Communication between Rehabilitation Staff and People with Traumatic Brain Injury: A Systematic Review

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Abstract

This systematic review aimed to synthesize barriers and facilitators in communicative interactions between staff and people with traumatic brain injury (TBI) in the rehabilitation context. Searches captured published evidence up to November 2022 in MEDLINE, Embase, SCOPUS, Web of Science, CINAHL, AMED, and PsycINFO. Eligible studies reported on the communicative interaction between rehabilitation staff and adults with TBI. In total, 31 studies were included in the review; including quantitative, qualitative, and mixed-methods designs. Quality assessment was carried out using standard checklists. Quantitative studies and quantitative components of mixed-method studies were synthesized descriptively according to reported communication barriers and facilitators. Qualitative studies and qualitative components of mixed-method studies were analyzed through an inductive thematic meta-synthesis; generating six main themes with four subthemes. Themes were categorized as barriers or facilitators to communicative interaction. Findings demonstrated that cognitive-communication disorders of people with TBI challenge the communicative interaction between rehabilitation staff and people with TBI. However, the extent to which these disorders create a communicative barrier is closely related to staff's communicative approach. While staff holding a collaborative and acknowledging approach and using supportive strategies may facilitate successful communicative interactions, staff using the opposite approach may exacerbate communication barriers.

Keywords: *Traumatic brain injury, cognitive-communication, rehabilitation staff, communicative interaction, systematic review.*

Background

Traumatic brain injury (TBI) globally affects over 10 million people annually [1], with approximately 75% of people with TBI experiencing cognitive-communication disorders as a sequelae of the injury [2]. Cognitive-communication disorders are defined as communicative challenges due to underlying cognitive impairments, such as in attention, memory, and executive functions [3], leading to poor comprehension of larger information units, unstructured discourse production, and low adherence to the social rules of communication [4]. Cognitive-communication disorders cause challenges in communication between people with TBI and their communication partners [5]. C~~ommunication partners tend to change their speech, often unconsciously, using a communicative style that either supports or hinders the communicative abilities of the person with TBI.~~ ommunication partners tend to change their communicative style, often unconsciously, using an unequal approach, where they may initiate the majority of conversational topics or pose questions that test the individual's memory unnecessarily. ~~For example, communication partners may initiate the majority of conversational topics, or pose questions that test the individual's memory unnecessarily.~~ When such unsupportive strategies are used, the person with TBI is not fully included in information exchange and decision-making [6–8].

As rehabilitation of people with TBI can range from months to years [9], the communicative skills of rehabilitation staff impact extensively on the communicative opportunities of people with TBI [10,11]. Current health care guidelines [12,13] and the International Classification of Functioning, Disability and Health (ICF) [14] strongly emphasize the concept of person-centered care, where people with TBI are viewed as equal partners in planning of the rehabilitation process with accommodation to their individual goals and needs. Communication is pivotal in person-centered care where dialogue serves as a means to create mutual understanding between staff and clients [15,16]. However, research

suggests that staff working with people with TBI struggle to follow the health care guidelines for communicative collaboration on rehabilitation tasks such as goal-setting and training activities [17,18]. Thus, people with cognitive-communication disorders are at risk of being sidetracked in their own rehabilitation process [19].

Two recent systematic reviews [20,21] have found increasing evidence for communication partner training (CPT), where familiar and unfamiliar communication partners of people with TBI are trained to use specific strategies to improve the communicative interaction. A small randomized control trial has shown that communication between paid carers and people with TBI in a post-acute residential rehabilitation setting can also be improved through CPT [24,25]. Thus, CPT holds potential to enhance adherence to the guidelines of person-centered care and support the communicative participation of people with TBI.

Rehabilitation settings are highly diverse in terms of type of facility (e.g. in-patient, out-patient, living), post-injury phase (e.g. sub-acute, community), and staff disciplines (e.g. physicians, occupational therapists, and social education workers) having overlapping but also discipline-specific types of communicative interactions with people with TBI according to their assigned professional rehabilitation tasks [26]. According to the ICF, these environmental factors may create various *barriers* (e.g. staff members using poor communication strategies) or *facilitators* (e.g. staff using supportive strategies) to the communicative participation of people with TBI [14,27]. To develop and tailor CPT programs for the rehabilitation context, it is therefore important to establish an in-depth understanding of the various barriers and facilitators in communicative interactions between staff and people with TBI in this setting. This systematic review and synthesis of the literature reporting on such barriers and facilitators will provide a comprehensive knowledge

base about both the interactions and the communicative behaviors in staff that can be targeted in future CPT interventions aiming to improve the interaction.

This study aims to answer the following research questions:

(1) In a population of people with TBI, which barriers and facilitators are observed and experienced when communicating with rehabilitation staff?

(2) In a population of rehabilitation staff, which barriers and facilitators are observed and experienced when communicating with people with TBI?

Methods

Design

The review followed The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [28]. In addition, The Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) statement was followed for the included qualitative studies [29]. PRISMA and ENTREQ checklists are included as supplemental materials. The protocol for the review is registered on PROSPERO (CRD42020218075).

Search strategy

The databases MEDLINE, Embase, SCOPUS, Web of Science, CINAHL, AMED, and PsycINFO were searched for studies published up to November 22, 2022. The Boolean operators OR and AND were used as required to link search terms together [30]. Four categories of search terms were searched in each database:

1. Etiology: Brain injur*

2. Activity: Communicat*, Conversation*, Rehabilitation*, Interaction*, Intervention*, Training*, Need*

3. Communication partner: Staff*, Nurs*, Paid care*, Therap*, Physician*, Allied health, Profession*, Mentor*

4. Communication disorder: Pragmatic*, Conversation*, Interaction*, Cognitive Communicat*, Confus*, Social*, Challeng*

The search algorithm is presented in Table 1. Searches were amended according to the options of each database. Medical subject headings (MESH) were included when available.

