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[Intervention Review]

Occupational therapy for patients with problems in activities of daily living after stroke

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ABSTRACT

Background

Occupational therapy aims to help people reach their maximum level of function and independence in all aspects of daily life.

Objectives

To determine whether occupational therapy focused specifically on personal activities of daily living improves recovery for patients following stroke.

Search methods

We searched the Cochrane Stroke Group Trials Register (last searched January 2006). In addition, we searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* Issue 1, 2006), MEDLINE (1966 to March 2006), EMBASE (1980 to March 2006), CINAHL (1983 to March 2006), PsycLIT (1974 to March 2006), AMED (1985 to March 2006), Wilson Social Sciences Abstracts (1984 to March 2006) and the following Web of Science databases: Science Citation Index (1945 to March 2006), Social Science Citation Index (1956 to March 2006) and Arts and Humanities Citation Index (1975 to March 2006). In an effort to identify further published, unpublished and ongoing trials we searched The Occupational Therapy Research Index and Dissertation Abstracts register, scanned reference lists of relevant articles, contacted authors and researchers and handsearched relevant journals.

Selection criteria

We identified randomised controlled trials of an occupational therapy intervention (compared to usual care or no care) where stroke patients practiced personal activities of daily living, or performance in activities of daily living was the focus of the occupational therapy intervention.

Data collection and analysis

Two review authors independently selected trials and extracted data for pre-specified outcomes. The primary outcomes were the proportion of patients who had deteriorated or were dependent in personal activities of daily living and performance in personal activities of daily living at the end of follow up.

Main results

We identified 64 potentially eligible trials and included nine studies (1258 participants). Occupational therapy interventions reduced the odds of a poor outcome (Peto odds ratio 0.67 (95% confidence interval (CI) 0.51 to 0.87; P = 0.003). and increased personal activity of daily living scores (standardised mean difference 0.18 (95% CI 0.04 to 0.32; P = 0.01). For every 11 (95% CI 7 to 30) patients receiving an occupational therapy intervention to facilitate personal activities of daily living, one patient was spared a poor outcome.

Authors' conclusions

Patients who receive occupational therapy interventions are less likely to deteriorate and are more likely to be independent in their ability to perform personal activities of daily living. However, the exact nature of the occupational therapy intervention to achieve maximum benefit needs to be defined.

PLAIN LANGUAGE SUMMARY

Occupational therapy for patients with problems in activities of daily living after stroke

Occupational therapy aims to help people reach their maximum level of function and independence in all aspects of daily living. Reviewing nine studies with 1258 participants, people who had a stroke were more independent in personal activities of daily living (feeding, dressing, bathing, toileting and moving about) and more likely to maintain these abilities if they received treatment from an occupational therapist. However, we still need to understand the best form of this occupational therapy input (for example, what should be provided, when it should be provided, how often and for how long) before we can plan how to best use it in health and social care settings.

BACKGROUND

Stroke is one of the major causes of death and disability in the Western world consuming large amounts of health service resources (Isard 1992). In 1985 cerebrovascular diseases cost the UK National Health Service £550 million, that is almost 4% of the total expenditure (Dale 1988) and it is believed that inpatient care and rehabilitation accounts for a large proportion of this amount.

It has been estimated that a third of the people who survive after stroke will remain dependent on others for care (Dennis 1987). Rehabilitation services aim to reduce such disability and handicap (WHO 1980). The benefits of stroke rehabilitation packages are well documented (SUTC 2000) but little is known about the efficacy of the various components of such interventions.

Stroke rehabilitation represents a considerable workload for occupational therapists (Mackay 1995). Specifically, stroke can affect performance of activities in any domain of life including the following:

(1) personal activities of daily living (pADL) are necessary for survival and include 'those tasks which all of us undertake every day of our lives in order to maintain our personal level of care.' (Hopson 1981) (such as feeding, dressing, toileting, washing, bathing, transferring in/out bed/chair, mobilising);

(2) instrumental or extended activities of daily living (IADL or EADL) which are necessary for maintaining a dwelling in a given socio-cultural setting (for example preparing own meals, doing light housework, managing own money, shopping for personal items);

(3) occupational activities (such as paid employment);

(4) discretionary activities, for example house and garden activities (beside those noted as IADL or EADLs), shopping and errands, work (paid employment), caring for children and others, hobbies and leisure activities, physical recreation and sport, entertainment away from home, public service or clubs or adult education, socialising with friends and relatives, local transportation and distant trips, religious services or activities.

Occupational therapy aims to enable people to achieve health, well being and life satisfaction through participation in occupation (COT 2004). Occupational therapy specifically aims to promote recovery through the use of purposeful activities. Often the performance of these purposeful activities is both the overall goal

as well as being the basis of the intervention. This review focuses primarily on the effectiveness of occupational therapy for personal activities of daily living after stroke.

OBJECTIVES

To determine whether any intervention provided by an occupational therapist (or under the supervision of an occupational therapist) with the specific aim of facilitating personal activities of daily living improves the outcomes for patients following stroke.

METHODS

Criteria for considering studies for this review

Types of studies

We sought all randomised controlled trials of stroke patients receiving an intervention provided by an occupational therapist or under the supervision of an occupational therapist with the specific aim of facilitating personal activities of daily living compared to usual care or no care.

Types of participants

We included trials that recruited patients who met a clinical definition of stroke (focal neurological deficit caused by cerebrovascular disease). We excluded trials of mixed aetiology where the percentage of stroke patients was less than 50%.

Types of interventions

We were interested in reviewing trials of occupational therapy interventions, which had the following features.
(1) Focused on activities of daily living. Occupational therapy interventions required to be focused on practice of personal activities of daily living or targeted towards improving the patient's ability to perform personal activities of daily living.
(2) Provided by a qualified occupational therapist or under the supervision of a qualified occupational therapist.
We included trials where the control group received usual care or no routine intervention. The nature of control was recorded but not used to exclude trials. Any trials that included occupational therapists as part of a multidisciplinary team were excluded as they are or will be covered in other reviews and therefore are beyond the remit of this review.
We did not include trials that compared different therapy techniques within the same service setting or that looked at different settings for providing similar interventions (for example occupational therapy provided to participants living at home versus day hospital occupational therapy).

Types of outcome measures

We aimed to record outcomes that reflected the full burden of disabling illness.

Primary outcomes of interest

(1) Performance in personal activities of daily living (pADL including: feeding, dressing, bathing, toileting, simple mobility and transfers) at the end of scheduled follow up.
(2) Death or a poor outcome. Death or a poor outcome is defined as the combined outcome of being dead or:

- having deteriorated, characterised by experiencing a deterioration in ability to perform personal activities of daily living (that is, experiencing a drop in pADL score); or
- being dependent, characterised by lying above or below a pre-defined cut-off point on a given pADL scale; or
- requiring institutional care at the end of scheduled follow up.

Secondary outcomes of interest

(1) Death at the end of scheduled follow up
(2) Number of patients dead or physically dependent at the end of scheduled follow up
(3) Number of patients dead or requiring institutional care at the end of scheduled follow up
(4) Performance in extended activities of daily living (community and domestic activities) at the end of scheduled follow up
(5) Patient mood at the end of scheduled follow up
(6) Patient subjective health status or quality of life at the end of scheduled follow up
(7) Carer mood at the end of scheduled follow up
(8) Carer subjective health status or quality of life at the end of scheduled follow up
(9) Patient and carer satisfaction with services
We aimed to record outcomes that reflected resource use (that is the number of admissions to hospital, number of days in hospital, aids and appliances provided, number of staff required per caseload).

Search methods for identification of studies

See: 'Specialized register' section in Cochrane Stroke Group
We searched the Cochrane Stroke Group Trials Register which was last searched by the Review Group Co-ordinator on 16 January 2006. In addition, we searched the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* Issue 1, 2006), MEDLINE (1966 to March 2006), EMBASE (1980 to

March 2006), CINAHL (1983 to March 2006), PsycLIT (1974 to March 2006), AMED (1985 to March 2006), Wilson Social Sciences Abstracts (1984 to March 2006) and the following Web of Science databases: Science Citation Index (1945 to March 2006), Social Science Citation Index (1956 to March 2006) and Arts and Humanities Citation Index (1975 to March 2006) (Appendix 1). In an effort to identify further published, unpublished and ongoing trials, we searched The Occupational Therapy Research Index and Dissertation Abstracts register, scanned reference lists of relevant articles, contacted authors and researchers and handsearched the following journals.

- *American Journal of Occupational Therapy* (1947 to July 2005)
- *Aphasiology* (1987 to July 2005)
- *Australian Journal of Occupational Therapy* (1975 to July 2005 (1965 to 1975 not available from The British Library))
- *British Journal of Occupational Therapy* (1950 to July 2005)
- *British Journal of Therapy and Rehabilitation* (1994 to July 2005)
- *Canadian Journal of Occupational Therapy* (1970 to July 2005)
- *Clinical Rehabilitation* (1987 to July 2005)
- *Disability and Rehabilitation* (1979 to July 2005) formerly *International Journal of Rehabilitation Medicine* (1979 to 1986)
- *European Journal of Disorders of Communication* (1985 to July 2005) formerly *British Journal of Disorders of Communication* (1977 to 1984)
- *Journal of Clinical Psychology in Medical Settings* (1944 to July 2005) formerly *Journal of Clinical Psychology* (1944 to 1994)
- *Journal of Rehabilitation* (1993 to July 2005)
- *International Journal of Rehabilitation Research* (1977 to July 2005)
- *Journal of Rehabilitation Science* (1989 to 1997) now *Clinical Rehabilitation* (1996 onwards)
- *Neuropsychological Rehabilitation* (1987 to July 2005 (1987 to 1991 not available from The British Library))
- *Neurorehabilitation* (1991 to July 2005)
- *Occupational Therapy International* (1994 to July 2005)
- *Physiotherapy Theory and Practice* (1985 to July 2005) formerly *Physiotherapy Practice* (1985 to 1989)
- *Physical Therapy* (1988 to 1997)
- *Rehabilitation Psychology* (1982 to July 2005)
- *The Journal of Cognitive Rehabilitation* (1983 to 2005) formerly *Cognitive Rehabilitation* (1983 to 1987)

Data collection and analysis

The trials were independently scrutinised by two review authors to ensure eligibility. Differences in opinion regarding trial eligibility were resolved through discussion and consensus.

Assessment of methodological quality

The methodological quality of the studies was documented by two independent review authors. The following quality criteria were documented: randomisation; method of treatment allocation; concealment of treatment allocation; presence of an intention-to-treat analysis and a blinded assessment of final outcomes. The sensitivity analyses were based on these variables.

Data extraction

Our primary aim was to obtain standardised data through collaboration with the original trialists. If data were taken from published sources, this was extracted independently by two review authors using a standard data recording form. Any differences occurring between the two review authors were resolved through consensus.

Data synthesis

We analysed binary outcomes with a fixed-effect model, as Peto odds ratios (OR) with 95% confidence intervals (CI). For continuous outcomes, we used a random-effects model to take account of statistical heterogeneity. Inconsistency across studies was quantified using I squared (I^2). A value greater than 50% was considered substantial heterogeneity.

Sensitivity analysis

Sensitivity analyses were carried out based upon the method of randomisation, presence of an intention-to-treat analysis and blinding of final assessment.

Heterogeneity tests

Standard tests of statistical heterogeneity were carried out and sources of heterogeneity explored.

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies.

