



Bilaga 5. Tabeller över inkluderade studier som ligger till grund för resultatet/ Characteristics of included studies

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Table 5.1 Specialised inpatient rehabilitation, moderate to severe TBI

First author Year Reference Country	Study design Setting Patient characteristics Blinding	Interventions Nr of individuals Withdrawal/ Follow-up time Drop-outs	Results: Function Psychological function Cognitive function Physical function Mortality	Results: Activities and participation ADL and participation Return to work Use of health care services	Results: Quality of life Life satisfaction Health status, HRQoL	Risk of bias Method of measurement Blinding Handling of missing data
Andelic et al 2012 [1] Norway	<p><u>Study design</u></p> <p>Observational study, prospectively collected data (inclusion criteria determined retrospectively)</p> <p><u>Setting</u></p> <p>2005-2007</p> <p><u>Patient characteristics</u></p> <p>Moderate to severe TBI, n=64 Mean age: 29, (range 16-55) Male: 78%</p> <p>Time since injury: not reported (early rehabilitation started in the acute phase)</p>	<p><u>Intervention</u></p> <p>Early specialised rehabilitation focusing on a) organisation of sensory input (mean 45 min/day), b) stimulation of normal movement, function and control (mean 30 min/day), and c) retraining functions of the face and mouth (mean 30 min/day)</p> <p>n=33</p> <p><u>Control</u></p> <p>Either inpatient brain injury rehabilitation in sub-acute rehabilitation departments after a waiting period at a local hospital or nursing home, or received no inpatient rehabilitation at all (broken chain of treatment)</p> <p>n=31</p> <p>(Both I and C group received a minimum of 2–3 h of daily individual treatment included physiotherapy, occupational therapy,</p>		<p><u>ADL and participation</u></p> <p>GOSE, favourable (score 6-8), n/N</p> <p>I: 22/31 (71%) C: 11/30 (37%) (p=0.007)</p> <p><u>Return to work</u></p> <p>Full-time or part-time work, n/N*</p> <p>I: 12/31 (39%) C: 8/30 (27%)</p>		<p><u>Risk of bias</u></p> <p>Moderate</p> <p>(Serious/critical regarding employment because of baseline differences)</p> <p><u>Method of measurement</u></p> <p>Interview and examination</p> <p><u>Blinding</u></p> <p>Assessors probably not blinded</p> <p><u>Handling of missing data</u></p> <p>na</p> <p><u>Comments</u></p> <p>*Calculated from percentages</p>

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		speech therapy, cognitive training, nutrition, dietary services, and psycho-social support) <u>Follow-up time</u> 12 months post-injury Withdrawal/Drop-outs I: 2/33 (6%) C: 1/31 (3%)				
Mackay 1992 [2] USA	<u>Study design</u> Observational study retrospectively collected data <u>Setting</u> Inpatient treatment, 1984-1990 <u>Patient characteristics</u> Severe TBI, n=38 Mean age: 30 (range 17-71) Male: not reported Time since injury: mean 2/23 days	<u>Intervention</u> Intensive, multidisciplinary rehabilitation at acute stage (formalised TBI program) n=17 <u>Control</u> Non-formalised TBI program at acute stage n=21 <u>Follow-up time</u> 2 months and 5 months post-injury <u>Withdrawal/Drop-outs</u> I: 0/17 (0%) C: 0/21 (0%)	<u>Cognitive function</u> RLA, mean (SD): <i>At 2 months (acute discharge):</i> I: 5.6 (0.3) C: 4.0 (0.4) <i>At 5 months (rehab discharge):</i> I: 7.4 (0.15) C: 6.7 (0.3)	<u>Use of health care services</u> Acute LOS, I: 51.5 (6.8) C: 64.1 (7.8) Rehab LOS, I: 106.5 (25.0) C: 239.5 (50.7))		<u>Risk of bias</u> Serious <u>Method of measurement</u> Assessment at hospital <u>Blinding</u> No blinding <u>Handling of missing data</u> na
Mohammed 2018 [3] Egypt	<u>Study design</u>	<u>Intervention</u> 15 days of care		<u>Use of health care services</u> ICU LOS: no data, only figure (0.007, favouring I)		<u>Risk of bias</u> Serious

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	<p>Observational study, prospectively collected data</p> <p><u>Setting</u> Inpatient treatment at ICU, 2014-2015</p> <p><u>Patient characteristics</u> Severe TBI, n=60 Mean age: 34 (SD 10/14) Male: 90% Time since injury: interventions started immediately at ICU admission</p>	<p>directed by a multidisciplinary clinical pathway for severe TBI n=30</p> <p><u>Control</u> 15 days of routine nursing, medical and ancillary care n=30</p> <p><u>Follow-up time</u> 15 days post-allocation</p> <p><u>Withdrawal/Drop-outs</u> I: 0/30 (0%) C: 0/30 (0%)</p>		ICU readmission: no data, only figure (0.001, favouring I)		<p><u>Method of measurement</u> Data recording at hospital/ interview</p> <p><u>Blinding</u> No blinding</p> <p><u>Handling of missing data</u> na</p>
Niemeier 2011 [4] USA	<p><u>Study design</u> Observational study, prospectively collected data</p> <p><u>Setting</u> Inpatient treatment in urban area, 2003-2006</p> <p><u>Patient characteristics</u> Mild, moderate and severe TBI, n=72 Mean age: 35 (SD 17/18) Male: 58%</p>	<p><u>Intervention</u> First steps acute neurobehavioral and cognitive rehabilitation (FANCI, 10 30-min sessions), +standard rehabilitation 3h/day n=51</p> <p><u>Control</u> Video watching (10 sessions of 30 min) +standard rehabilitation 3h/day n=21</p> <p><u>Follow-up time</u> Immediately at post-treatment and 3 months post-intervention</p>	<p><u>Physical function</u> FIM motor at 3 months, mean (SD): I: 80.91 (9.90) C: 84.35 (9.97)</p> <p><u>Cognitive function</u> NRS-R total at post-intervention, mean (SD): I: 41.33 (5.79) C: 45.80 (6.61) (p=0.006)</p>	<p><u>ADL and participation</u></p> <p>FIM motor at 3 months, mean change (SE): I: 50.01 (2.08), n=51 C: 44.10 (3.21), n=21 (p=0.13)</p> <p>FIM cognitive at 3 months, mean change (SE): I: 11.01 (0.99), n=51 C: 12.43 (1.50), n=21 (p=0.43)</p>	<p><u>Life satisfaction</u> SWLS at 3-months, mean change (SE): I: -2.91 (1.51), n=51 C: -0.37 (2.32), n=21 (p=0.3602)</p>	<p><u>Risk of bias</u> Serious</p> <p><u>Method of measurement</u> Interview in person or telephone (3-month data)</p> <p><u>Blinding</u> No blinding</p> <p><u>Handling of missing data</u> N.a.</p>

First author Year Reference Country	Study design Setting Patient characteristics Blinding	Interventions Nr of individuals Withdrawal/ Follow-up time Drop-outs	Results: Function Psychological function Cognitive function Physical function Mortality	Results: Activities and participation ADL and participation Return to work Use of health care services	Results: Quality of life Life satisfaction Health status, HRQoL	Risk of bias Method of measurement Blinding Handling of missing data
	Time since injury: 43/29 days	<u>Withdrawal/Drop-outs</u> I: 0/51 (0%) C: 0/21 (0%)				
Salazar et al 2000 [5] USA	<u>Study design</u> RCT <u>Setting</u> US military medical referral centre, 1992-1997 <u>Patient characteristics</u> Active duty military personnel with moderate to severe TBI n=120 Mean age: 25 (SD 7/6) Male: 93 % Time since injury: mean 38/39 days	<u>Intervention</u> 8 weeks of intensive, multidisciplinary in-hospital cognitive rehabilitation, combined group and individual therapy n=67 <u>Control</u> Education and individual counselling at discharge, limited home rehabilitation program with weekly telephone support from a psychiatric nurse n=53 <u>Follow-up time</u> 12 months post-allocation <u>Withdrawal/Drop-outs</u> I: 7/67 (10%) C: 0/53 (0%)	<u>Psychological function</u> Major depression diagnosis, n/N I: 7/42* (16%) C: 9/34* (27%) (p=0.26) General anxiety diagnosis, n/N: I: 4/42* (9%) C: 7/34* (20%) (p=0.33) <u>Cognitive function</u> HRNII score ≥ 0.5 , n/N: I: 3/42* (19%) C: 55/34* (44%) (p=0.46)	<u>Return to work.</u> Gainful employment, n/N I: 60/67 (90%) C: 50/53 (94%) <u>Use of health care services</u> Patients with 1 or more unscheduled outpatient or inpatient visits during first year after treatment: I: 27/67* (41%) C: 22/53* (42%)		<u>Risk of bias:</u> Low <u>Method of measurement</u> Multidisciplinary evaluation Structured telephone interviews and military records as complement <u>Blinding</u> Personnel involved in data analysis were blinded <u>Handling of missing data:</u> ITT analysis reported ("PP analysis did not change the results substantially") *Calculated from percentages
Semlyen 1998 [6]	<u>Study design</u>	<u>Intervention</u> Coordinated, multidisciplinary rehabilitation		<u>ADL and participation</u> BI, mean change: <i>From 8w to 12w</i>		<u>Risk of bias</u> Serious

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USA	<p>Observational study prospectively collected data</p> <p><u>Setting</u> Inpatient treatment, study period not reported</p> <p><u>Patient characteristics</u> Moderate to severe TBI, n=51 Mean age: 34 (range 16-62) Male: 80% Time since injury: <4 weeks</p>	<p>n=18</p> <p><u>Control</u> Treatment by a single discipline at local hospital n=33</p> <p><u>Follow-up time</u> 12 weeks, 6 months, 12 months and 24 months post-injury</p> <p><u>Withdrawal/Drop-outs</u> Not reported</p>		<p>I: 3.86 C: 1.00 <i>From 12w to 6m</i> I: 3.62 C: 1.83 <i>From 6m to 12m</i> I: 2.62 C: 1.00 <i>From 12m to 24m</i> I: 2.36 C: 1.34</p> <p>FIM motor, mean change: <i>From 8w to 12w</i> I: 2.55 C: 1.49 <i>From 12w to 6m</i> I: 3.05 C: 1.65 <i>From 6m to 12m</i> I: 1.98 C: 1.05 <i>From 12m to 24m</i> I: 1.39 C: 0.20</p> <p>FIM cognitive, mean change: <i>From 8w to 12w:</i> I: 3.46 C: 2.60 <i>From 12w to 6m:</i> I: 2.60 C: 1.17</p>		<p><u>Method of measurement</u> Assessment by health care personnel</p> <p><u>Blinding</u> No blinding</p> <p><u>Handling of missing data</u> N.a.</p>

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				<i>From 6m to 12m:</i> I: 1.50 C: 1.21 <i>From 12m to 24m</i> I: 1.58 C: 0.06		

