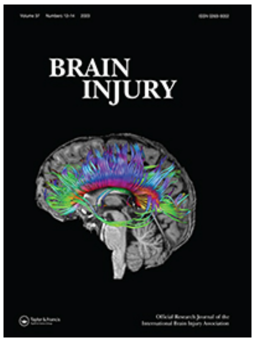

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Peer mentoring for people with acquired brain injury – a systematic review

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ABSTRACT

Introduction: Over 100 million people worldwide live with disabilities resulting from an acquired brain injury (ABI). ABI survivors experience cognitive and physical problems and require support to resume an active life. They can benefit from support from someone who has been through the same issues (i.e. peer mentor). This review investigated the effectiveness of peer mentoring for ABI survivors.
Method: Eleven databases, two trial registers, and PROSPERO were searched for published studies. Two reviewers independently screened all titles, abstracts, and full texts, extracted data, and assessed quality. The PRISMA 2020 guidelines were followed to improve transparency in the reporting of the review.
Results: The search returned 4,094 results; 2,557 records remained after the removal of duplicates and 2,419 were excluded based on titles and abstracts. Of the remaining 138, 12 studies met the inclusion criteria. Five were conducted in the United States, three in Canada, three in the UK, and one in New Zealand. Meta-analysis was inappropriate due to the heterogeneity of study designs. Therefore, a narrative synthesis of the data was undertaken.
Conclusion: Although peer mentoring has the potential to positively influence activity and participation among ABI survivors, further research is needed to understand the extent of the benefits.

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Acquired brain injury; peer mentoring; systematic review; participation; peer support

Introduction

Acquired brain injury (ABI) is defined as any form of injury to the brain sustained since birth (1). Possible causes include traumatic brain injury (TBI), stroke, brain tumors, meningitis, encephalitis, hydrocephalus, oxygen deprivation (anoxia), neurotoxicity disorders, infections, electrolyte imbalances and others.

Worldwide, an estimated 40 million people are admitted to hospitals annually with TBI or strokes, the leading causes of ABI (2,3). At least 135 million people worldwide live with long-term disabilities resulting from TBIs and strokes, with many more affected by other forms of ABI (2,4,5).

ABIs can result in long-term physical, cognitive, emotional, and behavioral problems and personality changes that limit social interaction and participation in daily activities (6). Even people with minor head injuries can experience long-term difficulties (7).

Participation in personally valued activities is an important factor in life satisfaction, quality of life, well-being and social integration following brain injury (8). Evidence suggests that ABI survivors have problems occupying their time in meaningful ways (9–11).

Peer mentoring can help people to resume personally valued activities and is defined as 'a relationship in which two individuals share some common characteristic or experience and one provides needed assistance or support to the other' (12). It is 'purposeful [and] unidirectional, where the mentor is there to function as a support for the mentee' (13). Peer mentoring has been employed in the management of various long-term conditions, including spinal injury (14), diabetes (15), and cancer (16).

As part of a larger study (to be reported elsewhere) to design and test a peer mentoring intervention for people with ABI, we set out to systematically review the available evidence on peer mentoring following ABI to a) determine the effectiveness of peer mentoring interventions in enhancing participation in activities among people with ABIs, b) determine whether peer mentoring is effective in enhancing other outcomes such as quality of life, mood, confidence, satisfaction, and behavior management, and c) the design of peer mentoring interventions and issues affecting their implementation.

Materials and methods

This review was carried out in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (17) and a protocol was registered on the PROSPERO International Prospective Register of Systematic Reviews (CRD42016050395).

Studies of any design which employed and evaluated a model of individualized peer mentoring support between ABI survivors were included. The term 'peer mentoring' is used here for consistency, but similar concepts may be defined

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differently and use a variety of models. Any form of peer mentoring intervention was included in the review if it did not vary widely from the model of individualized peer support. Only full-text articles published in English and in peer-reviewed journals were included.

Studies were excluded if they employed group support models or exclusively used non-ABI survivors in either mentor or mentee roles. Papers which simply described a peer mentoring service but failed to evaluate the experiences of people with ABI receiving peer mentoring support were excluded.

Literature searches were developed across a range of databases using indexing terms (e.g., medical subject headings (MeSH) and Embase's Emtree thesaurus) and text words relating to ABI and peer mentoring. Participation and activity-related terms were not included to keep the search broad and avoid excluding any relevant studies. The search strategy was adapted to the requirements of each database.

The following 11 medical, health, social care, and psychology databases were searched in late October 2022 (see Appendix 1 for examples of the search strategy for selected databases): MEDLINE (Ovid: 1946 to 18.10.22); PsycINFO (Ovid: 1806 to Week 2 October 2022); EMBASE (Ovid: 1974–18.10.22); CINAHL Plus with Full Text (EBSCOHost: 1986 to 18.10.22); Web of Science Core Collection (Thomson Reuters: 1970 to 18.10.22); Scopus (Elsevier: 1970 to 18.10.22); Cochrane Library (including Cochrane Database of Systematic Reviews (CDSR); Cochrane Central Register of Controlled Trials (CENTRAL); Cochrane Methodology Register (CMR); Database of Abstracts of Reviews of Effects (DARE); Health Technology Assessment Database (HTA); NHS Economic Evaluation Database (EED) (Wiley: 1996 to 18.10.22); AMED (Ovid: 1985 to 18.10.22); ASSIA: Applied Social Sciences Index and Abstracts (ProQuest: 1987 to 18.10.22); LILACS (Bireme 1982 to 1.11.16).

A search was conducted in PROSPERO for ongoing reviews in the same topic area. Research in progress was identified through the ISRCTN registry (www.isrctn.com) and Clinical Trials (www.clinicaltrials.gov) websites. Hand searches of reference lists of relevant papers were conducted, and citation searches were undertaken using SCOPUS and Google Scholar.

Three researchers independently assessed titles and abstracts using a PICO (Participants, Intervention, Comparator, Outcomes) screening and selection tool and shortlisted studies for inclusion. Full texts were obtained for all shortlisted articles and two reviewers assessed them for inclusion in the review. Any discrepancies were resolved through discussion, with the involvement of a third reviewer (KR), a senior member of the research team, who supported the researchers screening studies to resolve any discrepancies and make a final decision if necessary.

