ENHANCING COMMUNICATION THROUGH THE USE OF AUGMENTATIVE AND ALTERNATIVE COMMUNICATION IN PATIENTS STATUS POST TRAUMATIC BRAIN INJURY

by

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ABSTRACT

Patients who suffer from traumatic brain injury often face communication deficits during their hospital stay. This thesis intended to examine approaches the nurse can use to facilitate communication in collaboration with the speech-language pathologist. A review of literature was conducted to examine current research on the most effective devices used to facilitate communication in this patient population. Research revealed that low-technology devices were the most effective means of communicating in the hospital setting. Barriers to effective communication were identified as lack of time, education and access to the devices. Recommendations for future research include developing a documentation component that emphasizes nursing assessment and intervention through collaboration with the SLP. Additional recommendations for research include the examination of impact of AAC use on patient satisfaction and outcomes. Communication using AAC is necessary in order to improve patient outcomes for traumatic brain injured individuals. This can be achieved through increased collaboration with the SLP, and increased nursing knowledge of the available devices and their implementation.

DEDICATIONS

To my parents, who have given me a lifetime of unconditional love, knowledge and support.

To Rich, for always believing in me.

ACKNOWLEDGEMENTS

Thank you to my committee members, Christina Amidei, Linda Hennig, and Pamela Resnick. Without you this thesis would not have been possible. Thank you for sharing your knowledge and lending your support.

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INTRODUCTION

Communication is defined as the imparting or interchange of thoughts, opinions, or information by speech, writing or signs. In patients suffering from traumatic brain injuries, communication is often so impaired that it affects the individual's ability to interact in social situations and express basic needs. There are many resources available in order to facilitate communication in these patients; augmentative and alternative communication is one such resource. According to the American Speech-Language-Hearing Association, augmentative and alternative communication (AAC) refers to an area of research, clinical and educational practice that involves attempts to study and when necessary compensate for temporary or permanent impairments, activity limitations, and participation restrictions of individuals with severe okdisorders of speech-language production and/or comprehension, including spoken and written models of communication (ASHA, 2005) AAC is achieved through the use of various devices. These devices range from those requiring no equipment to ones operated with low technology and finally high tech voice output communication aids (Hodge, 2007).

Problem

In patients suffering from brain injury, the inability to communicate effectively with healthcare staff members creates a barrier to effective treatment and care. This is especially important in relation to communication between nurses and their patients. When the ability to communication is impaired, patient's recovery may be delayed and length of stay prolonged

(Hemsley et al, 2001). In addition, patients who are unable to communicate effectively with their care givers report increased physical discomfort and pain, constant feelings of frustration, lack of self-esteem and lack of basic needs being met (Finke, Light & Kitko, 2008). In these instances it becomes appropriate to use augmentative and alternative communication tools in order to facilitate communication for these patients and increase the quality of care (Beukelman & Mirenda, 2005).

Nurses may be unaware of AAC resources or not know how to use them properly (Finke et al., 2008). In order for the resources to be made readily available to the patients, nurses must become more knowledgeable about the methods of AAC. A further barrier is that these communication tools may not be available in clinical settings and nurses may not be familiar with how to properly utilize them (Hemsley et al, 2001). To what degree should nurses collaborate in assessment and intervention of patients post traumatic brain injury that require AAC devices?

BACKGROUND

It is estimated that 1.4 million people sustain a brain injury every year. The incidence of brain injury is thought to be between 150 to 200 per 100,000 persons in the United States. This prevalence is highest for people between the ages of 15 to 24 years of age; the incidence in this age group increases to 400 to 700 cases per 100,000 individuals. Males are more prone than females to experience TBI and also suffer a greater morbidity and mortality related to their injuries. In addition, the prevalence of TBI is higher in urban areas with more victims falling into lower socioeconomic categories. (Beukleman, Yorkston, Reichle, 2000)

Types of Trauma

Traumatic brain injuries fall into two categories, open or closed. The severity of the injury is directly related to which type of injury is sustained. In an open-head injury, the skull is fractured by some mechanism. The mechanism may be a gunshot, stabbing, or a high velocity impact that is strong enough to break the skull. In closed-head injury, the skull remains intact and the trauma is internalized to the underlying brain tissue. For both of these injuries, speech mechanisms can be impaired, producing linguistic deficits. Linguistic deficits can be phonetic, semantic, or pragmatic in origin. Injury to the brain can also cause a loss of previous capacity for comprehension and formulation of language known as aphasia. Aphasia results in a phonetic, semantic or syntactic degradation of communication that causes incorrect word sounds, word choice and grammar. (Hoeman, 2008)

Communication Deficits Related to Trauma

Following a traumatic brain injury, patients may experience emotional, social, behavioral, cognitive and physical impairments. A significant amount of executive dysfunction and impairment can be attributed to frontal lobe damage following TBI. In these patients, damage to the frontal lobe accounts for deficits in concept formation, attention, memory, and regulation of emotions. In addition, problems may be related to concrete thoughts, impulse control, perseveration, impaired self-monitoring and impaired self-regulation (Kreutzer & Wehman, 1991). All of these impairments indirectly impact linguistic formation. There is also a high incidence of confused language following TBI, in which patients will respond with incoherent and irrelevant phrases. In addition, many experience impaired social interaction. Patients with more severe injuries may be mute or have aphonia.

