Communicating with Inpatients with Memory Impairments

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ABSTRACT

Many patients with acquired brain injury have acute impairments in declarative memory, the memory system responsible for learning facts and remembering events, whereas implicit memory for skills, habits, and emotional associations remains intact. The combination of impaired declarative memory and preserved implicit memory has implications for communicating with patients in inpatient rehabilitation, not only in therapy sessions but also in nontherapy interactions with rehabilitation staff. The aim of this study was to describe communication patterns among inpatients with declarative memory impairments and rehabilitation staff members during the early stage postinjury. Participants were five adults with acquired brain injury and declarative memory impairments. Each participant was observed for a full inpatient rehabilitation day. Results showed that staff and visitors frequently asked participants declarative questions to which answers were not verifiable (e.g., questions about preinjury events). Answers that could be verified often were incorrect but were accepted by staff as correct. Results suggest that acute rehabilitation staff may need training in communicating with patients with declarative memory impairments. We suggest strategies to create a more supportive communication environment for inpatients with memory impairment.

KEYWORDS: Communication, memory, posttraumatic amnesia, inpatient rehabilitation, cognitive rehabilitation

Learning Outcomes: As a result of this activity, the reader will be able to (1) differentiate between implicit and explicit memory and which memory system is impaired when a patient is in posttraumatic amnesia and (2) determine how to most effectively modify the healthcare facility's environment and the manner of communicating with patients who have memory impairment, to ensure that patients receive the best rehabilitation care.

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Learning and memory problems are common in patients with acquired brain injury (ABI), particularly in the acute stage after injury. These impairments affect all of the patient's daily interactions, and may present a significant challenge to staff working on the inpatient rehabilitation unit. In this article, we consider common learning profiles in patients with ABI, and how patients' memory strengths and limitations affect not only what they learn on inpatient rehabilitation but also what we learn from them.

MEMORY PROFILES OF ADULTS WITH ABI

Humans have two primary long-term memory systems: the declarative or explicit system, and the non-declarative or implicit system.[1] Declarative memory is memory for events, facts, and ideas. Implicit memory is memory for skills, habits, and emotional associations. These two memory systems differ in the type of information each stores and uses, and also in how information is encoded into and stored within each system.[2]

The difference between declarative and implicit memory is most salient in patients who are in the state referred to as posttraumatic amnesia (PTA). PTA has been defined as "the time between loss of consciousness and return of continuous memory for day-to-day events."[3(p.422)] PTA also has been characterized as a syndrome of disorientation to time, place, and person; confusion; diminished memory; and reduced capability for attending and responding to environmental cues.[4] PTA may be best described as a stage postinjury during which declarative learning is impaired and implicit learning is intact, evidenced by intact learning of automatic motor behaviors in the context of profound impairments in learning new facts (e.g., intact mirror reading with impaired verbal list learning).[5]

Even after PTA has resolved, it is common for patients with ABI to have persistent deficits in declarative memory, whereas implicit memory is preserved.[6] Impaired declarative memory has been reported in patients with virtually any type of brain damage that reduces oxygenation to the brain,[7,8] and it is therefore a pertinent consideration in rehabilitation. When patients have impaired declarative learning and intact implicit learning, they will learn the thought and action patterns that they repeat most often, including thoughts and actions related to communication, even if they have no conscious memory of the learning event.[1] Intact implicit memory also means emotional associations are stored. For example, the patient might "have a good feeling" about a person or place, without any recollection of the event attached to that feeling.

ROLE OF MEMORY IN REHABILITATION

During a typical rehabilitation day, a patient learns new skills and information using both implicit and explicit memory systems to the extent he or she is able. It is possible, however, that rehabilitation specialists might not formally consider these two types of memory when planning intervention for an individual patient. Rehabilitation therapists also might not be aware of what the patient is learning outside of therapy, much of which could be implicit. U.S. Medicare regulations state that patients must be in direct therapy for 3 hours per day, 5 days per week, for a total of at least 15 hours of formal therapy each week. Assuming that a patient is awake for 12 hours each day (84 hours per week), that means there are 69 hours each week in which the patient is awake, not attending formal therapy, and potentially communicating with others. These others include hospital staff and families, who interact with patients during transit times between therapies, waiting time before therapy starts, medical testing, routine care, and time with visitors. As a result, there may be instances in which incorrect answers to declarative questions are being reinforced, as well as instances in which the patient may be learning a repeated communication pattern implicitly.

