National Institute for Health and Care Excellence

Final

Cerebral palsy in adults

[D1] Interventions that improve function and participation: vocational and independent living skills

NICE guideline NG119

Evidence reviews

January 2019

Final

These evidence reviews were developed by the National Guideline Alliance hosted by the Royal College of Obstetricians and Gynaecologists

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Interventions that improve function and participation for adults aged 25 and over with cerebral palsy:

Review question

D1 Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?

Introduction

Recreational, educational and vocational participation in society can be reduced in adults with cerebral palsy due to physical, cognitive and emotional disabilities that require interventions to optimise function. Barriers to participation can be environmental, financial, cultural, systemic and institutional. This review question seeks to look at what therapeutic interventions for the individual, based on their abilities and aspirations, improve participation.

PICO table

Please see Table 1 for a summary of the Population, Intervention, Comparison and Outcome (PICO) characteristics of this review.

Table 1: Summary of the protocol (PICO table)

Population	Adults aged 25 and over with cerebral palsy (In included studies, all participants should be over 16 years old, but ideally over 25)
Intervention	• Vocational training (for example: multidisciplinary vocational rehabilitation; work skills training; work readiness) • Independent living skills training (for example: life skills training; relationships) • Carer training
Comparison	• Usual care • Within intervention category comparison

Outcome	**Critical**
	• Participation
	  ○ occupation
	  ○ employment
	  ○ vocational activity
	  ○ leisure
	  ○ (AUS)TOMS
	  ○ GAS
	• Independence
	• Health related quality of life
	Important
	• Function
	  ○ COPM
	  ○ FIM or FAM
	• Self-efficacy / self-determination

(AUS)TOMS: (Australian) Therapy Outcome Measures; COPM: Canadian Occupational Performance Measure; FAM: Functional Assessment Measure; FIM: Functional Independence Measure; GAS: Goal Attainment Scale;

For full details see the review protocol in appendix A.

Methods and process

This evidence review was developed using the methods and process described in Developing NICE guidelines: the manual 2014. Methods specific to this review question are described in the review protocol in appendix A and for a full description of the methods see supplementary document C.

Declaration of interests were recorded according to NICE's 2014 conflicts of interest policy from May 2016 until April 2018. From April 2018 onwards they were recorded according to NICE's 2018 conflicts of interest policy. Those interests declared until April 2018 were reclassified according to NICE's 2018 conflicts of interest policy (see Interests Register).

Clinical evidence

Included studies

One cross-sectional study (number of participants, N=3162) was included in the review (Huang 2013).

Huang 2013 was a retrospective cross-sectional study using a United States vocational rehabilitation database to examine whether demographic, work disincentive variables and vocational rehabilitation services predicted employment outcomes in adults with cerebral palsy. The association of different types of rehabilitation services with employment was evaluated using multiple regression controlling for demographic and work disincentive variables.

The clinical studies included in this evidence review are summarised in Table 2 and evidence from these are summarised in the clinical evidence profile below (Table 3Table 3).

See also the literature search strategy in appendix B study selection flow chart in appendix C, study evidence tables in appendix D and forest plots in appendix E.

Excluded studies

Studies excluded from this systematic review, with reasons for their exclusion, are provided in appendix K.

Summary of clinical studies included in the evidence review

Table 2 provides a brief summary of the included study.

Table 2: Summary of included studies

Study	Design	Participants	Comparisons	Outcomes
Huang 2013	Cross-sectional study	N=3162 adults with cerebral palsy aged 16 to 54 years United States of America	• vocational rehabilitation services compared with no rehabilitation services: ○ diagnostics and treatment ○ on-the-job training ○ job placement assistance ○ on-the-job support ○ maintenance ○ rehabilitation technology	Participation (employment)

N: number of participants in study.

See appendix D for the full evidence table.

Quality assessment of clinical studies included in the evidence review

The clinical evidence profile for this review question is presented in Table 3.

Table 3: Summary clinical evidence profile: Comparison 1 vocational rehabilitation versus no vocational rehabilitation

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)[1]	No of Participants (studies)	Quality of the evidence (GRADE)
	Assumed risk without vocational rehabilitation[2]	Corresponding risk with vocational rehabilitation			
Participation: employment (Diagnostics and treatment versus none)	500 per 1000	541 per 1000 (500 to 582)	OR 1.18 (1 to 1.39)[3]	3162 (1 study)	Low
Participation: employment (On-the-job training versus none)	500 per 1000	605 per 1000 (510 to 692)	OR 1.53 (1.04 to 2.25)[3]	3162 (1 study)	Low
Participation: employment (Job placement assistance versus none)	500 per 1000	737 per 1000 (705 to 766)	OR 2.8 (2.39 to 3.28)[3]	3162 (1 study)	Low
Participation: employment (On-the-job support versus none)	500 per 1000	700 per 1000 (659 to 738)	OR 2.33 (1.93 to 2.81)[3]	3162 (1 study)	Low
Participation: employment (Maintenance versus none)	500 per 1000	602 per 1000 (548 to 653)	OR 1.51 (1.21 to 1.88)[3]	3162 (1 study)	Low
Participation: employment (Rehabilitation technology versus none)	500 per 1000	643 per 1000 (597 to 687)	OR 1.8 (1.48 to 2.19)[3]	3162 (1 study)	Low
Independence - not reported	-	-	-	-	-
Health related quality of life - not reported	-	-	-	-	-
Function - not reported	-	-	-	-	-
Self-efficacy - not reported	-	-	-	-	-

CI: Confidence interval; OR: Odds ratio; NR: not reported
1 Univariate rates of employment were not reported according to types of vocational rehabilitation –odds ratios were derived from logistic regression
2 Control risk is the overall employment rate in the study (50%)
3 Odds ratios were adjusted for demographic and work disincentive variables

See appendix F for the full GRADE tables.

Economic evidence

Included studies

A systematic review of the economic literature was conducted, but no studies were identified which were applicable to this review question.

Excluded studies

No studies were identified which were applicable to this review question.

Summary of studies included in the economic evidence review

No economic evaluations were included in this review.

Economic model

This question was not prioritised for economic modelling as the committee considered that it was unlikely that any recommendation made would place additional costs on NHS or PSS budgets.

Resource impact

No unit costs were presented to the committee as these were not prioritised for decision making purposes.

Evidence statements

Comparison 1: Vocational rehabilitation versus no vocational rehabilitation

Critical outcomes

Participation

- Low quality evidenced from 1 cross-sectional study including 3162 adults with cerebral palsy indicated that people who had received certain types of vocational rehabilitation including:
  - diagnostics and treatment,
  - on-the-job training,
  - job placement assistance,
  - on-the-job support,
  - maintenance,
  - and rehabilitation technology,

  were more likely to be in competitive employment than those who had not received those interventions. It was not possible to infer causality, however, as this was an observational study.

Independence

- No evidence was found for this outcome.