We identified a total of 64 trials by March 2006, of which 53 were excluded (Byl 2003; Chamberlain 1981; Chase 1991; Corr 2004; Diller 1974; Flinn 1999; Flinn 2005; Flynn 2000; Goh 2001; Goldenberg 1998; Gray 2001; Hong Kong 2001; Huck 1997; Kayhan 1996; MacPhee 2004; Mount 2000; Nelson 1996; Netherlands 2001; Nottingham 2000; Nottingham 2004; Ontario 1982; Ozdemir 2001; Paul 1998; Purdie 1997; Rodgers 2001;

Rose 2002; Schauer 2003; Schneider 2001; Shreiber 2000; Slade 1999; Soc/Psy/Phys 1995; Soderback 1988; Soderback 1992; Starke 2002; Taylor 1971; Tham 1997; Tickle-Degnen 1990; Trombly 1999; Tse 1999; Turton 1990; Unsworth 2002; Van der Loos 2001; van Vleit 1995; Van Wijck 2003; Vancouver 1989; Vancouver 1991; Woldag 2003; Wolfe 2000; Wressle 2002; Wu 1998; Wu 2000; Wu 2001; Young 1983). These trials were excluded for various reasons; details are given in the 'Characteristics of excluded studies' table. Two trials are still awaiting assessment (China 2001; Sweden 1997).

We were careful to ensure that no patient in any of the included studies was recruited to more than one of the included studies.

Patient characteristics

(1) Demographic characteristics

The mean age of patients in the included studies ranged from 55 to 87.5 years. There was a significant difference in the ratio of males to females between the intervention group in one trial (Nottingham 1997). Percentage males in the included studies ranged from 19% to 66%. Full details of the percentage males in each study are included in the 'Characteristics of included studies' table.

(2) Stroke severity (Barthel Index scores) at baseline

Five trials provided information on baseline Barthel Index scores for all participants. Four studies (Cardiff 1995; Glasgow 2000; Nottingham 1999; TOTAL 2001) presented Barthel Index Scores at baseline for intervention and control groups as medians and inter quartile range (IQR). One study (Nottingham 2001) presented Barthel Index Scores at baseline as means and standard deviations. Full details of all baseline scores are included in the 'Characteristics of included studies' table.

Exclusion criteria

Eight trials employed exclusion criteria which excluded patients who had: varying degrees of communication or cognitive difficulties or both, or had other co-existing conditions that would interfere with outcome assessments or participation in treatment regimens (Glasgow 2000; Hong Kong 2004; Nottingham 1995; TOTAL 2001); who were unable to speak English (Nottingham 1995; Nottingham 1996; Nottingham 1999; TOTAL 2001); were terminally ill (Glasgow 2000; Hong Kong 2004); blind (Nottingham 1996); deaf (Nottingham 1996); had a history of dementia (Nottingham 1999; TOTAL 2001) or were resident in, or to be discharged to, a residential or nursing home, or both (Glasgow 2000; Nottingham 1999; TOTAL 2001). One trial (Hong Kong 2004) required the participant to be living at home with family support. One trial excluded patients who scored 15 or above on the Barthel Index (Nottingham 2001).

Definition of stroke

One trial used the World Health Organization (WHO 1980) criteria to define stroke (TOTAL 2001), while four used a clinical definition of stroke (Cardiff 1995; Glasgow 2000; Nottingham 1997; Nottingham 1999). Four trials did not specify the definition of stroke (Hong Kong 2004; Nottingham 1995; Nottingham 1996; Nottingham 2001).

Recruitment

Six trials recruited patients at discharge from inpatient facilities (Cardiff 1995; Glasgow 2000; Nottingham 1995; Nottingham 1996; Nottingham 1997; TOTAL 2001). One trial recruited patients from inpatient facilities and those who had been discharged from the same inpatient facilities within the previous two weeks (Hong Kong 2004). One trial recruited following admission to a stroke unit (Glasgow 2000). Three trials recruited patients within a set time frame from stroke onset: less than two weeks after discharge from hospital (Hong Kong 2004); one month (Nottingham 1999) and within six months (TOTAL 2001). One trial recruited stroke patients who were not admitted to hospital following stroke onset (Nottingham 1999). One trial recruited patients from nursing homes (Nottingham 2001).

Duration of follow up

Duration of follow up was between three and 12 months, median six months. For full details of periods of follow up refer to the 'Characteristics of included studies' table.

Study interventions and comparisons

For details of study interventions and comparisons refer to the 'Characteristics of included studies' table. Two trials (Nottingham 1995; TOTAL 2001) compared two alternative forms of interventions against usual care or no routine intervention, that is occupational therapy focused on leisure and ADL-based occupational therapy against control. For the purpose of analysis in this review the two intervention groups in each of the trials have been combined. One trial (Nottingham 1996) used a crossover design in which patients were given dressing practice, the intervention of interest, in sequence. For the purpose of this review the end of scheduled follow up is the end of the first treatment period at 12 weeks.

Intensity of intervention

Eight trials provided information on the intensity of treatment sessions. Three trials provided an intervention programme that covered a six-month period: Cardiff 1995 - intervention at two, eight, 16, 24 weeks; conventional three half days; Nottingham 1995 - 30 minutes per week in the first three months, thereafter

30 minutes per fortnight; TOTAL 2001 - six-month programme, minimum of ten treatment sessions, each session lasting 30 minutes or more.

One trial (Nottingham 1999) provided a five-month treatment programme with a mean of 5.8 visits per patient. One trial provided an intervention programme that lasted six weeks: Glasgow 2000 - 1.7 visits per week for six weeks, 30 to 45 minute sessions). One trial (Nottingham 1997) provided a mean of six visits per patient. One trial (Nottingham 2001) provided a mean of 8.5 visits and a mean total of 4.5 hours per participant. One trial provided a minimum of two and a maximum of three visits (Hong Kong 2001). One trial did not provide any information on the intensity of the intervention (Nottingham 1996).

Outcomes for analysis

Based on the predefined outcomes of interest and the availability of data from specific outcome measures in the included trials, the data analysis has been concentrated on the following outcomes.

Patient outcomes

(1) Personal activities of daily living

If trials recorded the Barthel Index (Barthel) this was used for analysis; if this was not available then an alternative measure of personal activities of daily living was used.

(2) Death or a poor outcome (deterioration, dependency, institutionalisation)

Defined as the combined 'poor outcome' of being dead or (a) experiencing a deterioration in ability to perform personal activities of daily living (that is, experiencing a drop in a given ADL score or; (b) dependent (that is, one side of a pre-defined threshold characterised by a drop in score on a given ADL scale) or (c) requiring institutional care at the end of scheduled follow up. If deterioration in ability to perform personal ADL was available, this was used for analysis; if this information was not available, dependence in personal ADL was used. Institutionalisation was used if no other measures were available. And if trials recorded the Barthel Index, this was used for analysis.

(3) Death

Defined as the number of patients dead at the end of scheduled follow up.

(4) Death or requiring institutional care

Defined as the combined adverse outcome of being dead or in institutional care defined at the end of scheduled follow up.

(5) Death or dependency

Defined as the combined adverse outcome of being dead or dependent in personal activities of daily living at the end of scheduled follow up. Dependence in personal activities of daily living was defined as either lying above or below a predefined cut-off point on a given ADL scale. If the Barthel Index was used, this was used for analysis. If the Barthel Index was not available, alternative global dependency scales with a predefined cut-off point were used.

(6) Extended activities of daily living

If trials recorded the Nottingham Extended ADL Index (NEADL), this was used for analysis; if this was not available then an alternative EADL scale was accepted.

(7) Quality of Life

If the trials recorded a subjective health status measure such as the Nottingham Health Profile (NHP) this was used for analysis; if a subjective health status measure was not available then a quality of life measure was used.

(8) Mood

If the trials recorded the General Health Questionnaire (GHQ) this was used for analysis; if this was not available then an alternative measure of mood was accepted.

Carers Outcomes

(1) Quality of Life

Pearlman's six-point Quality of Life Scale (Pearlman).

(2) Mood

If the trials reported the General Health Questionnaire (GHQ), this was used for analysis. Alternative mood scales were accepted if this was unavailable.

Risk of bias in included studies

Methodological quality of included studies

(1) Randomisation and allocation concealment

Of the nine trials able to provide outcome data, eight used a clearly concealed randomisation procedure (Cardiff 1995; Glasgow 2000; Nottingham 1995; Nottingham 1996; Nottingham 1997;

Nottingham 1999; Nottingham 2001; TOTAL 2001). One trial did not fully describe randomisation and adequate allocation concealment (Hong Kong 2004). Full details of the methodological quality of the studies are provided in the 'Characteristics of included studies' table.

(2) Blinding

Eight trials used an unequivocal blinded final outcome assessment for all patients; one trial (Hong Kong 2004) did not display clear blinding of final outcome assessor. Full details of the methodological quality of the studies are provided in the 'Characteristics of included studies' table.

(3) Intention-to-treat analysis

In total 95 participants (7.6%) were reported to be lost to follow up, with 892 (70.9%) participants enrolled in studies with a stated intention-to-treat analysis (Glasgow 2000; Nottingham 1997; Nottingham 2001; TOTAL 2001). However, the remaining trials may have performed, but omitted to report, an intention-to-treat analysis.

Effects of interventions

Analysis point

Two studies included in this review (Nottingham 1995; TOTAL 2001) have two intervention and one control arm. For the purpose of this review the results for the two intervention arms or sub-groups within each of the aforementioned studies have been combined. $ denotes where the contributing study sub-groups have been combined.

Guide to the completeness of data tables

Intervention group = (I)
N(I) = number of participants in the intervention group at the outset of the trial
n(I) = number of participants in intervention group outcome data available for at the end of scheduled follow up
Dead(I) = number of participants in the intervention group dead at the end of scheduled follow up
Missing(I) = number of participants missing from the intervention group at the end of scheduled follow up
Control group = (C)
N(C) = number of participants in the control group at the outset of the trial
n(C) = number of participants in control group outcome data available for at the end of scheduled follow up
Dead(C) = number of participants in the control group dead at the end of scheduled follow up
Missing(C) = number of participants missing from the control group at the end of scheduled follow up

Personal activities of daily living (Outcome 01)

(1) Completeness of data

(*see* Table 1 Completeness of data: Personal activities of daily living (Outcome 01))
Total participants: 1258
Contributing studies: (Cardiff 1995; Glasgow 2000; Hong Kong 2004; Nottingham 1996; Nottingham 1997; Nottingham 1999; Nottingham 2001; TOTAL 2001)
Number of participants from contributing studies: 1193
Number of participants missing from contributing studies: 232 (including 96 deaths)
Number of participants contributing to analyses: 961
Excluded studies or studies not recording outcome of interest: Nottingham 1995
$Analysis point. TOTAL sub-groups have been combined.

(2) Main analysis

Personal activities of daily living scores were available for 961 (80.6%) participants from eight trials (Cardiff 1995; Glasgow 2000; Hong Kong 2004; Nottingham 1996; Nottingham 1997; Nottingham 1999; Nottingham 2001; TOTAL 2001). The pooled result for all trials, combined using a standardised mean difference (SMD) with a random-effects model was 0.18 (95% CI 0.04 to 0.32; P = 0.01) with no significant heterogeneity (chi squared = 8.08, df = 7; (P = 0.33) I^2 = 13.3%). Therefore, participants who received an occupational therapy intervention after stroke were significantly more independent in personal activities of daily living than those participants who received no care or usual care.