ADL = Activities of daily living; **BI** = Barthel index; **BSI** = Brief Symptom Inventory; **CBT** = Cognitive behavioral therapy; **CIQ** = Community integration questionnaire; **c** = Control; **d** = Days; **FIM** = Findependence measure; **GOSE** = Glasgow Outcome Scale Extended (range 1-8, high = better); **GSI** = Global Severity Index; **HRNII** = Halstad-Reitan neuropsychological impairment index (range 0.0-1.0, low = better); **HRQoL** = Health-related quality of life; **LOS** = Length of stay; **I** = Intervention; **ICU** = Intensive care unit; **y** = Years; **NRS-R** = Neurobehavioral rating system revisited (low = better); **QoL** = Quality of life; **RCT** = Randomised controlled trial; **RLA** = Rancho Los Amigos Scale of cognitive functioning (range 1-8, high = better); **SD** = Standard deviation; **SWLS** = Satisfaction with life scale (high = better); **TBI** = Traumatic brain injury

Table 5.2. Specialised outpatient rehabilitation, moderate to severe TBI

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Nr of individuals Follow-up time Drop-outs	Results: Function Physical function Psychological function Cognitive function Mortality	Results: Activities and participation ADL and participation Return to work Use of health care services	Results: Quality of life Life satisfaction Health status, HRQoL	Risk of bias Method of measurement Blinding Handling of missing data Comments
Brenner et al 2018 [7] USA	<p><u>Study design</u> RCT with crossover design (only first part before crossover reported here)</p> <p><u>Setting</u> Outpatient treatment, 2012-2015</p> <p><u>Patient characteristics</u> Moderate to severe TBI, US military veterans >1 y post-injury with symptoms of hopelessness (BHS score ≥ 9), patients recruited through flyers and through a VA clinic</p> <p>n=44 Age: mean 55/48 (range 18-65) Male: 91 %</p> <p>Time since injury: >1 year</p>	<p><u>Intervention</u> Small group cognitive-behavioural intervention targeting hopelessness, "Window to hope", conducted by study clinicians with doctoral degree in psychology or related field (10 sessions once weekly for 2 hours each time) n=22</p> <p><u>Control</u> Usual care from VHA/ wait list n=22</p> <p><u>Follow-up time</u> 3 months post-allocation (T2, before crossover)</p> <p><u>Withdrawal/Drop-outs</u> I: 7/22 (32%) C: 2/22 (9%)</p>	<p><u>Psychological function</u> Beck hopelessness scale, adjusted mean (95% CI): I: 13.0 (10.5 to 15.5) C: 8.6 (5.7 to 11.5) p=0.03</p> <p>Beck-D-II, adjusted mean (95% CI): I: 29.3 (24.8 to 33.9) C: 23.7 (18.4 to 29.0) p=0.13</p> <p>Beck scale for suicide ideation, adjusted mean (95% CI): I: 5.8 (3.1 to 8.5) C: 2.0 (0 to 5.1) p=0.07</p>			<p><u>Risk of bias</u> Some concerns</p> <p><u>Method of measurement</u> Self-reported questionnaires administered by an independent assessor</p> <p><u>Blinding</u> Assessors blinded</p> <p><u>Handling of missing data</u> -</p>
Goransson 2003 [8] Canada	<p><u>Study design</u> Observational study, archival data</p>	<p><u>Intervention</u> Outpatient multidisciplinary programme including recreation therapy, occupational therapy,</p>		<p><u>ADL and participation</u> CIQ total, MANCOVA, group main effect: $F(1,37)=4.193$, (p=0.024 favouring I)</p>		<p><u>Risk of bias</u> Serious</p> <p><u>Method of measurement</u></p>

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Nr of individuals Follow-up time Drop-outs	Results: Function Physical function Psychological function Cognitive function Mortality	Results: Activities and participation ADL and participation Return to work Use of health care services	Results: Quality of life Life satisfaction Health status, HRQoL	Risk of bias Method of measurement Blinding Handling of missing data Comments
	<u>Setting</u> Outpatient treatment, patients recruited from an outpatient clinic 1994-1998 Patient characteristics Mild to moderate TBI, n=42 Mean age: 36 (SD 12/13) Male: 40% Time since injury: mean 13 y (SD 9/11)	physical therapy, speech therapy, social work, neuropsychology and psychiatry (individual and group therapy), offered 4 days a week for 5.5 h/day during 1-7 months n=21 <u>Control</u> No rehabilitation/ usual care n=21 <u>Follow-up time</u> 6-18 months post allocation <u>Withdrawal/Drop-outs</u> na (only patients with follow-up data included)				Self-reported questionnaire (or interview?) <u>Blinding</u> No blinding <u>Handling of missing data:</u> -
Hsieh et al 2012 [9] Australia	<u>Study design</u> RCT, single centre <u>Setting</u> Outpatient treatment, 2008-2010 <u>Patient characteristics</u> Moderate to severe TBI, recruited from a brain injury rehabilitation hospital n=27	<u>Intervention</u> la) CBT and motivational interviewing (MI) targeting anxiety, 12 weekly individual sessions. n=9 lb) CBT and non-directive counselling, 12 weekly individual sessions. n=10 <u>Control</u>	<u>Psychological function</u> HADS-A, mean (SD) la: 8.75 (3.5), n=8 lb: 10.70 (5.03), n=10 C: 10.63 (4.21), n=8 HADS-D, mean (SD): la: 9.75 (3.11), n=8 lb: 7.60 (5.08), n=10 C: 8.38 (4.03), n=8 CSA, mean (SD): la: 50.57 (10.31), n=7 lb: 68.00 (20.79), n=9	<u>ADL and participation</u> SPRS2, mean (SD): la: 32.57 (8.92), n=7 lb: 35.00 (9.37), n=9 C: 32.13 (9.55), n=8		<u>Risk of bias</u> Some concerns <u>Method of measurement</u> Self-reported questionnaires and interviews <u>Blinding</u> Assessors blinded <u>Handling of missing data</u> -

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Nr of individuals Follow-up time Drop-outs	Results: Function Physical function Psychological function Cognitive function Mortality	Results: Activities and participation ADL and participation Return to work Use of health care services	Results: Quality of life Life satisfaction Health status, HRQoL	Risk of bias Method of measurement Blinding Handling of missing data Comments
	Mean age: 38 (range 21-73) Male: 78 % Time since injury: mean 38 months (range 3 months-25 years)	Usual care (e.g., physiotherapy, occupational therapy, return to-work programme, neuropsychological assessment and rehabilitation such as memory strategies) n=8 <u>Follow-up time</u> 12 weeks post-allocation <u>Withdrawal/Drop-outs</u> Ia: 1/9 (11%) Ib: 1/10 (10%) C: 0/8 (0%)	C: 53.63 (23.04), n=8 <u>Cognitive function</u> SADI, mean (SD): self-awareness): Ia: 0.29 (0.49), n=7 Ib: 1.00 (1.12), n=9 C: 0.67 (1.21), n=6			<u>Comments</u> Groups Ia and Ib were pooled in meta-analyses
Powell 2002 [10] UK	<u>Study design</u> RCT, single-centre <u>Setting</u> Outpatient treatment in an urban area (subject's homes, day centres or workplaces), recruitment start at 1992 <u>Patient characteristics</u> Moderate to severe TBI, patients living in community or discharged from an inpatient neurological rehabilitation unit	<u>Intervention</u> Outreach treatment by multidisciplinary teams with contractually organised goal setting (2-6 h/weeks) for 27.3 (SD 19.1) weeks n=54 <u>Control</u> Information and limited assistance with pursuing referrals to outpatient services (1 home visit) N=56 <u>Follow-up time</u>	<u>Psychological function</u> HADS-A, mean change score (SD): I: 0.5 (4.1), n=20 C: -0.6 (3.8), n=26 (ns) HADS-D, mean change score (SD): I: 0.0 (4.2), n=20 C: 0.4 (4.0), n=26 (ns)	<u>ADL and participation</u> BICRO-39, median change score from baseline (range): I: 2.5 (-1.7 to 6.2) C: 0.9 (-4.1 to 6.8) (p<0.05) BICRO-39, improved n/N: I: 28/35 (80%) C: 28/40 (70%) (ns) <u>Return to work:</u> Productive employment: I: 5/54 (9%) C: 8/56 (14%)		<u>Risk of bias:</u> Some concerns <u>Method of measurement</u> Assessment by independent research worker +self-reported questionnaires completed by participants or their careers, or both <u>Blinding</u> Assessors blinded <u>Handling of missing data:</u> -

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Nr of individuals Follow-up time Drop-outs	Results: Function Physical function Psychological function Cognitive function Mortality	Results: Activities and participation ADL and participation Return to work Use of health care services	Results: Quality of life Life satisfaction Health status, HRQoL	Risk of bias Method of measurement Blinding Handling of missing data Comments
	n=110 Mean age: 34/35 (range 17-63) Male: 76 % Time since injury: median 1.37 years (range 3 months to 20 years)	Mean 24.8 months post-allocation <u>Withdrawal/Drop-outs</u> I: 6/54 (11%) C: 19/56 (33%)				
Sarajuuri 2005 [11] Finland	<u>Study design</u> Observational study prospectively collected data <u>Setting</u> Inpatient and outpatient treatment, 1993-1996 <u>Patient characteristics</u> Moderate to severe TBI, n=42 Mean age: 30 (range 16-52) Male:85% Time since injury: 1-24 months (approximated from chronicity data)	<u>Intervention</u> Interdisciplinary neuropsychologically oriented inpatient programme, group and individual, 6 weeks n=19 <u>Control</u> Usual care and rehabilitation at local health care units (nonstructured, individually tailored) n=23 <u>Follow-up time</u> 24 months post-allocation <u>Withdrawal/Drop-outs</u> I:0/19 (0%) C:3/20 (15%)		<u>Return to work</u> Productive activity (including non-gainful work): I: 17/19 (89%) C: 11/23 (48%) Gainful work or studies: I: 8/19 (42%) C: 11/23 (48%)		<u>Risk of bias</u> Moderate <u>Method of measurement</u> Self-reported questionnaires or telephone interviews <u>Blinding</u> No blinding <u>Handling of missing data</u> -
Svensden 2006 [12] Denmark	<u>Study design</u> Observational study, retrospectively collected	<u>Intervention</u> Interdisciplinary holistic rehabilitation programme consisting of neuropsychological	<u>Psychological function</u> HADS-A, mean (SD): I: 6.0 (4.2), n=28 C: 7.7 (2.8), n=12	<u>ADL and participation</u> PCRS total score, mean (SD): I: 74 (13), n=37	<u>HRQOL</u> WHO-QoL-BREF general, mean (SD):	<u>Risk of bias</u> Serious <u>Method of measurement</u>

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	<p>data with matched controls</p> <p><u>Setting</u> 1987-1992</p> <p><u>Patient characteristics</u> Moderate to severe TBI (70%) or cerebro-vascular accident (30%) n=50 Mean age: 26/31 y Male: 66% Time since injury: 17/15 y</p>	<p>assessments in groups of 12–16 individuals for 3–4 months with day attendance, followed by close contact and monitoring of progress in the community for at least a further 8 months</p> <p>n=37</p> <p><u>Control</u> No rehabilitation/ usual care n=13</p> <p><u>Follow-up time</u> 12-22 y post-injury</p> <p><u>Withdrawal/Drop-outs</u> Na (only patients with follow-up data included)</p>	<p>HADS-D, mean (SD): I: 4.6 (4.1), n=28 C: 7.8 (2.8), n=12</p>	<p>C: 65 (15), n=13</p>	<p>I: 66 (22), n=30 C: 59 (21), n=12</p>	<p>Self-reported questionnaires and interviews</p> <p><u>Blinding</u> No blinding</p> <p><u>Handling of missing data</u> -</p> <p><u>Comments</u> p-values not reported for comparative analysis of I and C</p>

ADL= Activities of daily living; **Beck-D-II** = Beck depression inventory-II (range 0-63, low = better); **BSI** = Brief Symptom Inventory (range 0-72, low = better); **BICRO-39** = Brain injury community rehabilitation outcome scale (range 0-30, low = better); **CIQ** = Community integration questionnaire, (range 0-29, high = better); **CSA** = Coping Scale for Adults (range 21-105, high=better) **C** = Control; **d** = Days; **EuroQoL** = European quality of life scale (range 0-1, high = better); **FIM** = Functional independence measure; **GOSE** = Glasgow Outcome Scale Extended (range 1-8, high = better); **I** = Intervention; **HADS** = Hospital anxiety and depression scale (range 0-21, low = better); **HRQoL** = Health-related quality of life **na** = Not applicable; **PCRS** = Patient Competency Rating Scale (range 0-100, high = better); **SADI** = Self-Awareness of Deficits Interview (range 0-9, low = better); **SPRS-2** = Sydney Psychosocial Reintegration Scale Version 2 (range 0-48, high = better); **TBI** = Traumatic brain injury; **WHO-QoL-BREF** = World Health Organisation Quality of Life questionnaire brief version (general score 0-100, high = better); **y** = Years

All data including p-values have been extracted from the original studies unless otherwise stated.