Health related quality of life

- No evidence was found for this outcome.

Important outcomes

Function

- No evidence was found for this outcome.

Self-efficacy

- No evidence was found for this outcome.

The committee's discussion of the evidence

Interpreting the evidence

The outcomes that matter most

The critical outcomes for this question were participation and independence because of their role in enabling a person to take a full part in adult life. Health related quality of life was also a critical outcome because of the potential effects of participation in work and leisure on health and wellbeing. Important outcomes were function and self-efficacy.

Evidence was lacking for independence, health related quality of life and the other elements of participation beyond employment (such as vocational and leisure activities).

The quality of the evidence

The quality of the evidence was low according to GRADE, due to the observational nature of the study there may have been important differences between those who did and did not receive vocational rehabilitation. The single included study, however, did attempt to control for group differences in relevant demographic and work disincentive variables including age, ethnic group, co-occurring disabilities, educational level, medical insurance and cash benefits by using multivariate logistic regression analysis. This lends weight to the study findings which indicated those who had received certain types of vocational rehabilitation were more likely to be in competitive employment. However, because of its observational design it was not possible to compare the relative effectiveness of such interventions.

The study was from the USA with a slightly different system of vocational rehabilitation which is not provided directly by the health service.

Evidence was lacking for independent living skills training and for the training of carers.

Benefits and harms

The committee recognised that the Equality Act (2010) protects the rights of people with disability and supports them to overcome barriers to reach their full potential. They noted that any recommendations need to be consistent with this legislation and also support the human rights of adults with cerebral palsy, as set out in the UN Convention on the rights of persons with disabilities, to independence , social and occupational integration, participation in the community, access to training and to engage in work. They did not explicitly state this as a recommendation but noted that their recommendations are drafted to fulfil NICE's obligation to advance equality. However, the committee noted a number of potential environmental, social and institutional barriers to participation that should be minimised in line with governmental policy and legislation.

Based on their experience and expertise they decided to recommend referral to occupational therapy services to people with complex physical, cognitive, language or sensory needs. The committee agreed that such referrals would lead to tailored support in order to increase independence and quality of life.

There is potentially great benefit to be gained from increased independence, social and occupational integration, participation in the life of the community and access to work. The committee agreed, based on their experience that individualised information provision is key to identify which activities the adult with cerebral palsy would like to pursue. Furthermore they highlighted that this information about vocational and independent living skills needs to be tailored to the individual's cognitive, communicative and functional abilities and be relevant to their needs and aspirations. The committee agreed best practice for the format of information provision and how to communicate with adults most effectively, is well described in the NICE guideline on patient experience and NICE's guideline on people's experience in adult social care service to which they cross referred.

In the included study, higher educational attainment and fewer physical complications were associated with gaining paid employment. The committee agreed that this group of adults with cerebral palsy should be supported, but recognised that there are other adults with cerebral palsy who would like to work and/or live independently and should be offered referral to a professional with expertise in vocational and independent living skills, for example an occupational therapist. The benefits of this relate to the provision of information to enable adults to reach their full potential.

If problems in participation were highlighted by the adult with cerebral palsy the committee decided, based on their expertise and experience, that an assessment of physical and psychological factors followed by consideration of specialist input and possible to a professional with expertise in vocational and independent living skills (for example an occupational therapist). Examples of the relevant areas for assessment that the committee discussed included: employment support to include workplace training and job retention, leisure activities, statutory welfare benefits, vocational rehabilitation, voluntary work, job-seeking and access to work schemes, occupational health assessment or workplace assessment, supporting a planned exit from the workforce should it become too difficult to continue working. The committee acknowledged that many related recommendations in the NICE guideline on Workplace health: management practices (NG13) are also relevant and therefore cross-referenced to it.

Cost effectiveness and resource use

The committee noted that no relevant published economic evaluations had been identified for this topic.

The committee recognised that if adults with cerebral palsy are not supported appropriately this can reduce their ability to participate and increase the costs associated with ill-health. The committee therefore prioritised a recommendation to assess someone's physical and psychological health to reinforce current best practice. Estimating the costs to optimise physical and psychological health would go beyond the scope of this guideline, but the committee considered that such interventions would reduce future costs caused through lack of participation and delayed or inappropriate management.

The committee noted that access to risk assessments in the workplace are geographically variable, despite their relatively low cost to perform. This prevents any downstream costs associated with (avoidable) incidents such as strains and falls. Consequently, the committee considered that their recommendation to offer workplace assessment/occupational health assessment to individuals with cerebral palsy would be a cost effective. Even if these recommendations were not cost effective the committee noted that offering such assessments is government legislation and should legally be adhered to regardless of the resource use implications.

The committee agreed that the potential benefits in terms of securing employment and preventing problems associated with isolation would also positively impact on quality of life and participation. Overall, these recommendations are not expected to lead to a significant increase in resource use.

References

Huang 2013

Huang,I.C., Holzbauer,J.J., Lee,E.J., Chronister,J., Chan,F., O'Neil,J., Vocational rehabilitation services and employment outcomes for adults with cerebral palsy in the United States, Developmental Medicine and Child Neurology, 55, 1000-1008, 2013

Appendices

Appendix A – Review protocols

Review protocol for review question D1: Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?

Table 4: Review protocol for interventions to promote participation and function

Field (based on PRISMA-P)	Content
Review question	Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?
Type of review question	Intervention review
Objective of the review	The aim of this review is to determine the relative effectiveness of interventions to promote participation in adults with cerebral palsy
Eligibility criteria – **population**/disease/condition/issue/domain	Adults aged 25 years and over with cerebral palsy (In included studies, all participants should be over 16 years old, but ideally over 25)
Eligibility criteria – **intervention**(s)/exposure(s)/prognostic factor(s)	• Vocational training (for example: multidisciplinary vocational rehabilitation; work skills training; work readiness) • Independent living skills training (for example: life skills training; relationships) • Carer training
Eligibility criteria – **comparator(s)**/control or reference (gold) standard	• Usual care • Within intervention category comparisons

Outcomes and prioritisation	**Critical**
	• Participation
	  ○ occupation
	  ○ employment
	  ○ vocational activity
	  ○ leisure

Field (based on PRISMA-P)	Content
	○ (AUS)TOMS ○ GAS • Independence • Health related quality of life **Important** • Function ○ COPM ○ FIM/FIMFAM • Self-efficacy / self-determination Minimally important differences • Goal Attainment Scale (GAS): 7 units • ICF - Measure of Participation and Activities Screener: 2 units • Canadian Occupational Performance Measure (COPM): 2 units • Australian Therapy Outcome Measures for Occupational Therapy (AUSTOMS): 0.5 units • Assessment of Life Habits: use minimal detectable change for each subdomain reported on rehabmeasures.org • FIM total score 20 points • FAM total score 20 points • Other dichotomous outcomes will use default MIDs [RR thresholds of 0.80 and 1.2] Other continuous outcomes will use default MIDs [0.5 times the SD of the control group]
Eligibility criteria – **study design**	Only published full text papers - • Systematic reviews of RCTs • RCTs • Comparative cohort studies or cross sectional studies (only if RCTs unavailable or limited data to inform decision making) Consider conference abstracts only related to RCTs.

