically significant effect on Physical Activity (MD 5.00; 95% CI 0.82 to 9.18, 95 participants). However, subgroup analysis at, or greater than, six months revealed no benefit (MD -1.90; 95% CI -5.80 to 1.99, 183 participants) as compared with IBR.

Figure 3: Quality of life outcomes at follow-up > three months: SF 36 Physical Activity



In the remaining study which reported the quality of life outcome as median scores, no significant difference was reported between CBR and IBR (Lincoln NB et al., 2004).

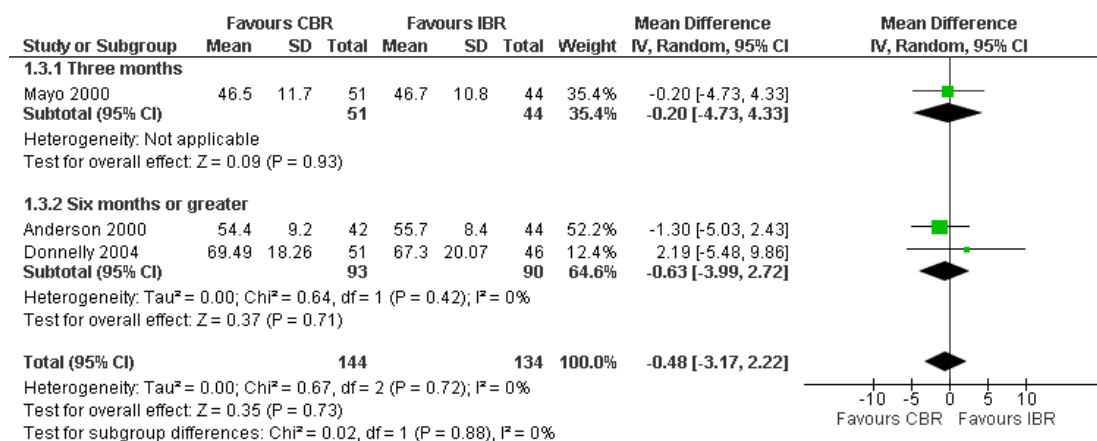
6.9.3. Effect of CBR on Quality of life: Mental Health

The SF-36 Mental Health was reported as a mean score in three of the four studies having quality of life as an outcome (Anderson C et al., 2000, Donnelly M et al., 2004, Mayo NE et al., 2000). Overall, CBR had no statistically significant effect on Mental Health (MD, -0.48; 95% CI -3.17 to 2.22; P=0.88; 277 participants; Figure 4). This effect was consistent at three months (MD -0.20; 95% CI -4.73 to 4.33, 95

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participants) and at six months or greater (MD -0.63; 95% CI -3.99 to 2.72, 183 participants).

Figure 4: Quality of life outcomes at follow-up > three months: SF 36 Mental Health



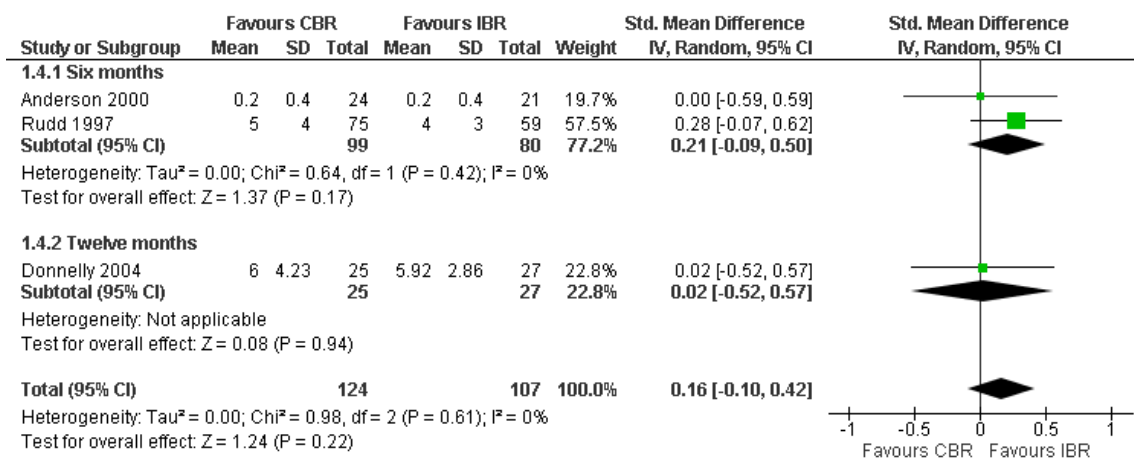
In the remaining study which reported the quality of life outcome as median scores, no significant difference was reported between CBR and IBR (Lincoln 2004).

6.9.4. Effect of CBR on Carer Strain

The Carer Strain Index was reported as a mean score in three of the four studies having carer strain as an outcome (Anderson C et al., 2000, Donnelly M et al., 2004, Rudd AG et al., 1997). The pooled results from the two studies found that CBR had no significant effect on Carer Strain Index (SMD, 0.16; 95% CI -0.10 to 0.42; 231 participants; Figure 5). Subgroup analysis at six months indicated that CBR had no significant effect on Carer Strain Index (SMD 0.21; 95% CI -0.09 to 0.50, 179 participants). Subgroup analysis at 12 months indicated that CBR had no significant effect on Carer Strain Index (SMD 0.02; 95% CI -0.52 to 0.57, 52 participants)

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Figure 5: Carer strain outcome at follow-up > three months: Carer Strain Index



In the remaining study which reported the carer strain outcome as median scores, the authors reported that carers of patients in CBR group were under significantly less strain than those in the routine care group (Lincoln NB et al., 2004). Five of the 12 reviewed studies (Anderson C et al., 2000, Donnelly M et al., 2004, Gladman JR et al., 1993, Lincoln NB et al., 2004, Rudd AG et al., 1997) involved carers in the intervention or evaluation stage of the community based rehabilitation programme. The outcomes measured included: General Health Questionnaire (n=2), Carer Strain Index (n=4), Brief Assessment of Social Engagement (BASE) (n=1), McMaster Family Assessment Device (n=1), Carer satisfaction (n=1), Euroquol (n=1), Life Satisfaction Index (Nottingham) (n=1) and Adelaide Activities Profile (n=1). See *Table 5: 'Carer outcome measures'*.

6.9.5. Economic Evaluation

One study reported the breakdown of individual values for each items cost included in the final sum ((Bjorkdahl A et al., 2006). The remaining two studies reported the cost comparison as a package of care (Donnelly M et al., 2004, Roderick P et al., 2001) and not by cost breakdown of individual items.

7. Discussion

This systematic review included only RCTs, universally considered to be the “gold standard” with true experimental designs providing strong evidence for guiding practice. RCTs are designed to examine causal relationships between rehabilitation interventions and outcomes while ruling out alternative explanations of results (Siu AMH et al., 2009).

The methodological quality of the included studies was considered good given the scores using the PEDro scale. Except for one study (Yu J et al., 2009) where specific details were not reported, all the studies used random allocation and allocation concealment. In all studies, groups were reported as being similar at baseline. Studies included in the meta-analysis showed very little heterogeneity.