Table 5.3. Specialised outpatient rehabilitation for mild traumatic brain injury

First author Year Reference Country	Study design Setting Patient characteristics	Intervention Control Follow-up time Withdrawal/Drop-outs	Results: Function Post-concussion symptoms Psychological function Cognitive function	Results: Activities and participation ADL and participation Return to work Use of health care services	Results: Quality of life Life satisfaction Health status	Risk of bias Blinding Comments
Bell 2017 [13] Richardsson 2017 [14] USA	<u>Study design</u> RCT, single-centre <u>Setting</u> Outpatient treatment, (study period not reported) <u>Patient characteristics</u> Mild TBI, active service duty military personnel n=356 Mean age: 29 (range 20-54) Male: 93% Time since injury: ≤24 months	<u>Intervention</u> Telephone-delivered problem-solving therapy, 12 biweekly calls conducted by master's-level counsellors +usual care n=178 <u>Control</u> Usual care +education (e-mailed or mailed) n=178 <u>Follow-up time</u> 6- and 12-months post-allocation <u>Withdrawal/Drop-outs</u> I: 40/178 (22%) C: 21/178 (12%) (larger drop-out for health care use)	<u>Post-concussion symptoms:</u> RPQ, mean (SD): <i>at 6 months</i> I: 22.8 (15.3), n=138 C: 25.4 (14.4), n=166 (p=0.190) <i>at 12 months:</i> I: 22.4 (15.6) n=142 C: 24.2 (14.5), n=157 (p=0.453) <u>Psychological function:</u> BSI-18 GSI T-score, mean (SD) <i>At 6 months:</i> I: 54.5 (12.5), n=138 C: 57.4 (11.1), n=166 (p=0.05) <i>At 12 months:</i> I: 56.4 (12.8), n=142 C: 56.9 (10.9), n=156 (p=0.543) PHQ-9, mean (SD) <i>At 6 months:</i> I: 7.6 (6.2), n=126	<u>ADL and participation</u> SDS, mean (SD): <i>At 6 months:</i> I: 8.0 (7.6), n=126 C: 9.4 (7.4), n=158 (p=0.12) <i>At 12 months:</i> I: 9.1 (8.0), n=129 C: 8.9 (7.5), n=141 (p=0.906) <u>Self-reported use of health care services at months 4-6*:</u> Medical services, use of ≥1 service: I: 74/93 (80%) C: 93/115 (81%) (ns) Emergency department visits, ≥1 visit: I: 12/93 (13%)	<u>HRQoL</u> EuroQoL, mean (SD): <i>At 6 months:</i> I: 73.1 (17.0), n=126 C: 68.1 (18.8), n=158 (p=0.071) <i>At 12 months:</i> I: 70.0 (18.0), n=128 C: 70.6 (18.2), n=141 (p=0.389)	<u>Risk of bias</u> Some concerns <u>Method of measurement</u> Telephone interviews <u>Blinding</u> Assessors blinded <u>Handling of missing data</u> - <u>Comments:</u> *n/N were calculated from percentages

First author Year Reference Country	Study design Setting Patient characteristics	Intervention Control Follow-up time Withdrawal/Drop-outs	Results: Function Post-concussion symptoms Psychological function Cognitive function	Results: Activities and participation ADL and participation Return to work Use of health care services	Results: Quality of life Life satisfaction Health status	Risk of bias Blinding Comments
			C: 9.2 (5.7), n=158 <i>At 12 months:</i> I: 8.2 (6.4), n=128 C: 8.4 (5.8), n=138 (p=0.841)	C: 3/115 (3%) (ns) Psychological services, use of ≥1 service: I: 32/93 (34%) C: 47/115 (41%) (ns)		
Bryant et al 2003 [15] Australia	<u>Study design</u> RCT, single-centre <u>Setting</u> Outpatient treatment, before 2001 <u>Patient characteristics</u> Mild TBI at risk of developing chronic post-traumatic stress disorder (PTSD) n=24 Mean age: 31.2 (SD 13.9/14.4) Male: 33%	<u>Intervention</u> CBT, 5 weekly 90-min sessions conducted by clinical psychologists + homework n=12 <u>Control</u> Supported counselling program comprising education about trauma and general problem-solving skills, 5 weekly 90-min sessions n=12 <u>Follow-up time</u> 6 months post-allocation	<u>Psychological function:</u> IES intrusion subscale, mean (SD): I: 11.25 (9.81), n=12 C: 20.17 (9.7), n=12 (p=0.02, adjusted) IES avoidance subscore, mean (SD): I: 7.33 (7.22), n=12 C: 15.67 (10.49), n=12 (p=0.005, adjusted) Beck-A, mean (SD) I: 13.92 (10.98), n=12 C: 21.83 (18.72), n=12 (p=0.19, adjusted)			<u>Risk of bias</u> Some concerns <u>Method of measurement</u> Interview by assessors <u>Blinding</u> Assessors blinded <u>Handling of missing data</u> -

First author Year Reference Country	Study design Setting Patient characteristics	Intervention Control Follow-up time Withdrawal/Drop-outs	Results: Function Post-concussion symptoms Psychological function Cognitive function	Results: Activities and participation ADL and participation Return to work Use of health care services	Results: Quality of life Life satisfaction Health status	Risk of bias Blinding Comments
	Time since injury: ≤2 weeks	<u>Withdrawal/Drop-outs</u> I: 0/12 (0%) C: 0/12 (0%)	Beck-D, mean (SD): I: 15.42 (13.87), n=12 C: 20.33 (14.18), n=12 (p=0.69, adjusted)			
Potter et al, 2016 [16] UK	<u>Study design</u> RCT, two centres <u>Setting</u> Outpatient treatment, urban area, 2003-2009 <u>Patient characteristics</u> Mild (52%), moderate (28%) or severe (20%) TBI, and post-concussion disorder n=46 Mean age: 41.4 (SD 11.6) Male: 54% Time since injury: >6 months	<u>Intervention</u> Individualised, formulation-based CBT, 12 weekly 60-min sessions conducted by a clinical neuropsychologist n=26 <u>Control</u> Waiting-list n=20 <u>Follow-up time</u> 4 months post- allocation <u>Withdrawal/Drop-outs</u> I: 1/26 (4%) C: 0/20 (0%)	<u>Post-concussion symptoms:</u> RPQ, adjusted mean* (SD): I: 26.0 (16.4), n=25 C: 28.1 (9.2), n=20 (p=0.423) <u>Psychological function:</u> HADS-A, adjusted mean* (SD): I: 9.43 (4.9), n=25 C: 10.37 (4.1), n=20 (p=0.423) HADS-D, adjusted mean* (SD): I: 7.70 (5.0), n=25 C: 8.62 (4.5), n=20 (p=0.353) IES-R, adjusted mean*, (SD):	<u>ADL and participation</u> BICRO-39, adjusted mean* (SD): I: 77.87 (24.6), n=25 C: 83.97 (17.3), n=20 (p=0.245)	<u>QoL</u> EuroQoL, adjusted mean* (SD): I: 69.93 (16.3), n=24 C: 55.59 (15.5), n=20	<u>Risk of bias</u> Some concerns <u>Method of measurement</u> Self-reported questionnaires at outpatient appointment <u>Blinding</u> No blinding <u>Handling of missing data</u> - <u>Comments:</u> *Mean values adjusted for baseline differences

First author Year Reference Country	Study design Setting Patient characteristics	Intervention Control Follow-up time Withdrawal/Drop-outs	Results: Function Post-concussion symptoms Psychological function Cognitive function	Results: Activities and participation ADL and participation Return to work Use of health care services	Results: Quality of life Life satisfaction Health status	Risk of bias Blinding Comments
			I: 21.48 (18.7), n=25 C: 24.40 (19.9), n=20 (p=0.853)			
Rytter 2018 [17] Denmark	<p><u>Study design</u> RCT, single-centre</p> <p><u>Setting</u> Outpatient treatment in a mixed rural and urban community, 2009-2012</p> <p><u>Patient characteristics</u> Mild TBI with persistent (>6 months) post-concussive symptoms N=89 Age range: 18-65 Male: 30 % Time since injury: mean 28 months</p>	<p><u>Intervention</u> Interdisciplinary rehabilitation programme including group-based neuro-psychological treatment with exercise therapy and physiotherapeutic coaching, 22 weeks (3.5-7 h/week) n=45</p> <p><u>Control</u> Standard care mainly from general practitioner with referral to other treatments (mean 54 h of treatment during 22 weeks) n=44</p> <p><u>Follow-up time</u> Immediately after treatment (approx. 5 months post-allocation)</p>	<p><u>Post-concussion symptoms:</u> RPQ at 5 months, mean (SD): I: 32.29 (14.18) n=45 C: 37.5 (8.48), n=44 (p=0.013)</p> <p>RPQ at 11 months, mean (SD): I: 29.69 (12.92), n=45 C: 35.30 (7.57), n=44 (p=0.005)</p> <p><u>Psychological function:</u> MDI total score at 5 months, mean (SD): I: 16.49 (11.29), n=45 C: 20.05 (10.91), n=44 (p=0.281)</p>	<p><u>Return to work:</u> Employed or studying at 11 months, n/N:* I: 20/38 (53%) C: 11/33 (33%)</p>		<p><u>Risk of bias</u> Some concerns *RTW: high risk of bias due to baseline differences</p> <p><u>Method of measurement</u> Self-reported questionnaires (mailed)</p> <p><u>Blinding</u> Assessors blinded</p> <p><u>Handling of missing data</u> ITT reported, missing data replaced by baseline values ITT reported for employment</p> <p><u>Comments</u></p>