(3) Sensitivity analyses

(a) Randomisation procedures and allocation concealment

Although no formal statistical testing was performed, the effect of the occupational therapy intervention on ability to perform personal activities of daily living appeared very similar when analyses were restricted to trials with clear randomisation or allocation concealment or both (Cardiff 1995; Glasgow 2000; Nottingham 1996; Nottingham 1997; Nottingham 1999; Nottingham 2001; TOTAL 2001) (n = 908); SMD 0.17 (95% CI 0.02 to 0.33; P = 0.03) with no significant heterogeneity (chi squared = 7.69, df = 6; (P = 0.26) I^2 = 21.9%).

(b) Blinding

While no formal statistical testing was performed, restriction of the analysis to the seven trials with adequate blinding (Cardiff 1995; Glasgow 2000; Nottingham 1996; Nottingham 1997; Nottingham 1999; Nottingham 2001; TOTAL 2001) (n = 908) produced similar results; SMD 0.17 (95% CI 0.02 to 0.33; P = 0.03) with no significant heterogeneity (chi squared = 7.69, df = 6; (P = 0.26) I^2 = 21.9%).

(c) Intention-to-treat analysis

Although no formal statistical testing was done, the effect of the occupational therapy intervention on ability to perform personal activities appeared to be increased when analysis was restricted to the four trials with unknown intention-to-treat analysis (Cardiff 1995; Hong Kong 2004; Nottingham 1996; Nottingham 1999) (n = 328) SMD 0.32 (95% CI 0.10 to 0.54; P = 0.004) (chi squared = 0.50, df = 3; (P = 0.92) I^2 = 0%).

In contrast, restriction of the analysis to the four trials with clear intention-to-treat analysis (Glasgow 2000; Nottingham 1997; Nottingham 2001; TOTAL 2001) (n = 633) appears to reduce the effect SMD 0.12 (95% CI -0.10 to 0.33; P = 0.28) with no significant heterogeneity (chi squared = 4.63, df = 3; (P = 0.20) I^2 = 35.2%). However, it is worth noting that performing an intention-to-treat analysis is problematic with complex scores such as the Barthel Index, as it is difficult to score missing participants.

(4) Sensitivity to inclusion of a cluster randomised trial

When the one cluster randomised trial (Nottingham 2001) is excluded from the analysis, the results remain largely unchanged SMD 0.15 (95% CI 0.00 to 0.29; P = 0.05) with no statistically significant heterogeneity (chi squared = 6.58, df = 6 (P = 0.36) I^2 = 8.8%).

Inclusion of cluster randomised trial

See section 'Death or a poor outcome' (c)(ii) How the cluster-randomised trial has been incorporated into this review' for details.

Death or a poor outcome

(1) Completeness of data

(*see* Table 2 Completeness of data: death or poor outcome (Outcome 02))

Total participants: 1258

Contributing studies: Cardiff 1995; Glasgow 2000; Nottingham 1995; Nottingham 1997; Nottingham 1999; Nottingham 2001; TOTAL 2001

Number of participants from contributing studies: 1175

Number of participants missing from contributing studies: 110

Number of participants contributing to analyses: 1065

Excluded studies or studies not recording outcome of interest, that is combined adverse outcome of death and deterioration or dependency at end of follow up: Hong Kong 2004; Nottingham 1996

(2) Main analysis

Data on the combined adverse poor outcome of death and deterioration (where deterioration is represented by a drop or decline in personal ADL score) was available for 407 of the 413 participants (98.5%) from four trials (Cardiff 1995; Glasgow 2000; Nottingham 1995; Nottingham 2001) and shows that the odds of death or deterioration in ADL were significantly less (P = 0.02) in the group receiving an occupational therapy intervention (OR 0.60, 95% CI 0.39 to 0.91). Re-analysis including trials that have reported data on death or a poor outcome (deterioration or dependency), which were available for 1065 (90.6%) participants from seven trials (Cardiff 1995; Glasgow 2000; Nottingham 1995; Nottingham 1997; Nottingham 1999; Nottingham 2001; TOTAL 2001) produces similar results; OR 0.67 (95% CI 0.51 to 0.87; P = 0.003). There was no statistically significant heterogeneity between trials (chi squared = 7.50, df = 6 (P = 0.28) I^2 = 20.0%).

(3) Sensitivity analyses

(a) Intention-to-treat analysis

Although no formal statistical testing was done, when analysis is restricted to the three trials with unknown intention-to-treat analysis (Cardiff 1995; Nottingham 1995; Nottingham 1999) (n = 350), the odds of a poor outcome were not significantly reduced for those receiving an occupational therapy intervention (OR 0.69, 95% CI 0.42 to 1.12; P = 0.13) (chi squared 2.14, df = 2 (P = 0.34), I^2 = 6.5%). This is in contrast to the effect observed if the analysis is restricted to the four trials with clear intention-to-treat analysis (Glasgow 2000; Nottingham 1997; Nottingham 2001; TOTAL 2001) (n = 715) OR 0.66 (95% CI 0.48 to 0.91; P = 0.01) (chi squared 5.35, df = 3 (P = 0.15), I^2 = 43.9%).

(b) Sensitivity to missing data

Further, if we assume that the patients who are missing from the treatment groups (66 out of 673 participants) (9.8%) and control groups (44 out of 502 participants) (8.8%) are alive and well and living at home, then the odds of a poor outcome are still significantly reduced for those patients receiving occupational therapy; OR 0.71 (95% CI 0.55 to 0.92; P = 0.009) with no significant heterogeneity (chi squared 8.56, df = 6 (P = 0.20), I^2 = 29.9 %).

Alternatively, if we consider patients who are missing from the treatment groups and control groups to be either dead or having a poor outcome (deterioration or dependency), then the odds of a poor outcome are still significantly reduced for those patients receiving an occupational therapy intervention; OR 0.67 (95% CI 0.52 to 0.86; P = 0.002) with no statistically significant heterogeneity (chi squared = 7.55, df = 6 (P = 0.27), I^2 = 20.5%).

(c)(i) Sensitivity to inclusion of a cluster randomised trial

Exclusion of the one cluster randomised trial (Nottingham 2001) from the analysis produced a more modest but still significant effect; OR 0.73 (95% CI 0.55 to 0.96; P = 0.03) with no statistically significant heterogeneity (chi squared = 4.40, df = 5 (P = 0.49), I^2 = 0%).

(c)(ii) How the cluster-randomised trial has been incorporated into this review

(*See* Handbook 2005b). The cluster-randomised trial (Nottingham 2001) randomised six nursing homes with 63 residents (participants) into an intervention group and six nursing homes with 55 residents (participants) into a control group. The numbers of patients experiencing the odds of a poor outcome among the residents, ignoring the clustering, are:

- Intervention: 33/63
- Control: 42/55

We used an intra-cluster correlation coefficient of 0.02 to calculate the average cluster size. The average cluster size in the trial is (63 + 55)/(6 + 6) = 9.83. The design effect for the trial as a whole is then 1+ (m - 1)r = 1 + (9.83 - 1) × 0.02 = 1.1766. The effective sample size in the intervention group is 63/1.766 = 53 and for the control group is 55/1.1766 = 47.
Applying the design effects also to the numbers of events (patients worse or dead) produces the following results:

- Intervention: 27/53
- Control: 36/47

Death (Outcome 03)

(1) Completeness of data

(*see* Table 3 Completeness of data: Death (Outcome 03))
Contributing studies: All
Total participants: 1258
Number of participants missing: 95
Number of contributing participants 1163

(2) Main analysis

Data on death were available for 1163 (92.4%) participants. The overall estimate gives an odds ratio of 0.84 (95% CI 0.57 to 1.25; P = 0.39). This result does not provide evidence of either significant benefit or harm. There was no significant heterogeneity between trials (chi squared = 7.03, df = 6 (P=0.32), I^2 = 14.7%).

Inclusion of cluster randomised trial

See section 'Death or a poor outcome' (c)(ii) how the cluster-randomised trial has been incorporated into this review for details.

Death or institutional care (Outcome 04)

(1) Completeness of data

(*see* Table 4 Completeness of data: Death or requiring institutional care (Outcome 04))
Total participants: 1258
Contributing studies: Cardiff 1995; Glasgow 2000; Nottingham 1997
Number of participants from contributing studies: 359
Number of participants missing from contributing studies: 1
Number of participants contributing to analyses: 358
Excluded studies or studies not recording outcome of interest, that is nursing or residential care placement at end of follow up: Hong Kong 2004; Nottingham 1995; Nottingham 1996; Nottingham 1999; Nottingham 2001; TOTAL 2001

(2) Main analysis

Data on the combined adverse outcome of being dead or requiring institutional care at the end of scheduled follow up were available for 358 (99.7%) patients from three trials (Cardiff 1995; Glasgow 2000; Nottingham 1997). The summary OR for being dead or in institutional care: OR 0.72 (95% CI 0.43 to 1.19; P = 0.20) was not statistically significant. Therefore, at the 5% significance level we are unable to detect a difference in the odds of patient dying or requiring long-term institutional care between those patients receiving occupational therapy and those patients receiving usual care or no service. There was no significant heterogeneity between trials (chi squared = 2.27, df = 2 (P = 0.32), I^2 = 11.7%).

Death or dependency (Outcome 05)

(1) Completeness of data

(*see* Table 5 Completeness of data: Death or dependency (Outcome 05))
Total participants: 1258

Contributing studies: Cardiff 1995; Glasgow 2000; Nottingham 1999; TOTAL 2001
Number of participants from contributing studies: 899
Number of participants missing from contributing studies: 111
Number of participants contributing to analyses: 788
Excluded studies or studies not recording outcome of interest, that is dependency at end of follow up: Hong Kong 2004; Nottingham 1995; Nottingham 1996; Nottingham 1997; Nottingham 2001

(2) Main analysis

Data on the outcome of being dead or dependent in activities at the end of scheduled follow up were available for 788 (87.7%) patients from four trials (Cardiff 1995; Glasgow 2000; Nottingham 1999; TOTAL 2001). There was no statistically significant difference in the combined odds of patients dying or being less dependent between those patients receiving occupational therapy and those receiving usual care or no service: OR 0.90 (95% CI 0.67 to 1.23; P = 0.52). There was no significant heterogeneity between trials (chi squared = 4.46, df = 3 (P = 0.22), I^2 = 32.7%).

Extended activities of daily living (Outcome 06)

(1) Completeness of data

(*see* Table 6 Completeness of data: Extended activities of daily living (Outcome 06))
Total participants: 1258
Contributing studies: Cardiff 1995; Glasgow 2000; Nottingham 1995; Nottingham 1997; Nottingham 1999; TOTAL 2001
Number of participants from contributing studies: 1075
Number of participants missing from contributing studies: 228 (including 96 deaths)
Number of participants contributing to analyses: 847
Excluded studies or studies not recording outcome of interest: Hong Kong 2004; Nottingham 1996; Nottingham 2001
$ Analysis point. Nottingham 1995 and TOTAL sub-groups have been combined.

(2) Main analysis

Six trials (Cardiff 1995; Glasgow 2000; Nottingham 1995; Nottingham 1997; Nottingham 1999; TOTAL 2001) recorded outcome measures related to extended activities of daily living. Scores were available for 847 (78.8%) patients. Combined as the SMD using a random-effects model the result for all trials was 0.21 (95% CI 0.03 to 0.39; P = 0.02) indicating that patients who received an occupational therapy intervention following stroke were significantly more independent in extended activities of daily living. No significant heterogeneity between trials was detected (chi squared = 7.43, df = 5; (P = 0.19), I^2 = 32.7%).

