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Multidisciplinary care for Guillain-Barré syndrome (Review)

Khan F, Ng L, Amatya B, Brand C, Turner-Stokes L

Khan F, Ng L, Amatya B, Brand C, Turner-Stokes L.
Multidisciplinary care for Guillain-Barré syndrome.
Cochrane Database of Systematic Reviews 2010, Issue 10. Art. No.: CD008505.
DOI: 10.1002/14651858.CD008505.pub2.

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[Intervention Review]

Multidisciplinary care for Guillain-Barré syndrome

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Editorial group: Cochrane Neuromuscular Group.
Publication status and date: New, published in Issue 10, 2010.

Citation: Khan F, Ng L, Amatya B, Brand C, Turner-Stokes L. Multidisciplinary care for Guillain-Barré syndrome. *Cochrane Database of Systematic Reviews* 2010, Issue 10. Art. No.: CD008505. DOI: 10.1002/14651858.CD008505.pub2.

ABSTRACT

Background

Guillain-Barré syndrome is a significant cause of new long-term disability, which is thought to be amenable to multidisciplinary care, but the evidence base for its effectiveness is unclear.

Objectives

To assess the effectiveness of multidisciplinary care in adults with Guillain-Barré syndrome, especially the types of approaches that are effective (settings, intensity) and the outcomes that are affected.

Search methods

We searched the Cochrane Neuromuscular Disease Group Specialized Register (20 May 2010), The Cochrane Central Register of Controlled Trials (CENTRAL, *The Cochrane Library* 2010, Issue 2), MEDLINE (1966 to May 2010), EMBASE (1980 to May 2010), CINAHL (1982 to May 2010), AMED (1985 to May 2010), PEDro (1982 to May 2010) and LILACS (1982 to May 2010). We checked the bibliographies of papers identified and contacted their authors and known experts in the field seeking published and unpublished trials.

Selection criteria

Randomised and controlled clinical trials that compared multidisciplinary care in Guillain-Barré syndrome with either routinely available local services or lower levels of intervention, or studies that compared multidisciplinary care in different settings or at different levels of intensity.

Studies of 'other designs' (such as observational studies) were included only in the Discussion since such studies could only be of limited contribution to the best evidence synthesis.

Data collection and analysis

We performed a 'best evidence' synthesis based on methodological quality.

Main results

No randomised controlled trials or controlled clinical trials were identified. We summarised the results of three observational studies in the Discussion section of this review.

Authors' conclusions

In the absence of randomised controlled trials or controlled clinical trials, the 'best' evidence to date comes from three 'very low quality' observational studies. These provide some support for improved disability in the short term (less than 6 months) with high intensity inpatient multidisciplinary rehabilitation; and for improved quality of life, as measured by a reduction in handicap (participation). These conclusions are tentative and the gap in current research should not be interpreted as proof that multidisciplinary care is ineffective. Further research is needed into appropriate study designs; outcome measurement; caregiver needs; and the evaluation of optimal settings, type, intensity or frequency and cost-effectiveness of multidisciplinary care in the Guillain-Barré syndrome population.

PLAIN LANGUAGE SUMMARY

Multidiscliplinary care for Guillain-Barré syndrome

Guillain-Barré syndrome (GBS) is a neurological disease which generally presents with worsening weakness and altered sensation and, not uncommonly, difficulties with breathing. It can cause long-term disability which is amenable to rehabilitative treatment, delivered by a 'multidisciplinary' team that is made up of different disciplines (for example, doctors, nurses, therapists) working in a co-ordinated and organised manner.

This review did not find any randomised controlled trials that examined the effectiveness of such multidisciplinary care. The evidence from very low quality non-randomised studies suggests that such care may improve disability and quality of life in the short term.

The gap in current research should not be interpreted as proof that multidisciplinary care is ineffective. Further research into types of appropriate studies, caregiver needs and various aspects of multidisciplinary care in the Guillain-Barré syndrome population is needed.

BACKGROUND

Description of the condition

Guillain-Barré syndrome (GBS) is an immune mediated illness of the peripheral nerves and nerve roots (Hughes 2005). It presents with features such as progressive symmetrical ascending paralysis, loss of tendon reflexes, dysautonomia, sensory deficits and respiratory insufficiency, and usually reaches a nadir within four weeks from onset (Khan 2004; Khan 2009). GBS occurs worldwide with an annual incidence of 1 to 2 per 100,000 persons. Population-based studies indicate that GBS rarely has any geographical clustering (Hahn 1998; Hughes 1997) and can occur at any age, but is most common between ages 30 and 50 years.

GBS is recognised as a heterogeneous syndrome with several variant forms. The most common type of GBS is acute inflammatory demyelinating polyradiculoneuropathy. Axonal subtypes include acute motor axonal neuropathy and acute motor and sensory axonal neuropathy. Variants of GBS include Miller Fisher syndrome (cranial nerve involvement, ataxia) and acute pandysautonomia (Hughes 2005).

In 30% of patients, the disease course may be fulminating, with rapid progression requiring ventilatory support within a couple of days (Ropper 1992). By definition, the progressive phase is limited to four weeks (Asbury 1990). Facial weakness occurs in more than 50% (Ropper 1992). Autonomic dysfunction (sinus tachycardia or bradycardia, fluctuating hypertension or hypotension, flushing of the face, loss of or excessive sweating) occurs in 70% (Zochodne 1994) and is associated with sudden death (Zochodne 1994). In developed countries, GBS mortality has been reduced to two to three per cent but is higher in the developing world (Alshekhlee 2008). Despite the low overall mortality associated with GBS and the generally favourable outcome (the majority are ambulant within six months of onset of symptoms), 25% require artificial ventilation due to involvement of respiratory and bulbar muscles (Hughes 2006a), and approximately 20% of GBS survivors have residual permanent severe disability, especially in ambulation (Meythaler 1997). A number of factors, including preceding diarrhoea, older age, rapid progression, disability at nadir and specific neurophysiological parameters have been associated with poor outcome (Hartung 1998; McKhann 1990). Recently, a more readily applicable clinical prognostic scoring system, the Erasmus GBS outcome score was developed to predict poor outcome (inability to walk independently at six months) based on three variables: age, preceding diarrhoea, and GBS disability score at two weeks (Van Koningsveld 2007).

The longer term sequelae of GBS and their impact on everyday life are not yet fully understood. The impairment (weakness and sensory disturbance), disability and psychosocial and quality of life effects (including work, leisure activities and social activities) can be long lasting. According to two groups, psychosocial performance did not necessarily correlate with the severity of impairment in GBS, but might be explained by poor conditioning and fatigue (Bernsen 1997; Bernsen 1999; Bernsen 2002; Bernsen 2005; Forsberg 2005). Forsberg 2005 reported that the impact of GBS on activities of daily living, work, social activities and health-related quality of life (QoL) was still considerable two years after onset. Sixty-two per cent of patients reported an adverse impact on their own lives and the lives of their carers three to six years later (Bernsen 1999). Further work is needed to delineate the long-term effects of aging, cumulative disability (over time), overuse syndromes and ‘wear and tear’ in GBS survivors.

Description of the intervention

Multidisciplinary care in GBS refers to delivery of co-ordinated care with clearly identified goals within a specified time period, utilising at least two disciplines (medicine, physiotherapy, occupational therapy, dietetics and other allied health professions). The subcomponents of multidisciplinary care include (Stiens 1997):

- an individualised patient-centred plan formulated by the patient and treating team;
- goals derived and prioritised through an interdisciplinary process;
- active patient participation to achieve the goals and to optimise a patient’s personal potential;
- assessment of outcomes specifically to determine any reductions in impairments, disability and limitation in participation.

The International Classification of Impairment, Disability and Handicap (WHO 1980) was updated by the World Health Organization to the International Classification of Functioning, Disability and Health (WHO 2001), as an international standard to describe health and disability. Multidisciplinary care uses the terminology of this classification system to describe the impact of disease at different levels. For example, in a GBS survivor:

- “impairments” are problems with body (anatomical) structures or (physiological) function (such as paralysis, inability to swallow, pain);
- “activity limitations” (disability) are difficulties faced by a person executing everyday tasks (mobility or self care);
- “restrictions in participation” relate to problems that limit involvement in social and other life situations (for example, employment, family life);
- "contextual factors", which may affect the person’s experience of living with their condition, are:
  - "environmental" - the physical, social and attitudinal environment in which people live their lives, and
  - "personal" - such as gender, race, coping style, social and educational background.

Merkies 2003 evaluated the linkage between impairment, disability and handicap (participation) in patients with polyneuropathies and found significant and meaningful associations between the various levels of the International Classification of Impairment, Disability and Handicap. Disability measures accounted for half the variance in handicap (participation). This study supported the International Classification of Impairment, Disability and Handicap model as a good framework but suggested that other factors contributed to deficits in daily life and social functioning. Lennon 1993 and associates reported that the main reasons for persistent disability in GBS survivors included muscle weakness, sensory dysfunction, contractures, fatigue, comorbid conditions and psychological factors such as anxiety, depression and lack of motivation. The International Classification of Functioning, Disability and Health provides an improved framework which takes into account the effect of contextual factors when measuring disability and participation.

Multidisciplinary care does not alter the underlying pathology of disease. One example of multidisciplinary care is rehabilitation intervention. Rehabilitation is defined as "a problem-solving educational process aimed at reducing disability and handicap (participation) experienced by someone as a result of disease or injury" (Wade 1992).

How the intervention might work

GBS survivors may present with a range of difficulties: physical, emotional, psychosocial and/or environmental. Multidisciplinary rehabilitation care for GBS survivors can utilise the various categories within specific domains of the structured framework of the International Classification of Functioning, Disability and Health, such as "activity and participation" (which relates to mobility, self care, domestic life etc) and "environmental factors" (transport and access to places, relationships and attitudes etc) for targeted intervention and therapy.