According to research, these impairments may affect social interaction presenting with conditions such as insensitivity to others, topic shifts, irrelevant comments, inappropriate comments, and reduced initiation of social interaction. Other factors contributing to impaired social interaction are behavioral in nature, including disinhibition, temper outbursts, memory impairment and slow response time (Downing, 1999). Therefore, communication directly impacts social interaction which is regarded as the most significant problem post rehabilitation for persons with traumatic brain injury.

Summary

For patients with traumatic brain injury, rehabilitation efforts begin in the hospital. Nurses play an active role in advocating for the patient to receive AAC services. Since nurses have extensive contact with the patient and provide medical care, it is important to provide assessment data to the team about the patients' medical status, as well as information pertinent to the patients communication needs. The nurse should share observations about patient condition and consider use of AAC in collaboration with the speech-language pathologist. Introduction of AAC should be considered following stabilization of the patients medical condition.

Purpose

The purpose of this thesis is to provide a comprehensive review of research findings that support the use of augmentative-alternative communication in patients with traumatic brain injuries. Findings will be used to develop a protocol for nurses in the adult acute care setting. This protocol will enable them to accurately assess and facilitate treatment for patients after traumatic brain injury with AAC needs. This thesis will increase the nurse's level of awareness about AAC, and aid the nurse in application of alternative methods of communication for patients receiving treatment following traumatic brain injury. It will include an overview of the types of devices available and provide recommendations for selection based on patient criteria. This process will also require collaboration with a Speech-Language Pathologist. The results of this study will be used to create a recommendation on how to chart the assessment of each patient's ability to use each device will be developed, including the development of an order set

for use in the hospital setting. Information about educating the patient and their care giver on use of the device will be included as well as increased awareness of available resources and community acceptance of the patients who use AAC.

Method

A synthesis of current research related to the effectiveness of augmentative and alternative communication was conducted. A review of interdisciplinary research was performed utilizing the CINAHL, the Cochrane Database of Systematic Reviews and MEDLINE databases. Inclusion criteria for this thesis consisted of research focused on the patient's utilization of AAC following traumatic brain injuries. Search terms included "traumatic," "brain injury," "communication," "AAC devices," and "rehabilitation." Research conducted from 1990 to 2011 was given consideration. The age of the patients was left undefined, as communication is necessary for human interaction across the lifespan. Consideration was given to research analyzing the effectiveness of the device, patient's perception of available resources, education for the nurse on the available resources, the need for patient and caregiver education, community resources, and perspectives on the use of alternative communication in these patients.

FINDINGS

Importance of Communication

In order to ensure that patient care outcomes are met, the nurse must be aware of the importance of nurse patient communication. It is important for the patient to be able to effectively communicate their needs to the nurse, and for the nurse to ensure that these needs are met. In order for communication to be effective in the presence of communication deficits related to traumatic brain injury, both the patient and the nurse must be aware of the skills and resources necessary to make the communication interaction effective and beneficial. (Finke, Light & Kitko, 2008) Factors that influence communication between patients with these impairments and their nurses, are the severity of communication impairment and the conflict demands of the nurse related to their patient load. The effects of lack of communication between the nurse and patient include medical risk as the patient may not be able to communicate their needs and concerns, as well as frustration, anxiety, and fears of abandonment, lack of pain management, and increased risk for falls.

Barriers to Effective Communication

In a study by Balandin (2001), 10 patients with severe communication impairments were surveyed. These patients reported that the amount of time that the nurse was willing to spend attempting to communicate with the patient greatly affected their outcomes. They reported feeling as though the nurse did not take the time to listen or look at the patient, were too busy

to stop and communicate effectively, and that gaining the attention of the nurse was difficult. The study further recommended that nurses become more informed about AAC, and learn how to integrate the devices into their daily routine in order to increase patient satisfaction and improve outcomes.

In a study by Hemsley et al. (2001), 20 nurses experienced in caring for patients with severe communication impairment were surveyed. The research focused on the nurse's perception of communication devices and the challenges related to caring for patients with severe communication deficits. The nurses reported a lack of access to AAC devices, and that in-service training on AAC devices would be beneficial for their use. Increased support from the SLP was also believed to be necessary in improving communication with the patient.

Researchers have also explored the perceptions of caregivers who look after these patients while in the hospital (Hemsley et al, 2001). Caregivers reported lack of confidence in the nurses' abilities to provide adequate care due to lack of knowledge of AAC. In addition, they felt as though they needed to protect the patient from harmful situations that could potentially arise from miscommunication during their hospital stay. Finally, they expressed fear that the patient would be neglected or ignored due to absence of effective communication with the nurse and therefore often refused to leave the bedside for the duration of the stay.