[INSERT TABLE 1 NEAR HERE]

Eligibility criteria

Criteria for inclusion were: (1) Publication in an academic peer reviewed journal in English. (2) Studies reported on original data related to adult human beings aged 18 years or older with a diagnosis of TBI. (3) Study participants were either at least 50% adults with TBI, staff members with at least 50% of their clients being adults with TBI, or both participant groups. (4) The main purpose of the study was investigation of the communicative interaction between staff and people with TBI. Studies describing more general investigations were included if they reported key findings related to communicative interaction between staff and people with TBI from which recommendations about communication between staff and people with TBI could be made. (5) As the focus of the review was the communicative interactions between people with TBI and rehabilitation staff, a dialogistical and co-creational perspective of communication guided the inclusion criteria [31,32]. Accordingly, for studies to be included, they had to report on genres of communicative interactions, where both communication partners (people with TBI and staff) were expected to participate actively in the co-creation of dialogue, e.g. conversations, goal setting, establishing understanding, and communicative actions of staff triggering verbal aggression in people with TBI. Thus, studies reporting on information-giving as a unidirectional communicative action from staff to

people with TBI, and studies reporting on verbal outburst from people with TBI against staff without providing the communicative context, were not eligible for inclusion.

Screening

After de-duplication of identified papers, a title and abstract screening, based on the eligibility criteria, was carried out by the first author (IC) with another author (SB) screening 25% of the papers independently to ensure reliability. Interrater agreement was 97.5%. Due to too little variation in the dataset with far more papers agreed excluded than included calculation of Cohen's kappa was not useful. The high number of excluded papers was caused by the search terms aiming to capture studies reporting on different rehabilitation activities and different terminology of cognitive-communication disorders. However, the terms also generated a number of irrelevant studies, i.e. animal and pharmacological studies, and studies of specific interventions solely targeting the person with TBI.

Papers included for full text reading were reviewed by two authors independently (IC and EE) according to the eligibility criteria. Disagreements were resolved by further discussion between the two raters and a third author (EP). The review was performed using the Covidence software [33].

Data extraction and quality assessment

Data extraction of included studies (n=31) was undertaken by the first author (IC) in Microsoft Excel [34]. Data included bibliographic information, study aims and design, participant characteristics, genre of communicative interactions, type of rehabilitation setting, and reported barriers and facilitators in communication between rehabilitation staff and people with TBI. Outcome measures or themes/categories were extracted for quantitative and qualitative studies, respectively. The extraction sheets were reviewed by two co-authors (EP and LRJ) for accuracy and discussions of interpretation of data.

Quality assessment was conducted using the Joanna Briggs Institute (JBI) Critical Appraisal Tools [35] for randomized controlled trials (n=1), quasi-experimental studies (n=2), and qualitative studies (n=20). For mixed-method studies (n=5), the Mixed-Methods Appraisal Tool (MMAT) [36] was used. For quantitative, but descriptive studies (n=3), the JBI Tools were not deemed as suitable as their descriptive quantitative designs did not fit with any of the available JBI checklists. For this reason, the MMAT (section 4) was used. Summaries of quality assessments are presented in Table 2 and 3. Quality assessment was conducted independently by two authors (IC and NF). Disagreements were resolved through discussion between the two raters and with another author (EP).

To obtain a comprehensive knowledge base of the barriers and facilitators in the communication between staff and people with TBI, studies were not excluded from the review based on quality. Furthermore, the JBI Tools [35] do not provide specific quality ratings, but rather descriptive data. Therefore, a systematic process for identification of low and high quality of studies was not supported using these tools.

[INSERT TABLE 2 AND 3 NEAR HERE]

Data Synthesis

The 31 included studies were categorized based on the use of quantitative, qualitative, or mixed-methods. Quantitative studies (n=6) and quantitative components of mixed-methods (n=5) were highly heterogeneous in terms of participant characteristics, genre of communicative interactions, type of rehabilitation setting, and outcome measures. Therefore, a meta-analysis could not be conducted and instead a descriptive synthesis was performed.

Qualitative studies (n=20) and qualitative components of mixed-methods studies (n=5) were analyzed through a thematic meta-synthesis. This analysis was first guided by an inductive approach following the procedure described by Braun & Clarke [37]. Initially, data familiarization was established through reading and re-reading of the included studies. Next,

coding of the findings from each study was carried out to capture a condensed meaning of these findings and finally, the codes were collided into preliminary themes from which final themes were generated. Subsequently, themes identified in the inductive analysis were categorized as either communicative barriers or facilitators in staff-client interaction. Thematic meta-synthesis was carried out by the first author (IC) with continuous reflection and discussion with another author (EP) to establish analytical rigour.

For both quantitative and qualitative studies including other etiologies than exclusively TBI, analysis was based on data reported from the total study population or on data or quotes related explicitly to participants with TBI.

Results

Study selection

The selection process is illustrated in Figure 1, PRISMA flowchart. In total, searches identified 12452 papers, and 6616 remained after duplicates were removed. After title and abstract screening, 188 papers were included for full-text review. Of those papers, 157 were excluded primarily due to either lack of reporting on communicative interaction between staff and people with TBI, or inclusion of participant groups where less than 50% were people with TBI or staff working with people with TBI. Finally, 31 papers reporting on 29 unique studies were included ~~in the review~~.