Data extraction sheets were developed and piloted based on outcomes identified in the PICO selection tool (appendix 2). Three researchers (RM, JFS and BDP) extracted data independently; discrepancies were resolved through discussion. Data were extracted on the following elements: Participant demographics; Description of intervention and program using the template for intervention description and replication (TIDieR) (18); Details of mentor training; Logistical challenges; Primary outcome (activities, participation, social interaction, community integration); Secondary outcomes (measures of mood; measures of life satisfaction and quality of life; measures of disability management; measures of behavior management; measures of confidence; measures of resilience; measures of participant feedback; adverse events; other outcomes); study design.

Due to the broad range of methodologies included in the review, studies were assessed for quality and risk of bias using the Mixed Methods Appraisal Tool (MMAT) – Version 2018 (19). This tool is designed for reviews including qualitative, quantitative, and mixed methods studies.

Meta-analysis was inappropriate due to the scarcity of studies and the heterogeneity of designs. Therefore, a narrative synthesis of the data was undertaken in accordance with published guidelines (20). This focused on both the implementation and effectiveness of the interventions.

Results

The screening process resulted in 12 studies, reporting on 11 interventions being included in the review (Figure 1), published between 2002 and 2022. Two studies reported findings about the same trial [SUPERB feasibility trial] in two manuscripts, one presented the main trial results (21), and another one presented the post-intervention interviews of the trial (22). A third study evaluating the fidelity of the SUPERB feasibility trial (23) was excluded because the quantitative and qualitative findings of the trial were reported in the other two papers (21,22); thus, the fidelity study did not report any new information for the review. The PRISMA 2020 Checklist is presented in appendix 3.

Five studies were conducted in the United States (24–28), three in Canada (29–31), three in the UK (21,22,32), and one in New Zealand (33). Appendix 4 includes the Template for Intervention Description and Replication (TIDieR) checklist (18) for the 13 interventions identified in the review.

Quality assessment and summary of study designs

The studies included a randomized controlled trial (RCT) (26), a feasibility RCT (21), a pilot RCTs (27), a pilot feasibility RCT (30), two case studies (28,29), two qualitative studies (22,33), a concurrent mixed methods design with no control group (25), a co-design and feasibility testing study (32), a mixed methods pilot study (31), and a quantitative before-and-after study with no control group (24). A summary of the study characteristics is presented in Table 1.

The wide range of study designs meant comparing them in terms of quality was not possible. The quality assessment of each study according to the MMAT 2018 criteria (19) is presented in Table 2.

Participants characteristics

The demographic characteristics of mentors and mentees are presented in Table 1. Study populations included adults with stroke or post-stroke aphasia (21,22,32); adults with TBI (27,30,33); adolescents with encephalitis (mentee) and TBI (mentor) (28); adults with TBI and family members (mentors and mentees) (25); adults with a brain tumor (31);

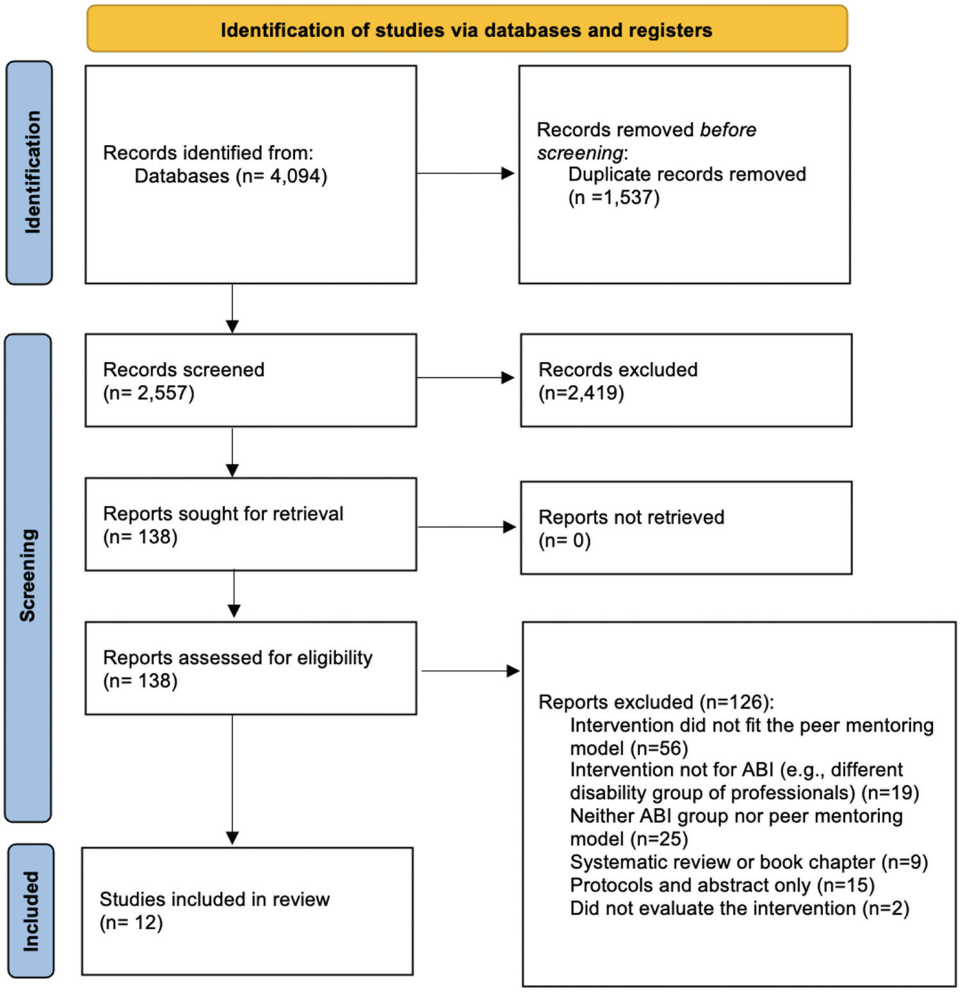

Figure 1. PRISMA 2020 flow chart.

young people (16–26 year-olds) with neurological conditions (including TBI) (mentees); adults with neurological conditions, rehabilitation professionals or family members (mentors) (24); adult stroke survivors (mentors and mentees), plus health professionals, program coordinators and care partners (for qualitative evaluation) (29); adults (16 years old and over) with TBI and significant others (mentors and mentees) (26).