Field (based on PRISMA-P)	Content
Other inclusion **exclusion criteria**	None
Proposed sensitivity/**sub-group analysis**, or meta-regression	Groups that will be reviewed and analysed separately: none identified In the presence of heterogeneity, the following subgroups will be considered for sensitivity analysis: • Population subgroups: o Level of functional disability o Age groups (proportion who are younger than 25 years) o Learning difficulties • Intervention subgroups: o Type of carer (paid, family – for carer training) o Setting (residential versus others) o Subtype of intervention (we anticipate there will be a variety of ways of delivering skills training programs) o Who carries them out (occupational Therapists, rehabilitation workers, psychologists, consultant rehabilitation neurologists) o How long are they provided (duration) o How intensely are they provided (frequency) Age and level of functional disability will be also considered important confounders which ideally should be adjusted for in any included comparative observational studies.
Selection process – duplicate screening/selection/analysis	A random sample of the references identified in the search will be sifted by a second reviewer. This sample size will be 10% of the total, or 100 studies if the search identifies fewer than 1000 studies. All disagreements in study inclusion will be discussed and resolved between the two reviewers. The senior systematic reviewer or guideline lead will be involved if discrepancies cannot be resolved between the two reviewers.
Data management (software)	STAR was used to sift through the references identified by the search, and for data extraction Pairwise meta-analyses and production of forest plots was done using Cochrane Review Manager (RevMan5). 'GRADEpro' was used to assess the quality of evidence for each outcome.
Information sources – databases and dates	See literature search strategy in appendix B.

Field (based on PRISMA-P)	Content
Identify if an update	Not an update
Author contacts	For details please see the guideline in development web site.
Highlight if amendment to previous protocol	For details please see section 4.5 of Developing NICE guidelines: the manual 2014
Search strategy – for one database	For details please see appendix B.
Data collection process – forms/duplicate	A standardised evidence table format will be used, and published as appendix D (clinical evidence tables) or H (economic evidence tables).
Data items – define all variables to be collected	For details please see evidence tables in appendix D (clinical evidence tables) or H (economic evidence tables).
Methods for assessing bias at outcome/study level	Standard study checklists were used to critically appraise individual studies. For details please see section 6.2 of Developing NICE guidelines: the manual 2014 The risk of bias across all available evidence was evaluated for each outcome using an adaptation of the 'Grading of Recommendations Assessment, Development and Evaluation (GRADE) toolbox' developed by the international GRADE working group http://www.gradeworkinggroup.org/
Criteria for quantitative synthesis	For details please see section 6.4 of Developing NICE guidelines: the manual 2014
Methods for quantitative analysis – combining studies and exploring (in)consistency	For details please see the separate methods document (supplementary document C). Meta-analysis will be conducted where appropriate.
Meta-bias assessment – publication bias, selective reporting bias	For details please see section 6.2 of Developing NICE guidelines: the manual 2014.
Confidence in cumulative evidence	For details please see sections 6.4 and 9.1 of Developing NICE guidelines: the manual 2014
Rationale/context – what is known	For details please see the introduction to the evidence review.
Describe contributions of authors and guarantor	A multidisciplinary committee developed the evidence review. The committee was convened by the National Guideline Alliance (NGA) and chaired by Dr Paul Eunson in line with section 3 of Developing NICE guidelines: the manual 2014. Staff from the NGA undertook systematic literature searches, appraised the evidence, conducted meta-analysis and cost effectiveness analysis where appropriate, and drafted the guideline in collaboration with the committee. For details please see the methods in supplementary document C.

Field (based on PRISMA-P)	Content
Sources of funding/support	The NGA is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists.
Name of sponsor	The NGA is funded by NICE and hosted by the Royal College of Obstetricians and Gynaecologists.
Roles of sponsor	NICE funds NGA to develop guidelines for those working in the NHS, public health and social care in England
PROSPERO registration number	Not applicable

AUSTOMS: Australian Therapy Outcome Measures for Occupational Therapy; ; COPM: Canadian Occupational Performance Measure; ; FIM: functional independence measure; FAM: functional ability measure; GRADE: Grading of Recommendations Assessment, Development and Evaluation; GAS: Goal Attainment Scale; ; ICF: International Classification of Functioning, Disability and Health; MID: minimally important difference; NGA: National Guideline Alliance; NHS: National health service; NICE: National Institute for Health and Care Excellence; RCT: randomised controlled trial; RoB: risk of bias; SD: standard deviation

Appendix B – Literature search strategies

Literature searches for review question D1: Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?

This appendix is a combined search strategy and will be the same for all the evidence reviews for the D review questions as listed below:

D1: Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?

D2: Which interventions are effective for maintaining physical function and mobility in adults with cerebral palsy?

- Physical activity
- Strengthening programmes or training
- Orthotics
- Task-oriented upper limb training
- Orthopaedic surgery (including tendon lengthening and orthopaedic bone procedures in adulthood).

D3: What is the effectiveness of electronic assistive technology in promoting independence in adults with cerebral palsy?

D4: Which interventions (for example augmentative and alternative communication systems) are effective in promoting communication for adults with cerebral palsy who have communication difficulties?

Database: Medlife & Embase (Multifile)

Database(s): Embase 1974 to 2018 March 22, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1946 to Present

Table 5: Last searched on 22 March 2018

#	Searches
1	exp Cerebral Palsy/ use prmz
2	exp cerebral palsy/ use oemezd
3	((cerebral or brain or central) adj2 (pal* or paralys#s or pares#s)).tw.
4	cerebral palsy.ti,ab.
5	little? disease.tw.
6	((hemipleg* or dipleg* or tripleg* or quadripleg* or unilateral*) adj5 spastic*).tw.
7	((hemipleg* or dipleg* or tripleg* or quadripleg* or unilateral*) adj3 ataxi*).tw.
8	or/1-7
9	limit 8 to english language
10	limit 9 to (adult <18 to 64 years> or aged <65+ years>) use oemezd [Limit not valid in Ovid MEDLINE(R),Ovid MEDLINE(R) In-Process; records were retained]
11	limit 9 to "all adult (19 plus years)" [Limit not valid in Embase; records were retained]
12	11 use prmz