At the time of publication there are three Cochrane systematic reviews of interventions for acute GBS: plasma exchange (Raphael 2009); intravenous immunoglobulin (within two weeks of GBS onset) (Hughes 2006a); and oral corticosteroids (Hughes 2006). There are, however, no systematic reviews to assess effectiveness of multidisciplinary care in the GBS population. Multidisciplinary rehabilitation care has been found to be effective in other neurological conditions such as multiple sclerosis (Khan 2007) and acquired brain injury (Turner-Stokes 2005).

Why it is important to do this review

There are no systematic reviews of multidisciplinary rehabilitation care in GBS survivors as mentioned above. Other reasons to do this review include the following.

- The incidence and age of onset of GBS: it is a significant cause of new long-term disability, affecting at least 1000 people a year in the United States (Meythaler 1997).
- Advances in medical care and increased life expectancy among persons with disabilities (including GBS survivors): ongoing health and wellbeing become increasingly important and require long-term planning (Campbell 1999; Turk 2001). From the rehabilitation perspective, the challenge is not just helping the GBS survivor become as independent as possible, but helping them stay independent in the community in the face of changes brought with aging (Kemp 2005).

This review aims to identify the existing evidence for multidisciplinary care in adults with GBS and identify gaps in current knowledge. We will also discuss issues for future expansion of the evidence base by traditional research and other methods.

OBJECTIVES

To assess the effectiveness of multidisciplinary rehabilitation care in adults with GBS, exploring the following areas.

- Does organised multidisciplinary rehabilitation care achieve better outcomes than the absence of such services in GBS survivors and/or their caregivers?
- Which type of programmes are effective and in which setting?
- Does a greater intensity (time and/or expertise) of rehabilitation lead to greater gains?
- Which specific outcomes are influenced (survival, dependency, social integration, mood, QoL)?
- Are there demonstrable cost-benefits for multidisciplinary rehabilitation care in GBS?

METHODS

Criteria for considering studies for this review

Types of studies

We included all randomised and quasi-randomised controlled trials (RCTs), and controlled clinical trials (CCTs) that compared multidisciplinary rehabilitation care in GBS with either routinely available local services or lower levels of intervention; or studies that compared multidisciplinary care in different settings or at different levels of intensity, regardless of language and type of publication.

Given the paucity of randomised trials, we also included in the Discussion section trials other than randomised and controlled clinical designs, such as cohort series, pre-post studies or 'other designs' (ODs) (Steultjens 2004) to provide a more complete picture of the available literature.

Types of participants

All included participants were 18 years of age and above, of any gender or ethnicity and included all degrees of severity of GBS diagnosed with the clinical and electrodiagnostic criteria proposed by Asbury 1990 or similar.

We excluded participants with other types of neuropathy such chronic inflammatory demyelinating polyneuropathy.

Types of interventions

In this review, we defined multidisciplinary rehabilitation care as any co-ordinated intervention delivered by two or more disciplines, under medical supervision (neurologist or rehabilitation medicine physician), which aims to limit patient symptoms, enhance functional independence and maximise participation, as defined by the International Classification of Functioning, Disability and Health (WHO 2001).

The multiple disciplines included nursing, physiotherapy, occupational therapy, speech pathology, orthotics, dietetics, social work, psychology or neuropsychology. Settings were either inpatient (hospital ward or specialist rehabilitation unit), outpatient (hospital or community), or home-based settings.

Rehabilitation multidisciplinary care is usually tailored to suit an individual's specific needs and therefore varies in content and intensity. We included studies with interventions that satisfy the definition of multidisciplinary care and which were compared to some form of 'control' condition, these were:

- lower level or different types of intervention such as 'routinely available local services' (for example, medical and nursing care);
- 'minimal intervention' (such as 'information only');
- waiting list conditions;
- intervention given in different settings;
- lower intensity of intervention.

We excluded studies with interventions that assessed the effect of therapy from a single discipline (for example, physiotherapy), or any unidisciplinary intervention or modality (for example, physical exercise).

Types of outcome measures

All outcomes were categorised where possible according to the International Classification of Functioning, Disability and Health (WHO 2001) into those that focus on:

- impairment – for example, strength;
- disability or limitation in activity – for example, the Functional Independence Measure (UDS 1993) which includes domains of self care, mobility, communication and cognition;
- restriction in participation and environmental or personal context, or both – for example, patient and carer mood and social integration.

It is important to note, however, that outcome measures can cross over the boundaries between impairment, disability and handicap as many measures predate the introduction of the International Classification of Functioning, Disability and Health concepts. Also, whilst impairment and disability often directly contribute to handicap (participation) (Merkies 2003), other aspects such as pain, fatigue, anxiety, depression and coping mechanisms may also contribute to deficits in daily and social participation and have therefore also been included in the list of outcome measures.

Primary outcomes

The primary outcome was the minimisation of disability (limitation in activity) measured by validated measures such as Functional Independence Measure (FIM) (UDS 1993), Barthel Index (Mahoney 1965), GBS Disability Scale (Hughes 1978) or the Overall Disability Scale (ODSS) (Merkies 2002), which highlights problems not only with walking but also with daily arm activities.

We measured the primary outcome at 12 months or more from the start of intervention.

Secondary outcomes

The secondary outcomes included:

- Disability (mobility, transfers, self-care etc) at less than 12 months from the start of intervention.
- QoL at less than 12 months and at 12 months or more as measured by validated measures such as the Sickness Impact Profile (SIP) (Bergner 1981), Short Form-36 Health Questionnaire (SF36) (Ware 1993), Nottingham Health Profile (NHP) (Kucukdeveci 2001), Environmental Status Scale (ESS) (Stewart 1995) and the Handicap Assessment Scale (HAS) (Nicholas 2000).

We also reported all serious adverse events, defined as those events that are life-threatening or require prolonged hospitalisation or are fatal.

Search methods for identification of studies

Electronic searches

We searched The Cochrane Neuromuscular Disease Group Specialized Register and The Cochrane Central Register of Controlled Trials (CENTRAL, *The Cochrane Library* 2010, Issue 2) (Appendix 3) using the following search items:

Guillain Barre Syndrome' or 'GBS' or 'acute inflammatory demyelinating polyradiculoneuropathy ' or 'AIDP' or 'acute motor axonal neuropathy and acute motor and sensory axonal neuropathy' or 'Miller Fisher syndrome' or 'acute pan-dysautonomia' combined using AND with 'ambulatory care' or 'rehabilitation' or 'hospitalization' or 'Physical Therapy Modalities' or 'home care services, hospital-based' or 'inpatients' or 'outpatients' or 'multidisciplinary' or 'interdisciplinary or integrated to multimodal', 'cognitive therapy', 'Behavior Therapy', 'Social Work, 'Dietetics', 'Dietary Services', and 'Counseling'.

We adapted this strategy to search MEDLINE (January 1966 to May 2010) (Appendix 1), EMBASE (January 1980 to May 2010) (Appendix 2), CINAHL (January 1982 to May 2010) (Appendix 4), AMED (January 1985 to May 2010) (Appendix 5), PEDro (January 1982 to May 2010) (Appendix 6) and LILACS (January 1982 to May 2010) (Appendix 7) for any studies on multidisciplinary care for GBS.

We screened search results for randomised controlled trials as well as well-designed published observational studies of multidisciplinary care in GBS and/ or ODs with controls where the diagnosis was clearly stated, the interventions clearly described and the outcomes clearly reported for all patients. These studies included prospective cohort studies or case control studies with concurrent controls or cross-sectional studies. We also considered retrospective case series of more than ten participants where patients were treated consecutively.

This evidence from non-randomised studies is reviewed in the Discussion section. We considered this strategy necessary as the number of RCTs and CCTs in GBS was limited.

We identified unpublished and ongoing trials by correspondence with authors and experts in the field. There were no language restrictions.

Searching other resources

We checked the bibliographies of trials identified and contacted their authors and known experts in the field seeking published and unpublished trials.

Data collection and analysis

Selection of studies

Three authors (FK, LN, BA) independently screened all abstracts and titles of studies identified by the search strategy for inclusion and appropriateness based on the selection criteria. Once all potentially appropriate studies were obtained, authors (FK, LN, BA, CB) independently evaluated each study for inclusion using specially designed data extraction forms. We obtained further information from the authors to determine if a trial met the criteria. In the case of disagreement, we made a decision by discussion amongst all the authors. If there was still no consensus, the full article was then to be submitted to the editorial board for arbitration. In the event, however, these further steps were not necessary. Authors were not masked to the name(s) of the study author(s), institution(s) or publication source at any level of the review.

Data extraction and management

Three authors (LN, BA, CB) independently extracted the data from each study that met the inclusion criteria. All studies that met the inclusion criteria are summarised in Characteristics of included studies, with details of design, participants and outcomes.

Assessment of risk of bias in included studies

Authors (FK, LN, BA, CB) independently assessed risk of bias of included trials during data extraction according to the *Cochrane Handbook of Systematic Reviews of Interventions* (Chapter 8.5) (Higgins 2008), from the domains: sequence generation, allocation concealment, blinding of participants, therapists and outcome assessors, incomplete outcome data and selective outcome reporting. A judgement of 'yes' indicates a low risk of bias, 'no' a high risk of bias, and 'unclear' unclear or unknown risk of bias.

We considered studies to be of high methodological quality if the risk of bias for all domains was low. These studies were of 'high quality'. We rated studies as low methodological quality if there was unclear or high risk of bias for one or more domains and were 'low quality studies'. (Table 1)

The authors independently assessed methodological quality and reached a consensus. Any disagreements were resolved by another author (LTS).