The two service description papers reported delivering support to 200 TBI survivors from 1994–1996, with 22 peer supporters and 19 stroke survivors with four mentors.

The studies included information regarding the eligibility criteria and desirable characteristics to recruit the mentors. The most common characteristics reported were being a good listener (22,25,28,31), having empathy (22,25,28,31), being able to share life experiences (22,31,33), willingness/motivation to help others (25,26,28,30,32), and having adequate personal adjustment (24–28).

Effectiveness of peer mentoring intervention in enhancing participation

The key outcome measures of interest in this review are summarized in Table 1.

Intervention outcomes

There was no evidence that peer mentoring interventions improved participation outcomes in people with ABI. This came from one RCT (26), one pilot feasibility trial (30), one pilot RCT (27), one feasibility RCT (21), one pilot concurrent mixed methods study (25), a case study (28), and a before and after non-randomized study (24). The heterogeneity in the study designs and outcome measures used meant metanalysis was not possible.

The RCT by Hanks et al. (26). found that the mentored TBI group showed lower scores than the control group in the Community Integration Measure (CIM). The pilot feasibility RCT by Levy et al. (30). found no significant change in the community integration questionnaire (CIQ). Hilari et al. (21). found a small but not-significant improvement in the general health questionnaire (GHQ-12), and no change in the CIQ. Hibbard et al. (25) found no impact on the social support section of the Traumatic Brain Injury-Mentoring Partnership Program questionnaire. Mentored participants in the study by Struchen et al. (27). showed an increase in perceived social support, while the control group showed a decline. This group also experienced a non-significant increase in social activity levels (27).

Table 1. Summary of studies included in the systematic review.

Author, Country, and study design	Participants	Intervention & setting	Mentee eligibility	Mentor eligibility	Outcomes
Kolakowsky-Hayner et al. (2012) USA Before and after study – non-randomized.	**Mentees**: 89 (61 men, 28 women). Age 20.5 (21.0) Ethnicity: white 30 (33.7%), Hispanic 38 (42.69%), Asian 10 (11.23%), other 11 (6.74%) Condition: TBI 57 (64%), SCI 25 (28%), other 11 (6.74%). Education: no high school diploma 28 (31.5%), high school diploma 32 (35.95%), college 28 (31.4%). **Mentors**: 121 trained mentors. Most were working (57%), 30% attended school, and 13% were retired. Most mentors were male (58%) and included 29% with TBI, 31% SCI, 4% cerebral palsy, 7% with other disabilities, and 28% without disability but who were either employed in the rehabilitation field or were the caregiver of a family member with a disability.	The Back on Track to Success Mentoring Program. To improve the ability of an individual with disabilities to access and maximally utilize the services and programs that are available in the community. Community setting. In-person, telephone, or electronic mail methods. Minimum of 3 contacts per month. Duration is not time-limited but a 24-month mentoring window applied for purposes of assessment.	Individuals with TBI, SCI and other neurological conditions between the ages of 16 and 26 who were unable to return to school, initiate or return to work or school, or simply return to their previous level of participation in the community.	Minimum 2 years post-injury. High level of acceptance and successful integration into the community (e.g., working, or post-secondary education).	DRS; M2PI-V4; SRS; CHART-SF; SWLS. Program satisfaction questionnaire.
Hibbard et al. (2002) USA Pilot concurrent mixed methods design.	**Mentees**: Twenty partners (11 individuals with TBI; 9 family members) (6 men, 14 women) Ethnicity: African- American 4 (20%), White 14 (70%), other 2 (10%). Age: Under 19 1 (5%), 19–30 1 (5%), 31–45 12 (60%), 46 + 6 (30%). **Mentors**: 114 mentors were trained, 70% were individuals with TBI.	The TBI Mentoring Partnership (TBI-MPP). Community Setting. Predominantly telephone with some face-to-face contacts. The duration of the partnership and its intensity are mutual decisions of the mentor and his or her partner.	Excluded if; risk of suicidal or violent behavior; had psychiatric/substance abuse problems; Inability to articulate reasons for wanting peer support; no personal interest in receiving peer support; excessive negativity, anger/volatility; severe cognitive impairments; no awareness of brain injury effects; no desire to change life situation.	Willingness and motivation to help others, successful personal adjustment after TBI, adequate insight into personal limitations and strengths; an absence of current serious psychiatric problems; an ability to listen and empathize; an ability to inhibit personal responses and views or opinions when necessary.	Interview assessing impacts of peer support on empowerment, quality of life, mood, skills and knowledge, and social supports; in-depth qualitative interview focused on the specific benefits/limitations of the program. Interview questions adapted from four existing measures: QRS-SF, FCB, SSQ-SR, and Empowerment Scale.
Hanks et al. (2012) USA Single site Randomized Controlled Trial.	**Mentees**: 47 (42 men, 5 women). Mean age – 38.46 (SD 17.60); Education years – 11.6 (SD 2.21), GCS – 9.39 (SD 4.52) Post-traumatic confusion – 24 hours (SD 16.19). Ethnicity: Black – 34 (72.34%), white – 13 (27.65%); married – 4 (8.5%). **Mentors**: No information.	Community Setting. Meet and/or talk via telephone. Mentors arranged for a meeting within 2 weeks of initial contact and were requested to meet and/or talk via telephone at least weekly for the first month, biweekly for the next 2 to 3 months, and then monthly for the remainder of the first year. Contact more frequent than these minimum guidelines were encouraged.	TBI survivors: >16. Must be clear of post-traumatic amnesia. Significant others: >18, knew the care recipient prior to brain injury and considered to be active carer.	Mentor candidates were evaluated on social competency (rated by supervisory/training staff)., willingness to talk openly about disability and life experiences, motivation, and commitment to participation. Mentors participated in 20 hours of training.	Peer Mentoring Questionnaire; Brief Symptom Inventory-18; Family Assessment Device; Coping Inventory for Stressful Situations; Short Michigan Alcohol Screening Test; Medical Outcomes Study 12-Item Short-Form Health Survey; and CIM.