#	Searches
13	or/10,12
14	exp Community Participation/ or exp Social Participation/ or exp "Activities of Daily Living"/ or exp Independent Living/ or exp Vocational Education/ or exp "Quality of Life"/ or exp Hearing Aids/ or exp Wheelchairs/ or exp Needs Assessment/ or exp Disability Evaluation/ or exp Self-Help Devices/ or exp Sickness Impact Profile/ or exp Sensory Aids/ or exp "Prostheses and Implants"/ or exp Orthotic Devices/ or exp Equipment Design/ or exp User-Computer Interface/ or exp communication aids for disabled/ or exp speech disorder/rh or exp Exercise/ or exp Rehabilitation/mt or exp Sports/ or exp Exercise Therapy/ or exp Orthopedic Procedures/ or exp Physical Therapy Modalities/
15	14 use prmz
16	social behavior/ or exp social adaptation/ or exp social participation/ or exp social interaction/ or exp community integration/ or exp community living/ or exp daily life activity/ or exp independent living/ or exp vocational education/ or exp "quality of life"/ or exp hearing aid/ or exp wheelchair/ or exp needs assessment/ or exp disability/ or exp self help device/ or exp Sickness Impact Profile/ or exp sensory aid/ or exp "prostheses and orthoses"/ or exp orthosis/ or exp implant/ or exp equipment design/ or exp computer interface/ or exp exercise/ or exp rehabilitation/ or exp self help/ or exp assistive technology/ or exp vocational guidance/ or exp communication aid/ or exp facilitated communication/ or exp eye tracking/ or exp sport/ or exp kinesiotherapy/ or exp orthopedic surgery/ or exp physiotherapy/
17	16 use oemezd
18	(participat* or (daily adj activit*) or (independen* adj5 liv*) or age* or aging or gender or motivat* or preference* or limitation* or restriction* or capacit* or performance* or (handl* adj5 object*) or assistive technolog* or (social adj5 interaction*) or employ* or vocation* or occupat* or educat* or profession* or isolat* or leisure activit* or mobil* or communicat* or eat* or dining or drink* or dress* or interact* or ((assistive or adaptive) adj5 (technolog* or device* or system*)) or home or school or work* or communit* or play* or eye tracking or sporting activit* or swim* or aqua* or upper limb training or bony procedure* or (neuro-developmental adj (treatment* or therap* or training)) or NDT or (muscle adj (tissue or tone)) or ((strength* or endurance) adj5 (program* or training*)) or ((tendon* or muscle*) adj (length* or stretch*)) or treadmill* or weight*).tw.
19	(augmentative or alternative communication or AAC or voice synthesizer* or accommodation* or sign language or gestur* or manual language board* or high?tech or touch screen* or speech?generating* or electronic keyboard* or phone* or iPad* or laptop* or computer* or modificat* or modify* or adapt* or custom* or tailor* or assist* or ((walking or hearing) adj aid*) or (communication adj (device* or system* or board*))).ti,ab.
20	15 or 17 or 18 or 19
21	13 and 20
22	conference abstract.pt. use oemezd
23	letter.pt. or LETTER/ use oemezd
24	Letter/ use prmz
25	EDITORIAL/ use prmz
26	editorial.pt. use oemezd
27	NEWS/ use prmz
28	exp HISTORICAL ARTICLE/ use prmz
29	note.pt. use oemezd
30	ANECDOTES AS TOPIC/ use prmz
31	COMMENT/ use prmz

#	Searches
32	CASE REPORT/ use prmz
33	CASE REPORT/ use oemezd
34	CASE STUDY/ use oemezd
35	(letter or comment* or abstracts).ti.
36	or/22-35
37	RANDOMIZED CONTROLLED TRIAL/ use prmz
38	RANDOMIZED CONTROLLED TRIAL/ use oemezd
39	random*.ti,ab.
40	or/37-39
41	36 not 40
42	ANIMALS/ not HUMANS/ use prmz
43	ANIMAL/ not HUMAN/ use oemezd
44	exp ANIMALS, LABORATORY/ use prmz
45	exp ANIMAL EXPERIMENTATION/ use prmz
46	exp MODELS, ANIMAL/ use prmz
47	exp RODENTIA/ use prmz
48	NONHUMAN/ use oemezd
49	exp ANIMAL EXPERIMENT/ use oemezd
50	exp EXPERIMENTAL ANIMAL/ use oemezd
51	ANIMAL MODEL/ use oemezd
52	exp RODENT/ use oemezd
53	(rat or rats or mouse or mice).ti.
54	or/41-53
55	21 not 54

Database: Cochrane Library

Table 6: Last searched on 22 March 2018

Hits	Search
#1	MeSH descriptor: [Cerebral Palsy] explode all trees and with qualifier(s): [Physiopathology - PP, Rehabilitation - RH]
#2	((cerebral or brain or central) N2 (pal* or paralys?s or pare?s))
#3	((hemipleg* or dipleg* or tripleg* or quadripleg* or unilateral*) N5 spastic*)
#4	((hemipleg* or dipleg* or tripleg* or quadripleg* or unilateral*) N3 ataxi*)
#5	#1 or #2 or #3 or #4
#6	MeSH descriptor: [Social Behavior] explode all trees
#7	MeSH descriptor: [Social Participation] explode all trees
#8	MeSH descriptor: [Interpersonal Relations] explode all trees
#9	MeSH descriptor: [Community Integration] explode all trees
#10	MeSH descriptor: [Independent Living] explode all trees
#11	MeSH descriptor: [Activities of Daily Living] explode all trees

Hits	Search
#12	MeSH descriptor: [Vocational Education] explode all trees
#13	MeSH descriptor: [Quality of Life] explode all trees
#14	MeSH descriptor: [Hearing Aids] explode all trees
#15	MeSH descriptor: [Wheelchairs] explode all trees
#16	MeSH descriptor: [Needs Assessment] explode all trees
#17	MeSH descriptor: [Disability Evaluation] explode all trees
#18	MeSH descriptor: [Self-Help Devices] explode all trees
#19	MeSH descriptor: [Sickness Impact Profile] explode all trees
#20	MeSH descriptor: [Sensory Aids] explode all trees
#21	MeSH descriptor: [Prostheses and Implants] explode all trees
#22	MeSH descriptor: [Orthotic Devices] explode all trees
#23	MeSH descriptor: [Equipment Design] explode all trees
#24	MeSH descriptor: [User-Computer Interface] explode all trees
#25	MeSH descriptor: [Exercise] explode all trees
#26	MeSH descriptor: [Rehabilitation] explode all trees
#27	MeSH descriptor: [Vocational Guidance] explode all trees
#28	MeSH descriptor: [Communication Aids for Disabled] explode all trees
#29	MeSH descriptor: [Eye Movements] explode all trees
#30	MeSH descriptor: [Sports] explode all trees
#31	MeSH descriptor: [Exercise Therapy] explode all trees
#32	MeSH descriptor: [Orthopedic Procedures] explode all trees
#33	MeSH descriptor: [Physical Therapy Modalities] explode all trees
#34	sporting activit* or swim* or aqua* or upper limb training or bony procedures or Neuro-developmental near (Treatment* or therap* or training) or NDT or muscle tissue or muscle tone or strength* or endurance or length* or stretch* or treadmill* or weight*
#35	participat* or independent liv* or age or aging or limitation* or restriction* or capacit* or performance* or Assistive technolog* or augmentative communication or alternative communication or AAC or employ* or vocation* or occupat* or educat* or profession* or leisure activit* or interaction* or home or school or work* or communit* or play* or accommodation* or sign language or gestur* or manual language board* or high?tech or touch screen* or speech?generating* or electronic keyboard* or phone* or iPad* or laptop* or computer or eye tracking or modif* or adapt* or custom* or tailor* or assist* or walking aid* or hearing aid*
#36	{or #6-#35}
#37	#5 and #36

