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# Assessment of Mild Traumatic Brain Injury By Advanced Practice Registered Nurses

Mary Lou Garey

Otterbein University, [mgarey@otterbein.edu](mailto:mgarey@otterbein.edu)

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**ASSESSMENT OF MILD TRAUMATIC BRAIN INJURY**

**BY ADVANCED PRACTICE REGISTERED NURSES**

**Presented in Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Nursing Practice**

by

**Mary Lou Garey, MSN  
The Graduate School  
Otterbein University  
2014**

**Final Project Committee:**

\_\_\_\_\_  
**John D. Chovan, PhD, DNP; Advisor**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Barbara Cornett, PhD**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Kirk Hummer, MBA, DNP**

\_\_\_\_\_  
**Date**

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Mary Lou Garey, MSN

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# ASSESSMENT OF MILD TRAUMATIC BRAIN INJURY

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## ASSESSMENT OF MILD TRAUMATIC BRAIN INJURY

### ABSTRACT

The purpose of this project was to evaluate the knowledge about assessing mild traumatic brain injured patient by the advanced practice registered nurse (APRN) as reflected in the Centers for Disease Control (CDC) Acute Concussion Evaluation (ACE) Tool Kit. A descriptive cross-sectional survey research design was used to assess knowledge about the evidenced based assessment of APRNs practicing in an urgent care setting as established by the CDC for the evaluation of acute concussion. Specifically the history and physical assessment practices of the APRNs for the mild traumatic brain injured patient (MTBI) were evaluated in relationship to the CDC / ACE standards. The objective was to assess the staff of APRNs in an urgent care clinic when assessing MTBI in relation to the CDC standards. The results showed that many of the APRNs were not familiar with the ACD/ACE standards in assessing the mildly traumatic brain injured patient. The APRNs did not follow a consistent assessment tool that included standards of subtle cognitive and physical symptoms seen in the MTBI patient. Recommendations for increasing their praxis with assessing mild traumatic brain injury were made.

## ASSESSMENT OF MILD TRAUMATIC BRAIN INJURY

### **ASSESSMENT OF MILD TRAUMATIC BRAIN INJURY**

#### **BY ADVANCED PRACTICE REGISTERED NURSE**

Mild traumatic brain injury (MTBI), or acute concussion, is a major public health problem. Neurological symptoms can resolve quickly, or linger for weeks to months. More than 50% of the persons with MTBI will develop symptoms, and approximately 15% will develop persistent disabling problems (Rockhill, et al., 2012). Often the individual with MTBI may not immediately seek medical attention due to the mildness of symptoms and a lack of awareness about MTBI. Weeks to months after injury they are often evaluated by their primary care provider with persistent, vague symptomatic complaints. These can include headaches, sleep disturbances, disorders of balance, cognitive impairments, fatigue, and mood disorders. Persistent post-concussive symptoms can result in functional disability, stress, and time away from work or school (Bay, Sikorskii & Gao, 2009; Hylin et al., 2013).

The proper identification for risk of secondary complications, establishment of pharmacological and rehabilitative intervention, and planned evaluation of progression of recovery are imperative. For those who seek medical attention, it is rarely with a neurologist, but with an urgent care or primary care provider who lacks specific training to assess for MTBI.

The adult with MTBI may evade appropriate diagnosis. Often this is due to lack of awareness of the need to seek help. Despite an expectation that full recovery will occur within weeks of the MTBI, a sizable minority continue to experience persistent symptoms and have difficulty with turning to work, school or play (Bazarian, Blyth, Mookerjee, He, & McDermott, 2110). With a systematic approach, the MTBI patient can be assured appropriate diagnosis and thus intervention. With appropriate education, symptom

intervention and therapy by the APRN, the MTBI patient could limit the duration and intensity of symptoms.

### **Project Mission / Vision**

The mission of this project was a first step to change MTBI assessment practice by APRNs. A survey of APRNs who were practicing in an urgent care setting in the central Ohio area assessed practice and identified gaps.

The vision of this project was to establish a systematic process for evaluating and thus transforming the assessment of the mildly traumatic brain injured patient and their families, as recommended by evidence-based practice in the CDC Heads/Up ACE program and offering recommendations for APRNs to improve their practice with this patient population.