(*Continued*)

Table 1. (Continued).

Author, Country, and study design	Participants	Intervention & setting	Mentee eligibility	Mentor eligibility	Outcomes
Struchen et al. (2011) USA Pilot randomized controlled trial.	**Mentees**: 30: mentored 12, waitlist 18 (24 men, 6 women). Age 31.7 (11.7). educated to above high school level 19 (63.3%), educated to high school level or below 10 (33.33%). Ethnicity: white 14 (46.7%), black 7 (23.3%), Hispanic 8 (26.7%). Relationship status: married 4 (13.3%), unmarried 26 (86.7%) Injury severity: severe 22 (73.3%), mild 6 (20%). Mean time post-injury 3.5 (4.1) months. **Mentors**: 11 (7 men, 4 women), age 36.3 (13.1), Ethnicity: white 9 (81.8%), black 1 (9.09%), Hispanic 1 (9.09%). Injury severity: severe 8 (72.7%), moderate 1 (9.1%). Mean time post-injury 9 (6.9) months.	Community setting. Social peer mentoring program. Primary mode was face-to-face although participants did have other types of contact. Only in-person contacts were recorded. Intended to be two outings per month for three months.	Medically documented TBI and community dwelling. >18 years of age. No longer participating in rehab program.	Medically documented TBI and community dwelling. >18 years of age. No longer participating in rehab program.	CHART-SF; SAI; Centre for Epidemiological Studies Depression Scale; UCLA Loneliness Scale – Version 3; 6-item Interpersonal Support Evaluation List; Satisfaction with Life Scale; Weekly Social Activity Survey; Peer Partner Satisfaction Survey; Mentor Satisfaction Survey.
Fraas & Bellerose (2009) USA Case study of single paring	**Mentee**: 14-year-old male survivor of Eastern Equine Encephalitis in August 2007. **Mentor**: 26-year-old male with TBI from RTA in July 2006.	Mentor program for adolescents with acquired brain injury. Face-to-face, 9:30am – 2pm one day per week for 10 weeks.	Between the ages of 13–18; absence of psychiatric or behavioral issues; insight into personal strengths and limitations; and parental consent to participate.	Willingness to support a young survivor of brain injury; absence of psychiatric or behavioral problems; insight into personal strengths and limitations.	Mayo-Portland Adaptability Inventory-4, WQLI, YQOL, TBI-MPP retrospective questionnaire Participant feedback and satisfaction

(*Continued*)

Table 1. (Continued).

Author, Country, and study design	Participants	Intervention & setting	Mentee eligibility	Mentor eligibility	Outcomes
Hilari et al. (2022) UK Single-blind, parallel-group feasibility randomized controlled trial	**Mentees**: 28 (15 men, 13 women). Age 70.5 (13.7). Ethnicity: Asian 1 (3.6%), Black 11 (39.3%), White 15 (53.6%), Mixed 1 (3.6%). Work prior to stroke: full-time 5 (17.9%), part-time 1 (3.6%), retired 19 (67.9%), Looking after home 1 (3.6%), unemployed 2 (7.1%). Education: Did not finish school 9 (32.1%), finished school 9 (32.1%), further education 5 (17.9%), university degree 5 (17.9%). **Mentors**: Same as Northcott et al.. (2022)	Six 1-hour peer-befriending visits over three months. Face-to-Face. At the person's home, or in the community (e.g., local caffe, stroke club, etc.)	**Inclusion criteria**: People aged >18 years old; pre-morbidly fluent in English; diagnosed with aphasia due to stroke; experiencing low levels of distress (based on Depression Intensity Scale Circles (DISCS) cutoffs). Those experiencing higher levels of distress, either received or were referred for more appropriate psychological support. **Exclusion criteria**: diagnosed with conditions affecting cognition or mental health; experiencing severe uncorrected visual or hearing problems; diagnosed with severe or potentially terminal co-morbidities; and discharged outside of the borough of the recruiting hospital.	People with mild-moderate aphasia and 1-year post-stroke, nominated by community services and screened by the trial man- ager. The same exclusion criteria applied to significant others and peer-befrienders, bar discharge destination.	GHQ-12; Communication Participation Item Bank; CIQ; DISCs; Warwick Edinburgh Mental Wellbeing Scale; Communication Confidence Rating Scale for people with Aphasia; Friendship Scale
Northcott et al. (2022) UK Qualitative study exploring experiences during SUPERB feasibility trial	**Mentors**: 10 (2 men, 8 women). Age (mean, SD): 54.2 years (8.4); range: 42–72. Ethnicity: White 6 (60%), black 4 (40%). Employment: Volunteer work 5 (50%), Retired prior to stroke 1 (10%), Retired because of stroke 1 (10%) Unemployed 3 (30%). Work prior to stroke: Full-time paid work 7 (70%), Part-time paid work 2 (20%), Retired prior to stroke 1 (10%). Education: Did not finish school 2 (20%), finished school 2 (20%), Further education qualification (not university) 4 (40%), University degree 2 (20%). Able to drive: No 6 (60%), Yes 4 (40%).				Post-intervention interviews
Masterson et al. (2020) UK Co-design peer-led coaching intervention and feasibility testing	Mentees: 5 (2 men, 3 women) Age: 58.4 (13.98) Unemployed **Mentors**: Not provided	Six coaching sessions, lasting up to 1 hour. Face-to-face Public setting (e.g., cafe, library, etc.)	Patients admitted to hospital with a diagnosis of stroke within the prior 6 months, had been discharged, and residing in community setting.	*Not clear*. Stroke survivors	Post-intervention interviews

(*Continued*)

Table 1. (Continued).