[INSERT FIGURE 1 NEAR HERE]

Study characteristics

Six quantitative studies were included: One RCT [24], two quasi-experimental studies [38,39], and three descriptive quantitative studies [26,40,41]. Twenty qualitative studies were included: 13 interview studies [11,25,42–52], five observation studies [19,53–56], and two

qualitative survey studies [57,58]. Five mixed-methods studies were included: two cross-sectional survey studies [17,59], and three observation studies [60–62]. A summary of included studies is provided in Table 4.

The following sections present the study data and the results from the descriptive synthesis of included quantitative studies and quantitative components of mixed-method studies. Subsequently, the study data of qualitative studies and qualitative components of mixed-method studies and the results of the qualitative thematic meta-synthesis are presented. Despite differences in study design, the results of both quantitative and qualitative studies could be understood from the theoretical ICF-perspective on barriers and facilitators [14]. Thus, the presentations below are structured in sections relating to the barriers and facilitators identified in the analysis of included studies, i.e. the factors challenging or supporting the communicative interaction between rehabilitation staff and people with TBI.

[INSERT TABLE 4 NEAR HERE]

Study data: quantitative studies and quantitative components of mixed-method studies

Participants with TBI

In total, seven of the 11 quantitative studies included 146 participants with TBI [24,38–40,60–62]. Four of the studies included staff perspectives only [17,26,41,59]. The youngest participants were 18, and the oldest were reported as ‘in their 70s’ [61]. Four studies reported on the sex of the participants with one study [38] having an equal number of male and female participants and the rest of the studies having mostly male participants [40,61,62]. Five studies reported on time since injury, with participants having sustained a TBI between eight days and 38 years before the study [24,38,40,61,62]. Three studies addressed the severity of participants’ TBI with two studies including participants with moderate to severe injury based on length of post-traumatic amnesia (PTA) [24] and Glasgow Coma Scale [60] . The third paper [39] used the Functional Independence Measure score to determine severity and

included 15 participants with severe communication and cognition disorders and 21 participants with mild to moderate communication and cognition disorders. Only one study [24] reported on the cause of the TBI (primarily motor vehicle accidents).

Staff participants

In total, 10 of the 11 quantitative studies included 637 staff participants [17,24,26,38,39,41,59–62]. One study exclusively included people with TBI as participants [40]. The 10 studies reported on the professional background of the participants with some studies including only one profession and others including a wide range of health professionals. Staff included physicians, nurses, nursing assistants, rehabilitation assistants, physiotherapists, physiotherapist assistants, occupational therapists, occupational therapy assistants, speech- language pathologists, neuropsychologists, clinical psychologists, social workers, recreational therapists, paid carers, case coordinators, secretaries, porters, job coaches, and students from some of these professions.

Seven studies reported on the length of staff experience working with TBI with a variation from less than one year to 35 years (median 7 years, range 0-35 [17]; mean 2.1years [24]; 4-9 years [41]; 28% >15 years, 13% one year or less [26]; average of approximately 16 years [59]; and an average of 5.6 years [60]). The age of staff was reported in four studies, ranging from 20-61+ years [26], mean age 31.4 years [24], 39.7 years [41], or 44.14 years [59]. Five studies reported the sex of staff participants [26,41,59,60,62] with all studies having a clear majority of female participants.

Communicative context

Across the 11 quantitative studies, ~~there was variation regarding b~~both the rehabilitation setting in which the studies were conducted and the type of communicative interaction between staff and people with TBI varied. Two studies reported on communication across the continuum of care [26,60]. Four studies reported on inpatient

settings with either people with TBI in PTA [17,61] or people with TBI post PTA [39,40]. One study focused on communication in a post-acute residential rehabilitation setting [24], one study on the outpatient setting [41], two studies on the community setting [38,59], and one study on both outpatient and community settings [62].

One study explored CPT and focused on both structured and casual conversations between staff and individuals with TBI [24]. Two studies focused specifically on communicative interaction in goal setting [60,62], one study focused on staff's questioning style [61], and one study looked at verbal aggression in people with TBI [40]. Six papers did not state the genre of the explored communicative interaction between staff and clients [17,26,38,39,41,59].

Outcome measures

Of the 11 studies with quantitative or mixed-methods designs with quantitative components, three studies were designed as cross-sectional survey studies using questionnaires specifically developed for the study purpose [17,26,59]. The remaining eight studies used 13 different outcome measures of which only six were directly assessing communication, i.e. rating of language data [38], interaction rating form and checklist [39], coding of observations [61], and the Adapted Kagan Scales, Global Impression Scale, and La Trobe Communication Questionnaire ~~(LCQ)~~ [24].

Descriptive synthesis: quantitative studies and quantitative components of mixed-method studies

Communicative barriers

Eight of the quantitative studies reported on a range of barriers in the communication between people with TBI and rehabilitation staff [17,24,26,38,40,59–61], whereas three studies [39,41,62] reported solely on communicative facilitators.

Cognitive-communication disorders in people with TBI was reported as one of the most prevalent barriers across the continuum of care [17,24,38,40]. Likewise, the communicative behavior of staff was reported as a barrier, e.g. lack of use of strategies and conversational support [17,24], questioning people with TBI without adjusting to their cognitive and communicative abilities [24,61], lack of engagement of people with TBI in meaningful every-day conversations and in rehabilitation conversations [26,60], and lack of establishment of a therapeutic alliance [26]. However, one study focusing on verbal aggression in people with TBI [40] found that staff providing high levels of structure, giving direct verbal prompts to comply with an instruction, and offering verbal guidance/advice could potentially increase the number of verbally aggressive responses in people with TBI.