Database: WEB OF SCIENCE

Table 7: Last searched on 22 March 2018

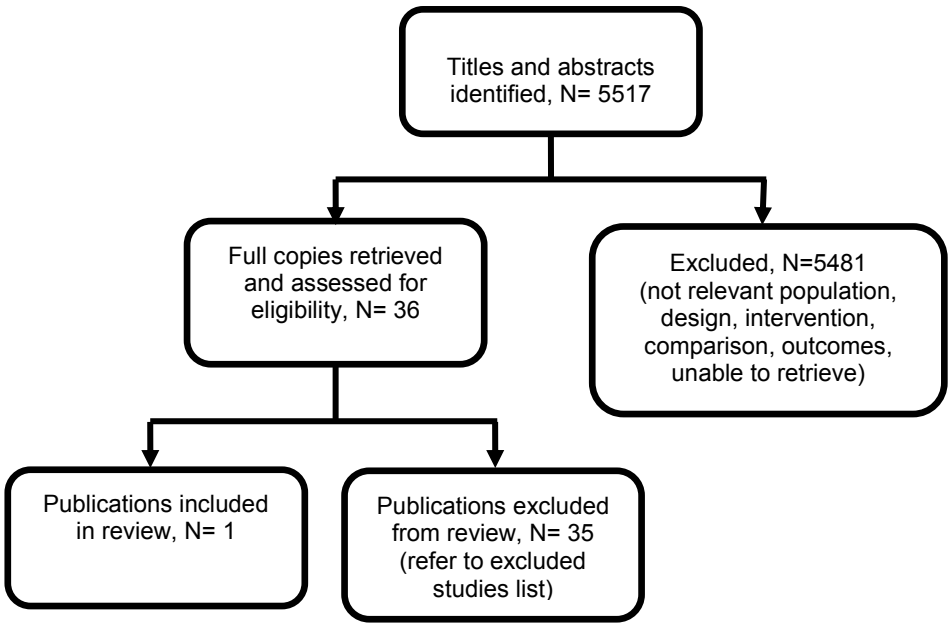
#3	#2 AND #1 AND LANGUAGE: (English)
#2	ts=Social Behavior or ts=Social Participation or ts=Interpersonal Relations or ts=Community Integration or ts=Independent Living or ts=Activities of Daily Living or ts=Vocational Education or ts=Quality of Life or ts=Hearing Aid* or ts=Wheelchair* or ts=Disability Evaluation or ts=Needs Assessment or ts=Self-Help Device* or ts=Sensory Aid* or

#3	#2 AND #1 AND LANGUAGE: (English)
	ts=Prostheses or ts=Implant* or ts=Orthotic Device* or ts=Equipment Design or ts=User-Computer Interface or ts=Exercise* or ts=Rehabilitation or ts=Vocational Guidance or ts=Sport* or ts=Exercise Therap* or ts=Orthopedic Surgery or ts=Physiotherapy OR TS=Assistive technolog* or TS=augmentative communication or TS=alternative communication or TS=AAC OR TS=manual language board* or TS=high?tech or TS=touch screen* or TS=speech?generating* or TS=electronic keyboard* or TS=phone* or TS=iPad* or TS=laptop* or TS=eye tracking
#1	ts=Cerebral Palsy

Appendix C – Clinical evidence study selection

Clinical evidence study selection for review question D1: Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?

Figure 1: Flow diagram of clinical article selection for interventions to promote participation in adults with cerebral palsy review



Appendix D – Clinical evidence tables

Clinical evidence tables for review question D1: Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?

Table 8: Studies included in the evidence review for interventions for participation

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Full citation
Huang,I.C., Holzbauer,J.J., Lee,E.J., Chronister,J., Chan,F., O'Neil,J., Vocational rehabilitation services and employment outcomes for adults with cerebral palsy in the United States, Developmental Medicine and Child Neurology, 55, 1000-1008, 2013
Ref Id
317351
Country/ies where the study was carried out
USA</td>
<td>Sample size
3162
Characteristics
Age 16 to 54 years
57.6% males
9.2% were diagnosed with an intellectual disability and 3.4% had co-occurring epilepsy.
54% reported receiving cash benefits
60% reported receiving medical insurance (for example: Medicare/Medicaid)
Inclusion criteria
People with CP whose details were entered in the US Department of Education Rehabilitation Service Administration Case Service</td>
<td>Interventions
Vocational rehabilitation services, classified as one of the following:
• Assessment
• Diagnosis and treatment of impairments
• Vocational rehabilitation counselling and guidance
• College or university training
• Occupational/vocational training
• On-the-job training
• Basic academic remedial or literacy training
• Job readiness training
• Disability-related augmentative skills training
• Miscellaneous training
• Job search assistance
• Job placement assistance</td>
<td>Details
Multivariate logistic regression was used to examine determinants of employability for adults with CP receiving vocational rehabilitation services.
Three sets of predictor variables were used for the analysis, including demographic variables, work disincentive variables, and rehabilitation</td>
<td>Results
Demographic, work incentive and vocational rehabilitation predictors of employment outcomes:
<table>
<tr><th>Predictor variable</th><th>B</th><th>SE</th><th>df</th><th>p</th><th>Exp (B)</th><th>95% CI</th></tr>
<tr><td>Sex (with female as the reference category)</td><td>0.24</td><td>0.08</td><td>1</td><td>0.002</td><td>1.27</td><td>1.09–1.48</td></tr>
<tr><td>Age at application (with 26–54y as the reference category)</td><td></td><td></td><td>2</td><td><0.001</td><td></td><td></td></tr>
<tr><td>16–20y</td><td>–0.39</td><td>0.09</td><td>1</td><td><0.001</td><td>0.68</td><td>0.56–0.81</td></tr>
<tr><td>21–25y</td><td>–0.15</td><td>–0.12</td><td>1</td><td>0.2</td><td>0.86</td><td>0.69–1.08</td></tr>
<tr><td>African- or Native-American race (with European-, Asian-, and Hispanic-American as the reference category)</td><td>0.13</td><td>0.11</td><td>1</td><td>0.225</td><td>1.14</td><td>0.92–1.42</td></tr>
<tr><td>Education level (with lower than bachelor degree as the reference category)</td><td>1.01</td><td>0.16</td><td>1</td><td><0.001</td><td>2.74</td><td>2.02–3.71</td></tr>
<tr><td>Medical insurance (with ‘No’ as the reference category)</td><td>–0.12</td><td>0.07</td><td>1</td><td>0.105</td><td>0.89</td><td>0.77–1.03</td></tr>
<tr><td>Cash benefits (with ‘No’ as the reference category)</td><td>–0.61</td><td>0.1</td><td>1</td><td><0.001</td><td>0.55</td><td>0.45–0.66</td></tr>
<tr><td>Diagnostics and treatment (with ‘No’ as</td><td>0.16</td><td>0.09</td><td>1</td><td>0.058</td><td>1.18</td><td>1.00–1.39</td></tr>
</table>
</td>
<td>Limitations
ROBINS-I checklist
Bias due to confounding: low risk
Bias in selection of participants into the study: low risk
Bias in classification of intervention: moderate risk. Due to subjective recall bias, rehabilitation counsellors handle and enter case service information at various stages in the rehabilitation process and</td>
</tr>
</table>