Measures of treatment effect

It was not possible to perform measures of treatment effect due to the diversity of methods and the nature of the available data in the studies. Had studies been available, we would have calculated risk ratio (RR) for dichotomous data and difference in means (MD) or standardised difference in means (SMD) for continuous data.

Unit of analysis issues

We reviewed evidence provided by OD studies in the Discussion section, as they can only contribute in a limited way to the best evidence synthesis.

Dealing with missing data

If data were insufficient, we contacted primary authors of potentially eligible studies to provide data and clarification. If the data remained unavailable or insufficient, we reported the study but did not include it in the final analysis.

In addition, we excluded studies with:

a) fatal flaws (withdrawals of more than 40% of patients total), or

b) nearly total non-adherence to the protocol or very poor or non-adjusted comparability in the baseline criteria).

Assessment of heterogeneity

We conducted statistical analysis as described in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2008). It was not possible to conduct a comprehensive quantitative analysis due to the variability of methods used and the nature of available data in each study.

Assessment of reporting biases

We minimised publication bias (Egger 1998) by sourcing unpublished data where possible.

Data synthesis

We were unable to conduct a quantitative analysis due to lack of studies identified and the clinical heterogeneity in the ODs. Had studies been available, we would have attempted a quantitative analysis provided there was clinical homogeneity and the methods and available data in each study allowed for such an analysis. We would also have calculated a weighted treatment effect across trials using the Cochrane statistical package Review Manager 5 (Revman 5) and expressed the results as risk ratios (RRs) with 95% confidence intervals (CIs) and risk differences (RDs) with 95% CIs for dichotomous outcomes and mean differences (MDs) and 95% CIs for continuous outcomes. We would have initially used a fixed-effect model and approximate Chi^2 tests for heterogeneity to assess outcome data for compatibility with the assumption of a uniform risk ratio ($P > 0.10$). In the presence of significant heterogeneity ($P < 0.10$), random-effects meta-analysis would have been used instead.

We used the GRADE approach to grading the quality of evidence, as described in Chapter 12 of the *Cochrane Handbook for Systematic Reviews of Interventions* (Schünemann 2008). The GRADE approach is applicable to all types of studies including ODs. For example, if observational studies yielded large effects and there was no obvious bias explaining those effects, the evidence could be rated as moderate or even high quality if the effect was large enough. On the other hand, those ODs with critical problems and unsystematic clinical observations could be downgraded to 'very low quality' studies. The four levels of quality using the GRADE approach and the five factors that impact the quality level of included studies are shown in Table 2 and Table 3.

We have highlighted the strength of study findings, discussed gaps in current literature and identified future research directions in the Discussion section.

Subgroup analysis and investigation of heterogeneity

We were unable to perform analysis of the following subgroups based on:

- Severity of GBS, as all participants in the included trials had severe GBS
- Stage of GBS. All participants were in the acute stages of GBS (six weeks or less following onset of GBS) and could not be compared to participants randomised or recruited in the convalescent stages of GBS (more than six weeks following onset of GBS), as there were none.

Factors considered in heterogeneity included setting, type and intensity of multidisciplinary rehabilitation care.

Sensitivity analysis

No sensitivity analysis was performed. Had studies been available, and had heterogeneity been found across trials, we would have used sensitivity analyses to determine the effect of omitting trials with a high risk of bias.

RESULTS

Description of studies

Results of the search

Electronic and manual searches identified 3103 references (MEDLINE = 1070; EMBASE = 1533; AMED = 56; CINAHL = 254; CENTRAL = 121; LILACS = 50; NMD REGISTER = 19) with our search criteria. Of these, 14 (all identified through MEDLINE) passed the first screening review and were selected for closer scrutiny.

Included studies

We found no RCTs or CCTs that compared multidisciplinary care in GBS with either routinely available local services or lower levels of intervention; nor were there trials that compared multidisciplinary types of care, or care in different settings or at different levels of intensity.

Excluded studies

We found no RCTs or CCTs that were unidisciplinary (for example physiotherapy only). Of the 14 studies, none of which were RCTs or CCTs, 11 had fewer than 10 participants or were unidisciplinary only or did not provide details of the subgroup of participants who had multidisciplinary rehabilitation. The remaining three (Demir 2008; Meythaler 1997; Nicholas 2000) met the criteria for 'other designs' (ODs) and are described in the Discussion section. All 14 studies are listed in Characteristics of excluded studies.

Risk of bias in included studies

We identified no RCTs or CCTs that met the inclusion criteria for the review.

Effects of interventions

We identified no RCTs or CCTs that met the inclusion criteria for this review.

DISCUSSION

Summary of main results

We identified no RCTs or CCTs that fulfilled the inclusion criteria and addressed the effectiveness of multidisciplinary care in GBS survivors. It was therefore not possible to determine:

- Whether organised multidisciplinary rehabilitation care quantitatively achieves better outcomes than the absence of such services in GBS survivors and/or their caregivers.
- Which type of programmes are effective and in which setting.
- Whether a greater intensity (time and/or expertise) of rehabilitation leads to greater gains.
- Which specific outcomes are influenced (survival, dependency, social integration, mood, QoL) by multidisciplinary rehabilitation care in GBS.

Overall completeness and applicability of evidence

Although there was a lack of RCTs and CCTs, three studies met the criteria for ODs. These were Demir 2008, Meythaler 1997 and Nicholas 2000, and are described in Table 4. In the absence of formal trial based evidence, the limited evidence from these studies is summarised below.

The three studies involved a total of 128 participants in three different countries (Turkey, USA and UK).

- All were conducted in inpatient rehabilitation settings, although Demir 2008 had a community follow up arm for the GBS patients at six months following discharge.
- One (Demir 2008) was a ‘case-control’ study, comparing outcomes of GBS patients at six months following rehabilitation (intensity not stated) with healthy controls. The other two (Meythaler 1997; Nicholas 2000) were retrospective cohort studies comparing outcomes at the start and end of brief, high intensity, inpatient rehabilitation programmes lasting four to six weeks.
- None had been specifically designed to determine the effectiveness of a rehabilitation program on its own - the aim of all three was to determine the association between medical variables and outcomes in GBS.
- All were rated as ‘very low' quality due to small numbers (between 24 and 65 participants), lack of methodological robustness, unsystematic clinical observations and presence of critical problems.
- All included patients had severe GBS with high levels of physical dependency. It is therefore difficult to generalise their results to patients with less severe GBS.
- None of the studies reported any adverse effects attributable to multidisciplinary care.

The effects of intervention and results of these ODs are summarised in Table 5.

All three studies demonstrated an improvement in disability (as measured by FIM or BI) from the time of inpatient rehabilitation admission to discharge in a timeframe of less than 12 months. In addition, Demir 2008 showed an improvement in disability at six months follow-up after rehabilitation.

Two of the studies addressed QoL or participation (handicap).

- Demir 2008 measured QoL using the Nottingham health profile (NHP) at six month follow-up and showed that GBS survivors reported a lower QoL compared with healthy control subjects. However, no evidence was provided to examine improvement of QoL during rehabilitation.
- Nicholas 2000 measured QoL using the Environmental Status Scale (ESS) and the Handicap Assessment Scale (HAS), and demonstrated a reduction in handicap. However, only half the patients of this already small study completed this measure.

Quality of the evidence

Therefore the best evidence synthesis from these three ‘very low quality’ studies (Demir 2008; Meythaler 1997; Nicholas 2000) provides some support that high intensity inpatient multidisciplinary rehabilitation may:

- improve disability and
- improve QoL (as measured by a reduction in handicap (participation))

in the short term (less than six months) in persons with GBS.

Potential biases in the review process

This review highlighted a number of limitations in GBS studies. No methodologically rigorous studies (RCTs or CCTs) were identified, and the number of OD studies included was small, and methodologically weak. It was therefore not possible to answer any of the questions posed in the original objectives for the study.

Even within the three OD studies there were problems which confounded comparison or assimilation of data. These were as follows.

- Minimal information regarding the content of multidisciplinary care (for example, modalities, duration and intensity of therapy, and the spectrum of care targeted).
- Diversity of outcome measures, which varied from functional ability, to 'handicap' (participation) and QoL.
- Lack of longer term (more than six months) follow-up. No longitudinal studies exist to outline issues faced by persons with GBS over time.
- No information on the cost effectiveness of GBS care.
- Although neuropsychological sequelae following GBS, such as mood, affect and work related issues, are recognised by clinicians as barriers to societal reintegration, no studies address these.

Therefore these three studies have only been able to contribute in a very limited way to the synthesis of best evidence for persons with GBS. It was not possible to determine conclusively which type of programme is effective and in which setting, nor whether a greater intensity (time or expertise, or both) or 'dose' of rehabilitation would lead to greater gains. Further studies are needed to suggest optimum number, duration and intensity of treatment sessions, and also to identify other factors that may affect outcome. It was also not possible to determine which specific outcomes are influenced (dependency, social integration, mood, QoL) by multidisciplinary care.

Agreements and disagreements with other studies or reviews

The three OD studies provide some support for multidisciplinary rehabilitation in GBS survivors, and are consistent with existing guidelines (Hughes 2005).

Gaps in evidence in GBS

The gaps in the evidence base in rehabilitation practice for persons with GBS include:

(i) lack of high quality evidence for overall effectiveness of multidisciplinary rehabilitation;

(ii) lack of agreement amongst treating clinicians with respect to the clinical approach and the most effective forms of intervention;

(iii) failure to incorporate the perspective of the person with GBS and their carers;

(iv) lack of common outcome measures to compare practice across different programmes and populations.

These are similar to evidence gaps outlined previously for persons with multiple sclerosis, motor neurone disease and those with acquired brain injury (Khan 2007; Ng 2009; Turner-Stokes 2005).