Common methodological weaknesses in these studies included the lack of blinding of therapists and patients (Siu AMH et al., 2009). We acknowledge that it is not always possible to blind participants in CBR intervention studies. Nevertheless, the use of blinded assessors reduces the potential for evaluation bias (Siu AMH et al., 2009) and given that all of the studies utilised blinding of the assessor, we feel that bias on the part of the outcome assessment has been negated. Granted, the lack of patient blinding has the potential to increase community-based participants’ motivation to try to obtain compensatory treatment or put more effort into self-management to compensate for their potential loss of the institution-based treatment (Siu AMH et al., 2009). Loss to follow up was moderate, with seven out of the 12 studies reporting returning participant figures of >85% at final assessment.

Other factors to consider when interpreting the results of this review include variations in the interventions between comparison groups and the relatively small number of studies included in the data analysis. Furthermore, the authors in a number of the studies report the interventions for both IBR and CBR as being individualised to patients’ needs with scarce detail, if any at all. Thus, we feel that the complex nature of the interventions renders it difficult to establish, with certainty, exactly which components were most instrumental in obtaining the outcomes.

CBR has been a dynamic concept since its introduction. For this study the working definition of CBR incorporates any rehabilitation based within a community setting evaluating the effect of CBR on functional outcomes. We acknowledge that people arriving at an institution for care may be closer to the time of onset of stroke and to some extent may represent a distinct population as compared with the CBR group, with the possibility of neuroplasticity effects. However, given our finding of IBR not being superior to CBR in a number of outcomes, this may lend support to considering CBR as a suitable intervention for people with stroke.

Bearing in mind the above, we found insufficient evidence for a significant effect of CBR compared with IBR with regard to improving functional independence, improving quality of life or reducing carer strain.

Functional independence was reported in all 12 studies. However, the studies used a variety of measures to determine functional independence and as a result, it was not always possible to meaningfully compare and contrast this outcome across all studies. The Barthel Index was the predominant measure for functional independence. The overall effect from the meta-analysis indicates that CBR had no significant effect on functional independence as measured with the Barthel index score; this result was consistent when analysing the data for a subgroup which had been assessed at 12 months. In summary, therefore, these findings suggest that patients treated by professionals in the community setting have similar results in attaining functional independence as compared with those receiving IBR within institutions. Other measures for functional outcomes included the 10m and 30m walk test, the functional independence measure and clinical neurological functional deficit scale. Unfortunately, pooling of data was not possible given the limited use of these measures in single studies only.

The evidence also suggests that CBR is significantly more effective in improving quality of life at three months for the physical activity domain of the SF-36 instrument. This too, would be expected as the participants in all 12 were treated in their own home in the first few months after the stroke. Research has shown that rehabilitation is more effective when given in the patients' own home environment (Wade DT, 2003). Some of the advantages associated with home based rehabilitation are that the environment is familiar to the patient, it provides emotional security, the

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patient is the centre of the individually tailored treatment programme, goal setting is more relevant and family members can be trained in the appropriate assistance and exercises the patients need (Eldar R, 2000, Kendall E et al., 2009). According to Barker and Zino (2009) the potential reasons for improvement may be summarised into two main categories. First, the patients undergoing rehabilitation at home take the initiative and express their goals more often than those receiving IBR and, second, the context is a key component in the rehabilitation process (Barker LN and Ziino C, 2009). Although the findings were significant at three months, the improvement was unfortunately not maintained at six months and greater.

Similarly, there was no significant effect on SF-36 Mental Health outcome overall, in the three month and six months and greater subgroup analysis. These results are not too unexpected, given that in all three studies, the same professionals delivered the service for both IBR and CBR allocated participants. One of the principles of CBR state that services should start at the grassroots level and that it should utilise available resources in the community (Crishna B, 1999, Sharma M, 2004). Thus, delivery of CBR could simply be considered as a shift of human resources from the institution to the community. Unfortunately, no studies employing only lay-members from the community were found.

There was no significant effect on carer strain overall, or when conducting three month and 12 month subgroup analyses. There was a trend in favour of IBR, suggesting that CBR increases carer strain, since CBR does not provide a social outlet for patients and no relief for family (Eldar R, 2000). The disability caused by stroke often leaves stroke survivors dependent on others, with much of the support being provided by informal carers (spouses, family and friends) (Greenwood N and Mackenzie A, 2010). According to Greenwood and Mackenzie (2010) carers experienced biographical disruption which involves a loss and change in roles and relationships and in their sense of their identity which contributes to negative impacts on mental health, burden and stress associated with caring (Greenwood N and Mackenzie A, 2010). The feasibility of community rehabilitation thus largely depends on the co-operation of informal carers and their ability to carry the burden of managing the stroke survivors (Eldar R, 2000).

CBR has been re-defined over the years, moving from a medical to a more social model since 2004 (Penny N et al., 2007). Interestingly, CBR is still being implemented from a largely biomedical model perspective, with the focus on physical rehabilitation, to improve function, with very little emphasis on incorporating aspects of social inclusion/participation and social equalisation of opportunities for people with stroke. This remains despite observations of this lack of shift in focus being previously highlighted (Finkelflügel H et al., 2005). The majority of the studies included in our review was conducted in developed countries and the emphasis mirrors many of the earlier CBR projects which focussed on restoration of the individual's functioning through different medical rehabilitation interventions (Ward D et al., 2008). The primary objective of rehabilitation has remained the restoration of an individual to 'normal' rather than the enhancement of their opportunities and quality of life (Kendall E et al., 2000).

Only one (Yu J et al., 2009) of the twelve studies included in this review was conducted in a developing country and therefore the results need to be interpreted with caution for developing countries. Most developing countries are resource-poor in terms of infrastructure, finance and personnel, and struggle to provide the most basic health resources for people with disabilities (Penny N et al., 2007). According to Evans et al (2001), core values in the field of CBR (such as commitment to consumer voice, community participation and cultural relevance) are not readily accommodated within traditional Western frameworks (Evans PJ et al., 2001).

Health systems around the world are attempting to improve and develop community service as a way of counterbalancing the cost of hospital services (Kendall E et al., 2009). Reducing costs is often cited as one of the primary goals of CBR. We attempted to evaluate the impact of CBR in terms of economic burden. Unfortunately, only three studies included a cost analyses component, each of which reported a trend in cost reduction associated with CBR.

Economic evaluation across the studies was difficult due to the absence of detailed reporting and no definite conclusions could be drawn. The one study detailing individual items, report a more than 50% reduction in costs in favour of home-based care over IBR (Bjorkdahl A et al., 2006). The other two studies reporting the cost comparison as a package of care (Donnelly M et al., 2004, Roderick P et al., 2001)

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showed no statistically significant difference between the two arms of the study. We suggest that future research provide more detailed assessment of costs to allow for in-depth economic comparison.

8. Authors' conclusions

8.1. Implications for practice

The studies under review provided insufficient data to support any recommendations regarding the use of CBR (defined as any rehabilitation based within a community setting evaluating the effect of CBR on functional outcomes) over IBR to improve functional independence, quality of life, carer strain and cost effectiveness for patients with stroke. However, despite the under-describing of the programmes, CBR appeared to show no worse outcomes than IBR. Thus, there appears to be every reason to exploit CBR given, de facto, non institutionalized care can be expected to be less expensive than institutionalized care.