Based on classical conditioning, a neutral response or positive reinforcement following a behavior will increase the likelihood of that behavior being learned. For example, in the context of the present study, a staff member might ask a patient a declarative question (e.g., "What did you eat for breakfast?") to which the patient answers incorrectly (e.g., "I didn't have

breakfast" when he did), and inadvertently reinforce the incorrect response by agreeing with it (e.g., "I'm sorry you missed breakfast"), because the staff member does not know the correct answer. Hospital staff or visitors may also extinguish a behavior by immediately correcting the patient (e.g., "No, you had eggs for breakfast this morning"). This response would decrease the probability that an incorrect response would be learned implicitly. Optimally, a hospital staff member or a visitor, upon hearing an incorrect response from the patient, would extinguish the response by immediately correcting the patient, providing the correct answer, and asking the patient to repeat the correct answer. This response pattern characterizes a therapy technique, spaced-retrieval training (SRT),[9] which will be discussed later in the article.

The aim of the study was to characterize communication behaviors of adults with ABI and acquired memory impairments and their communication partners during a typical day in inpatient rehabilitation. The overall purpose was to advance understanding of inpatients' communication experiences, to improve the quality of care delivered by speech-language pathologists (SLPs).

METHODS

Participants

Participants were five adults (one man, four women) receiving inpatient rehabilitation services in two accredited facilities in the United States. Each participant was referred for the study by a clinical professional (SLP, neuropsychologist, or physiatrist) who worked directly with that participant as part of routine clinical care on the rehabilitation unit. Inclusion criteria were as follows: (1) age 18 years or older; (2) diagnosis of ABI (i.e., memory impairment was not due to a progressive neurological disease); (3) ability to communicate with others orally, with gestures, or using assisted communication (e.g., writing or other communication aid); (4) a family member or other legally appointed representative (LAR) was available who could provide verbal informed consent; (5) English as a primary language, according to family or LAR report; and (6) impaired declarative memory, as reported by the referring clinical professional based on scores on the Orientation-Log[10] (O-Log; three participants) or Repeatable Battery for the Assessment of Neuropsychological Status[11] (RBANS; two participants), which were part of each facility's standard clinical care. The O-Log is a questionnaire that asks the patient to state elements of the place, time, and situation. An O-Log score of 25 or higher indicates that the patient is no longer in PTA. The RBANS is a brief neuropsychological test, and declarative memory impairment is indicated by below-average scores on immediate and delayed memory items.

Procedures

Once a potential participant was identified, the participant and his or her LAR (with participant assent) were invited to participate in the study, and consent and assent were obtained following procedures approved by the Institutional Review Board at each institution. Once consent and assent were obtained, the first author unobtrusively observed the participant for one entire rehabilitation day, beginning during the participant's first visit with a member of the rehabilitation team and ending when the last formal therapy session was completed. The participant's communication behaviors with each of his or her communication partners were recorded by hand with no identifying information, as required by the Institutional Review Board at each site. Data included time of day, context or type of treatment the patient was receiving, antecedent communication behavior by the communication partner, verbal response from the participant (either correct or incorrect), and response from the communication partner if the participant was incorrect (i.e., positive reinforcement for an incorrect response, negative reinforcement for an incorrect response, repeating the antecedent, or immediately correcting the patient's incorrect response). Handwritten data were transcribed into a digital format for descriptive analysis.

The researcher also recorded whether or not responses to fact-based declarative questions by the partner could be verified based on information available to hospital staff or family members. For example, if an occupational

therapist (OT) asked a patient what she ate for breakfast but the OT had not been in the patient's room, the OT would not know if the patient's answer of egg and toast was correct. In that instance, the question would be categorized as a fact-based question for which the answer could not be verified. The researcher also noted participant utterances that were repeated throughout the day, particularly "I don't know" responses. "I don't know" responses were of interest as any patient admitted to inpatient rehabilitation will be in a new environment with many questions and not many answers. "I don't know" is a common and socially accepted response for those times of confusion. As mentioned above, however, the classical conditioning model predicts that by repeating "I don't know" to unknown questions, the patient will implicitly learn that phrase, and it might become a habit to give that phrase as an automatic response to any question asked.