<table>
<tr><th>Study details</th><th>Participants</th><th>Interventions</th><th>Methods</th><th>Outcomes and Results</th><th>Comments</th></tr>
<tr>
<td>Study type
Cross-sectional study.
Aim of the study
To examine the relationship between vocational rehabilitation services provided and work outcomes among people with cerebral palsy, while accounting for demographic characteristics.
Study dates
2009 - this was the most current dataset available
Source of funding
Funded by a a grant from the Department of Education, National Institute on Disability and Rehabilitation</td>
<td>Report (RSA-911) database whose cases were closed in 2009.
Exclusion criteria
People who were ineligible for vocational rehabilitation services with an individualized plan for employment.</td>
<td>• On-the-job support
• Transportation services
• Maintenance
• Rehabilitation technology</td>
<td>service variables.
Competitive employment was the outcome measure defined as working full time or part time in an integrated competitive setting, in self-employment or in a state-managed business enterprise programme with an income compensated at or above the minimum wage.</td>
<td>
<table>
<tr><td>the reference category)</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>On-the-job training (with ‘No’ as the reference category)</td><td>0.43</td><td>0.2</td><td>1</td><td>0.031</td><td>1.53</td><td>1.04–2.25</td></tr>
<tr><td>Job placement assistance (with ‘No’ as the reference category)</td><td>1.03</td><td>0.08</td><td>1</td><td><0.001</td><td>2.8</td><td>2.39–3.28</td></tr>
<tr><td>On-the-job support (with ‘No’ as the reference category)</td><td>0.84</td><td>0.1</td><td>1</td><td><0.001</td><td>2.33</td><td>1.93–2.80</td></tr>
<tr><td>Maintenance (with ‘No’ as the reference category)</td><td>0.41</td><td>0.11</td><td>1</td><td><0.001</td><td>1.51</td><td>1.21–1.87</td></tr>
<tr><td>Rehabilitation technology (with ‘No’ as the reference category)</td><td>0.59</td><td>0.1</td><td>1</td><td><0.001</td><td>1.8</td><td>1.48–2.18</td></tr>
<tr><td>Constant</td><td>–0.65</td><td>0.15</td><td>1</td><td><0.001</td><td>0.52</td><td></td></tr>
</table>
B, logistic regression coefficient; CI, confidence interval; df, degrees of freedom; Exp (B), odds ratio; SE, standard error.
</td>
<td>may rely on recall rather than the case file itself.
Bias due to deviations from intended interventions: low risk
Bias due to missing data: no information
Bias in measurement of outcomes: moderate risk. Due to subjective recall bias, as above.
Bias in selection of the reported result: low risk
Overall bias: low risk

Other information</td>
</tr>
</table>

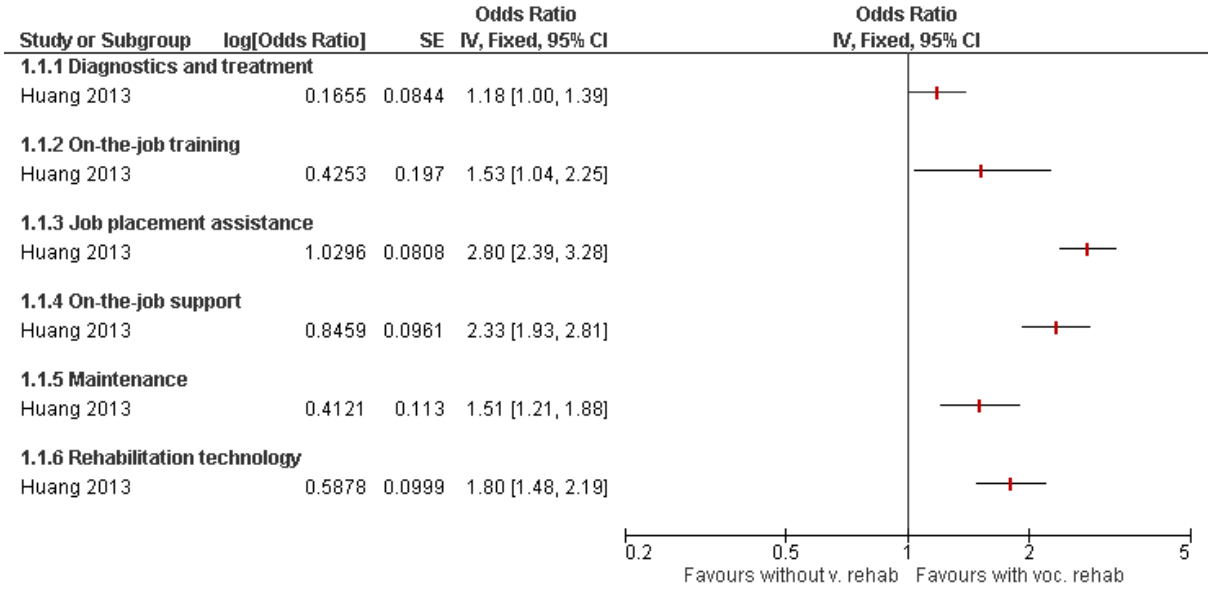
Study details	Participants	Interventions	Methods	Outcomes and Results	Comments
Research (NIDRR). Grant number PR# H133B100034.					

Appendix E – Forest plots

Forest plots for review question D1: Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?

Comparison 1: vocational rehabilitation versus no vocational rehabilitation

Figure 2: Employment in adults with cerebral palsy according to type of vocational rehabilitation received



CI: confidence interval; IV: inverse variance; SE: standard error; v(voc) rehab: vocational rehabilitation

Appendix F – GRADE tables

GRADE tables for review question D1: Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?