Another reported barrier referred to the lack of training to improve communicative knowledge, skills, and confidence in staff [17,24,26,59,61].

Communicative facilitators

Nine of the quantitative studies reported on facilitators in terms of strategies used by staff in their communication with people with TBI [17,24,38–41,59,61,62]. Two studies [26,60] reported exclusively on barriers to the communicative interaction.

In general, staff's use of communicative strategies was described as helpful and as a means to create more successful interactions [24,39,62]. In terms of ensuring people with TBI's comprehension in a conversation, one observation study [39] suggested a range of strategies for staff to use in the inpatient rehabilitation setting, e.g. eye contact, gestures, pointing, short and direct sentences, presenting directions one at a time, keeping complexity of information low, presenting information slowly, and repeating information. Furthermore, structuring the information was mentioned for both in- and outpatient settings in two studies [39,62], and the importance of staff explaining their knowledge to people with TBI in the outpatient and community settings was reported in two studies as well [41,62].

Three studies reported on questioning strategies for staff [17,24,61]. For inpatient settings, where people with TBI may have -PTA, communication could be improved when staff avoided using quiz questions and focused on questions about the 'here and now' [61]. Moreover, providing people with TBI with information instead of demanding information [17,61] or using questions without memory load [17] was found to be successful. For the post-acute residential rehabilitation setting, one RCT study [24] reported on the success of staff asking open-ended questions that encouraged extended responses from clients. In conversations in the inpatient setting, facilitating communication strategies was mentioned in one study as giving people with TBI more time and make sure to clarify what they had said [39]. In the outpatient setting, reported strategies were staff listening, collaborating, and being client-centered in their communication [62] as well as staff using strategies to increase the participation of people with TBI, e.g. introducing topics of interest to people with TBI [24]. In one study [24], the importance of staff having strategies for dealing with communicative breakdowns in conversations with people with TBI was also emphasized.

Two studies [24,38] reported on how staff using conversational engagement strategies could facilitate a communicatively stimulating environment [38] with better opportunities for people with TBI to share information and their own perspectives [24]. Furthermore, these opportunities could be enhanced by staff modelling positive language and communication [38] or staff using natural, adult-like, and non-patronizing communication [24]. Two studies [38,62] reported on staff providing feedback to people with TBI in the community setting. No specific feedback methods were reported, but feedback on communicative behavior was described as enhancing the communicative function of people with TBI [38]. However, one study [40] reported that specifically for verbal aggression in the inpatient setting, effective communicative strategies for staff were to ignore the aggression of clients within

rehabilitation sessions as well as to provide structure for rehabilitation settings to decrease the risk of severe aggression outbursts.

Studies across the continuum of care reported that teaching staff strategies was highly important for successful communication between staff and clients by improving knowledge and use of specific strategies [17,24,59], enhancing staff confidence [17,59], and ensuring uniform clinical practice [61].

Two studies [38,39] reported on strategies that staff could~~an~~ teach people with TBI. In the inpatient setting, people with TBI could be taught to focus on their conversational partner rather than dividing their attention between a communication task and another task [39]. In the community setting, people with TBI could learn strategies for self-monitoring [38].

Study data: qualitative studies and qualitative components of mixed-method studies

Participants with TBI

Thirteen of the 25 included qualitative studies reported on a total of 173 people with TBI [11,19,42,45,47,51,53–56,60–62]. Twelve studies reported exclusively on staff [17,25,42,43,45,47–49,51,56–58]. The age of people with TBI was reported in ten studies [11,19,47,51,53,54,60–62] and ranged from 19 years to 'in their 70s' [61]. Four studies [45,47,53,61] reported on the sex of people with TBI with the majority of participants being male; except from one study with 27 female participants and 24 male [45]. Time since injury was reported in seven studies [11,45,47,51,53,61,62] as a range from eight days to 42 years. Five studies reported on injury severity with four studies [19,47,53,60] including people with moderate-severe TBI, and one study [42] exclusively people with severe TBI. Only one study mentioned injury causes (vehicular accidents or violent assaults) [51].

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Staff participants

Twenty-one of the 25 included qualitative studies reported on a total of 1163 staff members [11,17,25,42–44,46–50,52–54,56–62]. Two studies did not provide the exact number of staff members [19,54], and two studies reported exclusively on the perspectives of people with TBI [45,51]. All but one study [19] reported on the professional background of the staff members. Some studies included only one profession and others included a variety of professionals. Professions were the same as reported for included quantitative studies.

The age of staff members was reported in eight studies [11,25,48,50,52,57–59] ranging from 19-77 years. Thirteen studies [11,44,46,48–50,52,54,57–60,62] reported on the sex of included staff members with more than 50% female participants in all studies. Years of experience was reported in 15 studies [11,17,25,42–44,46,50,52,53,56,57,60,62] and ranged from nine weeks to 35 years with some studies including mean values: 2.3 years [25], 5.1 years [46], 5.6 years [60], 6 years [42], 7 years [17], 7 years [50], 7.5 years [57], 10 years [62], 13.85 years [52], and 14 years [44].

Methodology

Data in the included qualitative studies and mixed-method qualitative components was primarily collected through individual interviews or focus groups, but some studies were observation studies or cross-sectional surveys. Most studies did not explicitly define their philosophical approach to data collection and analysis, but some had a basis of either phenomenology [43,45,46], grounded theory [48,56], or critical decision method [49,50].

Communicative context

The communicative context of the studies varied greatly. Two studies were conducted across the continuum of care [47,60], while nine studies were carried out in in-patient settings [17,19,42,43,49,50,52,55,57,61], one study in an out-patient setting [62], eight in community

settings [11,44–46,51,53,54,59], and two in post-acute residential rehabilitation settings [25,48]. One study was conducted in both in- and outpatient settings [58], and one study in both in-patient and community [56].