Although RCTs are appropriate to study effects of an intervention and are widely considered to be the 'gold standard' for high level evidence, they are much less suited to studying 'complex' interventions such as rehabilitation (Khan 2007; Turner-Stokes 2005). The many challenges in rehabilitation for traditional research designs include: heterogeneous interdependent components; different patient populations and contexts; and treatments that are multifaceted, multilayered and involve organisational restructure; individual intervention and ethical considerations (Khan 2007). For this reason, GBS survivors form a diverse group with a wide range of clinical presentations, and varied level of disability, requiring an individualised approach to rehabilitation despite the guidance laid down in the UK MRC framework for evaluation of complex intervention (MRC 2000). RCTs cannot answer all the questions that need to be answered (Khan 2007; Turner-Stokes 2005; Whyte 2002).

An alternative approach to gathering evidence is through the use of 'clinical practice trials' that acquire prospective and retrospective data without disrupting the natural milieu of treatment (Gassaway 2005). This routine data collection provides additional information about the nature of services provided, the outcomes of rehabilitative care and implications for clinical practice. Further, it can provide answers to what models of care work in which GBS patient populations, the intensity of rehabilitation required and assessment of care management processes (DeJong 2005; Gassaway 2005). More recently this approach has been used in the multiple sclerosis population to quantify intensity of rehabilitation intervention in inpatient rehabilitation programmes and to determine patient complexity and need for therapy (Khan 2010d). More research in GBS survivors is needed to build the evidence base in rehabilitation.

As persons with GBS can show marked clinical heterogeneity, clinicians may not always agree with one another or incorporate the patient perspective into care. The clinical decision making process can be subjective and biased (Elstein 2002). In addition, if only standardised instruments are used to assess patient functional status there can also be bias (Brown 2004). One approach to this problem is the use of goal attainment scaling (GAS) as an individualised person-centred outcome measure (Kiresuk 1968). GAS has been used to demonstrate change following rehabilitation (Khan 2008) and has been shown to give added value over standardised measures in evaluating outcomes that are meaningful to patients and their families (McCrory 2009; Turner-Stokes 2009). Individual goals can be mapped onto the WHO ICF as a framework for comparison (Turner-Stokes 2010).

Incorporation of the patient perspective (and carers' perspective) in multidisciplinary programmes can facilitate agreement amongst treating clinicians with respect to clinical approach. One example is a recent study (Khan 2010b) of self reported problems in everyday life faced by persons with GBS in the community (n = 76). The problems listed were linked with concepts within specific ICF categories in various domains to provide information considered important by persons with GBS for incorporation in multidisciplinary care programs. Further, the linked ICF categories within the structured framework of these domains provided

a common language for more effective communication and agreement amongst the treating multidisciplinary clinicians.

In addition an expert consensus opinion about what issues should be addressed in multidisciplinary care programs for persons with GBS is also important. A recent expert consensus (DELPHI) determined the ICF 'core set' for GBS (Khan 2010a). Core sets are lists of ICF categories selected by experts that list relevant categories in various ICF domains, which need to be addressed in multidisciplinary care settings. These are similar to existing core ICF sets for other neurological conditions such as stroke and multiple sclerosis (Geyh 2004; Khan 2007a). These core sets can then be used to facilitate clinical care and agreement, and in the future may assist in outcome development using ICF item banking and scale development techniques (Cieza 2009; Grill 2009).

It is difficult to analyse and compare clinical outcomes in GBS rehabilitation programmes owing to inconsistent use of appropriate outcome measures and variability in the types of rehabilitation. Many existing outcome instruments used in GBS populations do not fully capture its complex constructs. Commonly used tools such as the Rankin Scale or Hughes scale (Nyland 1984; Winer 1988) are biased towards disability and not participation. This may be one reason for the wide variation in the reported outcomes in GBS patients, and reflects the insensitivity of these measures in these persons. Further, health related quality of life is difficult to define in neurological patient populations. In GBS the limitation in activity alone accounted for only minor variation in overall QoL (Bernsen 1997), as many factors influence QoL. A recent study (n = 76) (Khan 2010c) identified older age and female gender as factors associated with lower current level of functioning after GBS (median time since GBS 6 years (range 1 to 14 years)). Similar to other reports (Bersano 2006; Demir 2008; Koeppen 2006), GBS survivors treated in intensive care and those with longer length of hospital stay (more than 11 days in acute care) showed ongoing lower function and greater impact on participation many years following GBS. As persons with GBS are expected to live a long time, the longer term sequelae of GBS and QoL need further research.

Variability in the types of rehabilitation programme available and their outcomes in GBS survivors need review (nationally and internationally), to highlight areas for improved data collection and to identify future clinical needs for planning health service provision. One recent report (Khan 2010) used a National Rehabilitation Dataset to review outcomes of inpatient rehabilitation programmes for persons with GBS (n = 570) from 162 accredited rehabilitation facilities across Australia. Analysis of outcome measurements (including the Functional Independence Measure) showed that following inpatient rehabilitation there was reduction in disability and hospital length of stay, and increased discharge of these persons back to the community. Further analysis of ambulatory programmes for GBS survivors is currently under way in the Australian setting.

GBS is a challenging condition. Although most persons make a good functional recovery following GBS, many may have residual neurological and neuropsychological sequelae. The existing deficiencies in GBS care and services require a collaborative practice model with integrated long-term care (neurology and multidisciplinary rehabilitation teams) to address many issues. These include participatory restriction especially those relating to psychological issues (anxiety and depression); and work, family and social reintegration. This involves education and support for persons with GBS (and their families) to improve their coping skills and self efficacy where appropriate, and for the treating multidisciplinary teams.

AUTHORS' CONCLUSIONS

Implications for practice

There are no randomised trials of multidisciplinary input in GBS but this does not indicate ineffectiveness of rehabilitative care. There are three OD studies which provide some support for multidisciplinary rehabilitation in GBS survivors.

More evidence is needed to support specific rehabilitative interventions in GBS: such as neurofacilitation for improving muscle performance, improvement in swallowing using specific strategies or improvement in activity with provision of adaptive equipment.

Implications for research

- The lack of methodologically robust studies in GBS needs to be addressed urgently. Well-designed research methodology using both randomised and clinical controlled trials, and also using 'clinical practice trials' where data are routinely gathered without disrupting the natural milieu of treatment, is needed. This will provide valuable information about outcomes in real life clinical settings.
- Longitudinal data in the GBS population are needed to ascertain long-term care needs.
- More research about patient and caregiver perspective and their involvement in GBS care should be encouraged. Caregiver burden should be assessed wherever possible.
- Research about specific rehabilitation modalities and interventions in GBS are needed to improve evidence-based practices. These include the types of interventions - their intensity and duration, and types of settings for rehabilitation.
- Cost effectiveness of multidisciplinary care needs further exploration.
- Development of more sensitive and appropriate outcome measurement in GBS is needed. These measures should include various participatory domains that may impact societal integration in this population.
- More research and emphasis on psychological care in GBS is needed to ensure there is no restriction in participation over the longer term.
- Research into return to work programmes for GBS survivors is needed so that appropriate support may be provided to these individuals.
- Aging with a disability (including GBS), the wear and tear and the cumulative impact of various disabilities over time need further study.

ACKNOWLEDGEMENTS

We thank Ms K Jewitt, R Brassington, J Batchelor, A Gunn, A Swan and Professors R Hughes of the Cochrane Neuromuscular Disease Group for their support and assistance and Ms K Vezzoso for her assistance with the preparation of this manuscript.

REFERENCES

References to studies excluded from this review

Bernsen 2005 *{published data only}*

Bernsen RA, de Jager AE, van der Meché FG, Frans GA, Suurmeijer TP. How Guillain-Barré patients experience their functioning after 1 year. *Acta Neurologica Scandinavica* 2005;**112**(1):51-6. [PUBMED: 15932357]

Bussmann 2007 *{published data only}*

Bussmann JB, Garssen MP, van Doorn PA, Stam HJ. Analysing the favourable effects of physical exercise: relationships between physical fitness, fatigue and functioning in Guillain-Barré syndrome and chronic inflammatory demyelinating polyneuropathy. *Journal of Rehabilitation Medicine* 2007;**39**(2):121-5. [PUBMED: 17351693]

Carroll 2003 *{published data only}*

Carroll A, McDonnell G, Barnes M. A review of the management of Guillain-Barré syndrome in a regional neurological rehabilitation unit. *International Journal of Rehabilitation Research* 2003;**26**(4):297-302. [PUBMED: 14634364]

Davidson 2009 *{published data only}*

Davidson I, Wilson C, Walton T, Brissenden S. Physiotherapy and Guillain-Barré syndrome: results of a national survey. *Physiotherapy* 2009;**95**(3):157-63. [PUBMED: 19635334]

Demir 2008 *{published data only}*

Demir SO, Koseoglu F. Factors associated with health-related quality of life in patients with severe Guillain-Barré syndrome. *Disability and Rehabilitation* 2008;**30**(8):593-9. [PUBMED: 17852306]

El Mandhi 2007 *{published data only}*

El Mandi L, Calmels P, Camdessanché JP, Gautheron V, Féasson L. Muscle strength recovery in treated Guillain-Barré syndrome: a prospective study for the first 18 months after onset. *American Journal of Physical Medicine and Rehabilitation* 2007;**86**(9):716-24. [PUBMED: 17709995]

Fisher 2008 *{published data only}*

Fisher TB, Stevens JE. Rehabilitation of a marathon runner with Guillain-Barré syndrome. *Journal of Neurological Physical Therapy* 2008;**32**(4):203-9. [PUBMED: 19265762]

Forsberg 2006 *{published data only}*

Forsberg A, de Pedro-Cuesta J, Widén Holmqvist L. Use of healthcare, patient satisfaction and burden of care in Guillain-Barré syndrome. *Journal of Rehabilitation Medicine* 2006;**38**(4):230-6. [PUBMED: 16801205]