The researcher had no access to participants' medical records and or other private health information. The Institutional Review Board at each institution approved all methods.

Data Analysis

Analysis included all verbal, declarative, fact-based questions that were recorded between each participant and communication partner. A declarative, fact-based question was operationally defined as a question with an answer that could be objectively verified as correct or incorrect. Mental state questions (i.e., questions about emotions, opinions, or preferences) were excluded because responses could not be objectively verified. A separate total was generated for the subset of declarative questions by the partner for which answers could not be verified as correct or incorrect given the information available to the observer and the communication partner asking the question. Unverifiable questions primarily included preinjury biographical questions where information was not available (e.g., "Did you take the bus regularly before your injury?") and questions about events for which the communication partner and observer were not present (e.g., "What did you have for breakfast?"). Partner feedback on participants' responses to questions also was analyzed. For example, if the participant answered a question incorrectly, the researcher recorded whether the communication partner immediately corrected the participant, gave a nonevaluative comment (e.g., "Okay"), or did not respond to the participant.

RESULTS

Interrater Reliability

To evaluate interrater reliability, a student intern from each of the data collection sites accompanied the researcher for 1 hour and recorded parallel data. Before the observation, each intern was trained by the researcher and provided with an instruction and information sheet. Interrater reliability was 84% (16/19 fact-based declarative questions recorded). None of the three disagreements affected the results, and all were resolved by discussion and clarification of recording rules. Of the questions that were correctly recorded, there was 100% agreement between raters in the participant's response and the conversation partner's reinforcement.

Observation Data

Table 1 summarizes the total number of fact-based questions that were asked of the participant, the subset for which accuracy of the participant's answer could be verified, and the number of participant responses that were correct versus incorrect. For questions that the participant answered incorrectly, the table includes how often the communication partner immediately corrected the participant, which would be the preferred method of correcting an incorrect response from a patient with declarative memory impairment.

Individual participants' errors when answering fact-based questions are listed in the following section. Specific observations for each participant are also included.

PARTICIPANT A

The partner's responses to participant A's four incorrect responses were as follows:

- When asked to verify the time she started treatment in the morning, the participant

Table 1 Declarative Questions Asked of Participants and Accuracy of Participant Answers. Data Are Counts per Participant per Day, with Percents in Parentheses

	Participants				
	A	B	C	D	E
Questions asked	46	51	21	48	47
Questions with verifiable answers	28 (60.9%)	17 (33.3%)	13 (61.9%)	29 (60.4%)	34 (72.3%)
Answers verified as correct	17 (60.71%)	11 (61.1%)	1 (7.7%)	19 (65.5%)	24 (70.6%)
Answers verified as incorrect, questions with no response, or "I don't know" answers	11 (39.3%)	6 (35.3%)	12 (92.3%)	10 (34.5%)	10 (29.4%)
Incorrect answers immediately corrected by communication partner	7 (63.6%)	3 (50%)	9 (75%)	5 (50%)	4 (40%)

responded with "I guess." The nurse did not respond to the participant.

- When the physical therapist (PT) asked the participant if she could turn off the sound to the television in her room so they could continue therapy, the participant said, "I thought I did." The television sound remained on. The PT did not respond, and muted the television himself.
- A nurse asked the participant what she did during the morning PT session, inquiring if she used the stair stepper. The participant did not answer the question and said, "They said I am doing a lot better than a week ago." This statement was true and verifiable, but the nurse did not follow-up on her declarative question and let the nonresponse stand.
- During the same conversation exchange, the nurse asked the participant how long the participant balanced on one leg during her previous therapy session. The participant answered, "Three minutes." The nurse appeared surprised, stating, "Okay, that is impressive." As the researcher was present during the participant's previous session, it was observed that the participant was able to stand on her leg for 3 seconds, rather than 3 minutes. During that session, the PT counted to three each time the participant took a step. This was repeated at least 20 times during the session.