### **Background**

Every year, 1.4 million traumatic brain injuries (TBIs) occur either as an isolated injury or associated with other injuries (Paul, Xu, Wald, & Coronado, 2010), with an estimated economic cost of approximately \$17 million (Coronado, McGuire, Paul, Sugerman, & Pearson, 2012). For those requiring acute care, cost can be up to \$98,000 per patient with an average hospital stay of 22 days. Inpatient rehabilitation costs are estimated at \$43,000 per patient with an average 32-day length of stay (Carroll, Cochran, Guse, & Wang, 2012).

Approximately 1.6 – 3.8 million sports- and recreation-related MTBIs occur in the United States each year (Coronado, McGuire, Paul, Sugerman, & Pearson, 2012). Individuals with a history of concussion are at an increased risk of a second concussion with a lesser impact than the first time head injured patient (Hylin et al., 2012). Consecutive head injuries also prolong the expected recovery period of the patient, with a greater predominance of post-concussion symptoms.

The onset and duration of symptoms are highly personalized for the MTBI patient. They may resolve immediately after impact, or may linger for weeks, months or longer. With rapid diagnosis and appropriate management, most MTBI patients can eventually recover and return to their pre-injury level of function. Early detection and education focused on managing the symptoms helps the injured persons and reduces the likelihood of chronic difficulties (Bell et al., 2008). The best chance of success is to establish a plan of evaluation and care using best practices in conjunction with neurophysiological and neuropsychological specialties (Blyth, Scott, Bond, & Paul, 2012). The timeliness of goal directed services is required from the onset of injury (Asch et al., 2006).

To assist in providing a thorough assessment of the head injured patient, the Center for Disease Control (CDC) developed the Heads Up program. This is a tailored process to assess and evaluate the MTBI patient. Heads Up incorporates the Acute Concussion Evaluation (ACE) tool kit, which includes questions for the adult victim, and a separate format for the school age patient (CDC, 2011). The material provides physicians and advanced practice registered nurses with an evidence-based protocol to evaluate and diagnose patients with potential MTBI (Dean, O'Neill, & Sterr, 2012). The kit also provided guidance with ongoing management and recovery of patients.

### **Significance of Problem to Nursing and Healthcare**

An MTBI can have a major impact on the physical and mental health of patients with implications for the nursing profession and for healthcare overall, particularly with respect to costs. The MTBI patient often exhibits significant depressive symptoms during their recovery process (Vani et al., 2011). It is not uncommon for excessive drinking and self-medication to attempt to alleviate emotional symptoms, increasing the risk for injury or self-harm. The patient and family members who support them must be evaluated for their strengths, limitations, and needs to determine their knowledge deficiencies. Each patient



must be approached with an individualized plan of care that considers their spirituality, beliefs, and resources, to assure that their dignity is maintained (McBride et al., 2008).

Recognition of the emotional changes should be discussed openly with the patient.

Education about both pharmacological and psychological interventions should be delivered, as well as about providing ease of access for the patient (Vani et al., 2011).

Heads Up and the ACE tool kit standardize the assessment of a patient who has suffered a blow or shock to the head. This systematic assessment can identify those at risk for MTBI, thus enabling the provider to escalate care earlier than later in the course of the injury. It also can assist in educating the patient and family members about when they should seek additional medical care.

Because many patients are seen in the urgent care clinic by APRNs, this problem is significant to the nursing practice. An evaluation of current knowledge and practices will inform the development of educational programs for areas of knowledge weakness and resources to for improved assessment, diagnosis and follow up care.

### **Theoretical Framework**

The theoretical framework for the project is Benner's model of skill acquisition as a nurse moves from novice to expert (Benner, 1984). Benner's model posits that expert nurses develop skills and understanding of patient care over time through a sound educational base as well as a multitude of experiences. This project evaluated the extent of knowledge with the advanced-level practitioners in this clinical setting through individual survey on applying the standards of care detailed by the CDC, and applying the Heads Up / ACE toolkit as the standard of care for assessment.

### **Statement of the Problem**

Individuals with head injuries require specific assessment for mild traumatic brain injuries. Typical curricula used to prepare APRNs for practice in primary care may not

include assessing patients on mild traumatic brain injuries, so the level of expertise is unknown.

### **Methods**

*Project Design.* A descriptive cross sectional survey design was used. Otterbein University Institutional Review Board approved the project. The participating agency did not require IRB approval.