Likewise, the explored communicative interaction varied across studies. Most studies did not define the communicative genres [11,17,42,43,45,47,49,50,52,55,57,58]. Five studies focused on communication in goal setting [46,53,56,60,62], two studies focused on verbal aggression [44,59], two studies focused on humor [48,54], one study focused on decision-making conversations [51], one study focused on rehabilitation meetings [19], one study focused on staff questioning style [61], and one study focused on CPT including both casual and structured conversations [25].

Thematic meta-synthesis: qualitative studies and qualitative components of mixed-method studies

Through an inductive synthesis of the findings across the 25 included qualitative papers, six main themes with four subthemes were generated. Subsequently, themes and subthemes were categorized as associated with either barriers or facilitators to successful communication between staff and people with TBI. Themes and subthemes are illustrated in Figure 2.

[INSERT FIGURE 2 NEAR HERE]

Communicative barriers

The following themes and subthemes were identified as associated with communicative barriers: (1) Communication disorders in people with TBI. (2) Staff's communicative approach (2.a. Style; 2.b. Inefficient strategies; and 2.c. Lack of communicative training). (3) Unequal relationship between staff and people with TBI.

Barriers theme 1: communication disorders in people with TBI. ~~*According to the majority of the qualitative studies, the Ccognitive-communication disorders of people with TBI can be a*~~

~~*were reported to be a barrier to successful communicationve interaction between rehabilitation staff and people with TBIclients, affecting the ability of people with communication impairments to understand or provide information. Thus, communicative disorders affecting the ability of people with TBI to either understand or provide information in conversations with staff are perceived by both staff and people with TBI as an obstacle in their communicative interaction.*~~According to the majority of the qualitative studies, the cognitive-communication disorders of people with TBI were reported to be a barrier to successful communication between rehabilitation staff and clients. ~~. Thus, communicative disorders~~ affecting the ability of people with TBI to ~~either~~ understand or provide information ~~in conversations with staff were perceived by both staff and people with TBI as an obstacle in their communicative interaction~~. In an interview study with people with TBI [51], a female participant expressed the challenges with her comprehension:

> They might give me material here, [name of community association], but can my brain scan it and make it work and make it think for me? No, I need somebody to say 'this is what it does', p. 195 [51].

Likewise, the disturbances of discourse production associated with cognitive-communication disorders could~~may~~ become a barrier to successful conversations in rehabilitation settings. In an interview study with staff participants [46], a clinician stated:

> They [people with TBI] would not be able to give me that information (identifying goals) because they can't generate those sorts of ideas, p.35 [46].

Furthermore, changes in pragmatics and social cognition challenged the rapport between clients and staff. One study observed the use of inappropriate humor by an individual with TBI in a group setting including other people with TBI and Speech-Language Pathology students [54]:

> In short, the response to MP3's [individual with TBI] joke is not one of camaraderie. Group reactions express disaffiliation with the joke and the joke teller, p. 329 [54].

Barriers theme 2: staff's communicative approach. The communication of staff could~~may~~ also constitute a barrier to successful communication between people with TBI and rehabilitation staff. According to the included qualitative studies, challenges primarily arose from the style of staff's communication, their use of inefficient communicative strategies, and their lack of communicative training.

Barriers subtheme 2.a.: style. Staff's communicative style was reported as being overly loud, having a harsh tone of voice, or even snapping or yelling at people with TBI [44,49,50,52,59]. As this could~~may~~ result in agitation or verbal aggression from the individual with TBI towards staff, this wa~~i~~s considered a barrier to successful communication. In an interview study with nurses focusing on the environmental factors irritating people with TBI [49], a nurse described this connection between the communicative style of staff and the response from people with TBI:

> Staff trigger aggression by annoying them, by being verbally aggressive or snappy towards them, by probably not tending to their needs, p. 977 [49].

Barriers subtheme 2.b.: inefficient strategies. Another barrier to the~~staff~~ communication was staff's~~their~~ use of ineffective strategies. This include~~d~~s inappropriate questioning style, lack of awareness and acknowledgement of the contributions made by people with TBI, and lack of adjustments to enable the necessary cognitive and communication supports to facilitate interactions [17,42,49,53,55,59,61]. An observation study of the amount and quality of staff's questions to people with TBI in acute care settings [61] showed how a high number of orientation questions during the period of PTA could be counterproductive:

> …in addition to reinforcing incorrect responses, autobiographical questions run the risk of providing inaccurate information to the treatment planning process. Asking questions about orientation, recent events, or personal history during PTA carries the additional risk of creating anxiety in patients when they 'draw a blank', p.1519 [61].

Staff's lack of awareness and acknowledgement of the communicative contribution of people with TBI could~~may~~ also create barriers to a person-centered approach emphasizing the participation of the individual with TBI in rehabilitation conversations. Observations from a study focusing on goal setting [60] supported~~s~~ this:

> There were also, however, instances where health professionals were unable to shift attention from data gathering to address the needs or concerns communicated by patients or their family members. In these instances, patients and family members were observed to retreat from participation in the session, potentially because their expressed needs were not being met, or at times not even acknowledged, p. 26 [60].

Furthermore, barriers ~~may~~ arise~~i~~ when staff did~~o~~ not adjust their communication to the needs for cognitive and communicative support of people with TBI. A cross-sectional survey study with therapist participants [59] categorized this as an unhelpful approach to address challenging behaviors:

> Staff not taking into account ABI [acquired brain injury] contributors to CB [challenging behavior] (e.g. communication difficulties), p. 200 [59].