Table 9: Clinical evidence profile: Comparison 1: vocational rehabilitation versus no vocational rehabilitation

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision[4]**	**Other considerations**	**Vocational rehabilitation[2]**	**No (or other type) of vocational rehabilitation[2]**	**Relative (95% CI)**	**Absolute[1]**		
Participation: Competitive employment - Diagnostics and treatment versus none												
1	observational studies	no serious risk of bias	no serious inconsistency	no serious indirectness	no serious imprecision	none	943 50%	2219	OR 1.18 (1 to 1.39)[3]	- 41 more per 1000 (from 0 more to 82 more)	LOW	CRITICAL
Participation: Competitive employment - On-the-job training versus none												
1	observational studies	no serious risk of bias	no serious inconsistency	no serious indirectness	no serious imprecision	none	145 50%	3017	OR 1.53 (1.04 to 2.25)[3]	- 105 more per 1000 (from 10 more to 192 more)	LOW	CRITICAL

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision[4]**	**Other considerations**	**Vocational rehabilitation[2]**	**No (or other type) of vocational rehabilitation[2]**	**Relative (95% CI)**	**Absolute[1]**		
Participation: Competitive employment - Job placement assistance versus none												
1	observational studies	no serious risk of bias	no serious inconsistency	no serious indirectness	no serious imprecision	none	1289	1873 50%	OR 2.8 (2.39 to 3.28)[3]	- 237 more per 1000 (from 205 more to 266 more)	LOW	CRITICAL
Participation: Competitive employment - On-the-job support versus none												
1	observational studies	no serious risk of bias	no serious inconsistency	no serious indirectness	no serious imprecision	none	767	2395 50%	OR 2.33 (1.93 to 2.81)[3]	- 200 more per 1000 (from 159 more to 238 more)	LOW	CRITICAL
Participation: Competitive employment - Maintenance versus none												
1	observational studies	no serious risk	no serious inconsistency	no serious indirectness	no serious imprecision	none	469	2693 50%	OR 1.51 (1.21	- 102 more per	LOW	CRITICAL

Quality assessment							No of patients		Effect		Quality	Importance
No of studies	**Design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision[4]**	**Other considerations**	**Vocational rehabilitation[2]**	**No (or other type) of vocational rehabilitation[2]**	**Relative (95% CI)**	**Absolute[1]**		
		of bias							to 1.88) [3]	1000 (from 48 more to 153 more)		
Participation: Competitive employment - Rehabilitation technology versus none												
1	observational studies	no serious risk of bias	no serious inconsistency	no serious indirectness	no serious imprecision	none	651	2511 50%	OR 1.8 (1.48 to 2.19)[3]	- 143 more per 1000 (from 97 more to 187 more)	LOW	CRITICAL
Independence - not reported												
-	-	-	-	-	-	-	-	-	-	-		CRITICAL
Health related quality of life - not reported												
-	-	-	-	-	-	-	-	-	-	-		CRITICAL
Function - not reported												
-	-	-	-	-	-	-	-	-	-	-		IMPORTANT
Self-efficacy - not reported												
-	-	-	-	-	-	-	-	-	-	-		IMPORTANT

CI: confidence interval: OR: odds ratio

1. Control risk is the overall employment rate in the study (50%)
2. The event rates for each rehabilitation type were not reported: the odds ratios were derived from logistic regression
3 Odds ratios were adjusted for demographic and work disincentive variables

4 In the absence of default thresholds for imprecision of odds ratios, a threshold of ≤300 events was used to define serious imprecision

Appendix G – Economic evidence study selection

Economic evidence study selection for review question D1: Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?

No economic evidence was identified for this review.

Appendix H – Economic evidence tables

Economic evidence tables for review question D1: Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?

No economic evidence was identified for this review.

Appendix I – Health economic evidence profiles

Health economic evidence profiles for review question D1: Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?

No economic evidence was identified for this review.

Appendix J – Health economic analysis

Health economic analysis for review question D1: Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?

No economic evidence was included in this review.

Appendix K – Excluded studies

Clinical and economic list of excluded studies for review question D1: Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?

Clinical studies

Table 10: Excluded clinical studies for vocational and independent living skills

Excluded studies – D1 Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?	
Study	**Reason for Exclusion**
Alves-Pinto, A., Ehrlich, S., Cheng, G., Turova, V., Blumenstein, T., Lampe, R., Effects of short-term piano training on measures of finger tapping, somatosensory perception and motor-related brain activity in patients with cerebral palsy, Neuropsychiatric Disease and Treatment, 13, 2705-2718, 2017	The outcome measures do not match the protocol
Becker, H., Schaller, J., Perceived Health and Self-Efficacy among Adults with Cerebral-Palsy, Journal of rehabilitation, 61, 36-42, 1995	This study does not compare interventions
Benner, J. L., Hilberink, S. R., Veenis, T., van der Slot, W. M. A., Roebroeck, M. E., Course of employment in adults with cerebral palsy over a 14-year period, Developmental Medicine and Child Neurology, 59, 762-768, 2017	This study does not compare interventions
Clark, G. F., Vocational-Education for Multihandicapped Youth with Cerebral-Palsy - Wehman,P, Wood,W, Everson,Jm, Goodwyn,R, Conley,S, American Journal of Occupational Therapy, 44, 377-377, 1990	Book review
Eismann, M. M., Weisshaar, R., Capretta, C., Cleary, D. S., Kirby, A. V., Persch, A. C., Characteristics of Students Receiving Occupational Therapy Services in Transition and Factors Related to Postsecondary Success, American Journal of Occupational Therapy, 71, 7103100010p1-7103100010p8, 2017	This study does not compare interventions
Galambos, N. L., Magill-Evans, J., Darrah, J., Psychosocial Maturity in the Transition to Adulthood for People With and Without Motor Disabilities, Rehabilitation Psychology, 53, 498-504, 2008	See Magill-Evans 2008
Goodrich, E., Wahbeh, H., Mooney, A., Miller, M., Oken, B. S., Teaching mindfulness meditation to adults with severe speech and physical impairments: An exploratory study, Neuropsychological Rehabilitation, 25, 708-32, 2015	2/5 participants had CP. No effectiveness data reported
Huang,I.C., Wang,Y.T., Chan,F., Employment outcomes of adults with cerebral palsy in Taiwan, Disability and Rehabilitation, 35, 228-235, 2013	Predictors of employment - not intervention study
Hutchison, J., College students who have cerebral palsy. A follow-up study of employment, The Cerebral palsy journal, 29, 3-7, 1968	Describes predictors of employment in those with CP - does not compare interventions