One other similar instance of inaccurate positive reinforcement occurred when a communication partner asked the participant a question for which the partner did not know the answer. In this instance, a therapist asked the participant when she was admitted into the hospital. The participant provided three dates around the same time, but it was apparent the participant could not remember the correct date. The therapist did not have the participant file in the room, so was unable to correct a possible incorrect response. Incidentally, the participant stated early during the observation day that she was aware that she was unable to remember events from the previous day.

PARTICIPANT B

Of the 17 questions, the participant answered six incorrectly. The conversation partner immediately corrected three (50%) of these responses. Responses to the other three were as follows:

- The nurse asked the participant a question regarding the amount of time a pill remained effective. The participant did not respond and the conversation partner did not follow up.
- The PT asked a specific question about the exercise machine. When the participant answered incorrectly, the PT repeated the question and the participant corrected himself.
- When asked what the participant had done in recreational therapy, the participant responded, "I don't know." The conversation partner did not respond because she did not know the answer either. The researcher was present for the recreational therapy session but remained silent in accordance with the Institutional Review Board protocol.

Of the fact-based questions asked of participant B, 67% were not verifiable. Primarily,

these were questions about the participant's home environment and location as well as information regarding his current level of navigation skills (e.g., "Is your house on a hill?" or "Do you have trouble finding bus routes?"), and were part of an interview by the recreational therapist to potentially qualify the participant for transportation services after discharge from the hospital.

The participant also met with a diabetes specialist to discuss changes in the amount of insulin to take and how to manipulate new diabetes-related equipment. The participant was alone in the room. The specialist stated that she received a consult request for this single appointment and did not have access to the participant's medical record, and asked the researcher's opinion about the participant's cognitive status. The specialist asked questions such as, "Think back, do you remember if you used to take [name of prescription pill]?" The session concluded with practicing mock injections with a novel syringe into a pillow. The participant said he had never seen that type of syringe. The participant attempted two mock injections. The first time he was not successful. The diabetes specialist then retaught the task, and the participant was successful during the second trial. There was no additional practice. The specialist provided the participant with a new insulin schedule in writing, and a new syringe, then left the room.

PARTICIPANT C

Participant C incorrectly answered 12 of 13 fact-based declarative questions. Of these 12, the conversation partner immediately corrected the participant 9 times (75%). In response to two of the remaining incorrect responses, the conversation partner provided a nonevaluative comment (e.g., "Okay"). For example, the PT asked the participant, "Has your son been with you all day?" to which the participant responded, "Yes." This was incorrect, as the researcher was present when the participant's son arrived during lunchtime. The third incorrect response occurred when the PT asked the participant if she used a walker, and the participant insisted she did not. Although the researcher had observed the participant using a walker throughout the morning, the PT did not respond to the incorrect behavior and instead made a joke ("Shut the front door!").

Also remarkable, participant C repeated the phrase "I don't know" 21 times. She repeated the phrase "I don't remember" four times and "Can I have water?" seven times.

PARTICIPANT D

Participant D answered 10 of 29 fact-based declarative questions incorrectly. The conversation partner immediately corrected the participant 5 out of 10 times, or 50% of the time. Responses to the five other incorrect responses were as follows:

- The OT repeated a request for the participant to state the function of an object in the kitchen. The participant responded correctly the second time.
- The participant responded, "I don't know" when asked the name of her nurse. The information was not readily available, so the communication partner left the room to find out. She returned 5 minutes later with the nurse's name. This was coded as correcting the participant, although not immediately.
- An unfamiliar hospital staff member approached the participant, covered up his nametag, and asked the participant, "Who am I?" The participant looked at him, but did not respond. After several additional comments (e.g., "Come on, you remember me"), the hospital staff member removed his hand from his nametag and presented it to the participant to be read aloud. The participant did not read it aloud and the staff member left.
- An OT asked the participant if she had seen her SLP yet. The participant responded, "I don't know." The OT remained silent. The researcher had observed the participant with the SLP 2 hours prior.
- When describing the idea of outpatient therapy to the participant during casual conversation, the OT asked the participant, "What is that called?" The participant could not remember the word and said, "It's called . . ." The OT completed the participant's sentence after the participant remained silent for 10 seconds.