Subjective health status scores (Comparison 07)

(1) Completeness of data

(*see* Table 7 Completeness of data: Quality of life (Outcome 07))
Total participants: 1258
Contributing studies: Glasgow 2000; Nottingham 1995
Data collected but not available: Nottingham 1996 (n = 30)
Number of participants from contributing studies: 203
Number of participants missing from contributing studies: 36 (including 11 deaths)
Number of participants contributing to analyses: 167
Excluded studies or studies not recording outcome of interest: Cardiff 1995; Hong Kong 2004; Nottingham 1997; Nottingham 1999; Nottingham 2001; TOTAL 2001
$ Analysis point. Nottingham 1995 sub-groups have been combined.

(2) Main analysis

Three trials (Glasgow 2000; Nottingham 1995; Nottingham 1996) recorded outcome measures related to quality of life. Outcome measures reported include the Nottingham Health Profile (Nottingham 1995; Nottingham 1996) and Neurochol (Glasgow 2000). No Nottingham Health Profile data were available for Nottingham 1996. The quality of life scores were available for 13.5% patients and were combined as the SMD using the random-effects model. The pooled result for all trials was SMD 0.17 (95% CI -0.14 to 0.48; P = 0.28). However, there were insufficient numbers of trials to draw firm conclusions. There was no statistically significant heterogeneity between trials (chi squared = 0.01, df = 1; (P = 0.93), I^2 = 0%).
$ Analysis point. Results from the trials using the Nottingham Health Profile have been inverted to reflect the direction of scoring (that is, the higher the score the greater the health problem).

Mood or distress (Outcome 08)

(1) Completeness of data

(*see* Table 8 Completeness of data: Mood (Outcome 08))
Total participants: 1258
Contributing studies: Cardiff 1995; Nottingham 1997; Nottingham 1999; TOTAL 2001
Data collected but not available: Nottingham 1995 (Cn = 65); Nottingham 2001
Number of participants from contributing studies: 872
Number of participants missing from contributing studies: 236 (including 85 deaths)
Number of participants contributing to analyses: 636

Excluded studies or studies not recording outcome of interest: Glasgow 2000; Hong Kong 2004; Nottingham 1995; Nottingham 1996; Nottingham 2001
$ Analysis point. TOTAL 2001 sub-groups have been combined.

(2) Main analysis

The mood or distress scores were available for 636 (72.9%) participants from four studies (Cardiff 1995; Nottingham 1997; Nottingham 1999; TOTAL 2001). Outcome measures reported included the General Health Questionnaire (Nottingham 1997: GHQ - 28 item; Nottingham 1999: GHQ 28 - item; TOTAL 2001: GHQ 12 - item) and the Geriatric Depression Scale (Cardiff 1995). Data from one trial (Nottingham 1995) were excluded as the data were presented as proportions and could not be converted to means and standard deviations and therefore combined. The result for all trials was 0.07 (95% CI -0.09 to 0.23; P = 0.38). There was no significant heterogeneity between trials (chi squared = 2.87, df = 3; (P = 0.41), I^2 = 0%). Therefore, at the 5% significance level we are unable to detect an improvement in mood between those patients receiving occupational therapy interventions and those patients receiving usual care or no service.
$ Analysis point. General Health Questionnaire mean scores have been inverted to account for the direction of scoring (that is, high scores equal worse emotional health).

Carers

(1) Quality of life (Outcome 09)

(a) Completeness of data

(*see* Table 9 Completeness of data: carers' quality of life (Outcome 9))
Total participants: 1258
Contributing studies: Cardiff 1995
Number of participants (carers) from contributing studies: Unclear how many participants in the trial had a carer.
Number of participants (carers) missing from contributing studies: Unclear how many participants in the trial had a carer.
Number of participants (carers) contributing to analysis: 54
Excluded studies or studies not recording outcome of interest: Glasgow 2000; Hong Kong 2004; Nottingham 1995; Nottingham 1996; Nottingham 1997; Nottingham 1999; Nottingham 2001; TOTAL 2001

(b) Main analysis

Quality of life scores were available for 54 carers (4.3% of all participants) from one trial (Cardiff 1995). There is insufficient data to determine if carers of participants who receive occupational therapy interventions following stroke experienced improved quality of life.

(2) Mood or distress (Outcome 10)

(a) Completeness of data

(*see* Table 10 Completeness of data: Carers mood (Outcome 10))
Total participants: 1258
Contributing studies: Glasgow 2000; Nottingham 1997; Nottingham 1999; TOTAL 2001
Number of participants (carers) from contributing studies: Unclear how many participants in the trial had a carer.
Number of participants missing from contributing studies: Unclear how many participants in the trials had a carer.
Number of participants (carers) contributing to analyses: 590
Excluded studies or studies not recording outcome of interest: Cardiff 1995; Hong Kong 2004; Nottingham 1995; Nottingham 1996; Nottingham 2001

(b) Main analysis

Four trials recorded outcomes related to mood or distress (Glasgow 2000; Nottingham 1997; Nottingham 1999; TOTAL 2001) (n = 590). The General Health Questionnaire was used by all four trials. Mood or distress scores were available for carers (46.9% of all patients). The combined result for all trials using the SMD random-effects model was 0.23 (95% CI -0.05 to 0.51; P = 0.11). Although the results are not statistically significant, there is a trend towards improved mood in carers of patients who receive an occupational therapy intervention following stroke. However, there was statistically significant heterogeneity between trials (chi squared = 6.70, df = 3; (P = 0.08), I^2 = 55.2%).

DISCUSSION

This systematic review assessed the effectiveness of occupational therapy interventions for patients with problems in activities of daily living after stroke. Our primary aims were to estimate the extent to which occupational therapy interventions provided to patients with problems with activities of daily living after stroke (1) influenced the risk of deterioration in ability to perform activities of daily living, and (2) improved patients' ability to perform personal activities of daily living. The available evidence suggests that occupational therapy interventions can reduce the likelihood of such deterioration and improve patients' ability to perform personal activities of daily living.

We are satisfied that the risk of publication bias is low. Our literature search was comprehensive and extensive, and we contacted

original trialists and other researchers working in the field of stroke rehabilitation research. There was also no statistical or graphical evidence to suggest any publication bias.

There was some clinical heterogeneity between the trials in terms of the trial design (duration of follow up, selection criteria for patients), characteristics of the occupational therapy intervention (frequency, duration and timing), participant characteristics (length of time since stroke onset, stroke severity at baseline). There were also methodological differences in the mechanism of randomisation and allocation, blinding of final outcomes and follow up and presence of intention-to-treat analysis. To examine the robustness of results, we specified in advance methodological variables that we believed could influence the size of effect observed. However, for reasons of simplicity it was decided not to perform the pre-planned sensitivity analyses based on clinical differences.

Methodological issues

When we examined the effect of methodological quality on the odds of a poor outcome (death, deterioration or dependency) we found that there was a more modest estimate of effect when trials with unclear randomisation and allocation concealment procedures, unclear blinding and unclear intention-to-treat analysis were removed from the analysis, although no formal statistical testing was performed. However, best and worse case analyses indicated that treatment benefit was maintained with no statistical heterogeneity.

In addition, post-hoc analysis to explore the effects of inclusion of a cluster randomised controlled trial suggested that inclusion of the trial did not alter our conclusions, although again no formal statistical testing was performed.

When we considered the effect of methodological differences across the trials on patients' ability to perform personal activities of daily living, we found that benefits were more modest when trials with unclear randomisation and allocation procedures, unclear blinding and unclear intention-to-treat analysis were removed. Again, no formal statistical testing was carried out. In addition, removal of the cluster randomised trial produced a more modest but still significant estimate of effect.

While the methodological quality of the included trials was generally good, trials of occupational therapy interventions are subject to several potential methodological limitations. These limitations include inability to blind the therapist and patient, contamination (provision of the intervention to the control group) and co-intervention (when the same therapist unintentionally provides additional care to either treatment or comparison group). All these potential methodological limitations introduce the possibility of performance bias. However, empirical evidence currently indicates that only adequate randomisation, allocation concealment and blinding of outcome assessor will influence effect size (Handbook 2005a). As discussed earlier, this is supported in the sensitivity analyses by methodological quality.

Potential benefit

The exclusion of certain patient groups, for example those with communication problems, may limit the generalisability of the findings. However, many trials were reasonably inclusive and using the results from the primary outcomes it is possible to explore the apparent effectiveness of occupational therapy interventions on these outcomes.

Using the odds ratio 0.67 we can calculate the number needed to treat (NNT) for any specific event rate in terms of the number of people who would have to receive an occupational therapy intervention before one more person would experience a harmful outcome (death, deterioration or dependency). The overall rate for controls is 42.1% (209/458), which gives a NNT of 11 (95% CI 7 to 30). Therefore, for every 1000 patients treated, 97 will avoid a poor outcome. For an event rate of 20%, the NNT would be 18 and for an event rate of 60% the NNT would be 11.

Furthermore, if we are interested in estimating the effect of occupational therapy intervention on Barthel scores, then using the standardised mean difference and typical distribution of disability scores in this population we would estimate the effect to be a one (5%) point difference on a Barthel Index scale in favour of the group receiving occupational therapy interventions. However, it is worth noting that the Barthel Index has a ceiling effect, which means that once a patient has reached 20 (maximum score) there is no mechanism for highlighting and recording further improvement.

This review illustrates the potential impact of occupational therapy on performance in activities of daily living for patients after stroke. However, the only identifiable key components common to all the occupational therapy interventions tested in the trials included in this review are:

(1) the interventions are delivered by qualified occupational therapists;

(2) the occupational therapy interventions are delivered to participants in their own home; and

(3) the trial interventions are direct interventions at the level of patient care.

Therefore the results of this review are only of applicable to patients living at home after stroke.

What remains unclear is the optimum content of occupational therapy services (specific techniques, theoretical treatment approaches, use of assistive technologies) and the optimum method of delivery in terms of frequency, duration and timing.

In addition, we failed to identify any unconfounded trials of occupational therapy interventions provided to stroke patients within one month of stroke onset in either a hospital or home setting. Therefore the evidence base for the effectiveness of occupational

therapy for patients in the acute phase of stroke needs to be strengthened.

What is clear from this review is that the debate should move from considering whether occupational therapy services are effective to determining what elements make them effective. This will allow occupational therapy interventions to be replicated and ensure that occupational therapy interventions provided to patients after stroke are effective and efficient. The economic and wider benefits of providing such a service must also be considered, for example community care services and carer morbidity.

AUTHORS' CONCLUSIONS

Implications for practice

Occupational therapy interventions for patients after stroke reduce the chances of a poor outcome in terms of deterioration in ability to perform activities of daily living, and have a beneficial effect on a patient's ability to perform personal activities of daily living and extended activities of daily living. Approximately 11 patients need to be treated to prevent one avoidable deterioration.