Garssen 2004 *{published data only}*

Garssen MP, Bussmann JB, Schmitz PI, Zandbergen A, Welter TG, Merkies IS, et al. Physical training and fatigue, fitness and quality of life in Guillain-Barré syndrome and CIDP. *Neurology* 2004;**63**(12):2393-5. [PUBMED: 15623709]

Karper 1991 *{published data only}*

Karper WB. Effects of low-intensity aerobic exercise on one subject with chronic-relapsing Guillain-Barré syndrome. *Rehabilitation Nursing* 1991;**16**(2):96-8. [PUBMED: 2000470]

Meythaler 1997 *{published data only}*

Meythaler JM, DeVivo MJ, Braswell WC. Rehabilitation outcomes of patients who have developed Guillain-Barré syndrome. *American Journal of Physical Medicine and Rehabilitation* 1997;**76**(5):411-9. [PUBMED: 9354496]

Nicholas 2000 *{published data only}*

Nicholas R, Playford ED, Thompson AJ. A retrospective analysis of outcome in severe Guillain-Barré syndrome following combined neurological and rehabilitation management. *Disability and Rehabilitation* 2000;**22**(10):451-5. [PUBMED: 10950498]

Pitetti 1993 *{published data only}*

Pitetti KH, Barrett PJ, Abbas D. Endurance exercise training in Guillain-Barré syndrome. *Archives of Physical Medicine and Rehabilitation* 1993;**74**(7):761-5. [PUBMED: 8328900]

Tuckey 2004 *{published data only}*

Tuckey J, Greenwood R. Rehabilitation after severe Guillain-Barré syndrome: the use of partial body weight support. *Physiotherapy Research International* 2004;**9**(2):96-103. [PUBMED: 15317424]

Additional references

Alshekhlee 2008

Alshekhlee A, Hussain Z, Sultan B, Katirji B. Guillain Barré syndrome: Incidence and mortality rates in US hospitals. *Neurology* 2008;**70**(18):1608-13. [PUBMED: 18443311]

Asbury 1990

Asbury AK, Cornblath DR. Assessment of current diagnostic criteria for Guillain Barré syndrome. *Annals of Neurology* 1990;**27**(suppl):S21-4. [PUBMED: 2194422]

Bergner 1981

Bergner M, Bobbitt RA, Carter WB, Gilson BS. The Sickness Impact Profile: development and final revision of a health status measure. *Medical Care* 1981;**19**(8):787-805. [PUBMED: 7278416]

Bernsen 1997

Bernsen RA, Jacobs HM, de Jager AE, van der Meché FG. Residual health status after Guillain-Barré syndrome. *Journal of Neurology, Neurosurgery and Psychiatry* 1997;**62**(6):637-40. [PUBMED: 9219755]

Bernsen 1999

Bernsen RA, de Jager AE, Schmitz PI, van der Meché FGA. Residual physical outcome and daily living 3 to 6 years after Guillain-Barré syndrome. *Neurology* 1999;**53**(2):409-10. [PUBMED: 10430437]

Bernsen 2002

Bernson RA, Jager AE, Schmitz PI, van der Meché FG. Long term impact on work and private life after Guillain-Barré syndrome. *Journal of the Neurological Sciences* 2002;**201**(1-2):13-7. [PUBMED: 12163188]

Bernsen 2005

Bernsen RA, de Jager AE, van der Meché FG, Suurmeijer TP. How Guillain-Barré patients experience their functioning after 1 year. *Acta Neurologica Scandinavica* 2005;**112**(1):51-6. [PUBMED: 15932357]

Bersano 2006

Bersano A, Carpo M, Allaria S, Franciotta D, Citterio A, Nobile-Orazio E. Long term disability and social status change after Guillain-Barré syndrome. *Journal of Neurology* 2006;**253**(2):214-8. [PUBMED: 16096809]

Brown 2004

Brown M, Gordon WA. Empowerment in measurement: 'muscle', 'voice' and subjective quality of life as a gold standard. *Archives of Physical Medicine and Rehabilitation* 2004;**85**(4 suppl 2):S13-20. [PUBMED: 15083418]

Campbell 1999

Campbell ML, Sheets D, Strong PS. Secondary health conditions among middle-aged individuals with chronic physical disabilities: implications for unmet needs for services. *Assistive Technology* 1999;**11**(2):105-22. [PUBMED: 11010061]

Cieza 2009

Cieza A, Hilfiker R, Boonen A, Chatterji S, Kostanjsek N, Ustün BT, et al. Items from patient-oriented instruments can be integrated into interval scales to operationalize categories of the International Classification of Functioning, Disability and Health. *Journal of Clinical Epidemiology* 2009;**62**(9):912-21. [PUBMED: 19541452]

DeJong 2005

DeJong G, Horn SD, Conroy B, Nichols D, Healton EB. Opening the black box of post-stroke rehabilitation: stroke rehabilitation patients, processes, and outcomes. *Archives of Physical Medicine and Rehabilitation* 2005;**86**(12 Suppl 2):S1-7. [PUBMED: 16373135]

Egger 1998

Egger M, Smith GD. Bias in location and selection of studies. *BMJ* 1998;**316**(7124):61-6. [PUBMED: 9451274]

Elstein 2002

Elstein AS, Schwarz A. Clinical problem solving and diagnostic decision making: selective review of the cognitive literature. *BMJ* 2002;**324**(7339):729-32. [PUBMED: 11909793]

Forsberg 2005

Forsberg A, Press R, Einarsson U, de Pedro-Cuesta J, Holmqvist LW. Disability and health related quality of life in Guillain Barré syndrome during the first two years after onset: a prospective study. *Clinical Rehabilitation* 2005;**19**(8):900. [PUBMED: 16323390]

Gassaway 2005

Gassaway J, Horn SD, DeJong G, Smout RJ, Clark C, James R. Applying the clinical practice improvement approach to stroke rehabilitation: methods used and baseline results. *Archives of Physical Medicine and Rehabilitation* 2005;**86**(12 Suppl 2):S16-33. [PUBMED: 16373137]

Geyh 2004

Geyh S, Cieza A, Schouten J, Dickson H, Frommelt P, Omar Z, et al. ICF Core sets for Stroke. *Journal of Rehabilitation Medicine* 2004;**Suppl 44**:135-41. [PUBMED: 15370761]

Grill 2009

Grill E, Stucki G. Scales should be developed based on simple clinical ratings of International Classification of Functioning, Disability and Health Core Set categories. *Journal of Clinical Epidemiology* 2009;**62**(9):891-98. [PUBMED: 18619794]

Hahn 1998

Hahn AF. Guillain Barré syndrome. *Lancet* 1998;**352**:635-41.

Hartung 1998

Hartung HP, van der Meché FGA, Pollard JD. Editorial review: Guillain Barré Syndrome CIDP and other chronic immune mediated neuropathies. *Current Opinion in Neurology* 1998;**11**(5):497-513.

Higgins 2008

Higgins JPT, Green S (editors). Cochrane Handbook for Systematic Reviews of Interventions Version 5.0.0 [updated February 2008]. The Cochrane Collaboration 2008. Available from www.cochrane-handbook.org.

Hughes 1978

Hughes RA, Newson Davis JM, Perkin GD, Pierce JM. Controlled trial prednisolone in acute polyneuropathy. *Lancet* 1978;**2**(7):750-3.

Hughes 1997

Hughes RA, Rees JH. Clinical and epidemiologic features of Guillain Barré syndrome. *Journal of Infectious Diseases* 1997;**176**(Suppl 2):S92-8.

Hughes 2005

Hughes RA. Guillain Barré Syndrome. *Lancet* 2005;**366**(9497):1653-66.

Hughes 2006

Hughes RAC, Swan AV, van Koningsveld R, van Doorn PA. Corticosteroids for Guillain-Barré syndrome. *Cochrane Database of Systematic Reviews* 2006, Issue 2. [DOI: 10.1002/14651858.CD001446.pub2]

Hughes 2006a

Hughes RAC, Raphael JC, Swan AV, van Doorn PA. Intravenous immunoglobulin for Guillain Barre syndrome. *Cochrane Database of Systematic Reviews* 2006, Issue 1. [10.1002/14651858.CD002063 pub3]

Kemp 2005

Kemp BG. What the rehabilitation professional and the consumer need to know. *Physical Medicine Rehabilitation Clinics of North America* 2005;**16**:1-18 vii.

Khan 2004

Khan F. Rehabilitation of Guillain Barré syndrome. *Australian Family Physician* 2004;**33**(12):1013-7.

Khan 2007

Khan F, Turner Stokes L, Ng L, Kilpatrick T. Multidisciplinary rehabilitation for adults with multiple sclerosis. *Cochrane Database of Systematic Reviews* 2007, Issue 2. [DOI: 10.1002/14651858.CD006036.pub2]

Khan 2007a

Khan F, Pallant JF. Use of the International Classification of Functioning, Disability and Health (ICF) to identify preliminary comprehensive and brief core sets for multiple sclerosis. *Disability and Rehabilitation* 2007;**29**(3):205-13. [PUBMED: 17364771]

Khan 2008

Khan F, Pallant JF, Turner-Stokes L. Use of goal attainment scaling in rehabilitation for persons with multiple sclerosis. *Archives of Physical Medicine and Rehabilitation* 2008;**89**(4):652-9. [PUBMED: 18373995]

Khan 2009

Khan F, Ng L. Guillain-Barré syndrome: an update in rehabilitation. *International Journal of Therapy and Rehabilitation* 2009;**16**(8):451-60.

Khan 2010

Khan F, Stevermuer T, Simmonds F. Rehabilitation for Guillain Barre syndrome: analysis of the Australian rehabilitation outcomes dataset. *Journal of Clinical Medicine and Research* 2010;**2**(4):55-60.