Approximately 40% of the declarative questions asked of the participant were questions for which correct responses could not be verified. Questions with unverifiable answers ranged from the attending physician asking, "Did you complain of urinating problems earlier today?" to which the participant's response was "I don't know" to the OT asking whether or not the participant went to the movie night during her stay at the facility. In both cases, the conversation partner did not know the answers to the questions.

This was the participant's last day as an inpatient at the rehabilitation facility. As a result, different hospital staff members asked her many questions about her discharge plan. The participant stated that she did not know where she would be going next. Several rehabilitation therapists inquired if the participant had considered the options of continuing therapy through outpatient services, or a home-based therapy service, or if she was going to an assisted-living facility. The participant frequently replied, "I don't know" and one case added, "I'm easily confused." The participant appeared to be increasingly lethargic and confused as the day progressed. There were no family members or other friends who could answer for her during this time.

PARTICIPANT E

Participant E received a score of 27 out of 30 on the O-Log. Although this O-Log score was above the criterion for PTA, on the day of the observation the referring clinical professional reported that the participant still exhibited signs of declarative memory impairment. The participant's grandmother was present for 90% of the observation day. The following responses were given the six times the conversation partner did not provide immediate correction for the participant's incorrect answer to a verifiable declarative question:

- A fellow patient asked the participant whether she had watched the football game earlier in the week. The participant responded, "I don't know." The participant's grandmother spoke for the participant and said, "No."
- That same fellow participant inquired about the participant's current address. The participant stated only the street name. There was no response from the grandmother or the fellow participant.
- During therapy, the SLP inquired when the participant would graduate. The participant answered 2014. The SLP responded, "Okay." The grandmother was present and explained that the participant did not graduate college because she had stopped attending a year prior.
- The grandmother asked the participant whether the participant's wheelchair brakes were locked. The participant did not respond. The grandmother looked at the wheelchair's locking system, verified that it was not locked, locked the wheelchair, and did not repeat the question.
- During their afternoon session, the PT asked the participant to recall what activities they completed together during the morning session. The participant responded with, "I don't know. Spacewalk?" The PT repeated the question and said, "No. You heard 'spacewalk' from your grandmother." The participant did not respond. Subsequently, the PT described different aspects of the morning session such as being upstairs in the hospital and being hooked into a machine. The participant never correctly answered this question.
- The PT asked the participant to recall what she had for lunch earlier that day. The participant did not respond. The PT repeated the question. The participant's grandmother provided hints (e.g., "What did I get you crackers for?"), then the participant answered correctly.

The participant said "No" in a sarcastic manner (i.e., to mean "Yes") at least 15 times during the second half of the day. This use of "No" appeared to be a method of flirting, as the participant produced this response when asked to perform an exercise by her PT, who was a similar age and the opposite sex, and the participant would answer "No" and then, several seconds later, complete the task. She appeared to flirt with the PT in other ways as well, such as calling him "mean, ugly, and old" in a

sarcastic tone of voice. The PT responded in kind.

On three occasions, the participant asked her grandmother, "Where's my phone?" Each time, the grandmother answered, "Your brother has it." The grandmother answered each question asked of the participant, as she was present 90% of the time from when the participant woke up until the end of the therapy day. The grandmother witnessed each meal, each communication exchange and activity, and also provided biographical information such as when the participant got her tattoo and the age of the participant's child. The grandmother organized a guest book that acted as a memory log for all of the participant's visitors. She brought a camera to take pictures during therapy sessions so that the participant's experience in the hospital could be remembered.

DISCUSSION

The aim of this study was to learn more about communication experiences of inpatients with acquired declarative memory impairments by observing five inpatients and recording their communication interactions throughout a full therapy day. We recorded declarative questions asked of each participant, participants' responses, and subsequent responses from communication partners. Also noted were communication behaviors each participant repeated during the day, including the number of times each participant produced an "I don't know" response.