Implications for research

This analysis was based on a review of heterogeneous interventions. Further research is needed to define the optimum method of organising and delivering the occupational therapy interventions and to define the components of the intervention.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Cardiff 1995

Methods	Randomised controlled trial. Opaque sealed envelopes. Central randomisation. Blinded outcome assessment (postal questionnaire)
Participants	UK 110 patients: 55 intervention, 55 control. Mean age: 75.5 yrs. 37% male. Median Barthel Index score at baseline: intervention group 15 (IQR 2 to 20); control group 14 (IQR 0 to 20). Clinical definition of stroke. Patients recruited prior to discharge from inpatient facility. Inclusion criteria: discharged alive from one of two stroke units regardless of discharge destination
Interventions	Rehabilitation at home by occupational therapists versus usual care. Input at 2, 8, 16 and 24 weeks. Intervention based on the model of human occupation. Interventions included: teaching new skills; facilitating more independence in activities of daily living; facilitating return of function; enabling patients to use equipment supplied by other agencies; information provision to patient and carer; referring to or liaison with other agencies. Service provided by a qualified occupational therapist
Outcomes	Outcomes were recorded at 12 months. Death. Barthel Index. Nottingham Extended ADL Index. Geriatric Depression Scale (short form). Pearlman's six-point Quality of Life Scale. Carer: Pearlman's six-point Qualify of Life Scale.
Notes	Follow-up period used in analysis: 12 months.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Glasgow 2000

Methods	Randomised controlled trial. Centralised randomisation by telephone. Computer generated randomisation schedule stratified by sex and attendance at day hospital. Allocation method concealed (sequentially numbered, opaque, sealed envelopes). Blinded outcome assessor
Participants	UK 138 patients: 67 intervention, 71 control. Median age: 69 yrs. 45% male. Median Barthel Index score at baseline: intervention group 17 (IQR 15 to 18): control group 18 (IQR 16 to 19). Clinical definition of stroke. Patients recruited when discharged from hospital/date set. Inclusion criteria: discharged to a private address; willing to cooperate; consent. Exclusion: made a full recovery; discharged to institutional care; terminally ill; lived outside catchment area; severe cognitive or communication difficulties preventing consent, goal setting or completing outcome measures
Interventions	Domiciliary occupational therapy versus routine service. Domiciliary occupational therapy for a period of six weeks. Frequency approximately 1.7 visits per week lasting between 30 to 45 minutes. Client-centred occupational therapy programme. Liaison with other agencies. Occupational therapy provided by a qualified occupational therapist
Outcomes	Outcomes were recorded at 7 weeks and 6 months. Primary outcomes: Nottingham Extended ADL Index; Barthel Index; 'Global' i.e. death or deterioration in Barthel Index score. Secondary outcomes: Barthel Index; Canadian Occupational Performance Measure; EuroQol; Satisfaction with outpatient services; Resource use (staff time, hospital readmission, provision of equipment and services). Carer: General Health; Questionnaire at 6 weeks.
Notes	Follow-up period used in analysis: 6 months

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	A - Adequate

Hong Kong 2004

Methods	Randomised controlled trial. Unclear randomisation and allocation concealment procedures. Unclear if outcome assessment was blinded
Participants	Hong Kong 53 patients: 30 intervention, 23 control.

Hong Kong 2004 (*Continued*)

	Mean age: 72.1 yrs. 66% male. Barthel Index score at baseline: not available. Definition of stroke: unclear. Recruitment: inpatients and outpatients who had been discharged from hospital for less than two weeks. Inclusion criteria (1) aged over 55; (2) diagnosis of stroke; (3) able to follow instructions; (4) able to communicate using speech; (5) family support at home; (6) required bathing device
Interventions	Additional home based intervention in the use of bathing devices versus no intervention
Outcomes	Outcomes were recorded at 3 months after discharge. Primary outcome: not stated Outcome measures: Functional Independence measure (FIM) Users Evaluation of Satisfaction with Assistive Technology.
Notes	

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	B - Unclear

Nottingham 1995

Methods	Randomised controlled trial; parallel group design. Randomisation and allocation concealment (sequentially numbered, opaque sealed envelopes), randomisation sequence generated from random number tables. Blinded outcome assessor
Participants	UK 65 patients: 42 intervention (21 patient leisure intervention group, 21 patients in ADL intervention group), 23 control. Mean age: 66 yrs. 57% male. Barthel Index score at baseline: not collected. Definition of stroke: unclear. Patients recruited at discharge from inpatient facility. Inclusion criteria: Admitted to City Hospital Nottingham Stroke Unit. Exclusion criteria: severe comprehension difficulties (score < 3 on Speech Therapy Boston Diagnostic Aphasic Examination); a documented history of dementia; no English language
Interventions	Leisure versus conventional occupational therapy versus no occupational therapy. First three months patients were seen by an occupational therapist for a minimum of 30 minutes per week, thereafter 30 minutes every two weeks up to six months. Leisure intervention: Patients hobbies and interests were discussed in detail and the importance of maintaining a leisure programme stressed. Treatment reflected personal preferences and abilities. Help and advice included: treatment (e.g. practice of transfers needed for leisure pursuits); positioning; provision of equipment; adaptations; advice on obtaining financial assistance

Nottingham 1995 (*Continued*)

	and transport; liaison with specialist organisations; and providing physical assistance. Conventional OT: OT activities such as transfers, washing and dressing practice, and when appropriate, perceptual treatments
Outcomes	Outcomes were recorded at 3 and 6 months. Nottingham Extended ADL Index. Nottingham Health Profile. Nottingham Leisure Questionnaire. Wakefield Depression Inventory.
Notes	Follow-up period used in analysis: 6 months.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Nottingham 1996

Methods	Randomised controlled trials; parallel group design. Randomisation and allocation concealment (sequentially numbered, opaque, sealed envelopes), randomisation generated from random number tables. Blinded outcome assessor
Participants	UK 30 patients. Mean age: 68 yrs. 53% male. Barthel Index score at baseline: not collected Definition of stroke: unclear. Patients recruited at discharge from inpatient facility. Exclusion criteria: blind; deaf; unable to understand or speak English prior to stroke onset
Interventions	Domiciliary occupational therapy versus no occupational therapy intervention. Domiciliary occupational therapy over a three month period provided by a senior occupational therapist. Amount of therapy provided at therapist's discretion. Components of intervention: dressing practice on a regular basis; teaching patients and carers specific dressing techniques, energy conservation techniques, advice on clothing adaptation. Relative/carer involvement in therapy programme and between therapy sessions 'homework'. Occupational therapy provided by a qualified occupational therapist
Outcomes	Outcomes were recorded at 3 and 6 months. Nottingham Stroke Dressing Assessment. Rivermead ADL scale. Nottingham Health Profile.
Notes	Outcome data recorded at three months used in analyses (before cross-over period). Randomisation and allocation procedure checked with principal investigator

Nottingham 1996 (*Continued*)

Risk of bias		
Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	A - Adequate

Nottingham 1997

Methods	Randomised controlled trial, random allocation, concealed allocation assignment (prepared sealed envelopes). Blinded outcome assessor
Participants	UK 111 patients: 53 intervention, 58 control. Mean age: 55 yrs. 43% male. Barthel Index score at baseline: not available Clinical definition of stroke. Inclusion criteria: first stroke and discharged from hospital and referred to the Social Services Occupational Therapy Department
Interventions	Enhanced occupational therapy service versus usual care. Enhanced occupational therapy service provided by social services, includes provision of equipment. Occupational therapy provided by a qualified occupational therapist. Single therapist
Outcomes	Outcomes were recorded at 3 and 6 months. Nottingham Extended ADL Index. Barthel Index. General Health Questionnaire.
Notes	Follow-up period used in the analyses 6 months. Carers assessed at 6 months; General Health Questionnaire.

Risk of bias		
Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	A - Adequate

Nottingham 1999

Methods	Randomised controlled trial. Randomisation and allocation concealment (sequentially numbered, opaque sealed envelopes). Randomisation sequence generated from random number tables. Blinded outcome assessor

Nottingham 1999 (*Continued*)

Participants	UK 185 patients: 94 intervention, 91 control. Mean age: 74 yrs. 51% male. Median Barthel Index score at baseline: intervention group 18 (IQR 15 to 20); control group 18 (IQR 15 to 20). Clinical definition of stroke. Patients were recruited less than one month after stroke onset from home. Exclusion criteria: more than one month after stroke onset; history of dementia; living in a nursing or residential home; unable to speak or understand English prior to stroke onset
Interventions	Occupational therapy versus no occupational therapy. Occupational therapy intervention for a period of five months. Frequency of visits arranged between therapist, patient and carer (if appropriate). Mean of 5. 8 visits per patient. Aim of therapy was to achieve independence in personal (bathing, dressing, feeding, stair mobility) and instrumental activities of daily living (outdoor mobility, driving a car, using public transport, household chores). Homework tasks were set in between therapy sessions. Occupational therapy provided by a qualified occupational therapist. Single therapist
Outcomes	Outcomes were recorded at 6 months. Primary outcomes: Nottingham Extended ADL Index; Barthel Index. Secondary outcome measures: London Handicap Scale; General Health Questionnaire 28; Rivermead motor assessment (gross function). Carers: Carer strain Index; General Health Questionnaire 28.
Notes	Follow-up period used in analysis: 6 months. Randomisation and allocation procedure confirmed with principal investigator. Carers: Carer strain Index; General Health Questionnaire 28.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Nottingham 2001

Methods	Cluster randomised controlled trial. Randomisation was carried out independently by a statistician. Homes were grouped into four strata according to their type (residential, nursing, or both); funding source (private or local authority) and setting (urban or rural). Within each stratum pairs of homes were allocated randomly, using computer generated random numbers. The randomisation was done by an independent statistician, who informed the trial manager of allocation at the time the therapist went in; the therapist and assessors had no involvement in this
Participants	UK 12 nursing homes 118 residents: 63 intervention, 55 control. Mean age: 87.5 yrs. 19% male. Mean Barthel Index score at baseline: intervention group mean 10.1 (SD 5.68); control group mean 9. 49 (SD 5.2). Definition of stroke: unclear. Inclusion criteria: Barthel < 15.
Interventions	Occupational therapy versus standard care. Occupational therapy included activities of daily living practice, mobility practice, assessment and goal setting, communication with residents, staff, relatives and other agencies, adaptive equipment and treatment of impairments. Mean number of visits 8.5, mean total time spent with each participant 4.7 hours
Outcomes	Outcomes were recorded at 3 and 6 months. Primary outcome: Barthel Index.
Notes	Follow-up period used in analysis: 6 months.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

TOTAL 2001

Methods	Randomised controlled trial. Centralised randomisation by telephone. Randomisation stratified by participating centre and a five-level composite measure of prognosis. Treatment allocation concealed (masking to individual allocation maintained until all outcome measures recorded). Six and 12 month outcome measures obtained by postal questionnaire. Blinded outcome assessment
Participants	UK 466 patients: 309 intervention (153 patients in Leisure group; 156 patients in ADL group), 157 control. Median age (3 groups): 72 yrs, 71 yrs, 72 yrs. Median Barthel Index score at baseline: leisure 18 (IQR 15 to 19); ADL group 18 (IQR 16 to 20); control group 18 (IQR 16 to 19). 58% male. WHO definition of stroke. Patients recruited from one of four participating sites at discharge and, all patients attending a stroke

TOTAL 2001 (*Continued*)

	outcome clinic (site 5, Glasgow) with stroke onset less than six months. Exclusion criteria: discharge to a nursing or residential home; recorded history of dementia; inability to complete outcome questionnaires because of limited use of English language; unable to endure interventions because of co-existing health conditions; lived outside the catchment area
Interventions	Occupational therapy leisure 'leisure intervention' versus 'activities of daily living' versus no occupational therapy for a period of up to six months after recruitment to the study. A minimum of 10 treatment sessions lasting not less than 30 minutes were provided to each patient. Leisure group: goals were set in terms of leisure activities as well as ADL tasks to achieve leisure objectives. ADL group: goals set to improve independence in self care activities and included practice in activities such as meal preparation and walking outdoors. Control group: no occupational therapy. Occupational therapy provided by a qualified occupational therapist
Outcomes	Outcomes were recorded at 6 (primary) and 12 months. Primary outcome measure: General Health Questionnaire 12 item; Nottingham Leisure questionnaire; Nottingham Extended ADL Index. Secondary outcomes: The International Stroke Trial outcome questions; The Rankin Scale; The Oxford Handicap Scale; Barthel Index; The London Handicap Scale. Carer: General Health Questionnaire 12.
Notes	Follow-up period used in analyses: 12 months.