Support for Effective Communication

Both extrinsic and intrinsic factors have been identified that can increase the effectiveness of communication when utilized by the nurse. The intrinsic factors the nurse

should be aware of include any prior training and experience, willingness to take the time necessary to communicate the message, ability to verify that the message is understood, willingness to ask for help from other members of the healthcare team, and consistency in relaying information regarding the patient's ability to communicate during shift change (Hemsley et al, 2001). Research has also identified intrinsic factors related to the patient that are directly related to successful communication. Those factors include the patient's level of alertness, capability to maintain eye contact, and ability to mouth words. (Hemsley et al., 2001)

In addition, there are several methods that the nurse could implement to increase the effectiveness of patient communication. First, the nurse could follow written directions from the patient or patient family that detail communication strategies that are effective. (Balandin et al, 2001) It is also important to recognize verbal and non-verbal cues that indicate the message was understood. (Hemsley et al, 2001) Research also strongly advises that the nurse become familiar with AAC devices and tools that are available at their facility in order to best meet the needs of their patients. (Hemsley et al, 2001) Finally, collaborating with the patient, family members and other members of the healthcare team in order to make communication more effective and sharing this information with other members of the healthcare team. Additional extrinsic factors were identified as a quiet environment, patient load, amount of time available for each patient, the presence of family members and the use of AAC. (Hemsley et al, 2001)

Overview of AAC

The American Speech-Language-Hearing Association regards the importance of augmentative and alternative communication as spanning across research, clinical implementation and educational practice. AAC is used to compensate for impairments in speech production and comprehension by utilizing spoken and written methods of communication. (ASHA, 2005) There are four primary components to AAC use; symbols, aids, strategies and techniques. Symbol types include graphic, auditory, textured, tactile or gestural symbols that can be unaided or aided. Unaided communication such as facial expressions and gestures do not require external equipment. Aided communication requires external equipments such as a communication board with symbols. The symbols are chosen based on the severity of a person's injury and their ability to communicate effectively. The term aid refers to the use of an electronic or non-electronic device that can be used to transmit and receive messages. Technique describes the way that the message will be transmitted. Finally, strategy refers to the message time, grammatical formulation of messages, and the communication rate. (ASHA, 2005)

Types of Devices

AAC options for patients suffering from brain injury range from unaided communication (i.e. manual signs, gestures, etc) to aided communication (Downing, 1999) Aided communication includes devices that are low-technology such as communication boards, mid-technology such as Tech Talk or high-technology, such as devices with vocal output capability.

Unaided Communication

The manual sign systems are most widely regarded as AAC methods of communication that require no technology. There are three main types of manual sign. The first are those that are used as alternatives to the language of a specific country such as American Sign Language and Swedish Sign Language. The second are those that are used to coincide with a particular language such as Manually Encoded English. Finally, fingerspelling and other methods that can be used to supplement spoken language make up the third category (Beukelman & Mirenda, 2005).

Although sign language could be effective, limitations exist. For patients with traumatic brain injury it may be difficult to maintain the fine motor skills necessary to produce complex signs. In addition, ASL is not a universal language, therefore creating limitations in communicating within the community. Manually Encoded English, or specifically Key-Word Signing, may prove to be more effective and easier to learn for patients with TBI. This involves signing words in spoken English order that focuses on critical words such as nouns and verbs. Finally, fingerspelling and other methods of supplementing spoken language may not be effective in patients with TBI who have failed to regain any natural speech. This method should be reserved for later stages of rehabilitation in this population, patients with a higher level of baseline function following injury and patients with poor attention (Beukelman & Mirenda, 2005).

Low-technology

Low-technology devices are non-electronic forms of communication with static displays. The most common type of low-technology AAC device is the communication board. Communication boards may be commercially available or can be developed using picture communication symbols (PCS). The PCS system is a data base of over 7,000 black and white illustrations. The software available allows the illustrations to be individualized for the patient and their most common communication needs. Research conducted to determine the effectiveness of PCS found that the symbols within this system were more readily learned than other similar symbol sets (Huer, 2003).

Communication boards utilizing the PCS system would be effective for patients with traumatic brain injury that had gross motor skills intact. One benefit of the communication board is that it can be designed to meet the communication needs of the patient where only commonly used symbols are included in the board itself. It also requires very little training or education, something that would aid in caregiver accessibility and ease of use for the nurse. Disadvantages include lack of voice output and limited vocabulary capabilities. Without the ability for voice output, it may be difficult for the patient to gain the attention of the nurse.

Mid-technology

Mid-technology devices are static displays with the function of digitized speech. These devices are beneficial in aiding in the transition from low-tech device use to high-tech devices. The static displays are similar to those found on low-technology devices such as communication boards, and the digitized speech allows the patient to adapt to the functionality of a more high-technology device. However, they are not commonly used in patients with traumatic brain injury (Beukelman & Mirenda, 2005).