Khan 2010a

Khan F, Pallant JF. Use of the International Classification of Functioning, Disability and Health (ICF) to identify preliminary comprehensive and brief core sets for Guillain Barré syndrome. *Disability and Rehabilitation* 2010;**in press**.

Khan 2010b

Khan F, Amatya B, Ng L. Use of International Classification of Functioning, Disability and Health (ICF) to describe patient reported disability: a comparison of Guillain Barré syndrome with multiple sclerosis. *Journal of Rehabilitation Medicine* 2010. [DOI: 10.2340/16501977-0592]

Khan 2010c

Khan F, Pallant JP, Ng L, Bhasker A. Factors associated with long term functional outcomes and psychological sequelae in Guillain Barré syndrome. *Journal of Neurology* 2010. [DOI: 10.1007/s00415-010-5653-x]

Khan 2010d

Khan F, Pallant JP, Zhang N, Turner-Stokes L. Clinical practice improvement in multiple sclerosis. *International Journal of Rehabilitation Research* 2010. [DOI: 10.1097/MRR.0b013e328338b05f]

Kiresuk 1968

Kiresuk TJ, Sherman RE. Goal attainment scaling: a general method of evaluating comprehensive mental health programmes. *Community Mental Health Journal* 1968;**4**(6):443-53.

Koeppen 2006

Koeppen S, Kraywinkel K, Wessendorf TE, Ehrenfeld CE, Schürks M, Diener HC, et al. Long term outcomes of Guillain-Barré syndrome. *Neurocritical Care* 2006;**5**(3):235-42. [PUBMED: 17290096]

Kucukdeveci 2001

Kücükdeveci AA, McKenna SP, Kutlay S, Gürsel Y, Whalley D, Arasil T. The development and psychometric assessment of the Turkish version of the Nottingham Health Profile. *International Journal of Rehabilitation Research* 2000;**23**(1):31-8. [PUBMED: 10826123]

Lennon 1993

Lennon SM, Koblar S, Hughes RAC, Goeller J, Riser AC. Reasons for persistent disability in Guillain-Barré syndrome. *Clinical Rehabilitation* 1993;**7**(1):1-8.

Mahoney 1965

Mahoney FI, Barthel D. Functional evaluation: the Barthel Index. *Maryland State Medical Journal* 1965;**14**:56-61.

McCrory 2009

McCrory P, Turner-Stokes L, Baguley IJ, De Graff S, Katrak P, Sandanam J, et al. Botulinum toxin A for treatment of upper limb spasticity following stroke: a multi-centre randomized placebo-controlled study of the effects on quality of life and other person-centred outcomes. *Journal of Rehabilitation Medicine* 2009;**41**(7):536-44. [PUBMED: 19543664]

McKhann 1990

McKhann GM. Guillain Barré syndrome: clinical and therapeutic observations. *Annals of Neurology* 1990;**27**(suppl):S13-S16.

Merkies 2002

Merkies I, Schmitz P, van der Meche FGA, Samijn J, van Doorn PA. Clinimetric evaluation of a new overall disability scale in immune mediated polyneuropathies. *Journal of Neurology, Neurosurgery and Psychiatry* 2002;**72**(5):596-601.

Merkies 2003

Merkies I, Schmitz P, van der Meche FGA, Samijn J, van Doorn PA. Connecting impairment, disability, and handicap in immune mediated polyneuropathies. *Journal of Neurology, Neurosurgery and Psychiatry* 2003;**74**(1):99-104.

Meythaler 1997

Meythaler JM. Rehabilitation of Guillain Barré Syndrome. *Archives of Physical Medicine and Rehabilitation* 1997;**78**(8):872-9.

MRC 2000

A framework for development and evaluation of RCTs for complex interventions to improve Health. Medical Research Council 2000; Vol. London.

Ng 2009

Ng L, Khan F, Mathers S. Multidisciplinary care for adults with amyotrophic lateral sclerosis/motor neurone disease. *Cochrane Database of Systematic Reviews* 2009, Issue 4. [DOI: 10.1002/14651858.CD007425.pub2]

Nicholas 2000

Nicholas R, Playford ED, Thompson AJ. A retrospective analysis of outcome in severe Guillain-Barré syndrome following combined neurological and rehabilitation management. *Disability and Rehabilitation* 2000;**22**(10):451-5. [PUBMED: 10950498]

Nyland 1984

Nyland H, Naess A, Skjaerven R. Natural history and prognosis of acute Guillain-Barré syndrome. A follow-up study of 160 cases in Western Norway. *Acta Neurologica Scandinavica* 1984;**69**(S98):226-7. [DOI: 10.1111/j.1600-0404.1984.tb02450.x]

Raphael 2009

Raphael JC, Chevret S, Hughes RAC, Annane D. Plasma exchange for Guillain Barré syndrome. *Cochrane Database of Systematic Reviews* 2009, Issue 2. [DOI: 10.1002/14651858.CD001798]

Ropper 1992

Ropper AH. The Guillain Barré syndrome. *New England Journal of Medicine* 1992;**326**(17):1130-6.

Schünemann 2008

Schünemann HJ, Oxman AD, Vist GE, Higgins JPT, Deeks JJ, Glasziou P, et al. Chapter 12: Interpreting results and drawing conclusions. In: Higgins JPT, Green S editor(s). Cochrane Handbook for Systematic Reviews of Interventions. Chichester: John Wiley & Sons, 2008.

Steultjens 2004

Steultjens EMJ, Dekker J, Bouter LM, Van Schaardenburg D, Van Kuyk MAH, Van den Ende CHM. Occupational therapy for rheumatoid arthritis. *Cochrane Database of Systematic Reviews* 2004, Issue 1. [DOI: 10.1002/14651858.CD003114.pub2]

Stewart 1995

Stewart G, Kidd D, Thompson AJ. The assessment of handicap: an evaluation of the Environmental Status Scale. *Disability and Rehabilitation* 1995;**17**(6):312-6. [PUBMED: 7579482]

Stiens 1997

Stiens SA, O'Young B, Young M. Person centred rehabilitation: interdisciplinary intervention to enhance patient enablement. In: O'Young B, Young M, Stiens SA editor(s). Physical Medicine and Rehabilitation Secrets. Philadelphia: Hanley & Belfus, 1997.

Turk 2001

Turk MA, Scandale J, Rosenbaum PF, Weber RJ. The health of women with cerebral palsy. *Physical Medicine and Rehabilitation Clinics of North America* 2001;**12**(1):153-68.

Turner-Stokes 2005

Turner-Stokes L, Disler P, Nair A, Wade DT. Multidisciplinary rehabilitation for acquired brain injury in adults of working age. *Cochrane Database of Systematic Reviews* 2005, Issue 3. [DOI: 10.1002/14651858.CD004170.pub2]

Turner-Stokes 2009

Turner-Stokes L, Williams H, Johnson J. Goal attainment scaling: does it provide added value as a person-centred measure for evaluation of outcome in neurorehabilitation following acquired brain injury?. *Journal of Rehabilitation Medicine* 2009;**41**(7):528-35. [PUBMED: 19543663]

Turner-Stokes 2010

Turner-Stokes L, Baguley I, De Graaff S, Katrak P, Davies L, McCrory P, et al. Goal attainment scaling in the evaluation of treatment of upper limb spasticity with botulinum toxin: a secondary analysis from a double blind placebo-controlled randomized clinical trial. *Journal of Rehabilitation Medicine* 2010;**42**(1):81-9. [PUBMED: 20111849]

UDS 1993

Guide for Uniform Data Set for Medical Rehabilitation (Adult FIM SM) version 4. State University of New York. University of New York, Buffalo, 1993.

Van Koningsveld 2007

Van Koningsveld R, Steyerberg EW, Hughes RAC, Swan AV, Van Doorn PA, Jacobs BC. A clinical prognostic scoring system for Guillain-Barré syndrome. *The Lancet Neurology* 2007;**6**(7):589-94.

Wade 1992

Wade DT. Measurement in Neurological Rehabilitation. Oxford: Oxford University Press, 1992.

Ware 1993

Ware J, Snow KK, Kosinski M, Gandek B. SF-36 Health Survey. Manual and Interpretation Guide. SF-36 Health Survey. Manual and Interpretation Guide. Boston: The Health Institute, New England Medical Centre, 1993.

WHO 1980

World Health Organization. Internat. International classification of impairments, disabilities, and handicaps. Geneva: World Health Organization, 1980.

WHO 2001

World Health Organization. International Classification of Functioning, Disability and Health (ICF). Geneva: World Health Organization, 2001.

Whyte 2002

Whyte J. Traumatic brain injury rehabilitation: are there alternatives to randomized clinical trials?. *Archives of Physical*

Medicine and Rehabilitation 2002;**83**(9):1320-2. [PUBMED: 12235618]

Winer 1988

Winer JB, Hughes RA, Osmond C. A prospective study of acute idiopathic neuropathy. I. Clinical features and their prognostic value. *Journal of Neurology, Neurosurgery and Psychiatry* 1988;**51**(5):605-612.

Zochodne 1994

Zochodne DW. Automatic involvement in Guillain Barré syndrome: a review. *Muscle and Nerve* 1994;**17**(3):1145-55.

CHARACTERISTICS OF STUDIES

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

Study	Reason for exclusion
Bernsen 2005	Not RCT or CCT and details of rehabilitation subgroup not known.
Bussmann 2007	Not RCT or CCT. Unidisciplinary.
Carroll 2003	Not RCT or CCT. Fewer than 10 patients.
Davidson 2009	Not RCT or CCT. Single patient only.
Demir 2008	Not RCT or CCT.
El Mandhi 2007	Not RCT or CCT. Unidisciplinary.
Fisher 2008	Not RCT or CCT. Single patient only.
Forsberg 2006	Not RCT or CCT. Outcomes of rehabilitation subgroup not known.
Garssen 2004	Not RCT or CCT. Unidisciplinary.
Karper 1991	Not RCT or CCT. Single patient only.
Meythaler 1997	Not RCT or CCT.
Nicholas 2000	Not RCT or CCT.
Pitetti 1993	Not RCT or CCT. Single patient only.
Tuckey 2004	Not RCT or CCT. Single patient only.