Author, Country, and study design	Participants	Intervention & setting	Mentee eligibility	Mentor eligibility	Outcomes
Kersten et al. (2018) New Zealand Qualitative study	**Mentees**: 6 (4 men, 2 women). Age range 18–46. Injury severity: severe 5 (83.33%), moderate 1 (16.67%). Ethnicity: Māori 1 (16.67%), Māori/Samoan 1 (16.67%), New Zealand European 4 (66.67%) Preinjury Employment: Studying 1 (16.67%), working full-time 3 (50%), working part-time 2 (33.33%) **Mentors**: 6 (4 men, 2 women). Age range 21–59. Injury severity: severe 4 (66.67%), moderate 2 (33.33%). Ethnicity: Māori 1 (16.67%), New Zealand European 5 (83.33%) Preinjury Employment: Studying 2 (33.33%), working full-time 2 (33.33%), working part-time 2 (33.33%)	Up to six face-to-face sessions between a mentee and a mentor over a 6-month period. Activities conducted in the community. The sessions focused on building rapport, exploring hopes for, and supporting participation after discharge through further meetings and supported community activities.	**Inclusion Criteria**: Aged over 15, moderate or severe TBI, imminent discharge from inpatient rehabilitation, living in the greater Auckland region. **Exclusion criteria**: unable to communicate in a way that enabled engagement with a mentor, and medical condition that precluded their participation	Aged over 18, moderate or severe TBI, discharged from inpatient rehabilitation 1–5 years ago, living in the greater Auckland region.	Post-intervention interviews
Levy et al. (2021) Canada Pilot feasibility randomized controlled trial	**Mentees**: 6 (4 men, 2 women). Age 50.8 (12.92). Marital status: married 3 (50%), Single 2 (33.3%), Separated 1 (16.7%) Education: High school 1 (16.7%), some college 1 (16.7%), graduated from college 2 (33.3%), University 2 (33.3%). Severity of injury: Moderate 2 (33.3%), Severe 4 (66.7%) **Mentors**: 6 (3 men, 3 women). Age 51.0 (8.17). Marital status: married 3 (50%), Single 2 (33.3%), Separated 1 (16.7%). Education: Some college 1 (16.7%), graduated from college 2 (33.3%), University 3 (50%). Years as mentor: <1 year 2 (33.3%), 1–5 years 3 (50%), 6–10 years 1 (16.7%)	OBIA Peer Support Program Four months intervention with meetings once a week. Communication between mentors and mentees mostly via telephone call lasting 20–40 minutes.	**Inclusion**: 1. were community based (2); had moderate-to-severe TBI (3) were 18 years of age or older (4); were fluent in English (5); were able to provide informed consent or had an available proxy to provide informed consent. **Exclusion**: 1) had previously participated in the OBIA Peer Support Program or were currently part of another peer support or self-management program (2); were medically unstable (3); had active suicidal ideation.	Same as mentees but were permitted to have had previous mentorship experience with the OBIA Peer Support Program.	Primary: CIQ Secondary: PHQ-9; SF-20; TBI-SE Interviews

(*Continued*)

Table 1. (Continued).

Author, Country, and study design	Participants	Intervention & setting	Mentee eligibility	Mentor eligibility	Outcomes
Ozier & Cashman (2016) Canada Mixed methods pilot study	Mentees: 10 (8 men, 2 women). Age 55.1 (7.22). Ethnicity: Caucasian 9 (90%), Asian 1 (10%). Marital status: Married 8 (80%), single 2 (20%), common-law 1 (10%). Glioma grade: level III 3 (30%), level IV 7 (70%). Newly diagnosed (between 4–8 weeks) **Mentors**: 3 men, Caucasian (100%). Diagnosis: Glioblastoma grade 4, anaplastic astrocytoma grade 3; oligodendroglioma grade 2. Years post diagnosis: 6.33 (2.52)	Single one-on-one meeting in person at the BCCA Vancouver Centre four to eight weeks after the initial diagnosis of the mentee.	A new diagnosis of a grade II, III or IV glioma; English fluency; and a Karnofsky Performance Score > 70.	All were active members of our PFAC and had completed initial treatment for a PBT.	Adapted version of the post-meeting participant response questionnaire.
Kessler et al. (2014) Canada Case Study	**Mentees**: 16 (12 men, 4 women), age 64.8 (11.3). Stroke type: infarct – 14 (87.5%), bleed 2 (12.5%). Barthel score mean 78.8 (21.7), range 40–100. **Mentors**: 7 stroke survivors (4 men, 3 women). Age 59.3 (9.6) Infarct 3 (42.9%); stroke location: right 5 (71.4%); mean Barthel Stroke Index Score 95.0 (7).	Initial visit (10 minutes) in acute ward followed by six telephone contacts at home. Excluded if they have more severe deficits, are medically unstable, have global aphasia, or have a planned discharged to long-term care.	Mild to moderate deficits and basic cognitive and communication skills; Hospitalized on an acute stroke unit following a first stroke; wished to participate in the peer support program; demonstrated adequate cognitive and communication skills to participate in qualitative interviews	Trained peer supporters who are stroke survivors. No specific eligibility criteria provided.	Post-intervention interviews.

USA: United States of America; UK: United Kingdom; SCI: Spinal Cord Injury; DRS: Disability Rating Scale; QRS-SF: Questionnaire on Resources and Stress – Short Form; M2PI-V4: Participation Index of the Mayo-Portland Adaptability Inventory – Version 4; SRS: Supervision Rating Scale; CHART-SF: Craig Handicap Assessment and Reporting Technique – Short Form; SWLS: Diener Satisfaction with Life Scale; FCB: Frequency of Family Coping Behaviors; SSQ-SR: Social Support Questionnaire Short Form; CIM: Community Integration Measure; GHQ-12: General Health Questionnaire-12; DISCs: The Depression Intensity Scale Circles; CIQ: Community Integration Questionnaire; PHQ-9: Patient Health Questionnaire; SF-20: Self-administered Medical Outcomes Study Short Form; TBI-SE: TBI self-efficacy questionnaire; SAI: Social Activity Interview; WQLI: Wisconsin Quality of Life Inventory; YQQL: Youth Quality of Life; TBI-MPP: Traumatic Brain Injury-Mentoring Partnership Program.