High-technology

High-technology devices have dynamic displays and the ability to generate voice. Speech-generating devices are the most technologically advanced methods of AAC available. Synthetic speech technologies have advanced since the 1990s and now offer a wide variety of options for the individuals that rely on them. Speech can be generated using text-to-speech, digitized synthesized speech or a combination of both (Beukelman & Mirenda, 2005).

The benefits of synthetic speech are that it enables communication to be accepted and understood in all pre-injury settings, and it is the only device that allows for telephone communication. Limitations are that they may not be accessible in every area, accessible for every economic class, and can experience technical failure.

Effective Devices for TBI

In a study by Fager et al. (2006), three speech-language pathologists surveyed 25 individuals with TBI on their AAC use. Information for the study was gathered via questionnaire

which included background and diagnosis, AAC use, AAC recommendations, desired message formulation, and low-tech AAC use. Following the AAC recommendation, 17 of the 25 individuals were assigned high-tech devices and 8 of the 25 were given low-tech devices. The results of the questionnaire demonstrated a 94.22% acceptance of high-tech devices and a 100% acceptance of low-tech devices. Factors that influence the acceptance of high-tech devices include improved speech output synthesis ease of programming, and availability. Individuals in this group were able to produce a greater variety of communication not available with low-tech devices such as the use of a telephone. Low-tech devices were often accepted as a temporary means to facilitate communication until natural speech returned or in instances where cognitive and physical barriers prevented training for high-tech device use (Fager et. al, 2006). For both high- and low-tech devices the preferred method of message recovery was letter-by-letter spelling. There was no substantial evidence that the individuals were able to utilize encoding strategies. Encoding is a technique that increases the rate of communication by allowing the user to group symbols to create a desired message (Beukelman & Miranda, 2007). Encoding strategies provide a challenge for patients with TBI because of limitations that exist in memory and attention.

DISCUSSION

A significant purpose of the nursing profession is advocacy for the treatment of the whole person, also known as holistic care. Communication is vital in order to establish a therapeutic nurse- patient relationship, communicate needs, and ensure quality patient care. Without effective communication, the patient may experience adverse outcomes during their hospital stay. AAC devices can help bridge the gap between nurses and their patients who are unable to communicate in order to improve patient satisfaction and outcomes. If a patient were to be in pain, the use of a communication board or manual sign would enable them to express the need for medication to their nurse. The same would be true for patients who need to use the bed pan, want the lights turned off, or need the volume turned up on their TV. By enhancing communication and allowing these needs to be communicated on a regular basis, the nurse is addressing all aspects of the whole person during their hospitalization.

Barriers identified by both the patient and nurse are essential to address in the clinical setting in order to facilitate the use of AAC devices. Patients often identified the work load of the nurse as a barrier to use of AAC. Due to challenging patient loads and timeliness of other tasks nurses have also identified time as a significant barrier to utilization of the AAC device. Support needs to be gathered from administration in order to decrease the patient load of nurses whose patients have complex communication needs and require AAC devices to communicate. In addition, a realistic expectation of how long a nurse should be expected to work with the patient and the recommended AAC device per shift should be established.

Finally, research identified intrinsic factors related to the nurse that increase the effectiveness and success of AAC use. Because facilitation of a device can be time consuming and take a great deal of patience, it should not be an expectation of every nurse on the floor. Instead, nurses who possess the passion and interest in becoming skilled facilitators should be identified and trained accordingly. An incentive could be offered to encourage participation, such as a desirable schedule or advancement in the clinical ladder.

The use of AAC is widely recognized as a means for rehabilitation and reintegration into society following TBI. Use of communication devices can aid the patient in regaining social norms such as relationships and employment if implemented correctly. A major goal of rehabilitation following injury is return to previous function. Regaining conversational skills impacts all aspects of a person's life and can contribute to a person's ability to return to work, maintain relationships and resume marital status.

The identification of an effective AAC device is essential in the rehabilitation process. In the healthcare setting, it may be difficult to obtain the resources necessary to provide patients with high tech devices. However, the use of a communication board is simple, effective and inexpensive. It is critical for patient outcomes that the nurse collaborate with the SLP in the development of a communication board with symbols to meet the patient's needs.

The most prevalent risk factor associated with discontinued use of the recommended AAC device is social isolation. One of the greatest difficulties reported by persons with TBI is loneliness. This is attributed to a loss of pre-injury friendships and leisure activities. In order to

avoid social isolation, individuals with TBI need to be provided an effective communication device and given the support of a facilitator or community resources.