ADDITIONAL TABLES

Table 1. Levels of quality of individual studies

Judgement of risk of bias	Quality rating of study
Risk of bias of all domains low	High methodological quality = ‘high quality study’
Unclear or high risk of bias for one or more domains	Low methodological quality = ‘low quality study’
High risk of bias for most domains	Very low methodological quality = ‘very low quality study’

Table 2. Levels of quality of a body of evidence in the GRADE approach

Underlying methodology	Quality rating
Randomised trials; or double-upgraded observational studies.	High
Downgraded randomised trials; or upgraded observational studies.	Moderate
Double-downgraded randomised trials; or observational studies.	Low
Triple-downgraded randomised trials; or downgraded observational studies; or case series/case reports.	Very low

Table 3. Factors that may decrease the quality level of a body of evidence

1. Limitations in the design and implementation of available studies suggesting high likelihood of bias.
2. Indirectness of evidence (indirect population, intervention, control, outcomes).
3. Unexplained heterogeneity or inconsistency of results (including problems with subgroup analyses).
4. Imprecision of results (wide confidence intervals).
5. High probability of publication bias.

Table 4. Characteristics of observational studies

Demir 2008	**Methods**	Case-controlled study
	Participants	n = 65 Intervention n = 34, control n = 31 Inclusion: all patients admitted to a rehabilitation unit over a 5-year period who fulfilled the standard diagnostic criteria for GBS Control participants were selected from among hospital workers and patients' relatives who did not have any major illness and were not taking any medication. Exclusion: Age < 18 years and atypical variants of GBS Turkey
	Interventions	Treatment: inpatient rehabilitation program - no further description provided Control: healthy controls - no intervention
	Outcomes	Primary outcome: nil Secondary outcomes: Limitation of activity < 12 months - Functional Independence Measure (FIM) Quality of life < 12 months - Nottingham Health Profile (NHP)

Table 4. Characteristics of observational studies *(Continued)*

	Assessment time-points	FIM - Admission, discharge and 6 months in intervention group only. NHP - 6 months only in all participants.
	Risk of Bias	Adequate sequence generation: No Adequate allocation concealment: No Blinding: No. Whilst blinding of patients and therapists would not have been possible due to the nature of the study, outcome assessors could have been blinded. Incomplete outcome data addressed: No. Three patients did not complete participation (1 death and 2 unable to complete rehabilitation) but none were included in the analysis. Free of selective reporting: Yes. Other bias: Study design - prospective cohort study. Intervention was not clearly described other than "inpatient rehabilitation". Neither duration of intervention nor type of rehabilitation stated. Also unclear if all the subjects in the intervention group received a similar program. Intervention and control groups were not comparable as control group consisted of healthy individuals not receiving any interventions. No rationale was given for choice of controls. FIM was not measured in control group, hence no comparison of functional measures between intervention and control groups. Baseline NHP was not collected for any of the participants. No sample size calculation performed.
Meythaler 1997	**Methods**	Retrospective cohort study
	Participants	n = 39 Inclusion: all patients admitted to a rehabilitation unit over a 3 year period who fulfilled the standard diagnostic criteria for GBS. Exclusion: patients not admitted directly from acute care; patients who had undergone previous inpatient rehabilitation. USA
	Interventions	Treatment: Individualised inpatient multidisciplinary rehabilitation program with 3 to 4 hours daily of physical and occupational therapy, and psychology and speech therapy if indicated.
	Outcomes	Primary outcome: nil Secondary outcome: Limitation of activity < 12 months - Functional Independence Measure (FIM)
	Assessment time-points	Baseline (admission to rehabilitation) and discharge from inpatient rehabilitation (26 SD ± 18.6 days from baseline).
	Risk of Bias	Adequate sequence generation: No

Table 4. Characteristics of observational studies *(Continued)*

		Adequate allocation concealment: No Blinding: No. Incomplete outcome data addressed: Yes. All subjects fulfilling the inclusion criteria were included in the final analysis. Free of selective reporting: Yes. Other bias: Study design: retrospective case review therefore subject to documentation bias No control group
Nicholas 2000	**Methods**	Retrospective cohort study
	Participants	N = 24 Inclusion criteria: all patients admitted to a rehabilitation unit over a 3 year period who fulfilled the standard diagnostic criteria for GBS Exclusion criteria: not provided U.K.
	Interventions	Intervention: Individualised inpatient multidisciplinary rehabilitation (consultant neurologist, clinical nurse specialist, two sessions of physiotherapy and one session of occupational therapy daily, and if required, speech pathology and psychology).
	Outcomes	Primary outcome: nil Secondary outcome: Activity limitation < 12 months - modified Barthel Index (BI), Functional Independence Measure (FIM) Quality of life < 12 months - Environmental Status Scale (ESS), Handicap Assessment Scale (HAS)
	Assessment time-points	Admission to and discharge from inpatient rehabilitation (48 ± 32 days)
	Risk of Bias	Adequate allocation concealment: No Blinding: No. Incomplete outcome data addressed: Yes. All subjects fulfilling the inclusion criteria were included in the final analysis. Free of selective reporting: Yes. Other bias: Study design: retrospective case review therefore subject to documentation bias No control group

Table 5. Results of observational studies

Demir 2008	**Statistical analysis**	Wilcoxon matched-pairs signed-rank test, Mann-Whitney U test, Spearman analysis.
	Results	Primary outcome: not addressed. Secondary outcome: Activity limitation - There were improvements in reduction of disability as measured by FIM gains (mean ± SD) from admission to discharge (33.2 ± 12.7, p = 0.001) and also at 6 months after rehabilitation (20.9 ± 13.4, P = 0.001). GBS patients had poorer health-related quality of life at six months after rehabilitation compared with healthy controls. The scores of all of the NHP domains (intervention mean ± SD vs control) were statistically significantly higher in the patients (physical mobility 51.8 ± 29.7 vs 5.3 ± 5.6, energy 40.7 ± 35.8 vs 9.2 ± 11.3, pain 20.5 ± 20.2 vs 5.2 ± 11.4, sleep 38.9 ± 32.8 vs 11.7 ± 20.3, social isolation 34.9 ± 32.8 vs 5.2 ± 9.7 and emotional reactions 31.5 ± 23.7 vs 9.5 ± 21.4, P < 0.001 for all domains). Functional scores both at discharge and at the 6-month follow-up were highly related to the NHP scores (P < 0.05 across all domains). In particular, the correlations between FIM scores and the energy level (r = -0.58 at discharge), physical mobility (r = -0.61 at discharge and r = -0.48 at 6 months) and emotional reaction (r = -0.41 at 6 months) domains of NHP were highly significant (P < 0.01). Being a female, employment, mechanical ventilation, a tendency to depression and educational status were found to be associated with several NHP domains (P < 0.001). Age and marital status showed no association with the NHP scores.
	Author's conclusions	The HRQOL (health-related quality of life) of GBS patients remains lower than that of the healthy control subjects. There was a significant improvement in the functional scores in GBS patients at discharge and 6 months after rehabilitation. The reduced HRQOL after GBS appears to be related not only to the physical disability, but also to several demographic and medical variables, such as educational level, employment, gender, mechanical ventilation and psychological factors.
Meythaler 1997	**Statistical analysis**	Chi^2 test, one-way ANOVA, Pearson's correlation coefficients.
	Results	Primary outcome: not addressed. Secondary outcome: Activity limitation < 12 months - There was reduction in disability as FIM scores improved from admission to discharge: FIM motor score improved by an average of 15.7 points from mean admission score of 34.7 to mean discharge score of 50.3. The FIM cognitive score improved by an average of 6.9 points from mean admission score of 78.1 to mean discharge score of 85.
	Notes	Other outcome measures that were reported in this study included length of acute hospitalisation, length of inpatient rehabilitation, and acute and rehabilitation charges (costs). These outcome measures have not been included in this table since they were not pre-selected measures for the review.
	Author's conclusions	The requirement of prior ventilator support most strongly predicts an extended length of stay for inpatient rehabilitation and had most significant impact

Table 5. Results of observational studies *(Continued)*

		on total hospital length of stay (both acute and rehabilitation) and the amount of the hospital charges.
Nicholas 2000	**Statistical analysis**	Multiple regression analysis
	Results	Primary outcome: not addressed. Secondary outcome: Activity limitation < 12 months - There was improvement in BI and FIM scores at discharge compared to admission scores: Mean modified BI score increased from 10 to 19; Mean FIM score increased from 53 to 85. Quality of life < 12 months - Environmental Status Scale (ESS) (n = 15) decreased from 23 to 13, Handicap Assessment Scale (HAS) (n = 9) decreased from 19 to 10 indicating a reduction in handicap.
	Author's conclusions	Significant improvement in function and reduction in handicap occurred during rehabilitation, which was demonstrated by standardised outcome measures.

APPENDICES

Appendix 1. Ovid SP MEDLINE search strategy

1 exp Guillain Barre Syndrome/
2 (acute inflammatory demyelinating polyradiculoneuropath$ or acute motor axonal neuropath$ or acute motor sensory axonal neuropath$).tw.
3 Miller Fisher .tw.
4 acute pandysautonomia$1.tw.
5 polyradiculoneuropathy/
6 polyneuropathies/
7 acute polyradiculoneuritis.tw.
8 acute polyneuritis.tw.
9 (inflammatory adj5 neuropath$3).tw.
10 (inflammatory adj5 polyneuropath$3).tw.
11 guillain barre .tw.