First author Year Reference Country	Study design Setting Patient characteristics	Intervention Control Follow-up time Withdrawal/Drop-outs	Results: Function Post-concussion symptoms Psychological function Cognitive function	Results: Activities and participation ADL and participation Return to work Use of health care services	Results: Quality of life Life satisfaction Health status	Risk of bias Blinding Comments
		and at 6 months follow up (approx. 11 months post-allocation) <u>Withdrawal/Drop-outs</u> I: 9/45 (20%) C: 8/44 (18%)				
Scheenen 2017 [18] The Netherlands	<u>Study design</u> RCT, single-centre <u>Setting</u> Outpatient treatment (study period not reported) <u>Patient characteristics</u> Mild TBI with early complaints n=91 Mean age: 38 (range 18-66) Male: 50.5% Time since injury: 4-6 weeks	<u>Intervention</u> CBT, 5 60-min sessions in groups, by clinical psychologist n=44 <u>Control</u> Telephone counselling including psychoeducation, 5 sessions by psychologist or physician n=47 <u>Follow-up time</u> 3, 6- and 12-months post-allocation <u>Withdrawal/Drop-outs</u> I: 5/44 (11%) C: 2/47 (4%)	<u>Post-concussion symptoms</u> HISC complaints, adjusted mean*, SD: <i>At 6 months:</i> I: 8.3, (2.9) n=33 C: 6.5, (2.9) n=37 (ns) <i>At 12 months adjusted mean:</i> I: 8.5, n=37 C: 5.2, n=43 (p=0.006) <u>Psychological function:</u> HADS anxiety and depression: no	<u>ADL and participation:</u> GOSE, score≥8, n/N: <i>At 6 months:</i> I: 14/44 C: 17/47 ns <i>At 12 months:</i> I: 15/44 C: 28/47 (p=0.043) <u>Return to work at 12 months:</u> no difference (no data, only figure)		<u>Risk of bias</u> Some concerns <u>Method of measurement</u> Self-reported questionnaires <u>Blinding</u> No blinding <u>Handling of missing data</u> unclear Comments: *SD imputed from baseline value (pooled I+C)

First author Year Reference Country	Study design Setting Patient characteristics	Intervention Control Follow-up time Withdrawal/Drop-outs	Results: Function Post-concussion symptoms Psychological function Cognitive function	Results: Activities and participation ADL and participation Return to work Use of health care services	Results: Quality of life Life satisfaction Health status	Risk of bias Blinding Comments
			difference (numbers not reported)			
Silverberg et al 2013 [19] Canada	<u>Study design</u> RCT, single-centre <u>Setting</u> Outpatient treatment, 2009- 2011 <u>Patient characteristics</u> Mild TBI at risk for chronic PCS n=28 Mean age: 39.1 (SD 10.0/13.5) Male: 39% Time since injury: ≤6 weeks	<u>Intervention</u> CBT, 6 weekly 50-min sessions, by doctoral- level psychiatrists, + usual care n=15 <u>Control</u> Usual care (written information+ a 3-hour session with a service coordinator) n=13 <u>Follow-up time</u> 3 months post- allocation <u>Withdrawal/Drop-outs</u> I: 2/15 (13%) C: 2/11 (18%)	<u>Post-concussion symptoms:</u> RPQ, adjusted mean* (SD) I: 17.9 (14.5), n=13 C: 28.7 (14.5), n=11 (p=0.085) ICD-10 PCS diagnosis, n/N: I: 7/13 (54%) C: 10/11 (91%) (p=0.047) <u>Psychological function</u> HADS-A, adjusted mean* (SD): I: 8.5 (2.9), n=13 C: 8.4 (2.9), n=11 (p=0.942) HADS-D, adjusted mean (SD): I: 5.0 (3.1), n=13 C: 7.3 (3.1), n=11	<u>ADL and participation</u> M2PI, adjusted mean* (SD): I: 6.29 (5.0), n=13 C: 9.4 (5.0), n=11 (p=0.153)		<u>Risk of bias</u> Some concerns <u>Method of measurement</u> Interview+ self-reported questionnaires <u>Blinding</u> Assessors blinded <u>Handling of missing data</u> Missing data in questionnaires were imputed with average item score for that subscale <u>Comments:</u> *Mean values adjusted for baseline differences

First author Year Reference Country	Study design Setting Patient characteristics	Intervention Control Follow-up time Withdrawal/Drop-outs	Results: Function Post-concussion symptoms Psychological function Cognitive function	Results: Activities and participation ADL and participation Return to work Use of health care services	Results: Quality of life Life satisfaction Health status	Risk of bias Blinding Comments
			(p=0.084)			
Tiersky 2005 [20] US	<p><u>Study design</u> RCT, single-centre</p> <p><u>Setting</u> Outpatient treatment (study period not reported)</p> <p><u>Patient characteristics</u> Mild to TBI with consistent complaints n=29 Mean age: 47 (range 19-62) Male: 45% Time since injury: mean 6.25 y.</p>	<p><u>Intervention</u> 50 min of individual CBT and 50 min of individual cognitive remediation, +30 min homework, 3 times a week for 11 weeks. n=14</p> <p><u>Control</u> Wait-list/no treatment n=15</p> <p><u>Follow-up time</u> 11 weeks post-allocation</p> <p><u>Withdrawal/Drop-outs</u> I: 3/14 (21%) C: 6/15 (40 %)</p>	<p><u>Psychological function</u> SCL-90R GSI, mean (SD): I: 0.86 (0.41), n=11 C: 1.74 (1.00), n=9 (p=0.046, adjusted)</p> <p>SCL-90R anxiety, mean (SD): I: 0.72 (0.42), n=11 C: 1.53 (1.02), n=9 (p=0.03)</p> <p>SCL-90R depression, mean (SD): I: 1.12 (0.45), n=11 C: 2.11(1.14), n=9 (p=0.03 adjusted)</p> <p><u>Cognitive function</u> PASAT, mean (SD): I: 135.55 (30.71), n=11 C: 110.88 (60.28), n=9 (p=0.011, adjusted)</p>	<p><u>ADL and participation</u> CIQ, mean (SD): I: 15.90 (4.56), n=11 C: 15.72 (4.30), n=9 (p=0.715, adjusted)</p>		<p><u>Risk of bias</u> Some concerns</p> <p><u>Method of measurement</u> Interview/ tests by assessors</p> <p><u>Blinding</u> Assessors blinded</p> <p><u>Handling of missing data</u> -</p>

First author Year Reference Country	Study design Setting Patient characteristics	Intervention Control Follow-up time Withdrawal/Drop-outs	Results: Function Post-concussion symptoms Psychological function Cognitive function	Results: Activities and participation ADL and participation Return to work Use of health care services	Results: Quality of life Life satisfaction Health status	Risk of bias Blinding Comments
Twamley 2014 [21] USA	<p><u>Study design</u> RCT, single-centre</p> <p><u>Setting</u> Outpatient treatment (study period not reported)</p> <p><u>Patient characteristics</u> Mild to moderate TBI, military veterans n=50 Mean age: 32 Male: 96% Time since injury: mean 4/5 y.</p>	<p><u>Intervention</u> A manualised, compensatory cognitive training intervention (CogSMART), 12 weekly 60-min sessions delivered by supported employment specialist + supported employment (1 h/week) n=25</p> <p><u>Control</u> Enhanced supported employment, 2 visits/week for 12 weeks n=25</p> <p><u>Follow-up time</u> 6- and 12-months post-allocation</p> <p><u>Withdrawal/Drop-outs</u> I: 4/25 (16%) C: 4/25 (16%)</p>	<p><u>Post-concussion symptoms:</u> NSI, Cohens d*: <i>At 6 months:</i> 0.69 (favours I, p<0.10) <i>At 12 months:</i> 0.64 (favours I, p<0.10)</p> <p><u>Cognitive function:</u> CVLT-II, Cohens d*: <i>At 6 months:</i> 0.02 (ns) <i>At 12 months:</i> -0.71 (favours C, p<0.10)</p>	<p><u>Return to work at 12 months, n/N:</u> I: 13/25 (52%) C: 13/25 (52%)</p>	<p><u>QoL</u> QOLI-Brief, Cohens d* <i>At 6 months:</i> -0.19 (ns) <i>At 12 months:</i> 1.00 (p<0.05)</p>	<p><u>Risk of bias</u> Some concerns</p> <p><u>Method of measurement</u> Interview/ tests by assessors</p> <p><u>Blinding</u> No blinding</p> <p><u>Handling of missing data</u> ITT reported for dichotomous data</p> <p><u>Comments</u> *Adjusted for baseline differences</p>
Vikane et al 2017	<p><u>Study design</u> RCT, two centres</p>	<p><u>Intervention</u> Multidisciplinary outpatient follow-up</p>	<p><u>Post-concussion symptoms:</u></p>	<p><u>ADL and participation</u></p>		<p><u>Risk of bias</u> Some concerns</p>

First author Year Reference Country	Study design Setting Patient characteristics	Intervention Control Follow-up time Withdrawal/Drop-outs	Results: Function Post-concussion symptoms Psychological function Cognitive function	Results: Activities and participation ADL and participation Return to work Use of health care services	Results: Quality of life Life satisfaction Health status	Risk of bias Blinding Comments
[22] Norway	<p><u>Setting</u> Outpatient treatment in a mixed rural and urban community, 2009-2012</p> <p><u>Patient characteristics</u> Mild TBI with persistent post-concussive symptoms N=151 Median age: 16 (range: 16-55) Male: 61% Time since injury: 6-8 weeks</p>	<p>programme: individual contacts and a psycho-educational group intervention, including a schedule for RTW, 4 weekly sessions +individual follow-up n=81</p> <p><u>Control</u> Follow-up by a general practitioner n=70</p> <p><u>Follow-up time</u> 12 months post-injury</p> <p><u>Withdrawal/Drop-outs</u> I: 11/81 (14%) C: 14/70 (20%)</p>	<p>RPQ total score, mean (SD)*: I: 16.79 (14.9), n=70 C: 20.82 (14.9), n=56 (p=0.096)</p> <p>Number of symptoms (0–16): RPQ, median (min, max): I: 6 (0,16), n=70 C: 8 (0,16), n=56 (p=0.041)</p> <p><u>Psychological function:</u> HADS total (0-42), mean (SD)*: I: 10.54 (8.20) n=68 C: 11.00 (8.18), n=56 (p=0.716)</p> <p>HADS-D, median (min, max): I: 4 (0,14), n=75 C: 4 (0,14), n=68 (ns)</p> <p>HADS-A, median (min, max):</p>	<p>GOSE, mean (SD)*: I: 6.93 (0.94), n=69 C: 6.68 (1.03), n=56 (p=0.193)</p> <p><u>Return to work 12 months after injury:</u> I: 49/81 (60%) C: 50/70 (71%) (ns)</p>		<p><u>Method of measurement</u> Self-reported questionnaires (mailed) + telephone interview</p> <p><u>Blinding</u> Assessors blinded</p> <p><u>Handling of missing data</u> ITT reported for dichotomous data</p> <p><u>Comments</u> *Mean and SD derived from author upon request</p>

First author Year Reference Country	Study design Setting Patient characteristics	Intervention Control Follow-up time Withdrawal/Drop-outs	Results: Function Post-concussion symptoms Psychological function Cognitive function	Results: Activities and participation ADL and participation Return to work Use of health care services	Results: Quality of life Life satisfaction Health status	Risk of bias Blinding Comments
			I: 7 (0,19), n=75 C: 7 (0,16), n=68 (ns)			