*Sample.* The participants were a convenience sample of APRNs working in an urgent care clinic in central Ohio. Participation was voluntary. A group email was sent to prospective participants requesting evaluation of their knowledge and assessment of a MTBI patient according to the CDC / ACE tool. Because no random selection or random assignment of subjects to groups was done, the results of this study are not generalizable to a larger population. Demographic information was collected, however, to give the reader a flavor of the characteristics of the subjects who responded to aid the reader with decisions regarding the applicability of these results to other groups.

*Instrumentation.* A questionnaire that comprised both demographic and assessment items was the instrumentation for the study (Appendix A). The demographics included age, sex, ethnicity, education level, years as a staff nurse, years as an advanced practice registered nurse, and primary area of practice. For the practice component, the APRNs were surveyed about their practice in assessing MTBI patients. Portions of this part of the instrument were used in an earlier study to evaluate the knowledge of emergency department nursing staff in the acute care of the MTBI patient. The original survey evaluated the discharge instructions in acute care / emergency setting (Bay, 2011). This project is translating that methodology to the primary care setting. Written permission was obtained to duplicate portions of the published survey tool.

The questionnaire evaluated physical, cognitive, emotional, and sleep indicators. Physical indicators included headache, nausea/vomiting, balance difficulties/dizziness, fatigue, audible and visual sensitivity, and numbness or tingling. Cognitive indicators include mental slowness / foggy, retrograde or anterograde amnesia, loss of consciousness at time of event, confusion, forgetfulness and difficulty with concentration or memory. Emotional indicators included irritability, sadness, increased emotions or irritability. Sleep indicators included persistent drowsiness, extremes of more or less sleep than pre-injury baseline, or difficulty in falling asleep.

Face validity was assured by the project's advisor. Because the objective was translational, the need to assure that the instrumentation reliably collected valid data was outside of the scope of this project.

*Data Collection.* An online questionnaire using Survey Monkey® was developed to collect the data. The data were entered onto a spreadsheet and confirmed against the raw data.

*Data Analysis.* Descriptive statistics were calculated for each item. When the data were at the ratio or interval level, means were calculated. When the data were categorical, frequencies were calculated.

### **Barriers**

The major barrier to this project was the potential lack of participation of the sample APRNs either due to time limitations or lack of interest. To motivate participation, a \$25 restaurant gift card was offered to a randomly-selected participant. Because the questionnaire was distributed electronically by a survey management tool, the names of participants were not associated in any way with the responses.

This project was intended to translate a part of the CDC / ACE Toolkit to the practice of a group of APRNs working in a convenient care setting and to describe the process. The

limited sample size contravenes underlying assumptions of inferential statistics. This project are not intended to be generalized to a larger population.

### **Benefits of the Project to Practice**

The project benefits the current and future patients of this agency, and the APRNs who provide clinical care. Addressing the needs of the MTBI patient with a structured system such as provided by the CDC / ACE tools assures effective identification and thus timely interventions.

### **Results**

Nine APRNs completed the questionnaire. Participant demographics were 89% female, with a mean age 45.67 years. The participants had an average of 22.28 years as a nurse, with average of 14.25 years as an advanced practice registered nurse. Eight were masters degree prepared APRNs and one held a doctorate in nursing. The average length at current position was 11.5 years.

The results of the knowledge and practice questionnaire appear in Appendix B. When questioning the ease of access and quality of an urgent care system tools for assessing MTBI, 44% stated that they were aware of an available standard assessment and evaluation tool. Of this group, 56% stated they had some prior knowledge of the CDC / ACE tool prior to this survey, but did not utilize it in their practice. When questioned if they felt they had limitations to assessment of MTBI, 33% agreed, further adding: (1) standardized evaluation is most likely not up to date on current research, (2) inconsistent use of standardized tools among the staff, and (3) no set tool was recognized as being available to other staff members.

The majority of the respondents (96%) stated that they frequently or always assessed documentation of physical indicators, with the exception of balance disturbance, sensitivity

to light and/or noise. Most respondents (89%) also stated that they always or frequently questioned about seizure activity, but the remaining 11% rarely asked.

Most respondents (89 % – 100%) frequently or always asked regarding only some of the physical indicators: amnesia, loss of consciousness, confusion, and memory loss. Response summaries showed that 11% stated they sometimes or rarely asked mental clarity or fogginess, or about perception of feelings of slowness.

Responses showed a less than 65% response for always or frequently assessing for all emotional and sleep indicators. Responses showed that 22% rarely ask about change in sleeping patterns or increase in emotions. Also, 33% rarely asked about feelings of sadness, and 33% stated they sometimes asked about irritability.