8.2. Implications for research

Given the diversity of CBR programmes, particular emphasis should be placed on formulating a universal working definition of CBR so that there can be consistency in its application, thus allowing for comparative analysis across centres. In addition, non professional staff (e.g. grassroots workers, midlevel workers like community health workers and rehabilitation facilitators) should be incorporated in future RCTs. This will enable a truer evaluation of CBR's original intention of shifting to a social paradigm where the objectives of rehabilitation relate to more equal opportunities and social participation of people with stroke. Lastly, the outcome measures should reflect the multidimensional nature of the rehabilitation process and be able to capture clinically significant changes in function according to the International Classification of Functioning, Disability and Health conceptual framework.

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9. Tables

Table 1: Characteristics of included studies

Study ID	Design	Participants	Intervention	Follow-up	Outcome measures
Anderson, 2000	RCT	Adelaide, South Australia n = Int 42 (26 male), Con 44 (22 male) Mean age 72 years for Int and 71 years for Con	Community rehabilitation team (Co, CR, PT, OT, SW, ST, RN) Home based therapy Con = Conventional care Intervention = Tailored to each patient, on average 5 weeks Intensity = not stated	1, 3, 6 and 12 months	HRQL as assessed by SF-36, MBI, NHP, AAP, MFAD
Bjorkdahl 2006	RCT	Sweden n = Int 30 (22 male), Con 29 (22 male) Mean age 52 years for Int and 55 years for Con Age range 28 – 61 years for Int and 27 – 64 year for Con	Domiciliary stroke team (PT, OT) Con = Day clinic Int period = 3 weeks Both the Int and Con received 9 hours of training per week for three weeks	Baseline, 3 weeks, 3 months and 1 year	AMPS, FIM, IAM, 30m, NIHSS, BNIS,
Donnelly, 2004	RCT	Belfast, Ireland n = Int 59 (not stated), Con 54 (not stated) Median age 71 years for Int and 68 years for Con	Multidisciplinary CST (Co, OT, PT, SLT, RA) Con = Hospital rehabilitation and usual care Int = Home visits took place over 3 months, for an average of 45 min, 2.5 times a week	Baseline and 12 months	BI, NADL, 10m, EuroQol, SF-36, Qol, OS, CSI
Gladman, 1993	RCT	Nottingham, London n = Int 162 (85 male), Con 165 (88 male) Mean age 70 years for both Int and Con	Domiciliary Stroke team (PT, OT) Con = Hospital rehab services (routine) Int = tailored program which lasted 3 to 4 months 6 months, average of 7 attendances in 6 months	6 months	EADL, BI, NHP, BASE, LSI
Holmqvist, 1998	Population based RCT	Stockholm, Sweden n = Int 42 (22 male), Con 41 (22 male) Mean age 70.8 years for Int and 72.6 years for Con	Domiciliary Stroke team (PT, OT, ST) Con = Routine rehab 3 – 4 months tailored to each patient, 30 min, twice a week	3, 6 and 12 months	FLA, MC, 10m, AQ, SIP
Kalra, 2000	RCT	Suburban district, UK n = Int 153 (81 male), Con 152 (72 male) Mean age 75 years for Int and 77.7 years for Con	Domiciliary care Stroke team and stroke unit care Provided for a maximum of 3 months Not stated	3, 6 and 12 months	Death, institutionalisation, MR, BI

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Lincoln, 2004	RCT	Nottingham, UK n = Int 189 (94 male), Con 232 (128 male) Mean age 72.8 years for Int and 71.2 years for Con	Multidisciplinary CST (Various therapist as required by patient) Conventional outpatients rehab services 6 months Direct 0-95 hours (median 13hours) Indirect 1-76 hours (median 10hours) Until maximum potential reached	6 months	BI, EADL, GHQ-12, EuroquoI, CSI, Carer EuroquoI
Mayo, 2000	RCT	Montreal Canada n = Int 58 (37 male), Con 56 (40 male) Mean age 70.3 years for Int and 69.6 years for Con	Multidisciplinary home team (N, PT, OT, ST, Dc) Usual care 4 weeks tailored to each patient Not stated	1 and 3 months	SF-36 Physical, TUG, BI, OARS-IADL, RNL, SF-36 Mental
Roderick, 2001	RCT	East Dorset rural/urban, England n = Int 64 (31 male), Con 74 (32 male) Mean age 78.3 years for Int and 79.6 years for Con	Domiciliary stroke team (PT, OT,) Outpatient ST and language therapy, Consultant geriatrician Day hospital 6 months Until maximum potential reached	6 months	BI, RMI, PGCMS, SF-36 Physical health, SF-36 Mental health, FAI
Rudd, 1997	RCT	London n = Int 167 (92 male), Con 164 (93 male) Mean age 70 years for Int and 72 years for Con	Community therapy (PT, OT, SLT, TA, CP) Conventional care Maximum of 3 months Maximum of one daily visit by each therapist	Baseline, 2 months, 4 months, 6 months and 12 months	BI, MI, MMSE, FAST, RADL, HADS, 5m, NHP, CSI
Wolfe, 2000	RCT	South London n = Int 23 (10 male), Con 20 (8 male) Mean age 72 years for Int and 76 years for Con	Community Rehabilitation Team (PT, OT, SLT, TA, Co) Usual care Maximum of one daily visit by each therapist	Baseline, 12 months	MI, MMSE, AT, RADL, HADS, 5m, NHP, CSI, MBI, FAST
Yu, 2009	Community stratified RCT	Shanghai, China n = Int 377 (200 male), Con 360 (199 male) 35% and 33% between age of 40 -65 years respectively for the Int and Con and 65 % and 67 % over 65 years respectively for Int and Con	Standardised CBR (GP's and therapists) Usual care 5 months 10 sessions	Baseline, 2months and 5months	CNFDS

n, number of participants randomised; *Int*, Community based rehabilitation group (intervention); *Con*, Institution-based rehabilitation (control group)

TABLES

Outcome measures:

HRQoL, Health Related Quality of life, CNFDS, AAP, Adelaide Activities Profile; AMPS, Assessment of Motor and Process Skills; FIM, Functional Independence Measure; IAM, Instrumental Activity Measure; 30m, 30 metre timed walk test (seconds); NIHSS, National Institute of Health Stroke Scale; BNIS, Barrow Neurological Institute Screening for higher cerebral functions; Clinical Neurological Function Deficit Scale scores were used to evaluate improvement in neurological function; BI, Barthel Index is a measure of performance in personal activities in daily living or basic ADL, it also monitors functional independence (a lower score indicates more difficulty in ADL); RMI, Rivermead Mobility Index; PGCMS, Philadelphia Geriatric Center Morale Score; SF-36, Short Form Health outcome; FAI, Frenchay Activity Index; EADL, Extended Activities of Daily Living Scale; GHQ-12, Euroquol, European quality of life scale; CSI – Carer strain index; NADL, Nottingham Activities of Daily Living Scale; 10m, 10 metre timed walk test (seconds), QoL, Quality of Life; OS, Overall satisfaction, MBI, Modified Barthel Index; NHP, Nottingham Health Profile; MFAD, McMaster Family Assessment Device; FLA, Frequency of lifestyle activities; MC, Motor capacity; AQ, Aphasia quotient; SIP, Sickness Impact Profile is a measure of subjective dysfunction; BASE, Brief Assessment of Social Engagement (BASE scores vary between 0 – 20, higher scores denoting greater social engagement; LSI, Life Satisfaction Index (LSI scores vary between 0 – 26, higher scores denoting greater life satisfaction; TUG, Timed up and go; OARS-IADL, Older American Resource Scale for instrumental activities of daily living; RNL, Reintegration in Normal Living; RADL – Rivermead Activities of Daily score; MI, Motricity index; MMSE, Mini-Mental State Examination; AT, Albert Test; FAST, Frenchay Aphasia Screening Test; HADS, Hospital Anxiety and Depression Scale; MR, Modified Rankin; AMPS, The Assessment of Motor and Process Skills; 30m, 30m walk test; FIM, Functional Independence Measure; IAM, Instrumental Activity Measure; NIHSS, The National Institutes of Health Stroke Scale; BNIS, Barrow Neurological Institute Screening for higher cerebral function; MAD, Montgomery Asberg Depression rating scale