ADL = Activities of daily living; **BICRO-39** = Brain injury community rehabilitation outcome scale (range 0-30, low = better); **BSI-18** = Behavioral Symptoms Inventory-18 (t-score range 0-72?, low = better); **Beck-A** = Beck anxiety inventory (range 0-63, low = better); **Beck-D** = Beck depression inventory (range 0-63, low = better); **CVLT-II** = California Verbal Learning Test-II (range?); **EuroQoL** = European quality of life scale (range 0-100, high = better); **GOSE** = Glasgow Outcome Scale Extended (range 1-8, high = better); **CIQ** = community integration questionnaire (range 0-29, high = better); **C** = Control; **d** = Days; **GOSE** = Glasgow Outcome Scale Extended (range 1-8, high = better); **HADS** = Hospital anxiety and depression scale (range 0-21 for HADS-A and HADS-D respectively, low = better); **HISC** = head injury symptom checklist (complaints: range 0-21, low = better); **I** = intervention; **IES** = Impact of event scale (range 0-88, low = better); **ITT** = Intention to treat; **MDI** = Major Depression Inventory (range 0-50, low = better) **M2PI** = Mayo-Portland Adaptability Inventory-4 Participation Index (range 0-30, low = better); **NSI** = Neurobehavioral Symptom Inventory (range 0-88?, low = better); **PASAT** = Paced Auditory Serial Addition Task (range 0-60, high = better); **RPQ** = Rivermead post-concussion symptoms questionnaire (range 0-64, low = better); **PHQ-9** = Patient Health Questionnaire-9 (range 0-27, low = better); **QoL** = Quality of life; **QOLI-brief** = The Quality of Life Interview-Brief; **SCL-90R GSI** = Symptom Checklist-90 global score index (range 0-4, low = better); **SDS** = Sheehan disability scale (range 0-30, low = better), **SD** = Standard deviation; **TBI** = Traumatic brain injury; **y** = Years

All data including p-values have been extracted from the original studies unless otherwise stated

Table 5.4 Case management, supported living, vocational rehabilitation.

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Follow-up time Withdrawal/ Drop-outs	Results (1) (Post-concussion symptoms Psychological function Cognitive function)	Results (2) (Activities and participation ADL Return to work Use of health care services)	Results (3) (Quality of life/ life satisfaction)	Risk of bias Comments
Doig et al 2011 [23] Australia	<p><u>Study design</u> Randomised cross-over trial</p> <p><u>Setting</u> A day hospital (outpatient) setting and home setting</p> <p><u>Patient characteristics</u> N=14 severe TBI Median age, y (IQR): 24.5 (19.7–29.2)</p> <p>Men: 86% Injury severity: Median PTA duration, d (IQR): 72.0 (51.7–10.7) Median initial GCS score (IQR): 5.0 (3–9.5)</p>	<p><u>Intervention</u> Regular day hospital therapies and 6 weeks of additional intervention at home (A) and 6 weeks of additional intervention in the day hospital (B). Participants were randomly allocated to either treatment sequence AB (n=7) or BA (n=7)</p> <p><u>Follow-up time</u> 18 weeks</p> <p><u>Withdrawal/Drop-outs</u> None after randomisation</p>		<p>COPM overall Performance Post-home (A) change score (Median (IQ range)): 1.2 (0–2.9) Post-day hospital (B) change score (Median (IQ range)): 1.7 (0.5–2.2) A-B=0.4 ns</p> <p>COPM overall satisfaction Post-home (A) change score (Median (IQ range)): 1.2 (0.4–3.3) Post-day hospital (B) change score (Median (IQ range)): 2.1 (0.5–2.5) A-B=0.2 ns</p> <p>GAS standard score Post-home (A) change score (Median (IQ range)): 8.1 (6.1–12.0) Post-day hospital (B) change score (Median (IQ range)): 6.6 (3.6–10.9) A-B=2.0 ns</p> <p>MPAI total score Post-home (A) change score (Median (IQ range)): 3.5 (-2.0–8.0)</p>		Some concerns

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				Post-day hospital (B) change score (Median (IQ range)): 4.0 (1.5–6.0) A-B= -0.3 ns		
Greenwood et al 1994 [24] UK	<p><u>Study design</u> Prospective controlled unmatched nonrandomised</p> <p><u>Setting</u> Four district general hospitals and two university teaching hospitals, each with neurosurgical units, in east central, north, and north east London and its environs</p> <p><u>Patient characteristics</u> Patients who had sustained a closed head injury, were aged 16–60, had been in coma for six hours or had a post-traumatic amnesia of more than 48 hours, N=126</p>	<p><u>Interventions</u> I: standard services plus case management, n=56 C: standard services alone, n=70</p> <p><u>Follow-up time</u> Up to 2 years post injury</p> <p><u>Withdrawal/Drop-outs</u> At 2 years: I: 45% C: 59%</p>	<p><u>Cognitive function</u> <i>24 months after injury</i> mean (SD), (uncorrected for severity of injury) Verbal and non-verbal IQ: Mill Hill vocabulary I: 93.0 (8.7) C: 93.6 (7.2) Standard progressive matrices I: 112.8 (12.4) C: 108.5 (14.7) No significant difference</p> <p>Verbal and non-verbal memory: Logical memory (delayed) I: 7.3 (4.3) C: 8.5 (4.0) Rey figure (delayed): I: 21.8 (8.5) C: 24.9 (8.3) No significant difference</p> <p><u>Personality change</u> <i>24 months after injury</i></p>	<p><u>Service provision</u> Number of patients referred to: Rehabilitation unit OR=3.2 (95% CI, 0.7 to 14.8), intervention group more often, p<0.05 Outpatient services OR=2.3 (95% CI, 0.9 to 5.9), intervention group more often, p<0.05 Day center OR=3.5 (95% CI, 0.9 to 14.2)</p> <p><u>Physical ability</u> Bond neurophysical scale, mean (SD) <i>At 6 months after injury</i> I: 3.8 (3.0) C: 3.5 (2.7) No significant difference</p> <p><u>Vocational function</u> At competitive work: At 6, 12, and 24 months, No (%) I: 10/42 (24), 9/30 (30), 7/19 (37) C: 15/53 (28), 14/47 (30), 9/27 (33)</p>		Serious

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Follow-up time Withdrawal/ Drop-outs	Results (1) (Post-concussion symptoms Psychological function Cognitive function)	Results (2) (Activities and participation ADL Return to work Use of health care services)	Results (3) (Quality of life/ life satisfaction)	Risk of bias Comments
	<p>Men: 73% Age: 16–60 years</p> <p>Minimum GCS (mean+SD)*: I: 5.5±2.6 C: 6.6±3.0</p> <p>Days unconscious (mean+SD)*: I: 11.3±13.5 C: 4.6±7.5</p> <p>Days PTA (mean+SD)*: I: 64.9±97.5 C: 40.8±75.0 *p<0.05</p>		<p>No (%) with changeable mood I: 8/17 (47) C: 11/24 (46)</p> <p>No (%) with childish behavior I: 10/17 (59) C: 19/26 (73)</p> <p><u>Affective and social functioning</u> <i>24 months after injury</i> Leeds depression scale, mean (SD) I: 12.3 (4.3) C: 14.1 (2.6)</p> <p>General health questionnaire, raw score (SD) I: 6.0 (7.1) C: 2.3 (3.7)</p> <p>No (%) with change in leisure I: 13/27 (48) C: 14/18 (78) No significant differences</p> <p><u>Disability rating scale</u> At 24 months, mean (SD), (worst=30) I: 2.0 (2.4)</p>	<p>Employable in competitive work (disability rating scale): I: 15/46 (33), 16/32 (50), 14/21 (67) C: 27/57 (47), 26/53 (49), 25/29 (86)</p> <p>Unemployed or off work: I: 26/42(62), 15/30 (50), 9/19 (47) C: 25/53 (47), 24/47 (51), 11/27 (41)</p> <p>No significant differences</p>		

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Follow-up time Withdrawal/ Drop-outs	Results (1) (Post-concussion symptoms Psychological function Cognitive function)	Results (2) (Activities and participation ADL Return to work Use of health care services)	Results (3) (Quality of life/ life satisfaction)	Risk of bias Comments
			C: 0.76 (1.7) P<0.05			
Hanks et al 2012 [25] USA	<u>Study design</u> RCT <u>Setting</u> Midwestern rehabilitation hospital <u>Patient characteristics</u> Persons with TBI (ranging from mild complicated to severe, mean GCS: 9) and significant others/ caregivers (n=199) Age (mean+SD) I: 38.5±17.6 y C: 40.9±17.3 y GCS (mean+SD) I: 9.4±4.5 C: 9.8±4.6	<u>Interventions</u> Intervention: peer mentoring, n=99 <u>Control:</u> no mentoring, n=100) <u>Follow-up time</u> 2 years post allocation <u>Withdrawal/Drop-outs</u> Attrition rate 20% (data reported for 96 persons with TBI)	<u>Physical functioning, SF-12</u> I: 45.4±6.4 C: 42.5±7.5 p=0.04 <u>FAD, behavioural control</u> I: 1.75±0.3 C: 1.88±0.3 p=0.04 FAD, general functioning I:1.92±0.36 C: 2.01±0.35 p=0.23 <u>BSI-18, GSI</u> I:52.7±8.2 C:54.9±9.4 p=0.24	<u>CIM</u> I: 39.9±5.9 C: 41.1±6.3 p=0.35 <u>Alcohol Use (SMAST)</u> I: 1.6±1.8 C: 2.8±2.3 p=0.01		Some concerns

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Follow-up time Withdrawal/ Drop-outs	Results (1) (Post-concussion symptoms Psychological function Cognitive function)	Results (2) (Activities and participation ADL Return to work Use of health care services)	Results (3) (Quality of life/ life satisfaction)	Risk of bias Comments
Hopman et. al. 2012 [26] Australia	<p><u>Study design</u> Prospective, multicentre, longitudinal, controlled cohort</p> <p><u>Setting</u> The Transitional Living Unit (TLU) program operates within a community residence from Monday to Friday with clients returning to their family home or alternative accommodation on weekends. Participants of community-based rehabilitation (CR) programs remained living in their own homes and received intervention at home and/or centre-based environments</p> <p><u>Patient characteristics</u> n=39 with TBI and n =2 with a nontraumatic BI</p>	<p><u>Interventions:</u> A. transitional living units (TLU) program, n=20 B. community-based rehabilitation (CR) program, n=18</p> <p><u>Follow-up time</u> 6 months</p> <p><u>Withdrawal/Drop-outs</u> 3/38 (2 from CRU group and 1 from TLU group)</p>		<p>MPAI-4 Total (0–99, higher=worse) Mean (SD) of pre-, post-intervention and 6m follow-up TLU: 45.10 (12.25), 37.84 (19.21), 36.95 (19.45) CR: 40.22 (23.12), 38.00 (23.40), 34.38 (24.57)</p> <p>MPAI-4 Abilities Mean (SD) of pre-, post-intervention and 6m follow-up TLU: 17.3 (6.11), 15.74 (8.76), 14.20 (7.93) CR: 14.94 (9.14), 12.00 (9.15), 13.81 (10.39)</p> <p>MPAI-4 Adjustment Mean (SD) of pre-, post-intervention and 6m follow-up TLU: 15.75 (5.99), 14.37 (9.71), 15.55 (9.04) CR:14.67 (10.11), 17.19 (11.55), 13.56 (9.09)</p> <p>MPAI-4 Participation Mean (SD) of pre-, post-intervention and 6m follow-up TLU: 16.70 (4.39), 11.74 (6.03), 11.90 (7.12) CR: 16.17 (8.10), 15.00 (8.55), 11.25 (9.75)</p>		Moderate