Assessment and documentation of personal history showed disparity in consistency with CDC / ACE standards. All of the respondents stated they asked regarding history of previous concussion, but 67% failed to ask about history of ADHD or other developmental disorders, 56% did not ask about history of anxiety, depression or sleep disorders, and 33% failed to ask about previous psychiatric disorders.

### **Discussion**

Findings showed that many of the APRNs were not familiar with the CDC / ACE standards in assessing mildly traumatic brain injured patient. The APRNs did not follow a consistent assessment tool that included the current standards of subtle cognitive and physical symptoms seen in the MTBI patient. Those surveyed stated that they followed what have historically been the standard for assessment of symptoms in MTBI. They did not feel a standard format was consistently followed, and that they were subpar according to current standards in care and treatment.

Additional emphasis on past history regarding emotional, developmental or social disorders also proves to be an area of weakness when not using a standardized tool.

Previous history of depression, suicidal thoughts or psychiatric care needs to be investigated during the initial assessment as this can also be an indicator of the MTBI patient may need additional support and care.

### **Recommendations**

The majority of the respondents did not have a complete understanding of MTBI according to the CDC / ACE standards. It is clear that there is a need for a heightened awareness, and a tool for a consistent assessment and evaluation of the MTBI are needed. Educational reinforcement of the current standards of care as well as other resources available with current standards would be a useful resource for the APRNs. In response to this study, an educational tool was developed in effort to expand the knowledge base of the APRNs in the assessment and care of the MTBI patient in accordance to the CDC / ACE standards (see Appendix C). This tool was designed to introduce the important concepts of MTBI to the APRNs and the assessment techniques of the CDC / ACE standards. It also emphasized the emotional domain that was identified as the domain that showed the most knowledge and practice deficit. The standards included a checklist that can be duplicated in the practice and distributed for completion by the APRNs and subsequently placed in the patient chart (Appendix C). This education was provided to the convenient care agency by sending it via email to the same distribution list used to recruit subjects.

### **Limitations**

Although the response rate was low with 9 participants, the results provide a small window into the knowledge of this sample of APRNs regarding MTBI. The answers received may reflect a higher than average awareness of current guidelines regarding acute head injuries due to previous exposure that was in addition to their formal training as nurse practitioners. The actual awareness of the CDC / ACE guidelines among APRNs in general may be completely different (higher or lower) than reported in this study.

**Future Research**

Further studies could include following up on the practice change that occurs following the completion of the educational intervention and use of the ACE guidelines by the subject APRNs, and translating this study to other similar urgent care practices, to retail health clinics, and to other APRN practices in which the risk for MTBI should be evaluated.

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**Appendix A: Instrumentation****Demographics**

<b>What was your age at your last birthday (in years)?</b>	
<b>What is your sexual gender?</b>	
<b>How would you describe your ethnicity?</b>	
<b>What is your highest level of education in nursing?</b>	
<b>How long have you been practicing as an APRN?</b>	
<b>How long have you been in your current position?</b>	
<b>How many hours per week do you work as an APRN?</b>	
<b>How many total years have you been a nurse? (Undergraduate and graduate)</b>	
<b>What is your primary patient population seen?(Medical / Emergency Care / Trauma)</b>	

**Knowledge & Practice**

**How often are you assessing and documenting the following symptoms when evaluating a patient suspected of having a mild traumatic brain injury?**

Symptom	Always	Frequently	Sometimes	Rarely	Never
Trouble falling asleep	1	2	3	4	5
Change in sleeping patterns	1	2	3	4	5
Drowsiness	1	2	3	4	5
Nervousness	1	2	3	4	5
More emotional	1	2	3	4	5
Sadness	1	2	3	4	5
Irritability	1	2	3	4	5
Feeling slower	1	2	3	4	5
Mentally foggy	1	2	3	4	5
Difficulty with concentration	1	2	3	4	5
Difficulty with remembering	1	2	3	4	5
Amnesia before the event	1	2	3	4	5
Amnesia after the event	1	2	3	4	5
Dazed	1	2	3	4	5
Forgetful	1	2	3	4	5
Confused	1	2	3	4	5
Loss of consciousness with event	1	2	3	4	5
Fatigue	1	2	3	4	5
Sensitivity to noise	1	2	3	4	5
Sensitivity to light	1	2	3	4	5
Balance changes	1	2	3	4	5
Numbness or tingling	1	2	3	4	5
Dizziness	1	2	3	4	5
Seizures	1	2	3	4	5
Visual disturbances	1	2	3	4	5
Nausea and vomiting	1	2	3	4	5
Headache	1	2	3	4	5