Excluded studies – D1 Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?	
Study	**Reason for Exclusion**
Karlsson, B., Gardestroem, L., Nordqvist, I., Jacobson, F., Cerebral Palsy in Young Adults. A Socio-Medical Study with Special Regard to Employment Problems, Developmental Medicine & Child Neurology, 7, 269-77, 1965	Not interventional study
Lindsay, S., Discrimination and other barriers to employment for teens and young adults with disabilities, Disability and rehabilitation, 33, 1340-1350, 2011	This study does not compare interventions
Mackeith, R. C., Bax, M. C., Assessment, training and employment of adolescents and young adults with cerebral palsy. 2. What facilities are needed, Cerebral palsy bulletin, 3, 135-8, 1961	Expert review
Magill-Evans,J., Galambos,N., Darrah,J., Nickerson,C., Predictors of employment for young adults with developmental motor disabilities, Work, 31, 433-442, 2008	Predictors of employment - not intervention study
Majnemer, A., Shikako-Thomas, K., Lach, L., Shevell, M., Law, M., Schmitz, N., Poulin, C., Quala Group, Rehabilitation service utilization in children and youth with cerebral palsy, Child: Care, Health & Development, 40, 275-82, 2014	Demographics of rehabilitation service users - no comparison of interventions
Michelsen, S. I., Uldall, P., Kejs, A. M. T., Madsen, M., Education and employment prospects in cerebral palsy, Developmental Medicine and Child Neurology, 47, 511-517, 2005	Study of CP characteristics related to employment or educational status
Morgan, M. R., Assessment, training and employment of adolescents and young adults with cerebral palsy. 3. Facilities now available, Cerebral palsy bulletin, 3, 139-44, 1961	Expert review of services in 1961
Murphy,K.P., Molnar,G.E., Lankasky,K., Employment and social issues in adults with cerebral palsy, Archives of Physical Medicine and Rehabilitation, 81, 807-811, 2000	Compares educational level with employment status in those with CP Not an intervention study
Nielsen, H. H., A follow-up study of young cerebral palsied patients. Some psychological, educational and vocational aspects, Scandinavian Journal of Psychology, 16, 217-24, 1975	Predictors of education
O'Grady, R. S., Nishimura, D. M., Kohn, J. G., Bruvold, W. H., Vocational predictions compared with present vocational status of 60 young adults with cerebral palsy, Developmental Medicine & Child Neurology, 27, 775-84, 1985	Not an intervention study
Roebroeck, M. E., Van Den Bergemons, H. J. G., Nieuwenhuijsen, C., Hilberink, S. R., Van Der Slot, W. M. A., Van Meeteren, J., Stam, H. J., Innovating transition and lifespan care for people with cerebral palsy, Developmental medicine and child neurology, 52, 74, 2010	Abstract only
Ryan, J. M., Cassidy, E. E., Noorduyn, S. G., O'Connell, N. E., Exercise interventions for cerebral palsy, Cochrane Database of Systematic ReviewsCochrane Database Syst Rev, 6, CD011660, 2017	The interventions do not match the protocol References were checked but none could be included

Excluded studies – D1 Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?	
Study	**Reason for Exclusion**
Sillanpaa, M., Piekkala, P., Pisirici, H., The young adult with cerebral palsy and his chances of employment, International Journal of Rehabilitation Research, 5, 467-76, 1982	Observational study of employment outcomes in CP
Tarsuslu, T., Livanelioglu, A., Relationship between quality of life and functional status of young adults and adults with cerebral palsy, Disability & Rehabilitation, 32, 1658-65, 2010	Compares functional status and QOL - not an intervention study
Tobimatsu, Y., Nakamura, R., Retrospective study of factors affecting employability of individuals with cerebral palsy in Japan, Tohoku Journal of Experimental Medicine, 192, 291-9, 2000	Factors predicting employment - not intervention study
Tornbom, K., Tornbom, M., Sunnerhagen, K. S., Experiences of participation in a Swedish society among adults with cerebral palsy or spina bifida: involvement and challenges, Journal of Social Work in Disability & Rehabilitation, 12, 256-71, 2013	See Tornbom 2014
Tornbom, M., Jonsson, U., Sunnerhagen, K. S., Work participation among middle-aged persons with cerebral palsy or spina bifida - A longitudinal study, Disability and Health Journal, 7, 251-255, 2014	Longitudinal study of employment - not intervention study
van der Dussen, L., Niewstraten, W., Roebroeck, M., Stam, H. J., Functional level of young adults with cerebral palsy, Clinical Rehabilitation, 15, 84-91, 2001	Not interventional study
van der Slot, W. M. A., Nieuwenhuijsen, C., van den Berg-Emons, R. J. G., Wensink-Boonstra, A. E., Stam, H. J., Roebroeck, M. E., Participation and Health-Related Quality of Life in Adults with Spastic Bilateral Cerebral Palsy and the Role of Self-Efficacy, Journal of rehabilitation medicine, 42, 528-535, 2010	Not intervention study
van der Slot, W. M. A., Roebroeck, M. E., Landkroon, A. P., Terburg, M., van den Berg-Emons, R. J. G., Stam, H. J., Everyday physical activity and community participation of adults with hemiplegic cerebral palsy, Disability and rehabilitation, 29, 179-189, 2007	Not an intervention study
van der Slot, W. M., Nieuwenhuijsen, C., van den Berg-Emons, R. J., Wensink-Boonstra, A. E., Stam, H. J., Roebroeck, M. E., Transition Research Group South West, Netherlands, Participation and health-related quality of life in adults with spastic bilateral cerebral palsy and the role of self-efficacy, Journal of Rehabilitation Medicine, 42, 528-35, 2010	Not intervention study
Verhoef, J. A. C., Roebroeck, M. E., van Schaardenburgh, N., Floothuis, Mcsg, Miedema, H. S., Improved Occupational Performance of Young Adults with a Physical Disability After a Vocational Rehabilitation Intervention, Journal of Occupational Rehabilitation, 24, 42-51, 2014	3/11 had CP
Verhoef, J. A., Bramsen, I., Miedema, H. S., Stam, H. J., Roebroeck, M. E., Transition,, Lifespan Research Group South West, Netherlands, Development of work participation in young adults with cerebral palsy: a longitudinal study, Journal of Rehabilitation Medicine, 46, 648-55, 2014	Predictors of employment - not intervention study
Wehman,P.H., Revell,W.G., Kregel,J., Kreutzer,J.S., Callahan,M., Banks,P.D., Supported employment: an alternative model for vocational rehabilitation of persons with severe neurologic, psychiatric, or physical	This study does not compare interventions

Excluded studies – D1 Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?	
Study	**Reason for Exclusion**
disability, Archives of Physical Medicine and Rehabilitation, 72, 101-105, 1991	
Wigfield, M. E., Cerebral palsy: altered sensation, astereognosis and sensory perception in relation to vocational training and job performance, Clinical Orthopaedics & Related Research, 46, 93-108, 1966	Describes the Sherrards vocational training program (1966)
Yue, S. J., Moed, M. G., Medical and vocational evaluation of young adult cerebral palsied: experience and followup, 157 cases, Archives of Physical Medicine & Rehabilitation, 41, 136-42, 1960	Non-comparative study - reports outcomes of a brief vocational training intervention

CP: cerebral palsy; QOL: quality of life

Economic studies

No economic evidence was identified for this review.

Appendix L – Research recommendations

Research recommendations for review question D1: Which interventions (for example, vocational and independent living skills training) promote participation in adults with cerebral palsy?

No research recommendation was made for this review.