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Follow-up time Withdrawal/ Drop-outs	Results (1) (Post-concussion symptoms Psychological function Cognitive function)	Results (2) (Activities and participation ADL Return to work Use of health care services)	Results (3) (Quality of life/ life satisfaction)	Risk of bias Comments
	<p>Mean age (mean, SD): TLU: 33.1 (12.9) CR: 40.6 (13.3)</p> <p>TLU: 85% CR: 78%</p> <p>Injury severity: GCS, Mean (SD) TLU: 7.06 (4.15) CR: 6.60 (3.02)</p> <p>PTA, days (median, (IQR)): TLU: 48 (21.5–84.5) CR: 31.5 (25.8–48.5)</p>			<p>CANS Mean (SD) of pre-, post- intervention and 6m follow-up TLU: 5.45 (1.19), 4.53 (1.63), 3.95 (1.23) CR: 5.06 (1.63), 4.67 (1.53), 3.75 (1.73)</p> <p>SMAF IADL Skill Score Mean (SD) pre-, post- intervention and 6m follow-up TLU: 10.79 (4.60), 8.24 (3.17), 7.03 (4.63) CR: 11.38 (6.65), 9.35 (7.20), 7.59 (7.10)</p> <p>CIQ Total (mean (SD) of post- intervention and 6m follow-up) TLU: 13.06 (4.08), 15.53 (5.14) CR: 12.94 (5.03), 16.00 (6.08)</p> <p>CIQ Home (mean (SD) of post- intervention and 6m follow-up) TLU: 4.22 (1.70), 4.53 (2.84) CR: 3.47 (2.48), 4.81 (3.47)</p> <p>CIQ Social (mean (SD) of post- intervention and 6m follow-up) TLU: 6.33 (2.70), 8.42 (2.14) CR: 7.41 (2.09), 7.25 (1.98)</p>		

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Follow-up time Withdrawal/ Drop-outs	Results (1) (Post-concussion symptoms Psychological function Cognitive function)	Results (2) (Activities and participation ADL Return to work Use of health care services)	Results (3) (Quality of life/ life satisfaction)	Risk of bias Comments
				<p>CIQ Productivity (mean (SD) of post-intervention and 6m follow-up) TLU: 2.44 (1.65), 2.58 (1.68) CR: 2.18 (1.33), 3.94 (2.18)</p> <p>SPRS work/relationships/living skills/total</p> <p>Return to work, n/N TLU: 5/20 CR: 8/16</p>		
Man et al 2013 [27] China, USA	<p><u>Study design</u></p> <p>RCT</p> <p><u>Setting</u></p> <p>Department of Rehabilitation Sciences, The Hong Kong Polytechnic University</p> <p><u>Patient characteristics</u></p> <p>N=40 mild (N=20) or moderate (N=20) traumatic brain injury</p>	<p><u>Interventions</u></p> <p>I: artificial intelligent virtual reality based vocational training system (AIVTS), n=20 C: conventional psycho-educational vocational training programme (PEVTS), n=20</p> <p><u>Follow-up time</u></p> <p>One-month, 3-month and 6-month follow-ups on employment outcomes</p> <p><u>Withdrawal/Drop-outs</u></p> <p>I: N=5 C: N=5</p>	<p>Executive dysfunction</p> <p>WCST-% errors (lower=better) (Pre-training (SD)–Post-training (SD)) I: 47.28 (18.0)–40.08 (21.44) C: 56.04 (15.81)–53.12(14.75) $p=0.02$</p> <p>WCST-% perseverative errors (lower=better) I: 31.32 (17.54)–21.88 (16.41) C: 31.60 (18.86)–24.92 (10.82) $p=0.56$</p>	<p>Employment outcomes</p> <p>1–36 months Unemployment (%) I: 85–70–60 C:100–80–80</p> <p>Sheltered workshop (%) I: 0–0–0 C: 0–0–0</p> <p>Supported employment (%) I: 10–10–15 C: 0–5–5</p> <p>Supported employment (%) I: 5–20–25 C:0–15–15</p>		Some concerns

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Follow-up time Withdrawal/ Drop-outs	Results (1) (Post-concussion symptoms Psychological function Cognitive function)	Results (2) (Activities and participation ADL Return to work Use of health care services)	Results (3) (Quality of life/ life satisfaction)	Risk of bias Comments
	Age range: 18–55 years		<p>WCST-% conceptual level response I: 38.04 (21.34)–49.28 (28.10) C: 26.28 (19.9)–30.16 (18.23) $p < 0.01$</p> <p>Planning and problem-solving TOL (Pre-training (SD)–Post-training (SD)) I: 25.00 (3.39)–26.92 (3.39) C: 24.4 (4.91)–26.48 (4.09) $p = 0.28$</p> <p>Cognitive impairment in the workplace VCRS (Pre-training (SD)–Post-training (SD)) I: 56.56 (7.24)–63.2 (5.52) C: 56.36 (10.53)–62.36 (10.44) $p = 0.12$</p>			
Ownsworth et al 2008 [28] Australia	<u>Study design</u> RCT <u>Setting</u> Outpatient rehabilitation/	<u>Interventions</u> Intervention A: Group-based support targeting the development of metacognitive skills (3-h weekly for 8 weeks), n=12	<p>PCRS (Mean (SD) of pre-, post-, follow-up)</p> <p><i>Self</i> A: 108.8 (16.5), 110.3 (16.8), 114.7 (18.9)</p>	<p>COPM ratings (Mean (SD) of pre-, post-, follow-up)</p> <p><i>Self-performance</i> A: 4.08 (1.8), 6.78 (1.7)†, 6.29 (1.3)‡</p>		Low

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Follow-up time Withdrawal/ Drop-outs	Results (1) (Post-concussion symptoms Psychological function Cognitive function)	Results (2) (Activities and participation ADL Return to work Use of health care services)	Results (3) (Quality of life/ life satisfaction)	Risk of bias Comments
	<p>participants' home and community</p> <p><u>Patient characteristics</u> N=35 ABI (TBI n=21, GCS: mean 6.81, SD 3.9) Men 54% Mean age (y): 43.9±12.6 (range 21-62) <u>Time since injury (y):</u> 5.3±3.9 (range 2-18)</p>	<p><u>Intervention B:</u> Individualised occupation-based support (3-h weekly for 8 weeks), n=11</p> <p><u>Intervention AB:</u> Combined group and individualised support intervention (8 weeks), n=12</p> <p><u>Control:</u> waiting list</p> <p><u>Follow-up time</u> 8 weeks and 3-month</p> <p><u>Withdrawal/Drop-outs</u> Drop-outs n= 5 Missing data n= 3</p>	<p>B: 112.6 (16.1), 119.1 (12.6)†, 119.2 (16.2) AB: 113.8 (20.2), 116.8 (17.8), 118.0 (18.4) C (Pre-, Re-): 106.59 (17.5), 108.53 (15.2)</p> <p><i>Relative</i> A: 100.6 (26.1), 110.5 (22.5)†, 105.5 (23.0) B: 109.1 (14.2), 115.7 (17.3), 114.9 (12.7)‡ AB: 107.7 (18.3), 113.4 (15.8), 119.1 (14.5) C (Pre-, Re-): 103.06 (18.1), 104.25 (16.0)</p> <p>BICRO-39 (Mean (SD) of pre-, post-, follow-up)</p> <p><i>Psychological</i> A: 16.3 (3.7), 17.6 (4.1), 17.9 (3.6)‡ B: 16.3 (4.3), 19.6 (5.1)†, 20.1 (6.1)‡ AB: 17.1 (7.5), 17.7 (6.1), 19.4 (5.2) C (Pre-, Re-): 16.41 (5.8), 16.29 (5.8)</p> <p>† p<0.05 Pre-post</p>	<p>B: 4.68 (1.5), 6.10 (1.0), 6.13 (1.0)† AB: 5.04 (1.6), 6.98 (1.2)†, 7.10 (1.3)† C (Pre-, Re-): 4.72 (1.4), 4.84 (1.2)</p> <p><i>Self-satisfaction</i> A: 3.75 (1.8), 7.22 (1.6)†, 5.89 (1.7) B: 4.51 (1.7), 5.95 (1.6)†, 6.17 (1.4)‡ AB: 4.35 (1.9), 7.47 (1.1)†, 6.86 (1.4)‡ C (Pre-, Re-): 4.17 (2.1)†, 4.83 (1.8)*</p> <p><i>Relative-performance</i> A: 3.94 (1.7), 6.53 (1.9)†, 5.90 (1.6)† B: 4.78 (1.6), 5.93 (1.7), 6.43 (1.4)‡ AB: 4.37 (1.7), 5.32 (2.2)†, 5.84 (2.0)‡ C (Pre-, Re-): 4.69 (1.4), 4.62 (1.5)</p> <p><i>Relative-satisfaction</i> A: 4.52 (1.4), 6.94 (1.7)†, 6.49 (1.8) B: 5.92 (1.1), 6.52 (1.5), 6.73 (1.3)</p>		

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Follow-up time Withdrawal/ Drop-outs	Results (1) (Post-concussion symptoms Psychological function Cognitive function)	Results (2) (Activities and participation ADL Return to work Use of health care services)	Results (3) (Quality of life/ life satisfaction)	Risk of bias Comments
			‡ p<0.05 Pre–follow-up	AB: 4.52 (1.8), 6.28 (1.8)†, 6.13 (1.9)‡ C (Pre-, Re-): 5.47 (1.5), 5.64 (1.6) BICRO-39 (Mean (SD) of pre-, post-, follow-up) <i>Socialisation</i> A: 36.7 (8.5), 36.1 (8.8), 37.3 (9.8) B: 33.4 (9.4), 31.6 (8.9), 32.4 (8.8) AB: 33.7 (7.6), 32.8 (6.1), 33.1 (6.5) C (Pre-, Re-): 35.41 (7.7), 35.65 (7.8) <i>Productivity</i> A: 24.9 (3.9), 21.8 (7.2), 24.3 (4.9) B: 22.4 (6.7), 21.7 (6.7), 20.6 (6.4) AB: 21.3 (4.7), 19.8 (4.1), 19.3 (4.0) C (Pre-, Re-): 21.59 (5.8), 22.41 (5.9) † p<0.05 Pre–post ‡ p<0.05 Pre–follow-up *p<0.05		