RECOMMENDATIONS FOR NURSING

Practice

In order to effectively evaluate outcomes for patients with TBI, the development of a charting component that holds the nurse accountable for the intrinsic and extrinsic factors emphasized by the research should be developed. This assessment must be functional and clearly evaluate the effectiveness of the communication device based on clinical patient outcomes. The use of the AAC device would be evaluated based on a scoring system. Patients use of the recommended device would be evaluated on necessity, frequency, and accuracy. The nurse would first select whether or not the device was still necessary for the patient. This would allow for evaluation of return to natural speech. If the nurse selects "no" under necessity, the rest of the evaluation would be grayed out and require no additional documentation. Choices for frequency would include frequently, occasionally, rarely, or never. Scores indicating more use would generate higher scores, and less use would generate lower scores. Finally, accuracy would evaluate the effectiveness of the device in communicating the patients needs. For lower scores, a SLP consult would be automatically generated in order to facilitate early intervention and re-evaluation. This method of outcome measurement would increase collaboration between the nurse and SLP by providing a standardized means for intervention. This charting component would be implemented on units with an increased prevalence of communication deficits and need in order to determine its effectiveness.

Education

Evidence has shown that one of the greatest factors affecting the nurses ability to facilitate the use of AAC devices with their patients is lack of knowledge. Education is necessary in order to increase the nurse's knowledge of the devices within the acute care setting. In order to increase use of AAC devices and provide support for nursing staff, educational opportunities should be provided on many different levels.

An overview course should be included in the general orientation for new employees within the hospital setting. This could be in the form of a computer based learning program or a short lecture. Although communication deficits may not be prevalent on every unit, every nurse should be aware of the resources available to the facility in the event of a need. For units with a higher incidence of communication deficits and AAC need, the nurses should be required to complete computer based learning modules on each of the systems they will be exposed to. Education should be required either biannually or quarterly in order to maintain knowledge and competency. Lastly, in-service educational courses could be provided by the manufacturer of a system in order to provide demonstration of new devices that are being implemented throughout the facility. All of these methods would significantly increase nurse knowledge of each device, allow for continued education, and create an environment that encourages the nurses involvement in the care of patients with AAC needs.

Research

In order to facilitate the use of AAC devices in TBI further research needs to be conducted to improve measurement of patient outcomes. Following the implementation of an AAC device in the acute care setting, the nurse and SLP should collaborate to determine if the device is effectively meeting the needs of the patient. This information should be included in a hospital wide study that evaluates the outcomes for patients using devices. Information gathered could include decreased incidence of falls, decreased incidence of incontinent episodes, and overall satisfaction of the patient.

Limitations

The most significant limitation of this study was that an outcome database does not exist in evaluating the effectiveness of AAC use in patients with TBI. This made it difficult to draw conclusions as to which devices and interventions would be most effective in this population. In addition, the research in this study was limited to patients with TBI. However, there may be research conducted within other populations with results that could be generalized to this population. With increased use and research AAC devices will serve a greater purpose in the acute care setting.

APPENDIX: TABLE OF EVIDENCE

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ARTICLE	DESIGN	INTERVENTION	OUTCOME	NURSING
Bailey, R. L., Parette, H., J., Stoner, J. B., Angell, M. E., & Carroll, K. (2006). Family members' perceptions of augmentative and alternative communication device use. *Language, Speech & Hearing Services in Schools, 37*(1), 50-60.	Semistructured Interviews analyzed using cross-case analysis	Examination of perception of the use of AAC devices; factors that affect use, family expectations, and benefits.	Common perspectives on the categories of expectations, facilitators, barriers, and benefits of AAC.	This information could be used to improve professional and family relationships to benefit AAC users.
Beukelman, D. R., Fager, S., Ball, L., & Dietz, A. (2007). AAC for adults with acquired neurological conditions: A review. *AAC: Augmentative & Alternative Communication, 23*(3), 230-242.	Review of literature	Discusses the use of AAC in six groups of patients; ALS, TBI, brainstem impairment, aphasia, PPA, and dementia.	Recent technological advances, acceptance, use and limitations in these patient populations.	Raises awareness of available resources and need for future research in these patient populations.
Bryen, D. N., Chung, Y., & Lever, S. (2010). What you might not find in a typical transition plan! some important lessons from adults who rely on augmentative and alternative communication. *Perspectives on Augmentative & Alternative Communication, 19*(2), 32-40. doi:10.1044/aac19.2.32	Review of literature	Analyzes the importance of creating a valued, social adult life following the start of AAC use.	Three key issues were raised; access to needed vocabulary, social networking, and safety.	It is important to advocate for the patient to maintain a social life.
Burke, R., Beukelman, D. R., & Hux, K. (2004). Accuracy, efficiency and preferences of survivors of traumatic brain injury when using three organization strategies to retrieve words. *Brain Injury, 18*(5), 497-507.	Repeated measures research design	12 adult participants retrieved words in 3 experimental conditions and ranked their order of	Adults with TBI retrieved words more accurately with alphabet organization	Will aid the nurse in recommending which strategy for their patient to use.