Design and intervention:

CBR, Community based rehabilitation; CST, Community Stroke team; RCT, Randomised controlled trial; GPs, General practitioner; PT, Physiotherapist; OT, Occupational Therapist; ST, Speech Therapist; SLT, Speech and Language Therapist; Co, Co-ordinator; RA, Rehabilitation Assistants; CR, Consultant in Rehabilitation; SW, Social worker; RN, Rehabilitation nurse; N, Nurse; Dc, Dietary consultation; TA, Therapy Aid; CP, Consultant physician.

Table 2: Characteristics of excluded studies

Study ID	Reason for exclusion
Askim 2004	Intervention was an extension institution based rehabilitation
Bautz-Holter 2002	CBR was not the intervention
Crotty 2008	No people with stroke enrolled amongst participants and not analysed separately.
Fjaertoft 2003	Intervention was an extension institution based rehabilitation
Fjaertoft 2004	Intervention was an extension institution based rehabilitation
Hartman-Maeir 2007	Non-randomised controlled trial
Indredavik 2000	Intervention was an extension institution based rehabilitation
Ronning 1998	CBR was not the intervention.
Ryan 2006	Outcome focussed on intensity of CBR
Suwanwela 2002	A short IBR component preceded the CBR intervention.
Von Koch 2001	Same study as an early RCT results now reported at 12 months

TABLES

Table 3: PEDro scores for included studies

Study	Random allocation	Concealed allocation	Groups similar at baseline	Participant blinding	Therapist blinding	Assessor blinding	< 15% loss to follow up	Intention t treat analysis	Between group difference reported	Point estimate and variability reported	PEDro score (0-10)
Anderson 2000	Y	Y	Y	N	N	Y	Y	Y	Y	Y	8
Bjorkdahl 2006	Y	Y	Y	N	N	Y	Y	Y	Y	Y	8
Donnelly 2004	Y	Y	Y	N	N	Y	Y	Y	Y	Y	8
Gladman 1993	Y	Y	Y	N	N	Y	Y	Y	Y	Y	8
Holmqvist 1998	Y	Y	Y	N	N	Y	Y	Y	Y	Y	8
Kalra 2000	Y	Y	Y	N	N	Y	Y	Y	Y	Y	8
Lincoln 2004	Y	Y	Y	N	N	Y	N	Y	Y	Y	7
Mayo 2000	Y	Y	Y	N	N	Y	N	Y	Y	Y	7
Roderick 2001	Y	Y	Y	N	N	Y	N	Y	Y	Y	7
Rudd 1997	Y	Y	Y	N	N	Y	N	Y	Y	Y	7
Wolfe 2000	Y	Y	Y	N	N	Y	N	Y	Y	Y	7
Yu 2009	Y	N	Y	N	N	Y	Y	Y	Y	Y	7

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Table 4: Patient Outcome Measures

OUTCOME MEASURE	STUDY ID											
	Anderson 2000	Bjorkdahl 2006	Donnelly 2004	Gladman 1993	Holmqvist 1998	Kalra 2000	Lincoln 2004	Mayo 2000	Roderick 2001	Rudd 1997	Wolfe 2000	Yu 2009
<i>Global outcomes</i>												
Death						X						
Institutionalisation						X						
<i>Functional outcomes</i>												
Barthel Index	X		X	X		X	X	X	X	X	X	
Rivermead Mobility index									X	X	X	
Extended Activities of Daily Living Scale				X			X					
5m walk test										X	X	
10m walk test			X		X							
30m walk test		X										
Timed Up and Go (TUG)								X				
Frenchay Aphasia Screening Test (FAST)										X	X	
Nottingham Activities of Daily Living			X									
Modified Rankin						X						
Functional Independence Measure (FIM)		X										
Instrumental Activity Measure		X										
Older American Resource Scale for Instrumental Activities of Daily Living								X				
Rivermead Activities of Daily Living										X	X	
Motricity Index										X	X	
Frenchay Activities Index									X			
Stroke Rehabilitation Assessment of Movement								X				
The Assessment of Motor and Process Skills		X										

TABLES

Clinical Neurological Functional Deficit Scale												X
The National Institute Of Health Stroke Scale		X										
Quality of life												
Euroqol			X									
Nottingham Health Profile	X			X						X	X	
SF-36	X		X					X	X			
Participation												
Adelaide Activities Profile	X		X									
McMaster Family Assessment Device	X		X									
Reintegration to Normal Living								X				
Mood												
General Health Questionnaire							X					
Hospital Anxiety and Depression Score										X	X	
Philadelphia Geriatric Centre Morale Score									X			
Cognition												
Barrow Neurological Institute Screening for higher cerebral functions		X										
Mini-mental State Examination										X	X	
Cost effectiveness												
Cost analysis		X	X						X			

TABLES

Table 5: Carer Outcome Measures

OUTCOME MEASURE	STUDY ID											
	Anderson 2000	Bjorkdahl 2006	Donnelly 2004	Gladman 1993	Holmqvist 1998	Kalra 2000	Lincoln 2004	Mayo 2000	Roderick 2001	Rudd 1997	Wolfe 2000	Yu 2009
<i>Mood</i>												
General health questionnaire	X						X					
<i>Carer strain</i>												
Carer strain index	X		X				X			X		
Carer satisfaction										X		
<i>Quality of life</i>												
Euroquol							X					
Life satisfaction index (Nottingham)	X											
<i>Participation</i>												
Adelaide Activities Profile	X											
McMaster Family Assessment Device				X								
Brief Assessment of Social Engagement (BASE)				X								