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	A - Adequate

ADL: activities of daily living
IQR: inter quartile range
OT: occupational therapy
SD: standard deviation
yrs: years

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Byl 2003	Not occupational therapy.
Chamberlain 1981	Less than 50% stroke patients.
Chase 1991	Mixed physiotherapy and occupational therapy.
Corr 2004	Not occupational therapy.
Diller 1974	Not occupational therapy.
Flinn 1999	Main outcomes: organisation of reaching movements including acceleration profile, movement time, displacement, peak velocity and location of peak velocity
Flinn 2005	Not randomised controlled trial.
Flynn 2000	Not occupational therapy.
Goh 2001	Not focused on activities of daily living and not occupational therapy
Goldenberg 1998	Not randomised controlled trial.
Gray 2001	Not randomised controlled trial.
Hong Kong 2001	Trial compares two different types of occupational therapy and does not have a control arm. Therefore trial does not provide an unconfounded estimate of the effect of occupational therapy
Huck 1997	Not occupational therapy.
Kayhan 1996	Mixed physiotherapy and occupational therapy.
MacPhee 2004	Not focused on activities of daily living and not occupational therapy
Mount 2000	Not occupational therapy and comparison of two types of intervention
Nelson 1996	Not focused on activities of daily living and not occupational therapy
Netherlands 2001	Trial compares two different types of occupational therapy and does not have a control arm. Therefore trial does not provide an unconfounded estimate of the effect of occupational therapy
Nottingham 2000	Trial compares two different types of occupational therapy and does not have a control arm. Therefore trial does not provide an unconfounded estimate of the effect of occupational therapy
Nottingham 2004	Travel promotion programme targeted towards improving outdoor mobility after stroke

(*Continued*)

Ontario 1982	Trial compares two different types of occupational therapy and does not have a control arm. Therefore trial does not provide an unconfounded estimate of the effect of occupational therapy
Ozdemir 2001	Multidisciplinary intervention.
Paul 1998	Electronic music making provided by an occupational therapist to improve upper extremity active range of movement (shoulder flexion and elbow extension)
Purdie 1997	Not focused on activities of daily living and not occupational therapy
Rodgers 2001	Mixed physiotherapy and occupational therapy.
Rose 2002	Not occupational therapy.
Schauer 2003	Main outcome measures: gait velocity, step duration, gait symmetry, stride length and foot rollover path length (heel-on-toe-off distance)
Schneider 2001	Not focused on activities of daily living and not occupational therapy
Shreiber 2000	Not focused on activities of daily living.
Slade 1999	Mixed physiotherapy and occupational therapy.
Soc/Psy/Phys 1995	Not occupational therapy.
Soderback 1988	Not focused on activities of daily living.
Soderback 1992	Less than 50% stroke patients.
Starke 2002	Not focused on activities of daily living and not occupational therapy
Taylor 1971	Mixed physiotherapy and occupational therapy.
Tham 1997	Main outcome measures: Line Cancellation Task, Figure Copying Task, Line Bisection, and Baking Tray Task
Tickle-Degnen 1990	Main outcome measures: judged characteristics of patient non-verbal behaviour and patient cognitive performance demonstrated on post-test block designs
Trombly 1999	Main outcomes: organisation of reaching movements including acceleration profile, movement time, displacement, peak velocity and location of peak velocity
Tse 1999	Trial compares random practice versus blocked practice on a 'non-activities of daily living' task
Turton 1990	Main outcomes: sensory motor performance as measured by the upper limb activity assessment of the Southern Motor Group's motor assessment and by a timed 9 Hole Peg Test
Unsworth 2002	Not randomised controlled trial.

(*Continued*)

Van der Loos 2001	Participants assigned to one of three groups: (1) take home written material; (2) generalized videotape; or (3) personalised videotape instructing wheelchair transfers. Main outcomes: Critical Elements Video Analysis (CEVA)
van Vleit 1995	Not focused on activities of daily living and not occupational therapy
Van Wijck 2003	Not focused on activities of daily living and not occupational therapy
Vancouver 1989	Trial compares two different types of occupational therapy and does not have a control arm. Therefore, the trial does not provide an unconfounded estimate of the effect of occupational therapy
Vancouver 1991	Not focused on activities of daily living.
Woldag 2003	Mixed physiotherapy and occupational therapy.
Wolfe 2000	Multidisciplinary intervention.
Wressle 2002	Less than 50% stroke patients.
Wu 1998	Meta-analysis.
Wu 2000	Quantitative analysis (using several kinematic variables) of reaching performance in 14 participants after cerebrovascular accident and 24 age-matched adults
Wu 2001	Objective: To examine the effects of context on reaching performance in persons with stroke and without stroke. Design: A counterbalanced repeated-measures design. Main outcome measures: kinematic variables of movement time, total displacement, peak velocity, percentage reach at the point of peak velocity and movement units for reaching tasks
Young 1983	Not focused on activities of daily living and not occupational therapy

DATA AND ANALYSES

Comparison 1. Occupational therapy versus no routine input

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Activities of daily living	8	961	Std. Mean Difference (IV, Random, 95% CI)	0.18 [0.04, 0.32]
2 Death or 'poor outcome' (deterioration or dependency)	7	1065	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.67 [0.51, 0.87]
3 Death by the end of scheduled follow up	9	1163	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.84 [0.57, 1.25]
4 Death or requiring institutional care by the end of scheduled follow up	3	358	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.72 [0.43, 1.19]
5 Death or dependency by the end of scheduled follow up	4	788	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.90 [0.67, 1.23]
6 Extended activities of daily living scores	6	847	Std. Mean Difference (IV, Random, 95% CI)	0.21 [0.03, 0.39]
7 Subjective health status scores	2	167	Std. Mean Difference (IV, Random, 95% CI)	0.17 [-0.14, 0.48]
8 Mood/distress scores	4	636	Std. Mean Difference (IV, Random, 95% CI)	0.07 [-0.09, 0.23]
9 Carers: quality of life	1	54	Std. Mean Difference (IV, Random, 95% CI)	0.12 [-0.41, 0.66]
10 Carers: mood/distress	4	590	Std. Mean Difference (IV, Random, 95% CI)	0.23 [-0.05, 0.51]
11 Sensitivity to missing data (odds of poor outcome: better)	7	1175	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.71 [0.55, 0.92]
12 Sensitivity to missing data (odds of poor outcome: worse)	7	1175	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.67 [0.52, 0.86]

Analysis 1.1. Comparison 1 Occupational therapy versus no routine input, Outcome 1 Activities of daily living.

Review: Occupational therapy for patients with problems in activities of daily living after stroke

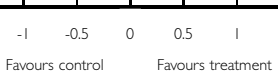
Comparison: 1 Occupational therapy versus no routine input

Outcome: 1 Activities of daily living

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
TOTAL 2001	218	15.77 (4.04)	110	16.08 (3.87)		27.6 %	-0.08 [-0.31, 0.15]
Cardiff 1995	46	12.3 (4.74)	39	10.87 (5.72)		10.0 %	0.27 [-0.16, 0.70]
Glasgow 2000	60	16.17 (3.76)	62	15.45 (4.48)		13.9 %	0.17 [-0.18, 0.53]
Hong Kong 2004	30	108.9 (11.6)	23	104.9 (12)		6.4 %	0.33 [-0.21, 0.88]
Nottingham 1996	12	10.75 (3.86)	15	10.33 (4.19)		3.4 %	0.10 [-0.66, 0.86]
Nottingham 1997	45	15.42 (4.64)	38	14.82 (3.97)		9.8 %	0.14 [-0.30, 0.57]
Nottingham 1999	84	18.44 (2.72)	79	17.35 (3.05)		17.4 %	0.38 [0.07, 0.69]
Nottingham 2001	53	10.21 (5.9)	47	8.09 (4.45)		11.5 %	0.40 [0.00, 0.80]
Total (95% CI)	**548**		**413**			**100.0 %**	**0.18 [0.04, 0.32]**

Heterogeneity: $Tau^2 = 0.01$; $Chi^2 = 8.08$, df = 7 (P = 0.33); $I^2 = 13\%$

Test for overall effect: Z = 2.45 (P = 0.014)



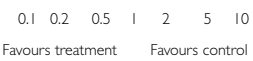
Analysis 1.2. Comparison 1 Occupational therapy versus no routine input, Outcome 2 Death or 'poor outcome' (deterioration or dependency).

Review: Occupational therapy for patients with problems in activities of daily living after stroke

Comparison: 1 Occupational therapy versus no routine input

Outcome: 2 Death or 'poor outcome' (deterioration or dependency)

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
Cardiff 1995	33/55	32/54		12.1 %	1.03 [0.48, 2.21]
Glasgow 2000	33/66	41/67		15.1 %	0.64 [0.32, 1.26]
Nottingham 1995	2/42	3/23		2.0 %	0.32 [0.05, 2.11]
Nottingham 1997	6/53	14/58		7.6 %	0.42 [0.16, 1.11]
Nottingham 1999	18/90	27/86		15.4 %	0.55 [0.28, 1.08]
Nottingham 2001	27/53	36/47		10.7 %	0.34 [0.15, 0.76]
TOTAL 2001	106/248	56/123		37.1 %	0.89 [0.58, 1.38]
Total (95% CI)	**607**	**458**		**100.0 %**	**0.67 [0.51, 0.87]**
Total events: 225 (Treatment), 209 (Control)					
Heterogeneity: Chi^2 = 7.50, df = 6 (P = 0.28); I^2 =20%					
Test for overall effect: Z = 2.97 (P = 0.0029)					
Test for subgroup differences: Not applicable					



Analysis 1.3. Comparison 1 Occupational therapy versus no routine input, Outcome 3 Death by the end of scheduled follow up.

Review: Occupational therapy for patients with problems in activities of daily living after stroke

Comparison: 1 Occupational therapy versus no routine input

Outcome: 3 Death by the end of scheduled follow up

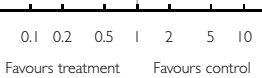
Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
Cardiff 1995	9/55	11/55		16.3 %	0.78 [0.30, 2.06]
Glasgow 2000	6/67	5/71		10.1 %	1.30 [0.38, 4.42]
Hong Kong 2004	0/30	0/23			Not estimable
Nottingham 1995	1/42	0/23		0.9 %	4.70 [0.08, 283.32]
Nottingham 1996	0/15	0/15			Not estimable
Nottingham 1997	5/53	7/58		10.7 %	0.76 [0.23, 2.52]
Nottingham 1999	6/94	7/91		12.0 %	0.82 [0.27, 2.52]
Nottingham 2001	8/53	17/47		18.7 %	0.33 [0.13, 0.81]
TOTAL 2001	29/248	11/123		31.4 %	1.33 [0.66, 2.67]
Total (95% CI)	**657**	**506**		**100.0 %**	**0.84 [0.57, 1.25]**

Total events: 64 (Treatment), 58 (Control)

Heterogeneity: Chi^2 = 7.03, df = 6 (P = 0.32); I^2 =15%

Test for overall effect: Z = 0.86 (P = 0.39)

Test for subgroup differences: Not applicable



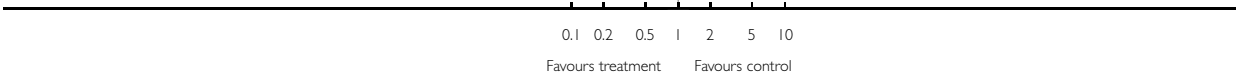
Analysis 1.4. Comparison 1 Occupational therapy versus no routine input, Outcome 4 Death or requiring institutional care by the end of scheduled follow up.