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Follow-up time Withdrawal/ Drop-outs	Results (1) (Post-concussion symptoms Psychological function Cognitive function)	Results (2) (Activities and participation ADL Return to work Use of health care services)	Results (3) (Quality of life/ life satisfaction)	Risk of bias Comments
Radford 2013 [29] United Kingdom	<p><u>Study design</u> Observational</p> <p><u>Setting</u> A specialist multidisciplinary TBI service, based in a large teaching hospital</p> <p><u>Patient characteristics</u> N=94. Adults (aged ≥16 years) with TBI (minor: 43%, severe: 40%, moderate: 17%) hospitalised >48 hours Mean age (range): 34.3 y (16–68) Men: 80%</p>	<p><u>Interventions</u> I: Specialist TBI interdisciplinary team comprising three case managers with professional backgrounds in occupational therapy, social work and intensive care nursing who met patients and families within 10 days of injury and work alongside with a Cognitive Behavioural Therapist, an Occupational Therapist and a neuro-psychologist, n=40. C: Usual care, n=54</p> <p><u>Follow-up time</u> 3, 6 and 12 months post-baseline</p> <p><u>Withdrawal/Drop-outs</u> At 12 months: I: 6/40 (15%) C: 9/54 (17%)</p>	<p>BICRO-39 (Median change score range (IQR)) <i>Psychological</i> I: 0.17 (95% CI, -0.22 to 2.00), IQR 1.63 C: 0.17 (95% CI, -2.00 to 2.00), IQR 0.75</p> <p>HADS (Mean (SD), Range) <i>Depression</i> I: 4.83 (4.59), 0 – 15 C: 5.06 (5.53), 0–17</p> <p><i>Anxiety</i> I: 7.42 (5.72), 0–20 C: 6.46 (5.25), 0–20</p>	<p>Return to work At 12 months: I: 27/36 C: 27/45</p> <p>RD=0.14 (95% CI, 0.01 to 0.28) OR=4.25 (95% CI, 1.05 to 17.21)</p> <p>BICRO-39 (Median change score range (IQR)), higher=better</p> <p><i>Personal care</i> I: 0.00 (-0.33, 0.67) (0.00) C: 0.00 (-2.33, 1.83) (0.00)</p> <p><i>Mobility</i> I: 1.58 (-4.17, 4.00) (1.92) C: 1.33 (-2.67, 4.17) (6.83)</p> <p><i>Self-organisation</i> I: 0.00 (-3.30, 3.67) (1.04) C: 0.33 (-3.00, 4.50) (1.46)</p> <p><i>Socialising</i> I: 0.08 (-2.17, 2.50) (1.67) C: -0.25 (-2.50, 2.00) IQR 1.83</p> <p><i>Productive employment</i> I: 2.33 (0.42, 3.33) (0.83) C: 2.13 (-0.08, 3.33) (0.83)</p>	<p>EQ-5D (Mean (SD), Range) Intervention: 7.44 (1.55), 4–10 Control: 7.36 (2.42), 2–10</p>	High

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Follow-up time Withdrawal/ Drop-outs	Results (1) (Post-concussion symptoms Psychological function Cognitive function)	Results (2) (Activities and participation ADL Return to work Use of health care services)	Results (3) (Quality of life/ life satisfaction)	Risk of bias Comments
Radford 2018 [30] UK	<p><u>Study design</u> RCT</p> <p><u>Setting</u> Three major trauma centres (MTCs)</p> <p><u>Patient characteristics</u> Adults (aged ≥ 16 years) with TBI (mild: 56%, moderate: 18%, severe: 26%) admitted for > 48 hours and working or studying prior to injury. N=78 Mean age (SD): 39.3 y (13.4) Men: 85%</p>	<p><u>Intervention</u> Early specialist TBI Vocational rehabilitation (VR) delivered by occupational therapists in the community using a case co-ordination model. Given within 8 weeks of TBI, n=39</p> <p><u>Control</u> Usual health and social care services were available to them in their area, n=39</p> <p><u>Follow-up time</u> 3, 6 and 12 months post-baseline</p> <p><u>Withdrawal/Drop-outs</u> At 12 months: Intervention 10/39 (26%) Non-intervention 16/39 (41%)</p>		<p>Competitively employed or in full-time study, n/N I: 19/29 C: 21/23 OR 0.23 (95% CI, 0.04 to 1.18)</p> <p>In purposeful occupation or studying, n/N I: 20/29 C: 21/23 OR 0.26 (95% CI, 0.05 to 1.40)</p>		Some concerns
Trexler et al 2016 [31] USA	<p><u>Study design</u> RCT</p> <p><u>Setting</u> Outpatient rehabilitation clinic</p>	<p><u>Interventions</u> Intervention: Resource facilitation services, n=22 Control: standard care, n=22</p>	<p><u>Psychological function</u> (psychological distress): BSI-18 GSI</p>	<p><u>Vocational and academic outcome</u> Vocational Independent scale revisited (range 1-5):</p>		Low

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Follow-up time Withdrawal/ Drop-outs	Results (1) (Post-concussion symptoms Psychological function Cognitive function)	Results (2) (Activities and participation ADL Return to work Use of health care services)	Results (3) (Quality of life/ life satisfaction)	Risk of bias Comments
	<p><u>Patient characteristics</u> N=44 Outpatients with acquired brain injury, 52% TBI (M2PI at baseline indicated moderate to severe level of disability) 62 % men</p> <p><u>Time since injury (mean+SD)</u> I: 63.2±19.6 d C: 64.4±37.7 d</p> <p><u>Age (mean +SD)</u> I: 33.0±10.81 y C: 39.5±12.7 y</p> <p>Time since injury (mean+SD) I: 63.2±19.6 d C: 64.4±37.7 d</p> <p>Age (mean +SD) I: 33.0±10.81 y C: 39.5±12.7 y</p>	<p><u>Follow-up time</u> 15 months post allocation</p> <p><u>Withdrawal/Drop-outs</u> 1/44 (control group)</p>	<p><u>Group by time interaction:</u> p=0.670 (no statistically significant difference)</p>	<p>Treatment group was on average 0.13 points higher than the control group Group by time interaction, p=0.375</p> <p><u>Return to competitive work, school, or volunteering (only persons with specific goals), n/N</u> I: 14/16 87.5% C: 10/20 50 %</p>		
Willer et al. 1999 [32] USA, Canada	<p><u>Study design</u> Controlled, matched design</p> <p><u>Setting</u></p>	<p><u>Interventions</u> I: residential-based postacute rehabilitation, n=23 C: home-based/outpatient services, n=23</p>		<p>HALS Disability (mean, SD of scores at <u>admission</u> and <u>discharge</u>):</p> <p><i>Motor</i> I: 4.36 (1.81)*; 3.40 (1.97)**</p>		Moderate

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Follow-up time Withdrawal/ Drop-outs	Results (1) (Post-concussion symptoms Psychological function Cognitive function)	Results (2) (Activities and participation ADL Return to work Use of health care services)	Results (3) (Quality of life/ life satisfaction)	Risk of bias Comments
	<p>A postacute community-based residential rehabilitation program or in the homes of patients</p> <p><u>Patient characteristics</u> N=46 with severe TBI</p> <p>Mean age, y (SD): I: 33.4 (11.3) C: 34.8 (10.72)</p> <p>Men: 87% Time since injury, y (mean, SD) I: 3.05 (2.98) C: 4.66 (4.66)</p> <p>Length of coma, hours (intervention group) 72–168: 2 participants 168–504: 3 participants >504: 18 participants</p> <p>Disability score (mean, SD) I: 20.39 (6.02) C: 20.30 (6.10)</p>	<p><u>Follow-up time</u> One year</p> <p><u>Withdrawal/Drop-outs</u> None</p>		<p>C: 2.83 (2.27)*, 2.56 (1.44)** *$p<0.001$ **$p<0.05$</p> <p><i>Sensory</i> I: 3.27 (1.60), 3.24 (1.73) C: 2.74 (1.45), 2.91 (1.44)</p> <p><i>ADL</i> I: 2.85 (2.37), 1.96 (2.25) C: 2.83 (2.06), 2.42 (2.17)</p> <p><i>Cognitive</i> I: 5.22 (2.43), 3.78 (2.61) C: 5.14 (1.94), 5.09 (2.13)</p> <p><i>Behavioral</i> I: 3.61 (2.33), 2.67 (2.21) C: 4.07 (2.15), 3.30 (2.10)</p> <p><i>Emotional</i> I: 1.00 (1.13) *, 0.74 (1.18) * C: 2.74 (1.45) *, 2.70 (1.40) * *$p<0.001$</p> <p><i>Total</i> I: 20.39 (6.02), 14.62 (6.68) * C: 20.30 (6.10), 18.98 (6.98) * *$p<0.001$</p>		

First author Year Reference Country	Study design Setting Patient characteristics	Interventions Follow-up time Withdrawal/ Drop-outs	Results (1) (Post-concussion symptoms Psychological function Cognitive function)	Results (2) (Activities and participation ADL Return to work Use of health care services)	Results (3) (Quality of life/ life satisfaction)	Risk of bias Comments
				<p><i>HALS Disability (mean, SD of scores at discharge and follow-up):</i></p> <p><i>Motor</i> I: 3.62 (1.93), 3.52 (2.00) C: 2.26 (2.26), 2.99 (2.30)</p> <p><i>Sensory</i> I: 2.06 (1.51), 1.97 (1.44) C: 2.85 (1.71), 2.78 (1.67)</p> <p><i>ADL</i> I: 2.10 (2.39), 2.32 (2.35) C: 2.48 (2.16), 2.48 (2.16)</p> <p><i>Cognitive</i> I: 3.80 (2.76), 3.90 (2.67) C: 5.35 (2.06), 5.15 (2.35)</p> <p><i>Behavioral</i> I: 2.82 (2.24), 2.75 (2.05) C: 3.10 (1.86), 3.40 (2.23)</p> <p><i>Emotional</i> I: 0.85 (1.23), 0.75 (1.07) C: 2.60 (1.47), 2.40 (1.50)</p> <p><i>Total</i> I: 15.21 (6.74), 15.62 (6.59) C: 19.18 (7.48), 19.20 (7.28)</p>		

ABI = Acquired brain injury, **BI** = Brain injury; **BICRO-39** = Brain Injury Community Rehabilitation Outcome 39, **BSI** = Brief Symptom Inventory, **C** = Control group, **CANS** = Care and Needs Scale, **CIM** = Community Integration Measure, **CIQ** = Community Integration Questionnaire, **COPM** = Canadian occupational performance measure, **d** = Days, **FAD** = Family Assessment Device, **FIM** = Functional independence measure, **GSC** = Glasgow Coma Scale, **GSI** = Global Severity Index, **HALS** = Health and activity limitation survey, **I** = Intervention group, **IADL** = Instrumental activities of daily living, **IQR** = Interquartile range, **M** = Month, **M2PI** = Participation Index, **MPAI-4** = Mayo-Portland Adaptability Inventory-4, **no** = Number; **ns** = Not significant, **OR** = Odds ratio; **PCRS** = Patient Competency Rating Scale, **PTA** = Post-traumatic amnesia, **SD** = Standard deviation, **SMAF** = Functional Autonomy Measurement Scale, **TBI** = Traumatic brain injury, **TOL** = Tower of London Test, **TSI** = Time since injury, **VCRS** = The Vocational Cognitive Rating Scale, **WCST** = Wisconsin Card Sorting Test, **y** = Years

Table 5.5 Economic evaluations comparing single rehabilitation interventions with usual care for mild traumatic brain injury.

Author Year Reference Country	Study design Population Setting Perspective	Intervention vs control	Incremental cost (95% CI)	Incremental effect (95% CI)	ICER (95% CI)	Study quality and transferability* Further information Comments
Richardson et al 2018 [33] US	<u>Study design</u> RCT-based CUA, 12-month time horizon <u>Population</u> Mild TBI, 93% men, mean age 30 years <u>Setting</u> 2 military medical centres <u>Perspective</u> US Department of Defense	Telephone-delivered problem-solving treatment (n=178) versus Educational brochures only (n=178)	Cost of programme per enrollee 996 USD (806, 1 217) Costs reported in USD year 2016**	0,015 QALYs (-0,003, 0,034) using EQ-5D-3L US value set 0,020 QALYs (0,006, 0,034) using SF-6D algorithm	68 658 USD per QALY gained (-463 535, 596 661) using EQ-5D-3L 49 284 USD per QALY gained (26 971, 159 309) using SF-6D	Moderate quality Low transferability to Sweden ITT analysis based on CONTACT trial [13] CUA based on statistically significant difference at 6 months only Protocol-driven costs and US military setting reduce transferability of results

CUA = Cost-utility analysis; **ICER** = Incremental cost-effectiveness ratio; **ITT** = Intention-to-treat; **nr** = Not reported; **TBI** = Traumatic brain injury; **USD** = United States Dollars

* Study quality is a combined assessment of the quality of the study from a clinical as well as an economic perspective (Bilaga 4).