Table 2. Risk of bias assessment.

Methodological quality criteria		ID_1 (24)	ID_2 (25)	ID_3 (26)	ID_4 (27)	ID_5 (28)	ID_6 (21)	ID_7 (22)	ID_8 (32)	ID_9 (33)	ID_10 (30)	ID_11 (31)	ID_12 (29)
Screening	S1. Are there clear research questions?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	S2. Do the collected data allow to address the research questions?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?							Yes		Yes			Yes
	1.2. Are the qualitative data collection methods adequate to address the research question?							Yes		Yes			Yes
	1.3. Are the findings adequately derived from the data?							Yes		Yes			Yes
	1.4. Is the interpretation of results sufficiently substantiated by data?							Yes		Yes			Yes
	1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?							Yes		Yes			Yes
Quantitative randomized controlled trials	2.1. Is randomization appropriately performed?			Can't tell	Can't tell		Yes				Yes		
	2.2. Are the groups comparable at baseline?			Yes	Yes		Yes				Yes		
	2.3. Are there complete outcome data?			Yes	Yes		Yes				Yes		
	2.4. Are outcome assessors blinded to the intervention provided?			Yes	Can't tell		Yes				Yes		
	2.5 Did the participants adhere to the assigned intervention?			No	No		Yes				Yes		
Quantitative non-randomized	3.1. Are the participants representative of the target population?	Yes				Yes							
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?	Yes				Yes							
	3.3. Are there complete outcome data?	Yes				Yes							
	3.4. Are the confounders accounted for in the design and analysis?	No				Yes							
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	No				Yes							
Quantitative descriptive	4.1. Is the sampling strategy relevant to address the research question?												
	4.2. Is the sample representative of the target population?												
	4.3. Are the measurements appropriate?												
	4.4. Is the risk of nonresponse bias low?												
	4.5. Is the statistical analysis appropriate to answer the research question?												
Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?		Yes							Yes		Yes	
	5.2. Are the different components of the study effectively integrated to answer the research question?		No							Yes		Yes	
	5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?		No							Yes		Yes	
	5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?		No							Yes		No	
	5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?		No							Yes		No	

Two studies (24,28) identified a small improvement in the participation domain of the Mayo-Portland Adaptability Inventory-4.

The participants and program successes of Kolakowsky-Hayner et al. (24) showed non-significant improvements on the Craig Handicap Assessment and Reporting Technique – Short Form (CHART-SF) Occupation and Social Integration sub-scales. The active peer mentoring participants in the Struchen et al. (27). study showed non-significant improvements only in the social integration sub-scale of the CHART-SF.

Effectiveness of peer mentoring in enhancing quality of life, mood, confidence, satisfaction and behavior management

There was limited evidence that peer mentoring interventions improved the secondary outcomes of interest. This came from one RCT (26), one pilot feasibility trial (30), one pilot RCT (27), one feasibility RCT (21), and a case study (28).

Two studies (26,28) found improved quality of life for the mentees after the peer mentoring intervention. Hilari et al. (21). found a small (close to zero) benefit of the intervention on friendship, communication participation measures, depression, and well-being measures. However, this study showed no difference in communication confidence levels between the intervention and control group (21).

Regarding the impact of mentoring on mood, a study found no significant difference in measures of mood or self-efficacy (30). They found a statistically significant reduction in pain at two months post-intervention ($p = 0.02$), but this was not maintained at any other time point (30). Struchen et al. (27). found a statistically significant ($p = <.01$) increase in depressive symptoms after mentoring in the intervention group and no impact on the loneliness scale. Hanks et al. (26). found that mentored TBI participants had significantly better behavioral control ($p=0.04$), lower alcohol use ($p=0.01$), and were less emotion-focused ($p=0.04$).

Qualitative findings

Eight papers reported the impact of peer mentoring based on participants' experiences, indicating potential outcomes for future research.

Across studies incorporating qualitative methods, a positive impact of peer mentoring support was reported by mentors and mentees. Many reported the benefits of sharing and learning about the lived experiences of people who have been through something similar (22,24–28,30,33). The mentees felt increased hope, received valuable guidance, and felt less lonely (25–31,33). Mentees also explained that the peer mentoring support took them out of their comfort zone and encouraged them to act toward overcoming their difficulties (32). Setting goals helped them remain motivated and work toward a shared purpose (30,32).

The mentors also experienced a positive feeling and sense of accomplishment, as well as decreased anxiety and improved communication skills related to the mentoring experience (31).

Design of peer mentoring intervention and issues affecting their implementation

Delivery mode and setting

The intervention delivery modes differed between the studies. Five interventions involved appointments exclusively face-to-face (21,22,28,31–33), three studies allowed a combination of sessions via face-to-face, telephone, and/or e-mail according to the participants' preferences (24–26), two studies reported an initial appointment face-to-face followed by remote sessions (27,29), and one study mostly via telephone (30). Nine interventions were conducted in a community setting (21,22,24–28,30,32,33), and two occurred in a hospital (29,31).

Matching criteria

The study which employed peer supporter visits to a rehabilitation unit did not match participants on specific criteria but on a convenience basis (26). The other studies all matched mentor and mentee pairings according to specific criteria. The most common criteria shared by the studies were geographical location (24,25,27,32), gender (21,22,24,25,27,28), age (21,22,24,25,27), interests (21,22,24,25,27,28), cultural factors (21,22) and personal attributes (e.g., openness, positivity, similarity in symptoms experienced) (32).

One study attempted to match for disability type as this was the only study with participants who had different neurological conditions (24). Additional criteria included: the current mentee load of mentors; similarity of communication difficulties; and a shared vision for enhancing quality of life for persons living with aphasia. Hibbard et al. (25). also reported additional criteria, including marital status; educational background; cognitive challenges; physical challenges; cause of TBI; and ability to meet specific psychological needs, such as the need for structure, role model, and social support (25). Two studies had no clear matching criteria (31,33).