Review: Occupational therapy for patients with problems in activities of daily living after stroke

Comparison: 1 Occupational therapy versus no routine input

Outcome: 4 Death or requiring institutional care by the end of scheduled follow up

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
Cardiff 1995	25/55	29/54		45.5 %	0.72 [0.34, 1.52]
Glasgow 2000	10/67	9/71		27.3 %	1.21 [0.46, 3.17]
Nottingham 1997	6/53	14/58		27.3 %	0.42 [0.16, 1.11]
Total (95% CI)	**175**	**183**		**100.0 %**	**0.72 [0.43, 1.19]**
Total events: 41 (Treatment), 52 (Control)					
Heterogeneity: Chi^2 = 2.27, df = 2 (P = 0.32); I^2 =12%					
Test for overall effect: Z = 1.29 (P = 0.20)					
Test for subgroup differences: Not applicable					



Analysis 1.5. Comparison 1 Occupational therapy versus no routine input, Outcome 5 Death or dependency by the end of scheduled follow up.

Review: Occupational therapy for patients with problems in activities of daily living after stroke

Comparison: 1 Occupational therapy versus no routine input

Outcome: 5 Death or dependency by the end of scheduled follow up

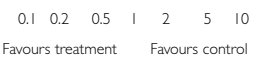
Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
Cardiff 1995	41/55	41/54		12.4 %	0.93 [0.39, 2.21]
Glasgow 2000	27/66	20/66		18.4 %	1.58 [0.78, 3.22]
Nottingham 1999	18/90	27/86		20.3 %	0.55 [0.28, 1.08]
TOTAL 2001	106/248	56/123		48.9 %	0.89 [0.58, 1.38]
Total (95% CI)	**459**	**329**		**100.0 %**	**0.90 [0.67, 1.23]**

Total events: 192 (Treatment), 144 (Control)

Heterogeneity: $Chi^2 = 4.46$, df = 3 (P = 0.22); $I^2 = 33\%$

Test for overall effect: Z = 0.65 (P = 0.52)

Test for subgroup differences: Not applicable



Analysis 1.6. Comparison 1 Occupational therapy versus no routine input, Outcome 6 Extended activities of daily living scores.

Review: Occupational therapy for patients with problems in activities of daily living after stroke

Comparison: 1 Occupational therapy versus no routine input

Outcome: 6 Extended activities of daily living scores

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
Cardiff 1995	45	5.73 (5.1)	39	5.1 (6)		12.9 %	0.11 [-0.32, 0.54]
Glasgow 2000	60	28.33 (15.72)	62	26.58 (16.47)		16.9 %	0.11 [-0.25, 0.46]
Nottingham 1995	41	31.26 (15.93)	23	25.43 (17.2)		9.7 %	0.35 [-0.16, 0.87]
Nottingham 1997	45	8.36 (5.89)	38	6.63 (4.83)		12.6 %	0.32 [-0.12, 0.75]
Nottingham 1999	84	42.95 (15.05)	79	34.67 (17.73)		19.9 %	0.50 [0.19, 0.81]
TOTAL 2001	219	33.38 (18.45)	112	33.3 (19.5)		28.0 %	0.00 [-0.22, 0.23]
Total (95% CI)	**494**		**353**			**100.0 %**	**0.21 [0.03, 0.39]**

Heterogeneity: $Tau^2 = 0.02$; $Chi^2 = 7.43$, df = 5 (P = 0.19); $I^2 = 33\%$

Test for overall effect: Z = 2.30 (P = 0.022)

Analysis 1.7. Comparison 1 Occupational therapy versus no routine input, Outcome 7 Subjective health status scores.

Review: Occupational therapy for patients with problems in activities of daily living after stroke

Comparison: 1 Occupational therapy versus no routine input

Outcome: 7 Subjective health status scores

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
Nottingham 1995	40	25.7 (7.43)	19	24.58 (7.12)		32.3 %	0.15 [-0.40, 0.70]
Glasgow 2000	54	53.84 (20.05)	54	49.85 (23.29)		67.7 %	0.18 [-0.20, 0.56]
Total (95% CI)	**94**		**73**			**100.0 %**	**0.17 [-0.14, 0.48]**

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.01$, df = 1 (P = 0.93); $I^2 = 0.0\%$

Test for overall effect: Z = 1.08 (P = 0.28)

Analysis 1.8. Comparison 1 Occupational therapy versus no routine input, Outcome 8 Mood/distress scores.

Review: Occupational therapy for patients with problems in activities of daily living after stroke

Comparison: 1 Occupational therapy versus no routine input

Outcome: 8 Mood/distress scores

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
Nottingham 1997	39	31.74 (4.81)	34	30.15 (5.74)		12.0 %	0.30 [-0.16, 0.76]
Cardiff 1995	41	6.98 (2.64)	31	7.45 (2.64)		11.8 %	-0.18 [-0.64, 0.29]
Nottingham 1999	83	12.96 (11.24)	77	10.62 (12.96)		26.6 %	0.19 [-0.12, 0.50]
TOTAL 2001	219	19.87 (7.35)	112	19.8 (7.4)		49.6 %	0.01 [-0.22, 0.24]
Total (95% CI)	**382**		**254**			**100.0 %**	**0.07 [-0.09, 0.23]**

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 2.87$, df = 3 (P = 0.41); $I^2 = 0.0\%$

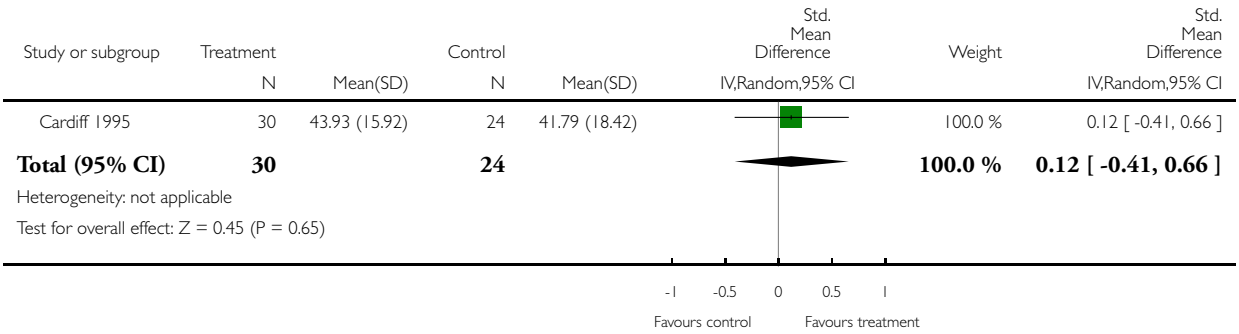
Test for overall effect: Z = 0.87 (P = 0.38)

Analysis 1.9. Comparison 1 Occupational therapy versus no routine input, Outcome 9 Carers: quality of life.

Review: Occupational therapy for patients with problems in activities of daily living after stroke

Comparison: 1 Occupational therapy versus no routine input

Outcome: 9 Carers: quality of life



Analysis 1.10. Comparison 1 Occupational therapy versus no routine input, Outcome 10 Carers: mood/distress.

Review: Occupational therapy for patients with problems in activities of daily living after stroke

Comparison: 1 Occupational therapy versus no routine input

Outcome: 10 Carers: mood/distress

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
Glasgow 2000	49	22 (5.77)	58	19.91 (7.01)		24.7 %	0.32 [-0.06, 0.70]
Nottingham 1997	29	33.69 (3.23)	26	29.5 (7.04)		16.5 %	0.77 [0.22, 1.32]
Nottingham 1999	58	15.62 (11.62)	39	15.48 (11.24)		23.3 %	0.01 [-0.39, 0.42]
TOTAL 2001	219	22.73 (6.35)	112	22.4 (5.2)		35.5 %	0.05 [-0.17, 0.28]
Total (95% CI)	**355**		**235**			**100.0 %**	**0.23 [-0.05, 0.51]**

Heterogeneity: $Tau^2 = 0.04$; $Chi^2 = 6.70$, df = 3 (P = 0.08); $I^2 = 55\%$

Test for overall effect: Z = 1.61 (P = 0.11)

Analysis 1.11. Comparison 1 Occupational therapy versus no routine input, Outcome 11 Sensitivity to missing data (odds of poor outcome: better).

Review: Occupational therapy for patients with problems in activities of daily living after stroke

Comparison: 1 Occupational therapy versus no routine input

Outcome: 11 Sensitivity to missing data (odds of poor outcome: better)

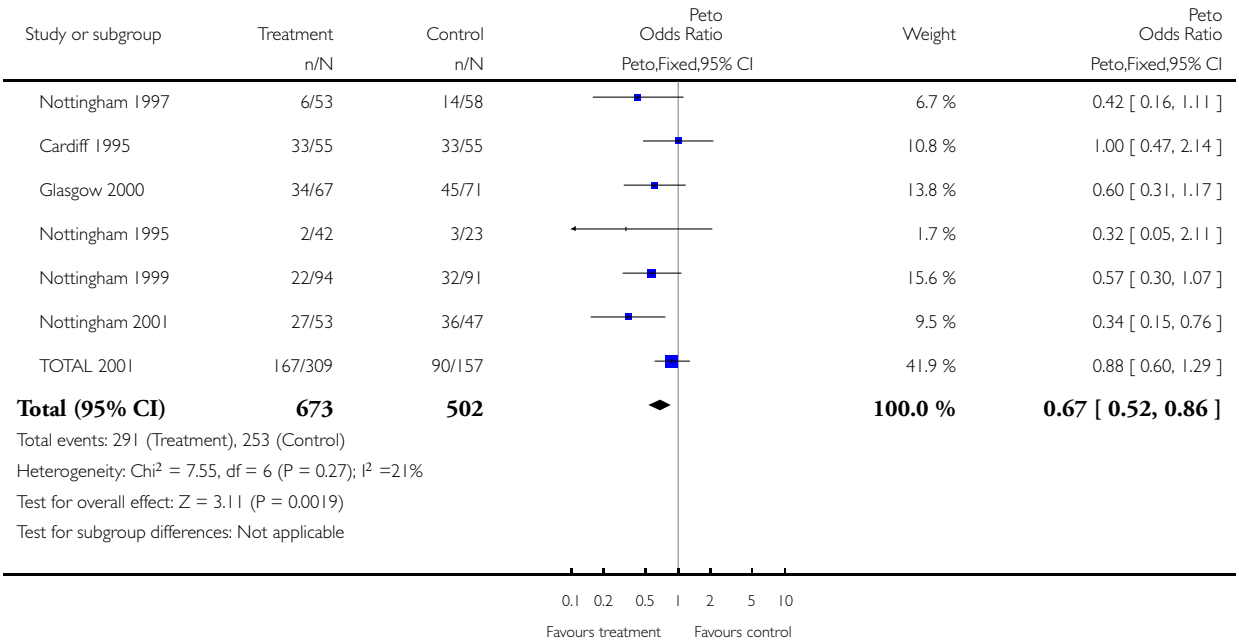
Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
Cardiff 1995	33/55	32/55		11.4 %	1.08 [0.51, 2.30]
Glasgow 2000	33/67	41/71		14.7 %	0.71 [0.37, 1.39]
Nottingham 1995	2/42	3/23		1.8 %	0.32 [0.05, 2.11]
Nottingham 1997	6/53	14/58		7.0 %	0.42 [0.16, 1.11]
Nottingham 1999	18/94	27/91		14.6 %	0.57 [0.29, 1.11]
Nottingham 2001	27/53	36/47		10.0 %	0.34 [0.15, 0.76]
TOTAL 2001	106/309	56/157		40.4 %	0.94 [0.63, 1.41]
Total (95% CI)	**673**	**502**		**100.0 %**	**0.71 [0.55, 0.92]**
Total events: 225 (Treatment), 209 (Control)					
Heterogeneity: Chi^2 = 8.56, df = 6 (P = 0.20); I^2 =30%					
Test for overall effect: Z = 2.60 (P = 0.0094)					
Test for subgroup differences: Not applicable					

Analysis 1.12. Comparison 1 Occupational therapy versus no routine input, Outcome 12 Sensitivity to missing data (odds of poor outcome: worse).