** Information obtained from authors.

Table 5.6 Economic evaluations comparing costs of residential community integration before and after intervention.

Author Year Reference Country	Study design Population Setting Perspective	Intervention vs control	Incremental cost	Incremental effect	ICER	Study quality and transferability* Further information Comments
van Heugten et al 2011 [34] The Netherlands	<p><u>Study design</u> CA 1 year before and after programme</p> <p><u>Population</u> 29 patients with brain injury (59% TBI), 62% men, mean age at intervention 30 years</p> <p><u>Setting</u> Community</p> <p><u>Perspective</u> Dutch societal perspective**</p>	1 year before and 1 year after community integration programme, covering 3 modules (independent living, social- emotional, work)	<p>Societal perspective: cost savings 10 263 EUR** per patient</p> <p>Incremental healthcare costs: 4 685 EUR per patient</p> <p>Cost savings informal care: 12 000 EUR per patient</p> <p>Costs reported in Euros year 2005 (year of data collection)</p>	Not relevant	Not relevant	<p>Moderate quality Moderate transferability to Sweden</p> <p>Intervention described further in [35]</p> <p>No control group, relatively short follow-up</p>

CA = Cost analysis; **EUR** = Euro; **ICER** = Incremental cost-effectiveness ratio; **TBI** = Traumatic brain injury

* Study quality is a combined assessment of the quality of the study from a clinical as well as an economic perspective (Bilaga 4).

** Productivity losses costed using friction cost method in main analysis; numbers in table are based on sensitivity analysis using human capital method. Total cost savings calculated as cost difference for healthcare professionals, medication and aids, informal care and productivity losses using human capital method (4685 + 2 - 12000 - 2950 EUR).

Table 5.7 Economic evaluations comparing specialist vocational rehabilitation intervention with usual care.

Author Year Reference Country	Study design Population Setting Perspective	Intervention vs control	Incremental cost (95% CI)	Incremental effect (95% CI)	ICER**	Study quality and transferability* Further information Comments
Radford et al 2013 [29] UK	<p><u>Study design</u> CA, CEA and CUA based on cohort comparison over 12 months</p> <p><u>Population</u> TBI patients hospitalised for at least 48 hours, in paid or voluntary work or education at time of injury, 80% men, mean age 34 years</p> <p><u>Setting</u> Specialist multidisciplinary TBI service in teaching hospital</p> <p><u>Perspective</u> Health and social care perspective, societal perspective</p>	<p>Specialist vocational rehabilitation (n=34)</p> <p>versus</p> <p>Usual care (n=45)</p>	<p><u>Health and social care perspective:</u> 75 GBP per person (-1 200, 1 350)</p> <p><u>Societal perspective:</u> -1 863 GBP per person (-9 000, 5 275)</p> <p>Costs reported in GBP year 2007</p>	<p>0,0175 QALYs (-0,108, 0,1707)</p> <p>EQ-5D-3L UK value set</p>	<p><u>Health and social care perspective:</u> 4 299 GBP per QALY gained</p> <p><u>Sensitivity analysis</u> using different imputation methods: 35 873 GBP per QALY gained to dominated***</p> <p><u>Societal perspective:</u> less costly and more effective (all analyses)</p>	<p>Moderate quality Moderate transferability to Sweden</p> <p>High loss to follow-up for resource information, addressed through sensitivity analyses</p> <p>Unclear information in methods and results on imputation of missing data</p>

CA = Cost analysis; **CEA** = Cost-effectiveness analysis; **CUA** = Cost-utility analysis; **GBP** = British pound; **ICER** = Incremental cost-effectiveness ratio; **TBI** = Traumatic brain injury

* Study quality is a combined assessment of the quality of the study from a clinical as well as an economic perspective (Bilaga 4).

** No confidence intervals reported.

*** More costly and less effective.

Table 5.8 Experiences and perspectives of the rehabilitation.

First author Year Reference Country	Aim	Theory or approach Competence of researchers	Setting, recruitment	Participants	Data collection	Data analysis Methods to ensure rigour of results
Abrahamson 2017 [36] UK	Explore experiences from the transition from in-patient rehabilitation to the community. Perspectives from the participants (and their carers)	Critical realism Two occupational therapists with experience of TBI	Specialist inpatient neurorehabilitation unit in an NHS teaching hospital Consecutive until sample size was reached (based on feasibility). Recruited by a consultant 2 weeks prior to expected discharge	Adults with severe TBI and able to communicate and consent N=10 (9 male) Age: range 48 to 89 years	Interview 1-month post discharge, in the participant's home based on a topic guide Field notes	Thematic analysis, data-driven. All steps conducted independently followed by consensus
Copley 2013 [37] Australia	Describe experiences of care and the factors that impacted upon participants' ability to access services Perspectives of the patients (and their significant others)	No information Three researchers	Former patients at two metropolitan acute trauma hospitals Recruitment from those who responded to a survey Maximum variation sampling (degree of rurality, healthcare funding of rehabilitation)	Adults (18-65 years) with a moderate to severe TBI N=14 (8 male)	Interviews at a place selected by the participant With or without significant other Guided oral history, 45 minutes to 2,5 hours	Thematic analysis Member validation
D'Cruz 2016 [38] Australia	Explore the client perspectives of client-centred occupational therapy	Grounded theory One junior and two senior researchers in	One occupational therapy practice in metropolitan area Purposeful sampling, where participants	Adults that had experienced a moderate – severe TBI (GCS score 3-12) and had lived in the	Semi-structured face-to-face interviews, two per interviewee. The questions were a combination of story-telling, enrichment	Constant comparison The primary researcher conducted the analysis, with secondary analysis by the two others

First author Year Reference Country	Aim	Theory or approach Competence of researchers	Setting, recruitment	Participants	Data collection	Data analysis Methods to ensure rigour of results
		occupational science.	were identified by the treating occupational therapists, combined with theoretical sampling	community for at least one year N=6 (3 F) Age: mean 44 years (range 20 to 71 years) Mean time post-accident: 10 years GCS: ≤ 8	questions and closed questions Memos, reflective journals	Triangulation and member checking
Fleming 2012 [39] Australia	Describe the in-patient rehabilitation experiences prior to discharge. Perspectives from the patients (and their carers) Part of a larger study	Phenomenology for the larger study influenced the topic guide Three researchers Data analysis was completed by students	One rehabilitation unit at a large metropolitan hospital Criterion-based purposeful sampling to select information-rich participants, recruitment by an occupational therapist Saturation principle	Adults (16 years or older) with ABI, able to communicate and consent N = 20 (5 F), 15 had TBI Age: mean 40,2 years (range 24-65) DRS score: mean 4,7 (moderate disability)	Initial questions from a topic guide for the larger study. In-depth interviews conducted in the occupational therapy department	Manifest content analysis Independent coding and consensus procedure
Graff 2018 [40] Denmark	Explore the living experience from hospital discharge up to four years post-injury Explore barriers encountered by patients and carers related to health care and rehabilitation	Hermeneutical phenomenological approach Three nurses and one anthropologist. The nurses were experienced in work with TBI, two were senior researchers with	The Trauma center for severely injured patients at a university hospital Consecutive recruitment from a list of trauma patients. Criterion-based purposeful sampling Saturation principle	Adults (18-60 years) with TBI and appropriate time after injury (dependent on severity). N = 20 consented (8 F) Mild: n=8 Moderate: n=7 Severe: n=5	In-depth interviews (mean 45 minutes, range 25 to 103 min) Field notes	Thematic analysis Deductive-inductive coding by one researcher and agreement searched with a second researcher Themes agreed among all authors

First author Year Reference Country	Aim	Theory or approach Competence of researchers	Setting, recruitment	Participants	Data collection	Data analysis Methods to ensure rigour of results
		experience in qualitative methodology		Age at inclusion: median 39 years (range 25 to 63)		
Månsson-Lexell 2013 [41] Sweden	Describe the experiences of an out-patient group rehabilitation programme	No information Three researchers with expertise in rehabilitation medicine and health sciences	Community Recruitment from patients that answered a questionnaire and consented to an interview	Adults with ABI n = 11 (6 F); 5 had TBI Age: mean 45,2 years (range 25 to 62 years)	Semi structured interviews at home or at the clinic, lasting 45-85 minutes	Qualitative content analysis by two researchers Consensus process and validation by the third author
Muller 2017 [42] UK	Explore how medical and social services support community-based patients	No information Six researchers, no information on expertise	A newly established pilot clinical service for TBI Maximum variation sampling for severity, time post-injury, social situation and education level	Adults (18 years or older) and able to participate in a prolonged interview N = 10 (5 females) Mild TBI: 5 Moderate to severe TBI: 5 Age: median 50 years	Semi structured interviews based on a topic guide at the clinic or at home, around 30 min Field notes	Thematic analysis by three researchers Iterative process Triangulation with results from another study
O'Callaghan 2012 [43] Australia	Explore experiences of health care of adults with moderate to severe TBI	Interpretivism Three researchers, no information on expertise	Community Recruitment from patients that answered a questionnaire and consented to an interview Maximum variation sampling for age,	N = 14 patients (6 females); N = 2 significant others as proxy for patients	Unstructured interviews based on guided oral history, 45 minutes to 2,5 hours, in a place chosen by the participant. If significant others accompanied the participant, they were invited to contribute	Thematic analysis Participant validation

First author Year Reference Country	Aim	Theory or approach Competence of researchers	Setting, recruitment	Participants	Data collection	Data analysis Methods to ensure rigour of results
			funding models and degree of rurality			
Turner 2007 [44] Australia	Explore the lived transition experiences of individuals with ABI and their caregivers	Phenomenology Eight researchers, no information on expertise	One out-patient and one case management service, invitation by health professionals Maximum variation sampling for type of ABI, severity, availability of network, rurality	N = 13 patients (7 females); 7 with TBI 4 with mild-moderate TBI 4 with severe TBI Mean age: 36,9 years (range 19-53 years)	Semi structured interviews, face-to face or by telephone, average 45 minutes	Qualitative content analysis Consensus coding and member check of the initial data analysis
Turner 2011 [45] Australia	Explore perceptions of the recovery process during the transition from hospital to home for persons with ABI	Phenomenology Four researchers, two occupational therapists, one speech pathologist and one neuropsychologist	One metropolitan-based in-patient ABU rehabilitation unit Consecutive recruitment until data saturation	N = 20 (5 females); 16 with TBI Mean age: 40,2 years (range 17 to 63 years)	Semi structured interviews, face -to face or by telephone at three occasions, pre and post discharge (1 and 3 months)	Thematic analysis Triangulation of data sources Consensus coding, prolonged engagement of participant contact, reflexivity

GCS score = Glasgow coma scale; **N** = Number; **NHS** = National Health Service; **TBI** =Traumatic brain injury

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