		preference.	than with topic or place strategies. However, patients preferred using the topic strategy.	
Burke, R., Wassink, K., Martin, T., & Seikel, A. J. (2008). Message retrieval for survivors of traumatic brain injury. *AAC: Augmentative & Alternative Communication, 24*(1), 56-63.	Repeated measures research design	An update of the previous research study. Analyzed topic, place and alphabet for message recognition. Participants were asked a delayed recall question and asked to respond.	Alphabet is significantly more accurate than place and faster than both place and topic. Participants were able to use all three strategies.	Raises awareness of methods used to elicit response and how to help the patient respond quickly and accurately.
Campbell, L., Balandin, S., & Togher, L. (2002). Augmentative and alternative communication use by people with traumatic brain injury: A review. *Advances in Speech Language Pathology, 4*(2), 89-94.	Review of literature	The use of AAC in Traumatic Brain Injuries	Competent assessment, implementation, training and support is necessary.	Provides an overview for this patient population.
Collier, B., McGhie-Richmond, D., & Self, H. (2010). Exploring communication assistants as an option for increasing communication access to communities for people who use augmentative communication. *AAC: Augmentative & Alternative*	One-year intervention study	A study involving nine people that aimed to learn about communication support required by AAC users,	The majority of participants experienced a range of communication barriers in the community.	The nurse needs to be aware of the communication barriers that are present in

Communication, 26(1), 48-59. doi:10.3109/07434610903561498		develop and implement a funded communication assistant service for people with AAC in the community, evaluate the impact of the communication assistant service, and make recommendations for increased communication access for people who use AAC in their communities.	Trained communication assistants increased their ability to communicate and participate in their communities;increased their feelings of dignity, empowerment, autonomy and privacy and the quality of their community services.	the community should their patient be facing discharge with an AAC device. Further research and development of communication assistant services are needed in the community.
Fager, S., Hux, K., Beukelman, D., & Karantounis, R. (2006). Augmentative and alternative communication use and acceptance by adults with traumatic brain injury. *AAC: Augmentative & Alternative Communication, 22*(1), 37-47.	Research study using questionnaire	Analyze the acceptance and use patterns of 25 adults with traumatic brain injuries who use either high or low tech AAC devices at some point during their recovery. Documented acceptance, use patterns, access patterns for message	Adults generally accepted both the high tech and low tech devices and used their AAC systems for an extended period of time. Most used letter-by-letter message	The nurse should be aware of the importance of facilitator support and advocate for the patient to have support from their family or

		formulation and encoding, and the kind of communication functions that the different AAC strategies supported.	formulation strategies. When AAC use was discontinued it was due to loss of facilitator support rather than desire to discontinue the technology.	some other community resource in order to ensure the continued use of the technology.
Finke, E. H., Light, J., & Kitko, L. (2008). A systematic review of the effectiveness of nurse communication with patients with complex communication needs with a focus on the use of augmentative and alternative communication. *Journal of Clinical Nursing, 17*(16), 2102-2115.	Systematic review of literature	Analyzed the importance of communication, the barriers to effective communication, the support needs for communication and recommendations for improving the effectiveness of communication between nurses and patients with complex communication needs. Discusses AAC strategies to improve communication.	Using AAC strategies has the potential to improve patient to nurse communication and therefore improve patient care and outcomes.	Nurses must be aware of the tools and skills that will allow them to communicate effectively with patients who have complex communication needs.
Fried-Oken, M., & Doyle, M. (1992). Language representation for the	Research study	Analyzes the words and concepts	AAC for clients with TBI must	The nurse must be aware of

augmentative and alternative communication of adults with traumatic brain injury. *Journal of Head Trauma Rehabilitation, 7*(3), 59-69.		needed for patients recovering from TBI, selection of the words, symbols used to represent the words, and how they will be used for functional communication.	represent intact language and be flexible enough to integrate new symbols, concepts and communication functions necessary as they recover.	the different communication strategies and which are the most effective for patients with TBI.
Hodge, S. (2007). Why is the potential of augmentative and alternative communication not being realized? exploring the experiences of people who use communication aids. *Disability & Society, 22*(5), 457-471.	Review of literature	Explores the various problems that people who used AAC encountered.	Identifies lack of consistent, structured support as the major issue. Recommends the development of coordinated systems of support within education, health and social services.	Aids the nurse in recognizing the barriers their patients will face while using AAC.
Huer, M. B. (2008). Toward an understanding of the interplay between culture, language, and augmentative and alternative communication. *Perspectives*	Review of literature	Examines the influence of culture on AAC use.	There is significant impact on the ability of a person	The nurse must always be aware of the

on Augmentative & Alternative Communication, 17(3), 113-119.			to feel full inclusion in social, educational and economic experiences based on the ability of their AAC devices to address their cultural needs.	patients cultural needs and advocate for them.
Hux, K., Burke, R., Elliot, J., Ross, M., & Hrnicek, T. (2001). Communication interaction differences between natural speakers and AAC users with traumatic brain injury. *Journal of Medical Speech-Language Pathology, 9*(1), 71-86.	Research study	Examined the difference between natural speech and text-to-speech AAC communication devices in four TBI survivors.	AAC users initiated less conversation, produced fewer questions and comments, and spent more time in message generation than natural speakers.	The nurse must be aware of the drawbacks of some text-to-speech devices and advocate for the use of multiple communication modes to best meet their patient's needs.
Lund, S. K., & Light, J. (2007). Long-term outcomes for individuals who use augmentative and alternative communication: Part II - communicative interaction. *AAC: Augmentative &*	Research study	Evaluated the effective communication skills of 7 men ages 19-23 years who had used AAC	Turn-taking had improved over time. Three participants demonstrat	The nurse must be aware of the potential for improveme