TABLES

Table 6: Detailed characteristics of included studies

Anderson 2000	
Methods	<p>Parallel group RCT with randomisation at individual level Randomisation used computer generated allocation sequence Allocation concealment: opaque sealed envelopes Blinding: blinded outcome assessor</p>
Participants	<p>Australia (Adelaide) 86 participants (42 intervention and 44 control) Mean age 72 years for intervention and 71 years for control, 56% male Participants recruited from 2 affiliated acute care public teaching hospitals Clinical definition/diagnosis of stroke (first-ever or recurrent) but excluding subarachnoid haemorrhage Inclusion criteria: all patients with stroke and residual disability who were assessed by the attending medical team as requiring rehabilitation, their hospital consultant agreed that they were medical stable to be discharged early from hospital to a community rehabilitation scheme, they had sufficient physical and cognitive function for “active” participation in the rehabilitation scheme, their home environment was suitable for simple modifications, the community rehabilitation team was available to provide care, they had a general practitioner who was willing to provide care and their caregiver (if one was identified) gave consent for participation.</p>
Interventions	<p>Community rehabilitation team (early hospital discharge) vs. conventional care and rehabilitation in the hospital (most members of the CRT had community work experience) Adaptations, therapy and other care was organised so that discharge from hospital could occur within 48hours of randomisation Assessments done at baseline 1, 3, 6 and 12 months at participant’s home Interventions were individually tailored for each patient with the aim of attaining mutually agreed-upon goals, emphasis was placed on self learning and adjustment to disability. The CRT met weekly to discuss each pt’s progress and on discharge they were referred to any community agency for ongoing care as required. Therapy sessions conducted in patient’s home over several weeks (median of 5 weeks) Control: received conventional care and rehabilitation in the hospital, either on an acute medical/geriatric ward or in a multidisciplinary stroke rehabilitation unit run by specialists in rehabilitation or geriatric medicine. Care pathways were used and discharge planning and follow-up care as outpatient or in the community was organised according to usual policy.</p>
Outcomes	<p>Outcome measured at 6 months presented as median/IQR Primary outcome: Health related quality of life as assessed by SF-36 Secondary outcomes: general health as assessed by Nottingham Health Profile, Modified Barthel index, McMaster Family Assessment Device (MFAD) Carer: MFAD, Adelaide Activities Profile, General Health Questionnaire – 28, Carer Strain Index and SF-36.</p>
Notes	
PEDro score	8/10

TABLES

Bjorkdahl 2006	
Methods	RCT with consecutive randomisation at individual level Randomisation method not stated Allocation concealment: sealed envelopes Blinding: blinded outcome assessor
Participants	Sweden 59 participants (30 intervention and 29 control) Median age 53 years, 75 % male Participants recruited from Sahlgrenska University Hospital Clinical definition of stroke Inclusion criteria: not specified except that all patients admitted consecutively with first occurrence of stroke to the rehabilitation department and discharged to their own home were asked to participate
Interventions	Home rehabilitation vs. usual care (day clinic) Assessments done at baseline, 3 weeks, 3 months and 12 months Interventions - patient received 9 hours of training per week for 3 weeks; family or friends and helpers were involved and information was given to them and the patient about stroke, its consequences and how to deal with it It also included tailored training, based on the patient's needs and desires with focus on their natural context, a top down approach. Content varied from personal care to shopping and trying out leisure activities. Control: also received 9 hours of training per week for three weeks but at the day clinic. A multiprofessional team offered training at the day clinic the focus was more of a bottom up approach that focussed on the training of deficits or components of function (impairment) in order to generate better ability to perform ADL. After the intervention period all patients in both groups followed ordinary rehabilitation process and most of them attended one period (6 weeks, three days/week) of outpatient rehabilitation at the clinic during the first year.
Outcomes	Outcome measured at 12 months presented as mean/SD Primary outcome was activity, assessed with the Assessment of Motor and Process Skills Secondary outcomes included: 30m walk test, Functional Independence Measure, Instrumental Activity Measure, The National Institutes of Health Stroke Scale and Barrow Neurological Institute Screening for higher cerebral functions
Notes	
PEDro score	8/10

TABLES

Donnelly 2004	
Methods	<p>Parallel group RCT with randomisation at individual level Randomisation used computer generated randomly assigned care options was prepared by a statistician and administered solely by a named secretary No research team member or hospital staff had access to this list Allocation concealment: not provided but implied (as above) Blinding: blinded outcome assessor</p>
Participants	<p>Ireland (Belfast) 113 participants (59 intervention and 54 control) Mean age 71 years for intervention and 68 years for control, % male not provided Participants recruited from Belfast and Ulster Hospitals Clinical definition of stroke Inclusion criteria: all patients who experienced a stroke during the 4 weeks preceding admission and had the potential to benefit from further rehabilitation, was not residing in a nursing or residential home and had no pre-existing physical or mental disability that was judged to make further rehabilitation inappropriate</p>
Interventions	<p>Community-based multidisciplinary stroke team (early hospital discharge) vs. usual care Assessments done at baseline and 12 months Interventions (assessments and progress of patients) were discussed at multidisciplinary meetings and goals were set jointly with therapist, patient and closest relative. Patients were discharged as soon as the liaison therapist had assessed their home and ensured the necessary aids and equipment were in place. On average the numbers of home visits were 2.5 times a week for 3 months lasting for 45 mins. Control: discharge and after care was arranged in the usual way by the multidisciplinary team, which comprised of inpatient rehabilitation in a stroke unit and follow-up rehabilitation at a day hospital.</p>
Outcomes	<p>Outcome measured at 12 months presented as mean/SD as well as median/range A range of outcomes including Barthel index, the Nottingham ADL measure, the 10m timed walked test, Euroquol, overall satisfaction, The Short Form 36, and a quality of life assessment as well as costs of all services. Carer: CSI</p>
Notes	
PEDro score	8/10

TABLES

Gladman 1993	
Methods	RCT with randomisation at individual level Randomisation by table of random numbers Allocation concealment: consecutive sealed envelopes Blinding: blinded outcome assessor
Participants	London (Nottingham) 327 participants (162 intervention and 165 control) Mean age 70 years for both the intervention and control, 53% male Participants recruited from register of patients admitted to the City and University Hospital with acute and recurrent stroke World Health Organisation clinical criteria for acute stroke was used Inclusion criteria: all patients with stroke or recurrent stroke who met the WHO clinical criteria for stroke Exclusion criteria: patients were excluded if discharge to residential or nursing home and those requiring respite or terminal care, those who had been receiving outpatient rehabilitation before the stroke, those who had no significant disability from their stroke and those who stayed in hospital for less than 7 days.
Interventions	Domiciliary team vs. routine service Assessments done at 3, and 6 months Interventions included assessment at home with appropriate home based therapy and any other relevant help Therapy sessions conducted in patient's home for 6 months
Outcomes	Outcome measured at 3 and 6 months presented as median/IQR Primary outcome: the overall Extended ADL score, a postal assessment of Instrumental ADL Secondary outcomes: perceived health using the Nottingham Health Profile, personal ADL as assessed by the Barthel index, McMaster Family Assessment Device (MFAD) Carer: assessed at 6 months using the Brief Assessment of Social Engagement and the Nottingham version of the Life Satisfaction Index.
Notes	
PEDro score	8/10

TABLES

Holmqvist 1998	
Methods	<p>RCT with randomisation at individual level Randomisation by computerised random procedure were patients were randomised 1:1 in blocks of two or four individuals Allocation concealment: sealed numbered envelopes Blinding: blinded outcome assessor</p>
Participants	<p>Sweden (Stockholm) 83 participants (42 intervention and 41 control) Mean age 70.8 years for intervention and 72.6 years for control, 554% male Participants recruited from patients admitted to the stroke unit of the Department of Neurology at Huddinge Hospital World Health Organisation clinical criteria for acute stroke was used All patients had CT scans Inclusion criteria: acute stroke, independence in feeding and continence according to Katz index of ADL, Mini-Mental State Examination score of >23, impaired motor capacity according to Lindmark scale and/or dysphasia according to the Reinvang Aphasia Test. Exclusion criteria: discharged before 5 days of hospitalisation, progressive stroke, subdural haematoma, subarachnoid haemorrhage, clinical signs of massive perceptual deficit, renal, heart or respiratory failure, non stroke epilepsy, alcoholism, psychiatric disease and other co-morbidity likely to shorten length of life dramatically.</p>
Interventions	<p>Interventions Home rehabilitation team vs. routine service The home rehabilitation program emphasised a task and context orientated approach, which implies that the patient performs guided, supervised, or self directed activities in a functional and familiar context. The choice of activities was based on the patients' personal interests, and adherence to structured training between therapy sessions were promoted. Individual counselling, which focussed on education, applying information learned in practical situations, and solving problems occurring in the home, was offered to the spouse if needed. Routine rehabilitation included a heterogeneous set of interventions ranging from the best established in the hospital, day care, and/or outpatient care. Follow-up visits scheduled for 3, 6 and 12 months post stroke Interventions included assessment a tailored program for each patient approximately for 3 to 4 months The frequency of the therapy contacts were decided by the therapist in consultation with the family and it was gradually reduced until discharge</p>
Outcomes	<p>Outcome measured at baseline and three months, presented as median/IQR Outcome measures spanned the domains of impairment, disability and handicap and subjective health related quality of life Outcomes included independence in ADL, Frequency of lifestyle activities, motor capacity, ability to perform peg test, 10m timed test and Aphasia quotient</p>
Notes	
PEDro scale	8/10