Frequency, intensity, and duration

Only one intervention involved a single meeting with a mentor (31). The rest included different levels of frequency and intensity. Three studies included interventions with up to six 1-hour sessions (21,22,32,33). However, the intervention duration of these studies varied between three and six months.

Other interventions included one 10-minute visit followed by six telephone follow-ups of 5–60 minutes (33), one visit day a week for 10 weeks (28), and a four-month intervention with meetings once a week (30). One intervention involved a minimum of three contacts per month with the aim to end partnerships when mentees had achieved their employment or educational goals (24).

The intervention for the RCT ran for twelve months (26). The pairings were intended to meet weekly for the first month, biweekly for the next two to three months, and then monthly for the remainder of the first year. The pilot RCT by Struchen et al. (27). ran for three months. Most partnerships in both studies did not meet the requirements for the number and frequency of meetings.

For another study, the frequency and number of contacts, and partnership duration were entirely at the discretion of the participants (25).

Content, activities, and processes of interventions

Descriptions varied considerably regarding the content addressed during the contacts between the pairs. Overall, the interventions included activities focused on supporting mentees to integrate into the community, access resources and social opportunities (24,26,27,30,33), increasing awareness about the health condition of the mentee and in some instances, their families (25,26), addressing cognitive, emotional, and physical needs (25,26,28,30,31), support with employment or education (24,30), providing hope (29), developing intervention goals and working toward achieving them (21,22,32), referrals to other services to overcome issues (30), participating in leisure activities (e.g., getting nails done, coffee, lunch) and sharing feelings (33).

Programs were facilitated in some cases by professionals such as program coordinators (24,25,29), researchers (28), vocational rehabilitation counselors (24), rehabilitation psychologists (24), psychologists (26), and community coordinators (26).

Mentor training

All the studies provided details of mentor training. The training was delivered by a variety of professionals including speech and language therapists (21,22), neuropsychologists (27), clinical linguists (21,22), rehabilitation psychologists (24), rehabilitation consultant (33) and program staff, hospital staff and researchers (24,27–29,31–33).

The training included topics such as clarifying the role of the mentor (21,22,31,33), emotional management (31), communication and listening skills (21,22,25,26,29,30,32), knowledge of brain injury and its effects (25–28,33), techniques for building relationships and rapport with mentees (26,28,33), advocacy skills (25), accessing community resources (25,27,28), enhancing social functioning and skill acquisition of mentees (25,27,28), handling difficult situations/inappropriate conversation/problem behavior (21,22,27,28,30,31,33), and goal setting (21,22,32).

Some of the programs provided written guides and training manuals to mentors (21,22,25–27).

Logistical problems

Two studies did not report logistical problems (28,31). Multiple studies encountered the same logistical difficulties when implementing the peer mentoring intervention.

Seven studies reported challenges associated with the delivery and implementation of the peer mentoring intervention such as problems scheduling times and locations for meetings (22,24,25,31,33), making allowances for the mentors' cognitive difficulties (27,29), budgeting for transport (29), providing sufficient mentoring and staff support time (27,33), mentors and mentees living far away (24), lack of accessible meeting locations (24), short intervention timeframe to develop a good relationship (33,34), and loss of participants' interest due to delay between enrollment and matching (24).

There were also challenges associated with the research methods such as difficulties recruiting participants (21,25,26,29,30,32), identifying suitable mentors (25,27), having too many matching criteria (24), retaining participants during the intervention (24–27,29,32), and contacting participants for follow-up (25,29).

Discussion

The three main aims of this review were to assess the evidence of peer mentoring's effectiveness in enhancing participation in activities; and evidence for its effectiveness in other ways, such as enhancing quality of life and mood and to investigate issues relating to the design and implementation of previous ABI peer mentoring studies.

There was no evidence that peer mentoring interventions improved participation outcomes in people with ABI. The studies showed small or non-significant impact on participation levels and satisfaction. Two studies looked primarily at participation (27,30). Struchen et al. (27). employed a 'social peer mentoring' intervention. However, there were no significant improvements for mentored participants in the number of social activities and interactions or satisfaction with social life. Despite this, the authors reported a trend in the mentored group toward increased satisfaction with social life over the previous month. The study also demonstrated some improvements in perceived social support and social integration. Non-significant improvements in the participation domain of the Mayo-Portland Adaptability Inventory-4 were shown (24,28) and CHART-SF occupation and social integration sub-scales (24,27) but mentored participants had lower scores than controls on the Community Integration Measure (26). Overall, despite limited evidence, there is reason to think that with a specific focus on enhancing participation levels, future studies may have success.

A secondary aim was to ascertain the evidence for peer mentoring's effectiveness in enhancing other key rehabilitation outcomes, such as quality of life, mood, behavior management, and confidence. There were several significant improvements in measures of the quality of life (26,28), mood (21,26), disability management (24), general health (21), coping styles, behavioral control, and alcohol use (26). These findings provide encouraging evidence for the effectiveness of these programs. However, the increase in depressive symptoms found by Struchen et al. (27). should be considered carefully in future studies, with participants monitored carefully for any signs of negative effects. As Struchen et al. (27). hypothesized, these symptoms may be attributable to participants' increased awareness of their condition, so may decrease over time as participants learn how to manage their difficulties. Support should be made available for anyone who experiences negative effects.

A particularly encouraging finding was the high level of satisfaction and positive feedback reported in qualitative findings across the studies. Although no significant improvements were found in participation levels by Struchen et al. (27). participants themselves felt that their mentors helped them to increase their social activities and feel less lonely. Other benefits included emotional and affirmational support; shared experience; increased confidence; social support; having someone to talk to; enhanced knowledge of brain injury and community services; learning about coping strategies and receiving motivation and inspiration. The mentors involved also experienced a positive feeling from healing others (27,31), decreased anxiety and improved communication skills because of the study (31).