Alternative Communication, 23(1), 1-15.		systems for 15 years. Analyzed turn-taking patterns, use of communication functions, and linguistic complexity.	ed the ability to use complete and complex syntax with very few errors.	nt over time and advocate for future research.
Lund, S. K., & Light, J. (2007). Long-term outcomes for individuals who use augmentative and alternative communication: Part III -- contributing factors. *AAC: Augmentative & Alternative Communication, 23*(4), 323-335.	Research study using Qualitative interviews	Evaluated 7 young men who had used AAC for 15 years, their family members, and professionals who had worked with them. Interviews were conducted to identify factors that may have contributed to the young men's outcomes.	Factors that affected positive outcomes included attitude barriers, cultural differences, technologic al barriers, and service delivery limitations. Factors that contributed to positive outcomes included community support, parent and family support, personal characteristi c, and high-quality AAC.	Awareness of the factors that both positively and negatively affect positive outcomes for the patient aids the nurse in delivery of care.
Lund, S. K., & Light, J. (2006). Long-term outcomes for individuals who use augmentative and alternative	Research study	Evaluated long term outcomes for 7 young men who had	Outcomes varied across all measure.	The nurse should keep in mind the

communication: Part I -- what is a "good" outcome? *AAC: Augmentative & Alternative Communication, 22*(4), 284-299.		used AAC devices for 15 years. Outcomes were measured according to receptive language, reading comprehension, communication interaction, linguistic complexity, functional communication, educational and vocational achievement, self-determination and quality of life.	The results raised many issues that surround the challenges of outcome measurement.	difficulty behind measuring outcomes.
Minardi, R., & Cavatorta, S. (2003). Integrated speech therapy interventions in rehabilitation after traumatic brain injury. *Europa Medicophysica, 39*(3), 153-159.	Review of literature	Discusses the intergration of several modalities of speech therapy for patients with traumatic brain injury.	Collaboration between all members of the healthcare team is necessary to appropriately rehabilitate these patients.	The nurse must be aware of their role in rehabilitation and collaborate with other members of the healthcare team.
Murphy, P. (2007). Augmentative & alternative communication. *Exceptional Parent, 37*(8), 48-51.				
O'Keefe, B., Kozak, N. B., &	Research	The study	The focus	The nurse

Schuller, R. (2007). Research priorities in augmentative and alternative communication as identified by people who use AAC and their facilitators. *AAC: Augmentative & Alternative Communication, 23*(1), 89-96.	study using a questionnaire and Likert-type scale	analyzed the research priority perceptions of two groups; one comprised of AAC users and one comprised of AAC facilitators. The research priorities analyzed were set by the United States-based National Institute of Deafness and other Communication Disorders.	group members stressed the importance of preparing people who use AAC to succeed in friendships, dating, and finding jobs; improving service delivery of their devices; improving technology in both high and low tech; increasing public awareness of AAC; improving methods of teaching reading skills to people with AAC; improving AAC communications training for all healthcare professionals.	must be aware of both the perception of AAC users and their facilitators when it comes to their devices. Also, knowing which areas are recommended for future research will aid the nurse in identifying holes in the AAC systems.
Ried, S., Strong, G., Wright, L.,	Review of	Discusses	Developme	

Wood, A., Goldman, A., & Bogen, D. (1995). Computers, assistive devices, and augmentative communication aids: Technology for social inclusion. *Journal of Head Trauma Rehabilitation, 10*(5), 80-90.	literature	recent legislation that has made assistive technology more readily obtainable for children	nt of a needs assessment that focuses on the family, environmen t, and social roles of children with TBI.	
Sigafoos, J. (2010). Introduction to the special issue on augmentative and alternative communication. *Journal of Developmental & Physical Disabilities, 22*(2), 101-104. doi:10.1007/s10882-010-9197-x				
Wallace, S. E. (2010). AAC use by people with TBI: Affects of cognitive impairments. *Perspectives on Augmentative & Alternative Communication, 19*(3), 79-86. doi:10.1044/aac19.3.79	Review of literature	Evaluates the use of AAC in TBI based on the evolution of AAC use during the recovery process, the effect of cognitive impairments on multimodal communication, appropriate message representation, and difficulties with AAC navigation resulting from cognitive impairments.	Suggestions for future research related to survivors of TBI and AAC use.	

REFERENCES

American Speech-Language Hearing Association. (1991). Report: augmentative and alternative communication. *ASHA*. 31, 107-100.

American Speech-Language-Hearing Association. (2005). Roles and responsibilities of speech language pathologists with respect to augmentative and alternative communication.