TABLES

Kalra 2000	
Methods	RCT with randomisation at individual level Randomisation by block randomisation with computer generated random numbers. Assessor telephoned randomisation office for allocation of patients Allocation concealment: not stated but implied (as above) Blinding: blinded outcome assessor
Participants	United Kingdom 457 participants (153 intervention and 152 control (stroke team) and 152 control (stroke unit)) Mean age 75 years for intervention and 77.3 years stroke team and 77.7 years for stroke unit team, 52% male Participants recruited from a population based stroke register World Health Organisation definition was used and a diagnosis was made on clinical criteria Inclusion criteria: patients were included in the study at time of presentation but no later than 72 hours after stroke onset. A physician did the initial assessment to confirm the diagnosis and eligibility for inclusion. Patients with moderately severe stroke (persistent neurological deficit affecting continence, mobility, and ability to look after themselves, requiring multidisciplinary treatment) who could be supported at home with nursing, therapy and social services. Exclusion criteria: mild stroke, severe strokes (unconsciousness, swallowing problems not amenable to dietary modification, heavy nursing needs), those admitted to other hospitals, those with atypical neurological features who needed specialised assessments or investigations to establish diagnosis of stroke, patients who were institutionalised or had severe disability before stroke was also excluded
Interventions	home rehabilitation team vs. stroke team vs. stroke unit care Follow up visits scheduled for 3, 6 and 12 months post stroke Interventions included individualised care plan outlining activities and the objectives of treatment, which was reviewed at weekly multidisciplinary meetings This was provided for a maximum of 3 months
Outcomes	Outcome measured at baseline, 3, 6 and 12 months presented as median/IQR Primary outcome measure was death or institutionalisation Secondary outcome included dependence which was measured by the modified Rankin scale and the Barthel index.
Notes	
PEDro score	8/10

TABLES

Lincoln 2004	
Methods	<p>RCT with randomisation at individual level Randomisation used computer generated randomly assigned care options Assessor telephoned randomisation office for allocation of patients Random allocation was initially 50:50 but it was later changed to 60:40 in favour of the routine group due to staff shortages within the community stroke team Allocation concealment: not provided but implied (as above) Blinding: blinded outcome assessor</p>
Participants	<p>United Kingdom (Nottingham) 421 participants (189 intervention and 232 control) Mean age 72.8 years for intervention and 71.2 years for control, 53% male All patients referred to the Nottingham Community Stroke Team were considered for inclusion The majority of patients were referred on discharge from hospital but those not admitted had to have been seen by a stroke specialist for confirmation of the diagnosis Inclusion criteria: the team accepted referrals of anyone who had a stroke within the previous two years, who was over the age of 16 years and needed intervention for more than one rehabilitation discipline Exclusion criteria: patients were excluded if they lived outside the geographical area of study, had been treated by the community stroke team in the previous two years</p>
Interventions	<p>Community stroke team vs. routine care (included day hospital, outpatients departments and social services occupational therapy) Assessments done at 6 months Interventions (assessments and progress of patients) were discussed at team meetings The team provided co-ordinated multidisciplinary rehabilitation in the community, the team allocated therapists according to the nature of the patients problems All patients were seen at their homes and were treated for as long as it was considered that they were benefiting</p>
Outcomes	<p>A range of outcomes were measure at 6 months by the administering of and outcome questionnaire and was presented as median/IQR. It included the Barthel index, the Extended ADL, General Health Questionnaire 12 (GHQ-!2), Euroquol thermometer form and satisfaction with care Carer: GHQ-12 with respect to themselves, CSI, satisfaction with care and knowledge of stroke</p>
Notes	
PEDro score	7/10

TABLES

Mayo 2000	
Methods	<p>RCT with randomisation at individual level Randomisation was stratified by site and balanced within block sizes that varied from 4 to 8 randomisation Group assignment was revealed over the telephone Allocation concealment: opaque sealed envelopes Blinding: blinded outcome assessor</p>
Participants	<p>Canada (Montreal) 114 participants (58 intervention and 56 control) Mean age 70.3 years for intervention and 69.6 years for control, 68% male Patients admitted with acute stroke to 5 acute-care hospitals in Montreal Inclusion criteria: the study targeted persons with persistent motor deficits after stroke, who had caregivers willing and able to provide live-in care for the subject over a 4 week period after discharge from hospital Exclusion criteria: People with stroke who, by 28 days after stroke, still required the assistance of more than one person to walk were excluded, as were patients with cognitive impairment or with important co-existing conditions that affected their ability to function independently (e.g. dialysis required, paraplegia)</p>
Interventions	<p>Home rehabilitation (early supported discharge) vs. usual care Assessments done at baseline, 1, 2 and 3 months Intervention include prompt discharge from hospital with the immediate provision of follow-up services by a multidisciplinary team Intervention was individualised to the patients' needs and was co-ordinated by the team member who had the most contact with the patient Rehabilitation care was provided at home and the amount of therapy received by patients was set by the therapist on the basis of assessment of need Patient were not scheduled to have >1 active treatment session per day Duration of the intervention was 4 weeks for all participants</p>
Outcomes	<p>Primary outcome was the health related quality of life (HRQL) as measure by the Physical Component Summary of the Medical Outcomes Study Short Form-36 (SF-36) Secondary outcomes spanned the spectrum of impairment, disability and handicap which include the Canadian Neurological Scale, Stroke Rehabilitation Assessment of Movement, Timed Up and Go test, Barthel index, the Older Americans Resource Scale for instrumental ADL, Reintegration to Normal Living Index Outcomes were presented as means and standard deviation</p>
Notes	
PEDro score	7/10