**Does your assessment and documentation include evaluation of any of the following factors?**

Previous concussion	Yes	No
History of headaches	Yes	No
History of learning disabilities	Yes	No
History of ADHD	Yes	No
History of any other developmental disorder	Yes	No
History of anxiety	Yes	No
History of depression	Yes	No
History of sleep disorder	Yes	No
History of other psychiatric disorder	Yes	No

Does your agency use a standardized assessment and evaluation tool for patients presenting with mild head injuries

	Yes	No
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Are you familiar with the Center for Disease control and Prevention Acute Concussion Evaluation (ACE) tool?

	Yes	No
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Do you feel your practice has limitations in regards to the assessment and evaluation of the mild head injury patient?

	Yes	No
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If yes, please identify the limitations.

Any additional comments:

**Appendix B: Results**

Table	Symptom	Always		Frequently		Sometimes		Rarely		Never	
		n	%	n	%	n	%	n	%	n	%
P	Fatigue	5	56%	2	22%	2	22%	0	0%	0	0%
P	Sensitivity to noise	4	44%	2	22%	2	22%	1	11%	0	0%
P	Sensitivity to light	5	56%	1	11%	2	22%	1	11%	0	0%
P	Balance changes	6	67%	2	22%	0	0%	1	11%	0	0%
P	Numbness or tingling	7	78%	2	22%	0	0%	0	0%	0	0%
P	Dizziness	7	78%	2	22%	0	0%	0	0%	0	0%
P	Seizures	7	78%	1	11%	0	0%	1	11%	0	0%
P	Visual disturbances	8	89%	1	11%	0	0%	0	0%	0	0%
P	Nausea and / or vomiting	8	89%	1	11%	0	0%	0	0%	0	0%
P	Headache	8	89%	1	11%	0	0%	0	0%	0	0%
C	Feeling slower	4	44%	0	0%	1	11%	1	11%	0	0%
C	Mentally foggy	7	78%	1	11%	0	0%	1	11%	0	0%
C	Difficulty with concentration	6	67%	2	22%	1	11%	0	0%	0	0%
C	Difficulty with remembering	7	78%	1	11%	1	11%	0	0%	0	0%
C	Amnesia before the event	7	78%	2	22%	0	0%	0	0%	0	0%
C	Amnesia after the event	8	89%	1	11%	0	0%	0	0%	0	0%
C	Dazed	5	56%	4	44%	0	0%	0	0%	0	0%
C	Forgetful	5	56%	2	22%	2	22%	0	0%	0	0%
C	Confused	8	89%	1	11%	0	0%	0	0%	0	0%
C	Loss of consciousness with the event	8	89%	1	11%	0	0%	0	0%	0	0%
S	Trouble falling asleep	2	22%	2	22%	2	22%	3	33%	0	0%
S	Change in sleeping patterns	2	22%	4	44%	1	11%	2	22%	0	0%
S	Drowsiness	7	78%	2	22%	0	0%	0	0%	0	0%
E	Nervousness	4	44%	0	0%	3	33%	1	11%	0	0%
E	More emotional	3	33%	3	33%	1	11%	2	22%	0	0%
E	Sadness	0	0%	4	44%	2	22%	3	33%	0	0%
E	Irritability	3	33%	3	33%	3	33%	0	0%	0	0%

Domain: P = Physical, C = Cognitive, S = Sleep, E = Emotional

Table		Yes		No	
Domain	History	<i>n</i>	%	<i>n</i>	%
P	Hx of concussion	9	100%	0	0%
P	Hx of headaches	5	56%	4	44%
C	Hx of learning disabilities	2	22%	7	78%
C	Hx of ADHD	3	33%	6	67%
C	Hx of any other developmental disorder	3	33%	6	67%
E	Hx of anxiety	4	44%	5	56%
E	Hx of depression	5	56%	4	44%
S	Hx of sleep disorder	4	44%	5	56%
C/E	Hx of other psychiatric disorder	6	67%	3	33%

Domain: P = Physical, C = Cognitive, S = Sleep, E = Emotional