The final aim of the review was to elicit from previous research relevant information about the design and implementation of peer mentoring interventions for ABI. Heterogeneity in the research designs and clinical populations included made it difficult to draw any firm conclusions about the optimal design of a peer mentoring intervention for people with ABI. Most studies involved mentors and mentees with the same form of injury (predominantly stroke or TBI). This made it difficult to infer whether including participants with a range of ABIs as mentors and mentees in a future study would be successful. Fraas and Bellerose's study involved an encephalitis survivor mentoring a TBI survivor, however, this was a single case study (28). Kolakowski-Hayner et al. (24). included a mixture of neurological disabilities, which meant that the results could not be interpreted as applying generally to people with ABI. Ozier & Cashman included brain tumor participants, with only 10 mentees and three mentors (31).

There were also differences in the demographics of the populations, including the time since mentees sustained their injuries, with some still in hospital, some recently returned to the community, and some several years post-injury. This made it difficult to draw conclusions about the optimum stage of recovery for delivering peer mentoring interventions. Four pilot and feasibility RCTs have been conducted. One included only stroke survivors (21,22) and three were exclusive to TBI survivors (and significant others) (26,27,30). Two were pilot studies with few participants (27,30). Most mentored participants in both studies were male with moderate or severe injuries. As such there is limited information about the effectiveness of peer mentoring for people of other genders, or for people with less severe injuries. Methodological weaknesses also limit the conclusions to be drawn from the studies. For example, two studies did not assess participants at baseline, and one of these relied on self-report to assess the effectiveness of the intervention (25,26).

Characteristics of mentors identified by participants included authenticity, friendliness, confidence, good listening, knowledge of community resources, respectfulness, good communication skills, kindness, and experience with brain injury. These largely corresponded with, and added to, the mentor eligibility criteria pre-defined by the researchers. Future studies on peer mentoring may benefit from selecting and screening mentors carefully for these traits and providing relevant training. The feedback from mentors was positive, but there is little other evidence from the studies about the effectiveness of the training. Each program focuses on different training topics and there is a need to focus on topics specific to the goals of the intervention.

The mode of delivery, settings, and goals of the interventions varied depending on programs. For example, the early hospital one-off visits employed by a study (29) had different goals from the more sustained community-based approaches used in other studies. This makes outcomes difficult to compare. There was also little information in the studies on the content of mentoring sessions themselves, so it is not known whether discussions in sessions kept to the intended topics or what activities took place. This is understandable, as sessions were largely intended to be private interactions between the partners, but a more rigorous approach to documenting session content would inform future research and help to determine the active ingredients of ABI peer mentoring. It will be important to carefully select the mode of delivery and settings depending on project goals.

The inclusion and exclusion criteria are important considerations. The ones used in the included studies varied and those with more stringent criteria had difficulty recruiting participants. While it is important not to include people who won't benefit (such as those with severe cognitive problems or who will not be able to communicate with others or learn from the experience), it is also important not to exclude people unnecessarily.

There was considerable variation in the nature of the contacts between pairs (with most studies allowing in-person, telephone, or e-mail correspondence), the frequency of contacts, and the duration of partnerships. Consistent implementation of these variables is important to understand the factors which influenced outcomes. The study which implemented a consistent approach to duration, frequency, and mode of contact was successful at bringing the partners together as planned (28). This study required partners to meet once a week for 10 weeks at a specific time and venue. Future studies could learn from this and provide a fairly rigid structure for the frequency and nature of meetings. However, it should be noted that these papers focused on single case studies, so the approach may not be as successful when implemented with multiple partnerships. It will be important to consider the issue when matching partners and to consider their preferred means of contact. The goal and focus of the intervention are also key to this issue. If the focus is purely on discussing problems and speaking to a person who understands the difficulties, then phone conversations may be appropriate. However, if the goal is to participate in activities, then face-to-face contact in the community would be most effective.

Although the papers described the criteria employed to match partners together, they provided little information on how easy this was to implement in practice. It is a key consideration for future studies to match participants to suitable mentors soon after recruitment. It can be inferred from the high levels of participant satisfaction with mentors that those who completed the programs were matched together appropriately. However, future studies should provide more detailed information on the matching process and the reasons for unsuccessful matches and participant drop-out. Key considerations must be the personal preference of the participants and the convenience of contact.

Practical and logistical challenges related to scheduling meetings, staffing resources, maintaining participant involvement, and accommodating participants' cognitive difficulties. Researchers should consider these when designing peer mentoring interventions or planning future research. For example, help with arranging venues and transport for a project involving face-to-face meetings in the community, convenience, provision of support for both partners. Other considerations include, carefully matching partners, providing expenses and making the experience as enjoyable, rewarding and undemanding as possible.

This review has shown that there is a lack of definitive RCTs. The evidence available comes from small-scale studies, employing different models of mentoring, methodologies, and outcome measures. Conducting a meta-analysis or reporting a combined number of participants was not performed due to the variety of study types, including service descriptions, single case studies, and small RCTs.

One strength of this study is the use of the TIDieR checklist (18) to describe the peer mentoring interventions delivered in studies included in the review. This study has several limitations. A potential limitation of this review is that the studies included in the review had a small sample size, and there was heterogeneity in outcomes measured and follow-up assessments. Another limitation of this study may refer to publication bias because we only included studies written in English and published in peer-reviewed journals; therefore, we may have not conducted a comprehensive review of the literature available.

Conclusion

Peer mentoring for people with ABIs is a relatively new intervention with limited supporting evidence. It has the potential to positively influence participation among ABI survivors, but this requires further investigation.

Future research is needed to identify the most important skills and qualities required in a mentor; training requirements; how best to match mentors with mentees; mentee eligibility criteria; the optimum mode of delivery and setting; and to determine the frequency, intensity and duration of peer mentoring sessions required to be effective in promoting positive outcomes. Researchers must also carefully select measures sensitive enough to measure the desired outcomes. Mixed methods studies will help researchers to quantitatively assess intervention effectiveness and explore the acceptability of peer mentoring for participants.

In light of newer guidance on developing and evaluating complex interventions, a review focused on identifying the underlying theory or behavior change mechanisms of peer mentoring interventions might be worth considering for future research.

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