Barriers subtheme 2.c.: lack of communicative training. Finally, a lack of formal staff training regarding the cognitive and communicative disorders that individuals with TBI frequently experience was also found to be a barrier to effective communication. This may cause a lack of knowledge, skills, and confidence in staff, potentially increasing the use of inappropriate strategies. In an interview study with therapist participants [44], such challenges were described:

> Some participants reported they had low expertise and confidence in behaviour interventions: 'You feel out of your depth' … Participants indicated there was a lack of formal training available. Consequently, most training was informal, such as learning on the job and self-directed research, p.39 [44].

However, one observation study [56] found that despite training, staff could still experience challenges in changing their communicative practice:

> Several participating clinicians found delivering IOG [Identity-Oriented Goal Setting] challenging and at odds with their normal practice... 'we are not skilled in formulating dialogue that is used to facilitate thoughts and ideas from other people', p. 735 [56].

Barriers theme 3: unequal relationship between staff and people with TBI. Across the qualitative studies, the relationship between staff and people with TBI was considered a potential barrier to successful communicative interaction [19,42,45,47,49,51,53,59,60]. When the relationship wa~~i~~s unequal and based on an underlying skewed balance of power, there wa~~i~~s a risk that the communication approach taken by staff caused ~~s~~ individuals with TBI to feel patronized, devalued, or even de-humanized. In an interview study with people with TBI [51], these feelings were described and exemplified:

> Indeed, participants often described doctors as condescending and patronizing… 'They do talk down to you … Like I'm a child, and I'm not. I'm a fifty-year-old woman…', p. 193 [51].

Besides the negative emotional response in people with TBI, staff's communication in unequal relationships could~~may~~ also challenge the participation of individuals with TBI in conversations regarding the rehabilitation process. In an interview study with people with TBI [45], this was described as a power struggle between rehabilitation staff and the individual with TBI:

> 'Whatever I suggested was not done. What she [the physician] suggested was. Those kinds of power struggles are unnecessary, especially when you don't have the ammunition you need to hold your own', p. 195 [45].

The communicative context of meetings wa~~i~~s mentioned in two studies [19,47] as an example of a situation where this lack of inclusion of the person with TBI took~~akes~~ place:

> Ninety per cent of the clients are passive participants in the meeting… The information is over their heads, and we cannot allow the meeting to affect them emotionally…, p. 700 [19].

Communicative facilitators

The following themes and subthemes were identified as associated with communicative facilitators: (1) Staff's knowledge, skills, and confidence. ~~,~~ (2) Strategies for comprehension and production (2.a. Strategies for questioning). ~~, and~~ (3) Acknowledgement and collaboration.

Facilitators theme 1: staff's knowledge, skills, and confidence. Some studies emphasized improvement of staff's knowledge, skills, and confidence as a prerequisite for their use of successful communication strategies and therefore a facilitator for successful interactions [25,44,52,56,61]. In an interview study focusing on staff experiences of a CPT program [25], staff were able to identify successful strategies due to newfound knowledge:

> A greater understanding of the impact of cognition (i.e. information processing and memory abilities) on communication was revealed post-training. Instructions needed to be kept short and simple and the person with TBI needed time to respond to questions and comments made, p. 1557 [25].

Likewise, the training resulted in better communication skills and more confidence in staff members, which improved their communication style and the level of equality in the conversational interactions:

> Post-training greater feelings of confidence and enjoyment emerged for all paid carers for individual and group interactions. Paid carers felt more comfortable communicating with people with TBI and reported more positive conversations, p. 1557 [25] .

Facilitators theme 2: strategies for comprehension and production. The majority of qualitative studies focused on specific communication strategies that staff could use~~an use~~ as

facilitators to improve the comprehension and discourse production of people with TBI [17,25,42,44,46,48,50,51,57–60,62]. Some of these strategies included reducing the amount of information given and simplifying ~~their~~ instructions, using concrete language, structuring the conversation, recapping information, and providing a scaffolding for the different elements of a conversation to improve comprehension. In one study, the use of strategies was described in the context of a goal setting conversation [62]:

> Scaffolding involved the presentation or modification of verbal information, to ensure that the concepts being discussed were concrete rather than abstract ... the practitioner initially uses a direct question to elicit language and cognition goals but when the client was unable to answer, the practitioner re-frames the question to make it concrete for the client, p. 320 [62].

Supporting verbal communication with written keywords or visual materials to improve comprehension for people with TBI was also mentioned as a useful strategy. Examples of this approach were a written daily itinerary [17], pictures to guide delivery of information to people with TBI [58], and visual cues to address memory challenges [57].

To accommodate to the disrupted discourse production often demonstrated by people with TBI, staff could~~may~~ use strategies such as a clear conversation structure, scaffolding of different elements of the conversation, and specific options for answers to facilitate successful communicative interaction. However, the strategy mentioned in most studies related to the listening skills of staff members, such as in an observation study of goal setting conversations [62] where reflexive listening was used by staff to engage individuals with TBI:

> Listening included reflective listening, when practitioners repeated back, summarised or used questions to clarify what the client had said., p. 320 [62].

Additionally, general communication strategies such as providing enough time for communication, using humor, adjusting communication individually to each person with

TBI, and applying a humanized communicative approach were regarded as facilitators of successful communication across included qualitative studies. In an interview study [50], a nurse expressed:

> So I'd look at good communication, being able to talk to someone as a normal human being, being able to have a joke, muck around but also when it's time to be serious, be professional, p. 18 [50].