TABLES

Roderick 2001	
Methods	<p>RCT with randomisation at individual level Randomisation used computer generated random schedules Assessor telephoned central office for allocation of patients Randomisation was stratified by sex, age disability level (Barthel index <10, 10-14, or ≥15) and day hospital catchment Allocation concealment: not provided but implied (as above) Blinding: blinded outcome assessor</p>
Participants	<p>South coast of England (East Dorset) 138 participants (64 intervention and 74 control) Mean age 78.3 years for intervention and 79.6 years for control, 46% male All patients with a newly identified stroke admitted to Poole Hospital National Health Service Trust or one of its associated community hospitals and those with recent strokes directly referred from the community or day hospital rehabilitation were considered for inclusion Inclusion criteria: had a confirmed diagnosis of stroke, were aged 55 or over, were residents of East Dorset, needed further rehabilitation for the disability caused by stroke, were physically able to attend day hospital, had any previous disability which was too severe to prevent further rehabilitation and had no sign of advance dementia Exclusion criteria: patients with terminal illness and needing day hospital for social or medical reasons</p>
Interventions	<p>Domiciliary vs. day hospital Assessments done at 6 months Interventions was a newly formed domiciliary stroke team who met daily to plan activities and fortnightly with a consultant geriatrician to review patients using a goal-setting approach In both groups therapy was provided until maximum potential was reached</p>
Outcomes	<p>Primary outcome was functional status as measure by the change in Barthel index Secondary outcomes were mobility, mental state, social activity and generic quality of life as measured by the Rivermead Mobility Index, Philadelphia Geriatric Center Morale Scale, Frenchay Activity Index and perceived quality of life (SF-36) and the Abbreviated Mental Test Outcomes were presented as medians/IQR as well as mean change and standard deviation</p>
Notes	
PEDro score	7/10

TABLES

Rudd 1997	
Methods	<p>Parallel group RCT with randomisation at individual level Randomisation was with permuted blocks of 10 with random number tables Allocation concealment: blank opaque sealed envelopes Blinding: blinded outcome assessor</p>
Participants	<p>London (inner city district 331 participants (167 intervention and 164 control) Mean age 70 years for intervention and 72 years for control, 58% male Participants recruited from St Thomas's and King's College Hospitals from a hospital based stroke register World Health Organisation's definition of stroke was used Inclusion criteria: if patients lived alone they needed to be able to perform functional independent transfer, and if they lived with a willing carer they needed to perform transfer with assistance. Exclusion criteria: Patients were excluded if they lived too far away for the team to visit.</p>
Interventions	<p>Community therapy vs. conventional care Assessments done at baseline, 2, 4, 6 and 12 months Patients only discharged once the required package of social services care could be organised and any home adaptations undertaken Patients were given a planned course of domiciliary physiotherapy, occupational therapy and speech therapy Visits were as frequently as considered appropriate with a maximum of one daily visit from each therapist Each patient had an individual care plan which was reviewed at a weekly team meeting. Patients received care from the team for a maximum of three months</p>
Outcomes	<p>Primary outcome: Barthel score at 12 months Secondary outcomes included motoricity index, mini-mental state examination, Frenchay aphasia screening test, Rivermead activity of daily living scales, hospital anxiety depression scale, 5m walk, Nottingham health profile, carer strain index and patient and carer satisfaction Outcomes were presented as means and standard deviation</p>
Notes	
PEDro score	7/10

TABLES

Wolfe 2000	
Methods	RCT with randomisation at individual level Randomised to receive either usual community care or home treatment Allocation concealment: opaque sealed envelopes Blinding: blinded outcome assessor
Participants	South London) 43 participants (23 intervention and 20 control) Mean age 72 years for intervention and 76 years for control, 42% male Patients were recruited from a community-based register using multiple sources of notification All patients who remained at home after their stroke were eligible for inclusion i.e. patients not admitted to hospital post stroke
Interventions	Domiciliary vs. usual care Assessments done at 2, 4, 6 and 12 months Interventions by the community rehabilitation team include assessments at home for rehabilitation needs and objectives was set for a planned course of therapy (maximum one daily visit from each therapist) Patients received care for a maximum of three months
Outcomes	Primary outcome measure was the Barthel score at 12 months Secondary outcomes measures included the Motricity Index, Rivermead ADL score, Hospital Anxiety and Depression Score, Nottingham Health Profile, 5-metre timed walk, Frenchay Aphasia Screening Test (FAST), Mini-Mental State Examination and Albert Test Carer: CSI Outcomes were presented as medians/range
Notes	
PE德罗 score	7/10

TABLES

Yu 2009	
Methods	<p>RCT with randomisation at individual level Randomisation was done by flipping (throwing of coins) Randomisation was further stratified by infarction and haemorrhage Allocation concealment: not provided Blinding: blinded outcome assessor</p>
Participants	<p>China (Shanghai) 737 participants (377 intervention and 360 control) Mean age not provide, 54% male Patients were recruited from 5 centres in Shanghai Using brain computed tomography (CT) or magnetic resonance imaging (MRI) the patients were diagnosed with cerebral infarction or haemorrhage according to the diagnosis criteria of the Fourth National Cerebrovascular Academic Conference If the patient had several previous strokes the most recent one was counted for the trial Inclusion criteria: course less than 1.5 years, agreed to sign consent form, stable vital signs, GCS > 8, 40 – 85 years old and had limb or cognitive dysfunction Exclusion criteria: active hepatopathy; hepatic and renal inadequacy; congestive heart failure; malignant progress hypertension; respiratory non-functioning; previous dementia; previous psychiatric history and impossible to follow-up.</p>
Interventions	<p>community based rehabilitation vs. usual care (no standardised community-based rehabilitation therapy) Assessments done at 2 months and 5 months Interventions included a standard community-based rehabilitation programme which differed for people with stroke in the atony stage (Brunnstrom 1-2 stage) and for spasm stage (Brunnstrom 3-5) which included appropriate exercises, transfers, static and dynamic equilibrium exercises etc Patients were followed up 10 times, once a week for the first month, then once every two weeks for the second month ad third months and once a month for the fourth and fifth month The relatives and care givers were taught simple community rehabilitation techniques during the follow up and were asked to help the people with stroke complete functional exercises between sessions Patients were instructed to do functional exercises at least three times per week for 45 minute sessions. The therapist also telephoned the patients to supervise and guide them to complete their functional exercise</p>
Outcomes	<p>Primary outcome was functional status as measured by the Clinical Neurological Functional Deficit Scale Outcomes were presented as means and standard deviation</p>
Notes	
PEDro score	7/10

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10. Appendices

10.1. Appendix 1: Search strategy: PubMed

1. *Community medicine [MeSH Terms]*
2. *Community health services [MeSH Terms]*
3. *Home care services [MeSH Terms]*
4. *Rehabilitation [MeSH Terms]*
5. *Disabled persons [MeSH Terms]*
6. *Patient care management [MeSH Terms]*
7. *#1 OR #2 OR #3 OR #4 OR #5 OR #6*
8. *“Community based services” [Title/Abstract]*
9. *“Community”[Title/Abstract]*
10. *“Stroke”[Title/Abstract]*
11. *#8 AND #9 AND #10*
12. *#7 AND #11*
13. *#12 Limits: Humans, Clinical Trial, Randomised Controlled trial, Controlled Clinical Trial, English, Afrikaans*

10.2. Appendix 2: Data extraction form

Reviewer ID

Study ID

**Data Extraction Form
Community-based rehabilitation vs. institution-based care**

Citation	
Publication type & status	
Language of publication	
Case definition	
Diagnostic Method	

1. Type of study:

	Yes	Unclear	If No, exclude
RCT			
CCT			
CBA			
Quasi-randomised trials			

2a. Trial intervention:

Was the intervention a community based rehabilitation programme intended to improve the quality of life, functional independence and community participation of stroke patients with disabilities and their carers?

Yes	
Unclear	
If No, exclude	

2b. Was there a control (comparison) group which did not receive CBR?

Yes	
Unclear	
If No, exclude	

3. Trial participants:

Were the trial participants adults with strokes with disabilities?

