Community awareness and perception of concussions in central Minnesota

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A cross-sectional convenience questionnaire study was conducted among emergency room (ER) patients and visitors from February 2016 to March 2018. A total of 495 valid respondents were obtained. Approximately 35% had experienced a concussion or mTBI (mild Traumatic Brain Injury) prior to the study. Of these, only 65% had sought medical care, most going to the ER. Having had a prior mTBI did not make a significant difference with regard to using a helmet while bicycling or skateboarding. Data from our more age-diverse population was similar to that of primarily younger age studies.

Background
Between 1.6 and 3.8 million adults sustain traumatic brain injury (TBI) yearly in the United States.1 About 2.8 million people of all ages seek care in the United States emergency departments annually for traumatic brain injury (TBI).2 In 2013, that included about 640,000 children 14 years or younger.3 Traumatic brain injury, while difficult to initially categorize, is, for purposes of triage, frequently separated into levels of mild (mTBI), moderate, or severe, depending on the presenting symptoms and signs.4 The vast majority of these patients are considered as having a “mild concussion” or mild traumatic brain injury,5 and are discharged home after their evaluations. However, mTBI can represent a plurality of cases with continued disability.

In order to present for medical care, the patient or another person in proximity must perceive that brain injury has occurred and see that medical evaluation is provided. Recent studies suggest that there are many misconceptions about concussions.6-8 For example, a recent study that anonymously surveyed 454 high school athletes found that 65% admitted having their “bell rung,” but only 38% reported ever having a concussion.9

The purpose of this study was to determine the following: 1) the prevalence of head injury in our sample population, which constituted a broader segment of age groups than just those in youth sports, 2) common perceptions of concussions, 3) some of the actions taken by individuals to reduce the risk of head injury, and 4) where care had been sought after a head injury.

Objective
Our study sought cross-sectional data regarding the prevalence of concussions among central Minnesota emergency room (ER) visitors, the rate at which medical attention had been sought, and the participant’s knowledge and personal experience of concussion symptoms, pathophysiology, care, and prevention.

Methods
A non-randomized convenience sample of data from patients and visitors of a regional level II trauma center was collected sporadically from February 2016 to March 2018. Trained volunteers in the ER were instructed to seek out patients and visitors in patient rooms and in the waiting room who were older than 10 years of age and were interested in taking a survey about concussions. The survey consisted of 29 questions, the first seven of which consisted of demographic data, seven concerning knowledge about concussion, three about confidence of knowing how to handle a concussion, and the remainder about whether the individual had a concussion, what they did about it, and what they would do in the future. The data was entered directly on computer tablets by the trained volunteers, and tabulated on a Survey Monkey website.
Results
A total of 495 responses were judged to be substantially complete and valid. The median age for respondents was 39 years. Median education was some college. The majority (62%) were female; 85% were designated as “white”; 45% were married and 11% were single; median income was $50,000. Half claimed residence in St. Cloud or surrounding communities.

Among the respondents, 35% initially thought they had sustained a concussion at some time in the past, while 56% thought they hadn’t, and 9% weren’t sure. There was no significant variation in incidence by age (p=1 by chi square). Of those who said “No, I never had a concussion,” 5.9% changed their minds to “yes” by the end of the questionnaire. Of those who said “Yes, I had a concussion,” 2.3% changed their minds to “no.” Of those who were not sure, an approximately equal amount said “yes” or “no” after the session.

When all respondents were asked if they thought it was worth their time and money to see a physician if they had sustained a concussion, 94% selected yes, but of the respondents that had sustained concussion symptoms in the past, only 65% had sought medical care, and 35% had not. Of those individuals who previously sought medical care, 58% had gone to the ER (Fig.1), while 18% went to an urgent care center, and 21% went to their primary care provider. The highest selected reason (55%) for not seeking medical attention was that the symptoms didn’t bother them much or symptoms went away quickly. When respondents were asked what they would do if they sustained a concussion in the future, 51% said they would go to the ER for care, 28% would go to some form of urgent care, and 20% said they would go to their primary care provider. When respondents were asked if they thought they would know what to do if they sustained a concussion, 65% selected yes, while 23% selected not sure, and 13% selected no.

Of the seven questions on knowledge of mTBI, the two that were answered incorrectly most often were: “Healing from an immediate second blow has the same...
long term effect as having two concussions years apart.” (49% correct), and “A blow is necessary for concussion to occur.” (62% correct). In our data, up to 22% of respondents mistakenly considered unrelated symptoms, such as constipation, difficulty swallowing, or fever might be due to mTBI. Tellingly, overall sources of the respondents’ information were: 50% from other people, 40% from the internet. Overall, a majority (63%) correctly identified that mood or personality changes could be a result of mTBI.

Finally, overall, 36.3% never wore a helmet (Fig 2) which constituted 58% of those who did use a bike or skateboard, and this was applicable. Many who avoided wearing helmets cited reasons such as that they biked cautiously enough, or didn’t like the way the helmet looked or fitted. Even among our respondents who knew they had a previous mTBI, only 37% sometimes or always wore a helmet while biking or skateboarding (versus 31% of those not reporting a history of mTBI - not significantly different by chi square - p>0.9986); only 18% claimed to always wear a helmet.

**Discussion**

Since our study was not randomized and didn't use proportional sampling techniques, the generalization of our data to other populations is limited. However, there is adequate data to document deficits in middle class ER visitors in their ability to correctly identify mTBI symptoms. The accuracy of athletes correctly identifying symptoms of mTBI in the past has, at best, reached levels of only approximately 62%. This level was reached even if the participant was a professional or college athlete, who had a previous mTBI, or had received formal concussion training. In fact, the higher the level of achievement in sport, the lower the accuracy of identifying mTBI correctly. Even when a student athlete is aware of an mTBI, they might not report it or the coach might not be aware of it. Previously, among youth sport coaches, only a maximum of 61.5% correctly identified symptoms of mTBI. High school football coaches and professional educators have tended to be more knowledgeable about symptoms of mTBI. Our data suggest that that lack of knowledge extends beyond the young athlete into older age groups. Even among coaching professionals and parents, the areas of mental illness, cognitive, and social-emotional consequences are less likely to be identified with mTBI. About a third of our respondents did not see emotional or behavior changes as possible symptoms of mTBI. It has been previously documented that post-concussion syndrome might be missed in patients with depression.

As with other studies, having previous mTBI did not appear to be associated with increased TBI-related knowledge among our respondents. Also, even when acute mTBI was recognized, it wasn’t always considered serious enough to seek medical care. Our figure of only 65% of participants with mTBI symptoms seeking care is consistent with previous studies in high school football players, where only 47% reported their injury. Even sustaining a head injury did not always motivate an individual to wear a helmet when appropriate.

**Conclusion**

The majority of individuals visiting the ER believe that concussions are serious injuries, but this study supports previous assertions that head injuries are vastly underreported. When individuals had what they believed were concussion symptoms, only about two-thirds sought medical care, most going to the emergency room. The data suggest that while there is an opportunity for education to improve current TBI knowledge, actual systematic behavior change for prevention and reporting of concussions will require more than just an increase in public knowledge.

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**REFERENCES**