Results showed that hospital staff and visitors asked many declarative questions of patients with diagnosed memory impairments. Patients answered these questions correctly to varying degrees. Overall, when patients gave verifiably incorrect responses, their communication partners immediately corrected the responses about half the time. The remainder of the time, partners either gave no response or accepted incorrect answers as correct. Often, communication partners could not evaluate accuracy of patient answers because they did not know whether answers were true or false. "Testing" or "quizzing" was documented with each participant (e.g., "What did you have for breakfast today?" or "Do you remember my name?"). Participants repeated "I don't know" between 4 and 21 times during the observation, and also repeated specific communicative phrases.

Number of Questions Asked Overall

Although patients all had been diagnosed with memory deficits, each was asked between 21 and 51 declarative questions. We excluded mental-state questions from analysis, which would vastly increase the amount of total questions asked of each patient. As many as 67% of the declarative questions asked of each patient were not verifiable as correct or incorrect. As a result, communication partners might have been training incorrect responses by positively reinforcing or providing a nonevaluative comment for the patient's incorrect answers. This was evidenced when participant E thought she would be graduating from college, when in fact, she had ceased attending 2 years prior. The therapist responded, "Okay." to the participant's incorrect response. This reinforcement for an error might have increased the probability that the patient would answer incorrectly the next time this question was asked.

The number of fact-based questions asked of each participant in this study suggests that rehabilitation specialists lacked knowledge about either patients' memory problems or how these problems would translate into communication. As rehabilitation revolves around relearning tasks or learning ways to compensate for new cognitive impairments, it is integral for rehabilitation specialists to understand how and what each patient is capable of learning, and be able to verify answers to questions they are asking. It may seem counterintuitive to ask only questions for which we already know the answer, and verifying answers can be a challenge if LARs are not available, but if answers cannot be verified we run the risk of training the patient to make errors and making treatment decisions based on incorrect information.

Number of Participant Errors

Each participant answered between 29% and 92% of verifiable declarative questions incorrectly. At best, communication partners

immediately corrected the participant 75% of the time. This means that each participant experienced at least one communication exchange in which they answered incorrectly and the communication partner accepted it at face value. Unverifiable fact-based questions were also a substantial portion of questions asked by rehabilitation staff. These were either definitely or possibly incorrect, yet patient answers were accepted as correct. In everyday conversations, we accept the Gricean maxim that what others tell us is true, but we cannot make this assumption when talking with patients with memory impairments.

Number of Repeated I Don't Know-Type Answers by Patients

A striking finding was the number of times a participant repeated certain phrases, particularly versions of "I don't know." Participant C repeated the phrase, "I don't know" 21 times. Although unique unto the study's participant sample, she not only used it as a way to respond to declarative questions she did not know the answers to, she also used it when asked mental state inferences (e.g., "Do you want the soap or your toothbrush?"). As mentioned above, mental-state questions were omitted from analysis. This omission, however, could be another source of patient error as evidenced by participant C's incorrect response to mental-state questions.

Medical Implications of Making Errors

Lack of understanding of patients' cognitive impairments may have medical implications. For participant B, it appeared that the diabetes specialist was unaware of the participant's deficits, as she relied on potentially inaccurate history information from the participant to determine a plan of care, and offered only two opportunities for the participant to learn a reportedly new technique for insulin injection. This could drastically affect the long-term outcome of this participant's care.

Despite rehabilitation staff knowledge that the participant had memory impairment, the answers each participant provided to hospital staff appeared to be considered as fact.

Suggestions for Improved Patient Communication

The following strategies may create a supportive communication environment for inpatients with memory impairment. The goal is to maximize learning of correct information and successful communication exchanges during each patient's rehabilitation stay.

IDENTIFYING A RELIABLE HISTORIAN

If a patient's family member is present when the patient is in PTA, then a reliable historian is present. For most patients in the present study, however, there was no family member in the room. Thus, hospital staff relied on information from patients who were unreliable historians. In many cases information was in the patient's record, but staff do not always have time to find detailed biographic information in a medical record, and family members do not have access to that information. Family can help with shared long-term memories, but not necessarily with daily experiences in the hospital unless the family is consistently present. When talking with participant E, for example, the communication partner could not determine whether the participant was providing the correct answer to the question and therefore could not provide an immediate correction. The presence of the patient's immediate family during the duration of PTA may be unrealistic for most individuals, although it might ultimately improve the quality of care provided to the patient.