Facilitators subtheme 2.a.: strategies for questioning. Some studies focused on questioning strategies used by staff with people with TBI [17,25,51–53,55,58,60,61]. To facilitate successful communication, staff should pose questions in a way that allows people with TBI to answer them despite their potential cognitive-communication disorders. In sub-acute rehabilitation settings, this meant decreasing both the overall number of questions and the number of questions relying heavily on the memory functions of the individual with TBI.

Furthermore, staff should provide information to the person with TBI to support the cognitive functions that the individual needs to answer questions. This was emphasized in an interview study with staff [61], where the positive consequences for people with TBI wearе mentioned as well:

> Clinicians perceived themselves and their colleagues as minimizing questions that reply on explicit memory and providing, rather than requesting, information during interactions with patients in PTA ... Reduction in frustration and/or agitation in pTBI with impaired memory, was noted by 23% of respondents, p. 1522-1523 [61].

Reducing the number of questions waіs a strategy applying also to the later phases of rehabilitation, where fewer questions wearе associated with less irritation. This waіs explained by a female participant with TBI describing her current doctor [51]:

> She doesn't ask a thousand and one questions about what you just told her. She just asks a question or two just to clarify something. That's all she needs to know. She

> understands. Other doctors keep asking the same question over and over again, see, it gets annoying after a while, p. 196 [51].

Likewise, providing cognitive support was also associated with increased participation of people with TBI in later phases of rehabilitation. This was emphasized in an observation study focusing on goal setting conversations in the community setting [53]:

> When this conversational behaviour was used [staff using open-ended questions about specific tasks], clients made self-observations and reflected on previous performance, which subsequently enabled them to self-identify problems., p.491 [53].

Facilitators theme 3: Acknowledgement and collaboration. Across the included qualitative studies, an acknowledging and collaborative approach from staff in conversations with people with TBI was regarded as a communicative facilitator [11,19,25,45–47,50,53,54,59,60]. Acknowledgement wa~~i~~s associated with staff recognizing the person with TBI as an individual human being with unique life roles and social contexts. In an interview study with staff [60], it wa~~i~~s stated how acknowledging strategies such as building relationships, being engaged, and using reflective listening skills resulted in increased participation of people with TBI in goal setting conversations:

> Health professionals used reflective listening skills to understand the patient in the context of their family and to understand the life roles and activities of the person before their brain injury ... Patients and families responded to this with greater engagement in the interview, p. 25 [60].

In an observation study of goal setting conversations [53], staff's use of acknowledging strategies was seen as a direct facilitator of speech production in people with TBI:

> Acknowledgements and affirmations appeared to facilitate as they were frequently followed by explicit problem statements from the client, p. 491 [53].

Conversational collaboration between staff and people with TBI ~~is~~is established when both communication partners a~~a~~re given the possibility of contributing to the conversation. This

may not always be the case in rehabilitation conversations for instance about planning and goal setting, where staff traditionally have been holding the main role as explained in an observation study with staff regarding a collaborative goal setting training program [56]:

> Many of the clinicians admitted that previously they set their client's rehabilitation goals themselves in response to funder requirements rather than working with clients on developing their own goals. 'We always had goals, but we never did sort of really collaborative goal setting, p. 733 [56].

From the perspective of people with TBI, staff's use of strategies to increase collaboration in conversations facilitated their autonomy in their own rehabilitation process, as described in an interview study with people with TBI [45]:

> In some cases, the participant needed active assistance with taking charge: 'I was referred to an occupational therapist. And he was the one that really helped me. And also broke the logjam and finally got me a little more in charge of my recovery', p.195 [45].

Discussion

This systematic review aimed to identify the communication barriers and facilitators in the interaction between staff and people with TBI in the rehabilitation context. In total, 31 papers reporting on 29 unique studies were reviewed. Six studies were quantitative (one RCT, two quasi-experimental, and three quantitative descriptive), 20 studies were qualitative (13 interview studies, five observation studies, and two qualitative analyzed survey studies), and finally five studies were mixed-methods (two cross-sectional survey studies, and three observation studies). Overall, the included studies met a high percentage of the criteria of the quality assessment tools. Studies reported on a total number of 275 participants with TBI and 1522 inter-disciplinary staff participants from a variety of rehabilitation settings ranging from early phase to residential facilities.

In both the descriptive synthesis and thematic meta-synthesis, cognitive-communication disorders were identified by staff and people with TBI as a major barrier to successful communicative interaction. Furthermore, interaction challenges associated with the communicative disorders were considered by staff and people with TBI to be augmented by certain inappropriate communicative responses from staff, which in turn became another interaction barrier. In contrast, it was recognized that staff holding an acknowledging and collaborative approach to communication and staff using supportive communicative strategies could decrease the negative impact of cognitive-communication disorders.

The synthesis of included studies showed that the challenges of cognitive-communication disorders were present across the continuum of the rehabilitation setting and across the genres of communicative interaction, including goal setting, decision-making, and verbal aggression. This confirms the findings of previous cross-sectional survey studies, where staff members from various rehabilitation settings have pointed to communication with people with TBI as highly challenging in their everyday work [17,18]. However, this review highlights that the extent to which these disorders create a barrier for the interaction between staff and people with TBI is closely related to staff's communicative approach.

According to both staff and people with TBI, the opportunities for people with TBI to participate in their rehabilitation process are limited if staff do not accommodate to the altered cognitive and communicative needs of people with TBI. Lack of communicative support is therefore a barrier in achieving the recommendations outlined in the ICF and current health guidelines, specifically those relating to person-centred care [12–16].