Yes	
Unclear	
If No, exclude	

APPENDICES

Tick as appropriate	include <input data-bbox="592 309 667 360" type="checkbox"/>	exclude <input data-bbox="855 309 930 360" type="checkbox"/>	uncertain – requires full text artic. <input data-bbox="1074 309 1149 360" type="checkbox"/>	pending – study still in progress <input data-bbox="1342 309 1417 360" type="checkbox"/>
Reasons for exclusion/ uncertain/Pending				

Notes:

Study design and conduct:

Design: _____

METHODS:

Participant Selection:

Allocation concealment (if appropriate):

Clearly adequate	Possibly adequate	Clearly inadequate	Not described
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	Yes	No	Unclear
Assessor blinded			

Date trial was initiated:

Total duration of trial (treatment plus follow-up):

Duration of follow-up:

Type of follow-up:

Frequency of follow-up:

Loss to follow-up:

	Total	Intervention	Control
Total number randomised			
Number available to follow-up			
Loss to follow-up			

% of total number randomised included in analysis? _____

PARTICIPANTS:

Country and setting (rural or urban):

Numbers of persons in trial:

	Total	Intervention	Control
Number			
% of total	100%		

APPENDICES

Gender of persons in trial:

	Total		Intervention		Control	
	N	%	N	%	N	%
Male						
Female						
TOTAL		100%		100%		100%

Age of persons in trial:

	Total		Intervention		Control	
	N	%	N	%	N	%
Mean age						
Age range						
	N	%	N	%	N	%
=< 60 year						
> 60 year						

Nature/type of disability/stroke: e.g. intellectual, physical, hearing etc.

Ischaemic Hemorrhagic Undetermined

INTERVENTION

Type/nature of community-based rehabilitation programme

Intervention components	Treatment duration	Treatment intensity	Type of comparison group (Usual care)	Outcome measure

Information outstanding, to be requested:

Comments on ethics of study:

10.3. Appendix 3: Assessment of methodological quality.

PEDro scale

1. eligibility criteria were specified	no <input type="checkbox"/> yes <input type="checkbox"/> where:
2. subjects were randomly allocated to groups (in a crossover study, subjects were randomly allocated an order in which treatments were received)	no <input type="checkbox"/> yes <input type="checkbox"/> where:
3. allocation was concealed	no <input type="checkbox"/> yes <input type="checkbox"/> where:
4. the groups were similar at baseline regarding the most important prognostic indicators	no <input type="checkbox"/> yes <input type="checkbox"/> where:
5. there was blinding of all subjects	no <input type="checkbox"/> yes <input type="checkbox"/> where:
6. there was blinding of all therapists who administered the therapy	no <input type="checkbox"/> yes <input type="checkbox"/> where:
7. there was blinding of all assessors who measured at least one key outcome	no <input type="checkbox"/> yes <input type="checkbox"/> where:
8. measures of at least one key outcome were obtained from more than 85% of the subjects initially allocated to groups	no <input type="checkbox"/> yes <input type="checkbox"/> where:
9. all subjects for whom outcome measures were available received the treatment or control condition as allocated or, where this was not the case, data for at least one key outcome was analysed by “intention to treat”	no <input type="checkbox"/> yes <input type="checkbox"/> where:
10. the results of between-group statistical comparisons are reported for at least one key outcome	no <input type="checkbox"/> yes <input type="checkbox"/> where:
11. the study provides both point measures and measures of variability for at least one key outcome	no <input type="checkbox"/> yes <input type="checkbox"/> where:

10.3. Appendix 3: Assessment of methodological quality (cont’).

All criteria	Points are only awarded when a criterion is clearly satisfied. If on a literal reading of the trial report it is possible that a criterion was not satisfied, a point should not be awarded for that criterion.
Criterion 1	This criterion is satisfied if the report describes the source of subjects and a list of criteria used to determine who was eligible to participate in the study.
Criterion 2	A study is considered to have used random allocation if the report states that allocation was random. The precise method of randomisation need not be specified. Procedures such as coin-tossing and dice-rolling should be considered random. Quasi-randomisation allocation procedures such as allocation by hospital record number or birth date, or alternation, do not satisfy this criterion.
Criterion 3	<i>Concealed allocation</i> means that the person who determined if a subject was eligible for inclusion in the trial was unaware, when this decision was made, of which group the subject would be allocated to. A point is awarded for this criteria, even if it is not stated that allocation was concealed, when the report states that allocation was by sealed opaque envelopes or that allocation involved contacting the holder of the allocation schedule who was “off-site”.
Criterion 4	At a minimum, in studies of therapeutic interventions, the report must describe at least one measure of the severity of the condition being treated and at least one (different) key outcome measure at baseline. The rater must be satisfied that the groups’ outcomes would not be expected to differ, on the basis of baseline differences in prognostic variables alone, by a clinically significant amount. This criterion is satisfied even if only baseline data of study completers are presented.
Criteria 4, 7-11	<i>Key outcomes</i> are those outcomes which provide the primary measure of the effectiveness (or lack of effectiveness) of the therapy. In most studies, more than one variable is used as an outcome measure.
Criterion 5-7	<i>Blinding</i> means the person in question (subject, therapist or assessor) did not know which group the subject had been allocated to. In addition, subjects and therapists are only considered to be “blind” if it could be expected that they would have been unable to distinguish between the treatments applied to different groups. In trials in which key outcomes are self-reported (eg, visual analogue scale, pain diary), the assessor is considered to be blind if the subject was blind.
Criterion 8	This criterion is only satisfied if the report explicitly states <i>both</i> the number of subjects initially allocated to groups <i>and</i> the number of subjects from whom key outcome measures were obtained. In trials in which outcomes are measured at several points in time, a key outcome must have been measured in more than 85% of subjects at one of those points in time.
Criterion 9	An <i>intention to treat</i> analysis means that, where subjects did not receive treatment (or the control condition) as allocated, and where measures of outcomes were available, the analysis was performed as if subjects received the treatment (or control condition) they were allocated to. This criterion is satisfied, even if there is no mention of analysis by intention to treat, if the report explicitly states that all subjects received treatment or control conditions as allocated.
Criterion 10	A <i>between-group</i> statistical comparison involves statistical comparison of one group with another. Depending on the design of the study, this may involve comparison of two or more treatments, or comparison of treatment with a control condition. The analysis may be a simple comparison of outcomes measured after the treatment was administered, or a comparison of the change in one group with the change in another (when a factorial analysis of variance has been used to analyse the data, the latter is often reported as a group \times time interaction). The comparison may be in the form hypothesis testing (which provides a “p” value, describing the probability that the groups differed only by chance) or in the form of an estimate (for example, the mean or median difference, or a difference in proportions, or number needed to treat, or a relative risk or hazard ratio) and its confidence interval.
Criterion 11	A <i>point measure</i> is a measure of the size of the treatment effect. The treatment effect may be described as a difference in group outcomes, or as the outcome in (each of) all groups. <i>Measures of variability</i> include standard deviations, standard errors, confidence intervals, interquartile ranges (or other quantile ranges), and ranges. Point measures and/or measures of variability may be provided graphically (for example, SDs may be given as error bars in a Figure) as long as it is clear what is being graphed (for example, as long as it is clear whether error bars represent SDs or SEs). Where outcomes are categorical, this criterion is considered to have been met if the number of subjects in each category is given for each group.