AVOIDING DECLARATIVE QUESTIONS

Reducing or eliminating the amount of fact-based questions asked of the patient would reduce the risk that staff will act on incorrect information and the patient will learn error responses. Error control and high-frequency repetition of correct responses are the keys to procedural learning. Thus, even in the best-case scenario in which a patient is being immediately corrected each time they answer a declarative question incorrectly, the fact remains that they still made an error. If that incorrect response or unintended communication is repeated, the patient is likely to learn it.

STAFF TRAINING

When a patient has known declarative memory problems, all hospital staff who interact with

that patient should be educated about the nature of those problems and how they affect interactions with that patient. The rehabilitation team might create a memory profile for each inpatient to inform communication partners about how best to interact with that patient. Strategies such as "Don't Ask, Just Tell" (refrain from quizzing a patient on declarative information),[12] using familiar routines with the patient, or providing visual cues such as visual schedules or graphic organizers can reduce patient confusion and learning of bad habits during the early stages after injury. As the patient's memory improves, staff can modify the information sheet to address the patient's current needs. An easily accessible information sheet would support effective patient communication and encourage consistency in communication across the rehabilitation team.

ENVIRONMENTAL MODIFICATIONS

Simple room modifications can give a patient more control and knowledge about the unfamiliar rehabilitation environment. Staff may post a written schedule in a location easily visible to the patient, and use this schedule throughout the day as a teaching tool. Staff can refer to the schedule to review the date, the patient's room number, doctors' names, and therapy schedules without staff having to guess what sessions the patient has attended up to that point in the day.

An inpatient facility may consider asking staff to record detailed notes on events in a patient's day. The first author saw individualized memory books (books dedicated to personal information about the patients and the activities completed each day in therapy sessions) at each facility, but hospital staff members were not using the notebooks when talking with patients. Although it is time consuming to write notes after every event in a patient's day, if staff noted events as they occurred, other staff and visitors would have a reliable reference.

SPECIFIC TRAINING TECHNIQUES

If reteaching the patient is a goal, the SLP and other team members might use SRT as a teaching method.[9] SRT is an empirically supported therapy technique in which the therapist extinguishes an incorrect or inappropriate response by requiring the patient to hear the correct response and then repeat it. This therapy technique could be used by therapists and staff on the inpatient unit for training specific skills, such as locking wheelchair brakes before standing up or looking in a memory book for information. Error-control techniques like SRT capitalize on spared procedural learning in individuals with declarative memory impairments, and maximize learning through repetition of correct responses over progressively longer time intervals.[13]

IMPORTANCE OF A TEAMWIDE APPROACH

For a systemic change in inpatient rehabilitation to be achieved, an inpatient facility needs cooperation from all team members. Change should begin with education about memory impairments and how different types of memory problems affect patients' learning and behavior. With that background knowledge, hospital staff members can understand the logic behind strategies like refraining from asking declarative questions, can alter their plans of care to ensure that important medical information is provided in writing to both the patient and the patient's LAR, and also may feel empowered to share knowledge about communication strategies with the patient's family. This background information may shift the way in which rehabilitation therapists present material and create therapy plans, from focusing on recall of learned facts to observing how new information is used functionally during the day. Therapists then can implement approaches that capitalize on the patient's procedural learning strengths while minimizing opportunities for unintentional learning, such as learning of repeated "I don't know"-type phrases.

Limitations

This study had several limitations. First, the sample size was small. Five participants from two inpatient rehabilitation facilities is too small a number to generalize to the larger inpatient population. Even with a larger sample size, individuals with ABI are a heterogeneous group and each patient will be unique not only in his or her memory profile but also in other cognitive functions, such as language and

executive functioning. Patients also were observed for only one therapy day. Observation for additional days would provide information about consistency of observed responses and whether they were repeated enough to be trained as long-term procedural memories.