Balandin S., Hemsley B., Sigafoos J., & Green V. (2007). Communicating with nurses: the experiences of 10 adults with cerebral palsy and complex communication needs. *Applied Nursing Research* 20, 56-62.

Beukelman D.R. & Mirenda P. (2005). Augmentative and alternative communication: supporting children and adults with complex communication needs. 3rd edn. Paul H. Brookes Publishing, Baltimore, MD.

Beukelman, D.R., Yorkston, K.M., Reichle, J. (2000). Augmentative and alternative communication for adults with acquired neurological disorders. Baltimore, MD: Paul H. Brookes Publishing Co.

Burke, R., Beukelman, D. R., & Hux, K. (2004). Accuracy, efficiency and preferences of survivors of traumatic brain injury when using three organization strategies to retrieve words. *Brain Injury, 18*(5), 497-507.

Burke, R., Wassink, K., Martin, T., & Seikel, A. J. (2008). Message retrieval for survivors of traumatic brain injury. *AAC: Augmentative & Alternative Communication, 24*(1), 56-63.

Campbell, L., Balandin, S., & Togher, L. (2002). Augmentative and alternative communication use by people with traumatic brain injury: A review. *Advances in Speech Language Pathology, 4*(2), 89-94.

Downing, J.E. (1999). *Teaching communication skills to students with severe disabilities.* Baltimore:Brookes.

Fager, S., Hux, K., Beukelman, D., & Karantounis, R. (2006). Augmentative and alternative communication use and acceptance by adults with traumatic brain injury. *AAC: Augmentative & Alternative Communication, 22*(1), 37-47.

Finke, E. H., Light, J., & Kitko, L. (2008). A systematic review of the effectiveness of nurse communication with patients with complex communication needs with a focus on the use of augmentative and alternative communication. *Journal of Clinical Nursing, 17*(16), 2102-2115.

Fried-Oken, M., & Doyle, M. (1992). Language representation for the augmentative and alternative communication of adults with traumatic brain injury. *Journal of Head Trauma Rehabilitation, 7*(3), 59-69.

Hemsley B., Sigafoos J., Forbes R., Taylor C., Green V.A., Parmenter T. (2001). Nursing the patient with severe communication impairment. Journal of Advanced Nursing (35), 827 835.

Hoeman, S.P. (2008). *Rehabilitation nursing; prevention, intervention, and outcomes.* Naples, ME: Health Systems Consultations, Int.

Huer, M.B. (2003). Individuals from diverse cultural and ethnic backgrounds may perceive graphic sysmbols differently: Response to Nigam. *Augmentative and Alternative Communication, 19*, 137-140.

Hux, K., Burke, R., Elliot, J., Ross, M., & Hrnicek, T. (2001). Communication interaction differences between natural speakers and AAC users with traumatic brain injury. *Journal of Medical Speech-Language Pathology, 9*(1), 71-86.

Kreutzer, J.S., Wehman, P.H. (1991). *Cognitive rehabilitation for persons with traumatic brain injury.* Paul H. Brooks Publishing Company. Baltimore:MD.

Lund, S. K., & Light, J. (2007). Long-term outcomes for individuals who use augmentative and alternative communication: Part II - communicative interaction. *AAC: Augmentative & Alternative Communication, 23*(1), 1-15.

Lund, S. K., & Light, J. (2007). Long-term outcomes for individuals who use augmentative and alternative communication: Part III -- contributing factors. *AAC: Augmentative & Alternative Communication, 23*(4), 323-335.

Lund, S. K., & Light, J. (2006). Long-term outcomes for individuals who use augmentative and alternative communication: Part I -- what is a "good" outcome? *AAC: Augmentative & Alternative Communication, 22*(4), 284-299.

Minardi, R., & Cavatorta, S. (2003). Integrated speech therapy interventions in rehabilitation after traumatic brain injury. *Europa Medicophysica, 39*(3), 153-159.

O'Keefe, B., Kozak, N. B., & Schuller, R. (2007). Research priorities in augmentative and alternative communication as identified by people who use AAC and their facilitators. *AAC: Augmentative & Alternative Communication, 23*(1), 89-96.

Raghavendra, P., Bornman, J., Granlund, M., & Björck-Åkesson, E. (2007). The world health organization's international classification of functioning, disability and health: Implications for clinical and research practice in the field of augmentative and alternative communication. *AAC: Augmentative & Alternative Communication, 23*(4), 349-361.

Ried, S., Strong, G., Wright, L., Wood, A., Goldman, A., & Bogen, D. (1995). Computers, assistive devices, and augmentative communication aids: Technology for social inclusion. *Journal of Head Trauma Rehabilitation, 10*(5), 80-90.

Smith, M. M., & Connolly, I. (2008). Roles of aided communication: Perspectives of adults who use AAC. *Disability & Rehabilitation: Assistive Technology, 3*(5), 260-273.

Wallace, S. E. (2010). AAC use by people with TBI: Affects of cognitive impairments.

Perspectives on Augmentative & Alternative Communication, 19(3), 79-86.