Across the studies included in this review, a wide range of communicative strategies utilized by staff were considered as facilitators of successful interaction. This finding elaborates the suggestions of previous research into the communicative role of staff during the course of rehabilitation [10,11]. Some strategies were generic to all communication

interactions, for instance, allocating sufficient time for communication and applying a humanized communicative approach. Other strategies were specifically related to comprehension (e.g., staff providing a reduced amount of information) or they were related to discourse production (e.g., staff providing options to choose between). Furthermore, some strategies were aimed at specific rehabilitation settings or specific communicative genres.

Despite the variation in suggested strategies across the studies included in this review, all studies supported the premise that staff needed the communicative skills to approach communication with people with TBI using an acknowledging and collaborative intent. The syntheses of this review show that this premise is strongly associated with increased conversational participation of individuals with TBI and a greater sense of individual recognition amongst people with TBI in the rehabilitation situation.

Two studies [38,39] also included strategies that people with TBI could be taught in relation to attention and self-monitoring in conversations. Though the effect of such communicative strategies is supported by recent research [64–66], it is noteworthy that the literature reporting on interaction between people with TBI and staff members, synthesized in this review, primarily suggested that the responsibility for communication strategy use should be placed with staff. This finding may to some extent be expected due to the eligibility criteria, including studies focusing on interactions where both conversations partners were expected to participate actively. However, the strong emphasis on staff's role as communication partners may also be explained by the shift in speech-language pathology research and interventions in recent decades going from a focus on training only the affected individual towards inclusion of environmental factors, e.g. communication partners in treatment [23]. Accordingly, communication is considered a collaborative, two-way process with both conversation partners carrying the responsibility for success [22].

Even though the review only identified two papers (reporting on one study), focusing on CPT for staff working with people with TBI [24,25], a range of papers emphasized that communication training was required if rehabilitation staff are to increase their skills in facilitative communication strategies. Formal training was preferred by staff members in included studies, as this format was associated with increased knowledge, skills, and confidence in staff and was believed by staff to increase participation and conversational contribution of individuals with TBI.

Thus, the findings of this review suggest that there is reason to explore the potential of CPT in different rehabilitation settings to improve communication between staff and people with TBI. In accordance with the communicative facilitators identified in this review, existing CPT programs are based on acknowledging and collaborative approaches in conversations with the use of strategies, for instance providing a scaffold for the different elements of a conversation [67,68]. However, existing programs may need adjustment to the great variation of the environmental factors affecting the communicative participation of the individual with TBI in the rehabilitation context i.e., type of facility, staff disciplines, rehabilitation tasks, and power balance. As synthesized from included studies in this review, specific barriers and facilitators can be identified in the communicative interactions between staff and people with TBI including certain conversational genres such as meetings and goal setting; certain constraints e.g., limited time use; and certain traditional skewed power relations between individuals with TBI and rehabilitation staff.

Strengths and limitations

To our knowledge, this is the first review to synthesize the literature reporting on the communication barriers and facilitators in interactions between rehabilitation staff and people with TBI. Building on quantitative, qualitative, and mixed-methods studies, it provides an in-

depth knowledge base for researchers and clinicians aiming to understand how environmental factors may affect the participation of people with TBI in the rehabilitation context. Furthermore, the inclusion of both an observational perspective, a staff perspective, and the perspective of people with TBI facilitates a detailed interactional understanding of the communication that takes place in rehabilitation. However, it may be considered a limitation that the perspective of people with TBI is underrepresented compared to staff perspectives due to a paucity in studies exploring the perspectives of people with TBI-, which has been associated with the methodological challenges of interviewing people with cognitive and communicative disorders after TBI [69]. Another limitation to consider is the great heterogeneity between the included studies with only few studies representing the exact same participant groups, rehabilitation settings, outcomes measures, and communication genres. Thereby, an analysis of the impact of for instance differences in patient age or type of conversation on communicative barriers and facilitators was not possible. Furthermore, recommendations regarding outcome measures cannot be established. With the growing number of studies in this field, future research is recommended to attend to these aspects.

In terms of the quality assessment of included studies, the use of the JBI Tools [35] for assessment of qualitative studies may to some extent have introduced focus on the reporting of the studies rather than their conduct, which has been identified by Noyes et al. [70] as a common challenge in qualitative meta-syntheses. Given the inclusion of multiple study designs in this review, having numerous available tools under the JBI umbrella ensured greater consistency in quality analysis across study designs. Furthermore, the JBI Tools have been recommended over two other quality assessment tools for qualitative research [71]. However, the JBI Tools have a strong focus on the theoretical aspects of qualitative studies but do not include perspectives on recruitment. Thereby, a discrepancy between the included studies and the tool was introduced causing many studies to be rated as ‘no’ or ‘unclear’ for

JBI items regarding the philosophical perspective of the study. Nonetheless, studies were not excluded from the review based on this quality assessment.

Conclusion

Communication between staff and people with TBI is challenging in the rehabilitation context, where communicative collaboration is needed to set goals and plan treatment. This review has provided an in-depth understanding of the barriers that may limit this collaboration and the facilitators that may help staff and people with TBI overcome the experienced challenges and ensure successful interactions. The main finding across the included studies is the potential for staff's communicative approach to either enhance or limit the communicative opportunities for people with TBI. Thus, the communicative participation of people with TBI is to a greater extent determined by staff's communication than by the individuals' cognitive-communication disorders. This finding holds clinical and research implications in terms of developing and implementing a CPT program aiming to improve the communicative knowledge and skills of rehabilitation staff and, in turn, increase the inclusion of people with TBI in communication regarding their own rehabilitation process.

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775 There is no publicly available dataset from this research.

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