A second limitation of the study was that not all participants met criteria for PTA. Two participants who were administered the RBANS were tested more than 1 week prior to the observation, and might no longer have tested in the impaired range if the test was given the morning of the observation. A third participant (E) had a score of 27 out of 30 on the O-Log on the morning of observation, which was above the cutoff for PTA. All three of these participants, however, had significant behavioral evidence of poor declarative memory. Thus, inclusion of these patients may actually have underestimated the amount of error responses among inpatients with memory impairments.

A third limitation was that it was not possible to use a recording device for data collection, primarily because of Institutional Review Board concerns about protection of private health information and collecting identifiable data from staff and visitors. Reliance on handwritten notes meant that parts of communication exchanges might have been missed or written incorrectly. Use of handwritten notes was unlikely to have changed the results in a meaningful way, however, given the large number of responses that were captured and that interreliability was in the acceptable range.

FUTURE DIRECTIONS

The present study was a preliminary examination of five patients, and there is a need for more research to replicate the current findings. Future studies may include follow-up interviews with the patient and patient's caregiver after a patient is discharged, to ask about whether the patient continued using communication patterns that were repeated during the observed inpatient period. Follow-up interviews would help determine if patterns in acute care persisted when the patient returned to his or her home environment.

SUMMARY

The current study provided evidence that inpatient rehabilitation staff are not formally considering patients' declarative memory impairments in everyday interactions, and that patients have the opportunity to repeat, and thus learn, incorrect responses during their inpatient rehabilitation stay. Quality of care for patients with memory problems may be improved by staff training, use of specific therapy techniques, and environmental modifications that capitalize on spared procedural memory and minimize demands for declarative learning and recall. The most important element of any modification to the rehabilitation environment is that all team members are involved.

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REFERENCES

1. Cohen NJ, Eichenbaum H, Deacedo BS, Corkin S. Different memory systems underlying acquisition of procedural and declarative knowledge. Ann N Y Acad Sci 1985;444:54–71
2. Vidoni ED, Boyd LA. Achieving enlightenment: what do we know about the implicit learning system and its interaction with explicit knowledge? J Neurol Phys Ther 2007;31(3):145–154
3. McMillan TM, Jongen EL, Greenwood RJ. Assessment of post-traumatic amnesia after severe closed head injury: retrospective or prospective? J Neurol Neurosurg Psychiatry 1996;60(4):422–427
4. Nabors N, Seacat J, Rosenthal M. Predictors of caregiver burden following traumatic brain injury. Brain Inj 2002;16(12):1039–1050
5. Ewert J, Levin HS, Watson MG, Kalisky Z. Procedural memory during posttraumatic amnesia in survivors of severe closed head injury. Implications for rehabilitation. Arch Neurol 1989;46(8): 911–916

6. Schacter DL. Implicit knowledge: new perspectives on unconscious processes. Proc Natl Acad Sci U S A 1992;89(23):11113–11117
7. Myers CE, Hopkins RO, DeLuca J, et al. Learning and generalization deficits in patients with memory impairments due to anterior communicating artery aneurysm rupture or hypoxic brain injury. Neuropsychology 2008;22(5):681–686
8. Mecklinger A, von Cramon DY, Matthes-von Cramon G. Event-related potential evidence for a specific recognition memory deficit in adult survivors of cerebral hypoxia. Brain 1998;121(Pt 10):1919–1935
9. Brush JA, Camp CJ. A Therapy Technique for Improving Memory: Spaced Retrieval. Beachwood, OH: Menorah Park Center for the Aging; 1998
10. Novak T. The Orientation Log. The Center for Outcome Measurement in Brain Injury 2000. Available at: http://tbims.org/combi/olog/index.html. Accessed March 14, 2013
11. Randolph C. Repeatable Battery for the Assessment of Neuropsychological Status. First ed. San Antonio, TX: Psychological Corporation; 2001
12. Turkstra LS. Inpatient cognitive rehabilitation: is it time for a change? J Head Trauma Rehabil 2013; 28(4):332–336
13. Sohlberg MM, Turkstra LS. Optimizing Instructional Methods for Effective Cognitive Rehabilitation. New York, NY: Guilford Publications, Inc.; 2011