12 or/1-11
13 exp Ambulatory Care/
14 exp Rehabilitation/
15 exp Hospitalization/
16 exp Physical Therapy Modalities/
17 exp Home Care Services, Hospital-Based/
18 Home Care Services/
19 exp Inpatients/
20 exp Outpatients/
21 exp Cognitive Therapy/
22 Behavior Therapy/
23 exp Social Work/
24 exp Dietetics/
25 exp Dietary Services/
26 Counseling/
27 Patient Care Team/
28 (multidisciplinary or intergrated).tw.
29 (rehabilitat$ or physiotherap$ or physical therap$ or speech or occupation$ or social work).tw.
30 (cognitive therap$ or behavio?r therap$ or counsel?ing or nutrition or diet$ or food).tw.
31 (outpatient$ or inpatient$ or hospital$ or home).tw.

32 or/13-31

33 12 and 32

Appendix 2. OvidSP EMBASE search strategy

1 exp Guillain Barre Syndrome/
2 (acute inflammatory demyelinating polyradiculoneuropath$ or acute motor axonal neuropath$ or acute motor sensory axonal neuropath$).tw.
3 Miller Fisher.tw.
4 acute pandysautonomia$1.tw.
5 polyradiculoneuropathy/
6 polyneuropathy/
7 acute polyradiculoneuritis.tw.
8 acute polyneuritis.tw.
9 (inflammatory adj5 neuropath$3).tw.
10 (inflammatory adj5 polyneuropath$3).tw.
11 guillain barre.tw.
12 or/1-11
13 exp Ambulatory Care/
14 exp Rehabilitation/
15 exp Hospitalization/
16 exp Physiotherapy/
17 exp Home Care/
18 exp hospital patient/
19 exp Outpatients/
20 exp Cognitive Therapy/
21 Behavior Therapy/
22 exp Social Work/
23 exp dietetics/
24 counseling/
25 (multidisciplinary or intergrated).tw.
26 (rehabilitat$ or physiotherap$ or physical therap$ or speech or occupation$ or social work).tw.
27 (cognitive therap$ or behavio?r therap$ or counsel?ing or nutrition or diet$ or food).tw.
28 (outpatient$ or inpatient$ or hospital$ or home).tw. (583793)
29 or/13-28
30 12 and 29

Appendix 3. Cochrane Library CENTRAL search strategy

#1 MeSH descriptor Guillain-Barre Syndrome explode all trees
#2 miller fisher
#3 acute pandysautonomia
#4 MeSH descriptor Polyradiculoneuropathy explode all trees
#5 MeSH descriptor Polyneuropathies explode all trees
#6 acute polyradiculoneuritis
#7 acute polyneuritis
#8 inflammatory neuropath*
#9 inflammatory polyneuropath*
#10 guillain barre
#11 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10)
#12 MeSH descriptor Ambulatory Care explode all trees
#13 MeSH descriptor Rehabilitation explode all trees
#14 MeSH descriptor Hospitalization explode all trees
#15 MeSH descriptor Physical Therapy Modalities explode all trees
#16 MeSH descriptor Home Care Services, Hospital-Based explode all trees
#17 MeSH descriptor Home Care Services explode all trees
#18 MeSH descriptor Inpatients explode all trees
#19 MeSH descriptor Outpatients explode all trees
#20 MeSH descriptor Cognitive Therapy explode all trees
#21 MeSH descriptor Behavior Therapy explode all trees
#22 MeSH descriptor Social Work explode all trees
#23 MeSH descriptor Dietetics explode all trees

#24 MeSH descriptor Dietary Services explode all trees
#25 MeSH descriptor Counseling explode all trees
#26 MeSH descriptor Patient Care Team explode all trees
#27 multidisciplinary or intergrated
#28 rehabilitat* or physiotherap* or physical therap* or speech or occupation* or social work
#29 (cognitive therap* or behavio?r therap* or counsel?ing or nutrition or diet* or food)
#30 (outpatient* or inpatient* or hospital* or home)
#31 (#12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30)
#32 (#11 AND #31)
#33 (#32)

Appendix 4. EBSCOhost CINAHL search strategy

S32 S19 and S31 S
S31 S20 or S21 or S22 or S23 or S24 or S25 or S26 or S27 or S28 or S29 or S30
S30 guillain barre
S29 inflammatory polyneuropath*
S28 inflammatory neuropath*
S27 acute polyneuritis
S26 acute polyradiculoneuritis
S25 "polyneuropathies"
S24 (MH "Polyradiculoneuritis")
S23 acute pandysautonomia*
S22 Miller Fisher
S21 (acute inflammatory demyelinating polyradiculoneuropath* or acute motor axonal neuropath* or acute motor sensory axonal neuropath*)
S20 (MH "Guillain-Barre Syndrome") Search modes - Boolean/Phrase
S19 S1 or S2 or S3 or S4 or S5 or S6 or S7 or S8 or S9 or S10 or S11 or S12 or S13 or S14 or S15 or S16 or S17 or S18
S18 (outpatient* or inpatient* or hospital* or home)
S17 (cognitive therap* or behavio?r therap* or counsel#ing or nutrition or diet* or food)
S16 (rehabilitat* or home health care or physiotherap* or physical therap* or speech or occupation*)
S15 (multidisciplinary or intergrated)
S14 ("Patient Care Team") or (MH "Multidisciplinary Care Team")
S13 ("Counseling") or (MH "Counseling")
S12 ("Dietary Services") or (MH "Nutrition Services+")
S11 ("Dietetics") or (MH "Dietetics")
S10 ("Social Work") or (MH "Social Work+")
S9 ("Behaviour Therapy") or (MH "Behavior Therapy")
S8 ("Cognitive Therapy") or (MH "Cognitive Therapy")
S7 (MH "Outpatients")
S6 (MH "Inpatients")
S5 (MH "Home Health Care+")
S4 (MH "Physical Therapy+")
S3 (MH "Hospitalization+")
S2 (MH "Rehabilitation")
S1 (MH "Ambulatory Care")

Appendix 5. OvidSP AMED search strategy

1 exp Guillain Barre Syndrome/
2 (acute inflammatory demyelinating polyradiculoneuropath$ or acute motor axonal neuropath$ or acute motor sensory axonal neuropath$).tw.
3 Miller Fisher.tw.
4 acute pandysautonomia$1.tw.
5 polyradiculoneuropathy.tw.
6 polyneuropathies.tw.
7 polyradiculoneuritis/
8 polyneuritis.tw.
9 (inflammatory adj5 neuropath$3).tw.

10 (inflammatory adj5 polyneuropath$3).tw.
11 guillain barre syndrome.tw.
12 or/1-11
13 exp Ambulatory Care/
14 exp Rehabilitation/
15 exp Hospitalization/
16 exp Physical Therapy Modalities/
17 exp Home Care Services/
18 exp Inpatients/
19 exp Outpatients/
20 exp Cognitive Therapy/
21 Behavior Therapy/
22 exp Social Work/
23 exp diet therapy/
24 Counseling/
25 Patient Care Team/
26 (multidisciplinary or intergrated).tw.
27 (rehabilitat$ or physiotherap$ or physical therap$ or speech or occupation$ or social work).tw.
28 (cognitive therap$ or behavio?r therap$ or counsel?ing or nutrition or diet$ or food).tw.
29 (outpatient$ or inpatient$ or hospital$ or home).tw.
30 or/13-29
31 12 and 30

Appendix 6. PEDro search strategy

(GBS) OR (Guillain-Barre Syndrome) AND (rehabilitation)

Appendix 7. LILACS search strategy

(guillain barre) OR (Mh Guillain-Barre Syndrome) OR (Mh POLYRADICULONEUROPATHY) OR (MH POLYNEUROPATHIES) OR (acute polyradiculoneuritis) OR (acute polyneuritis) OR (inflammatory AND neuropath$) OR (inflammatory and polyneuropath$) OR (acute inflammatory demyelinating polyradiculoneuropathy$ disease$) OR (acute motor axonal neuropathy$) OR (acute motor sensory axonal neuropath$) OR (Miller Fisher) OR (acute pandysautonomia$)

AND (Mh Ambulatory Care) OR (Mh Rehabilitation) OR (Mh Hospitalization) OR (Mh Physical Therapy Modalities) OR (Mh Home Care Services, Hospital-Based) OR (Mh Home Care Services) OR (Mh Inpatients) OR (Mh Outpatients) OR (Mh Cognitive Therapy) OR (Mh Behavior Therapy) OR (Mh Social Work) OR (Mh Dietetics) OR (Mh Dietary Services) OR (Mh Counseling) OR (Mh Patient Care Team) OR (multidisciplinary) OR (intergrated) OR (rehabilitat$) OR (home health care) OR (physiotherap$) OR (physical therap$) OR (speech) OR (occupation$) OR (social work) OR (cognitive therap$) OR (behavior therap$) OR (counseling) OR (nutrition) OR (diet$) OR (food) OR (outpatient$) OR (inpatient$) OR (hospital$)

CONTRIBUTIONS OF AUTHORS

Fary Khan and Louisa Ng designed and were involved in all aspects of this review.

Bhasker Amatya assisted with literature researches and all analysis.

Caroline Brand assessed methodological quality of included studies.

Lynne Turner-Stokes assisted with the Discussion.

DECLARATIONS OF INTEREST

None known.

SOURCES OF SUPPORT

Internal sources

- Department of Rehabilitation Medicine, Royal Melbourne Hospital, Australia.

External sources

- No sources of support supplied

INDEX TERMS

Medical Subject Headings (MeSH)

*Patient Care Team; Guillain-Barre Syndrome [*rehabilitation]

MeSH check words

Adult; Humans