Review: Occupational therapy for patients with problems in activities of daily living after stroke

Comparison: 1 Occupational therapy versus no routine input

Outcome: 12 Sensitivity to missing data (odds of poor outcome: worse)



ADDITIONAL TABLES

Table 1. Completeness of data: activities of daily living (outcome 1)

Study	N(I)	n(I)	Dead(I)	Missing(I)	N(C)	n(C)	Dead(C)	Missing(C)
Cardiff 1995	55	46	9	0	55	39	11	5
Nottingham 1996	15	12	0	3	15	15	0	0
Nottingham 1997	53	45	5	3	58	38	7	13
Nottingham 1999	94	84	6	4	91	79	7	5

Table 1. Completeness of data: activities of daily living (outcome 1) (*Continued*)

Glasgow 2000	67	60	6	1	71	62	5	4
Nottingham 2001	53	53	8	0	47	47	17	0
TOTAL 2001	309	218	29	62	157	110	11	36
Hong Kong 2004	30	30	0	0	23	23	0	0

Table 2. Completeness of data: death or poor outcome (outcome 2)

Study	N(I)	n(I)	Dead(I) or deterior	Missing(I)	N(C)	n(C)	Dead(C) or deterior	Missing(C)	Measure
Cardiff 1995	55	55	9 + 24 = 33	0	55	54	11 + 21 = 32	1	Barthel deterioration
Nottingham 1995	42	42	0 + 2 = 2	0	23	23	1 + 2 = 3	0	Barthel deterioration
Nottingham 1997	53	53	5 + 1 = 6	0	58	58	7 + 7 = 14	0	Institutionalisation
Nottingham 1999	94	90	6 + 12 = 18	4	91	86	7 + 20 = 27	5	Barthel < 15 dependence
Glasgow 2000	67	66	6 + 27 = 33	1	71	67	5 + 36 = 41	4	Barthel deterioration
Nottingham 2001	53	53	27	0	47	47	36	0	Barthel deterioration
TOTAL 2001	309	248	29 + 77 = 106	61	157	123	11 + 45 = 56	34	Barthel < 15 dependence

Table 3. Completeness of data: death (outcome 3)

Study	N(I)	n(I)	Dead(I)	Missing(I)	N(C)	n(C)	Dead(C)	Missing(C)
Cardiff 1995	55	55	9	0	55	55	11	0
Nottingham 1995	42	42	1	0	23	23	0	0

Table 3. Completeness of data: death (outcome 3) (*Continued*)

Nottingham 1996	15	15	0	0	15	15	0	0
Nottingham 1997	53	53	5	0	58	58	7	0
Nottingham 1999	94	94	6	0	91	91	7	0
Glasgow 2000	67	67	6	0	71	71	5	0
Nottingham 2001	53	53	8	0	47	47	17	0
TOTAL 2001	309	248	29	61	157	123	11	34
Hong Kong 2004	30	30	0	0	23	23	0	0

Table 4. Completeness of data: death or requiring institutional care (outcome 4)

Study	N(I)	n(I)	Dead(I) or institut	Missing(I)	N(C)	n(C)	Dead(C) or instit	Missing(C)
Cardiff 1995	55	55	9 + 16 = 25	0	55	54	11 + 18 = 29	1
Nottingham 1997	53	53	5 + 1 = 6	0	58	58	7 + 7 = 14	0
Glasgow 2000	67	67	6 + 4 = 10	0	71	71	5 + 4 = 9	0

Table 5. Completeness of data: death or dependency (outcome 5)

Study	N(I)	n(I)	Dead(I) or dependent	Missing(I)	N(C)	n(C)	Dead(C) or dependent	Missing(C)	Measure
Cardiff 1995	55	55	9 + 32 = 41	0	55	54	11 + 30 = 41	1	Barthel < 15
Nottingham 1999	94	90	6 + 12 = 18	4	91	86	7 + 20 = 27	5	Barthel < 15

Table 5. Completeness of data: death or dependency (outcome 5) (*Continued*)

Glasgow 2000	67	66	6 + 21 = 27	1	71	66	6 + 14 = 20	5	Barthel < 15
TOTAL 2001	309	248	29 + 77 = 106	61	157	123	11 + 45 = 56	34	Barthel < 15

Table 6. Completeness of data: extended activities of daily living (outcome 6)

Study	N(I)	n(I)	Dead(I)	Missing(I)	N(C)	n(C)	Dead(C)	Missing(C)
Cardiff 1995	55	45	9	1	55	39	11	5
Nottingham 1995	42	41	0	1	23	23	1	0
Nottingham 1997	53	45	5	3	58	38	7	13
Nottingham 1999	94	84	6	4	91	79	7	5
Glasgow 2000	67	60	6	1	71	62	5	4
TOTAL 2001	309	219	29	61	157	112	11	34

Table 7. Completeness of data: quality of life (outcome 7)

Study	N(I)	n(I)	Dead(I)	Missing(I)	N(C)	n(C)	Dead(C)	Missing(C)
Nottingham 1995	42	40	0	2	23	19	1	4
Glasgow 2000	67	54	6	7	71	54	5	12

Table 8. Completeness of data: mood/distress (outcome 8)

Study	N(I)	n(I)	Dead(I)	Missing(I)	N(C)	n(C)	Dead(C)	Missing(C)
Cardiff 1995	55	41	9	5	55	31	11	13

Table 8. Completeness of data: mood/distress (outcome 8) (*Continued*)

Nottingham 1997	53	39	5	9	58	34	7	17
Nottingham 1999	94	83	6	5	91	77	7	7
TOTAL 2001	309	219	29	61	157	112	11	34

Table 9. Completeness of data: carers quality of life (outcome 9)

Study	N(I)	n(I)	Dead(I)	Missing(I)	N(C)	n(C)	Dead(C)	Missing(C)
Cardiff 1995	55	30	0	25	55	24	0	31

Table 10. Completeness of data: carers mood (outcome 10)

Study	N(I)	n(I)	Missing(I)	N(C)	n(C)	Missing(C)	Measure
Nottingham 1997	53	29	24	58	26	32	General Health Questionnaire
Nottingham 1999	94	58	36	91	39	52	General Health Questionnaire
Glasgow 2000	67	49	18	71	58	13	General Health Questionnaire
TOTAL 2001	309	219	90	157	112	45	General Health Questionnaire

APPENDICES

Appendix 1. MEDLINE search strategy

The following search strategy, using controlled vocabulary and free-text terms, was developed in conjunction with the Cochrane Stroke Group Trials Search Co-ordinator and used to search MEDLINE. It was modified to suit the other databases.

MEDLINE (Ovid)

1 exp cerebrovascular disorders/
2 stroke$.tw.
3 cva$.tw.
4 cerebrovascular$.tw.
5 cerebral vascular$.tw.
6 (cerebral or cerebellar or brain$ or vertebrobasilar).tw.
7 (infarct$ or isch?emi$ or thrombo$ or emboli$ or apoplexy).tw.
8 6 and 7
9 (cerebral or brain$ or subarachnoid).tw.
10 (haemorrhage or hemorrhage or haematoma or hematoma or bleeding).tw.
11 9 and 10
12 hemiplegia/
13 (hemipleg$ or hemipar$ or post-stroke or poststroke).tw.
14 1 or 2 or 3 or 4 or 5 or 8 or 11 or 12 or 13
15 Occupational therapy/
16 activities of daily living/
17 exp rehabilitation, vocational/ or Rehabilitation/ or Self care/
18 automobile driving/ or exp transportation/
19 "Task performance and analysis"/ or "Time and motion studies"/ or Work simplification/
20 exp leisure activities/
21 Home care services/ or Home care services, hospital-based/
22 Recovery of function/
23 exp work/ or Human activities/
24 Social adjustment/ or Social behavior/ or Social facilitation/
25 Social environment/ or Social support/
26 exp Counseling/
27 Goals/
28 occupational therap$.tw.
29 (activities of daily living or adl$ or eadl$).tw.
30 rehabilitation.tw.
31 ((self or personal) adj5 (care or manage$)).tw.
32 (dressing or feeding or eating or toilet$ or bathing or mobil$ or driving or public transport$).tw.
33 ((daily or domestic or house or home) adj5 (activit$ or task$ or skill$ or chore$)).tw.
34 leisure.tw.
35 (recover$ adj5 function$).tw.
36 (social adj5 (activit$ or function$ or support$ or skill$ or adjust$ or behavio?r or facilitat$)).tw.
37 (counsel?ing or goal$ or work or employment).tw.
38 or/15-37
39 14 and 38
40 exp *cerebrovascular disorders/rh or *hemiplegia/rh
41 39 or 40
42 randomized controlled trial.pt.
43 randomized controlled trials/
44 controlled clinical trial.pt.
45 controlled clinical trials/
46 random allocation/

47 single-blind method/
48 clinical trial.pt.
49 exp clinical trials/
50 (clin$ adj25 trial$).tw.
51 random$.tw.
52 research design/
53 multicenter study.pt.
54 intervention studies/
55 cross-over studies/
56 control$.tw.
57 latin square.tw.
58 "comparative study"/
59 exp evaluation studies/
60 Follow-up studies/
61 Prospective studies/
62 (single blind or prospective or assign$ or alternat$ or counterbalance$ or quasi-random$ or cross?over).tw.
63 ((experimental or treatment or intervention) adj5 (group$ or study)).tw.
64 or/42-63
65 41 and 64
66 limit 65 to human

WHAT'S NEW

Last assessed as up-to-date: 21 May 2006.

Date	Event	Description
3 September 2008	Amended	Converted to new review format.

HISTORY

Protocol first published: Issue 2, 2002

Review first published: Issue 4, 2006

CONTRIBUTIONS OF AUTHORS

Lynn Legg and Avril Drummond planned the review, wrote the first draft of the review and revised subsequent drafts. Peter Langhorne provided advice on data analysis, statistics and helped revise the review.

DECLARATIONS OF INTEREST

None known.

SOURCES OF SUPPORT

Internal sources

- No sources of support supplied

External sources

- Chest Heart and Stroke, Scotland, UK.
- The Big Lottery Fund, UK.

INDEX TERMS

Medical Subject Headings (MeSH)

*Activities of Daily Living; *Occupational Therapy; *Stroke Rehabilitation; Randomized Controlled Trials as Topic

MeSH check words

Humans