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Factors Influencing Primary Care Follow-up after Pediatric Mild Traumatic Brain Injury

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Abstract

Objective: To identify socio-economic, demographic and caregiver factors associated with children attending primary care provider (PCP) follow-up after emergency department (ED) evaluation for mild traumatic brain injury (mTBI).

Setting: Pediatric trauma center ED

Participants: Children 8–18 years old sustaining mTBI < 48 hours prior to an ED visit. Mean age of the 183 participants was 12 years with no significant differences between those who attended follow-up and those who did not in race, ethnicity, insurance provider or PCP office setting.

Design: Thirty-day longitudinal cohort study

Main Measures: Insurance type, PCP practice setting, and a caregiver attitude survey (CAS) regarding mTBI recovery and management (5 questions each scored on a 5-point Likert scale). The primary outcome was attending a PCP follow-up visit within one month of injury.

Results: Females were more likely than males to attend PCP follow-up (aOR 2.27 [95% CI: 1.00–5.18]). Increasing scores on the CAS indicating greater concerns about recovery were significantly associated with attending PCP follow-up (aOR: 1.12 per unit increase in composite score [95% CI: 1.02–1.23]). No other socio-economic, demographic or injury characteristics were associated with attending PCP follow-up.

Conclusions: ED counseling regarding PCP follow-up of mTBI should stress the importance of follow-up care to monitor recovery and identify presence of lingering symptoms.

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INTRODUCTION

Approximately 700–1400 per 100,000 children and adolescents visit US emergency departments (EDs) for evaluation of mild traumatic brain injuries (mTBI) annually with visits rising approximately 8% per year between 2006–2012.¹ This amounts to over 640,000 ED visits annually by children 0–14 years old.² While this observed increase may have been driven by increased vigilance and efforts to refer children with suspected mTBI for prompt evaluation rather than an actual increased incidence of mTBI, nonetheless, it has resulted in a sizeable spike in EDs visits.³ While ED evaluation is useful for excluding more serious injuries, 20–30% of children with mTBI remain symptomatic for a month or more, requiring care after ED discharge.^{4,5} Clinicians' ability to predict persistent symptoms is relatively imprecise.⁶ Guidelines advocate that children should not return to sports until symptom-free⁷ and may require special academic accommodations.⁸ For these reasons, monitoring of recovery in primary care settings is commonly recommended by ED providers.^{9,10}

However, primary care follow-up for concussed children after ED discharge is variable and often infrequent.^{11–13} Follow-up may depend on insurance status, access to primary care providers (PCP) and discharge recommendations.^{1,14,15} Other factors that influence attending follow-up appointments remain ill-defined in children with mTBI initially presenting to the ED.¹³

The growing incidence of mTBIs,^{16,17} the significant proportion of children experiencing prolonged symptoms, and the inability to determine precisely who is at risk for persistent symptoms at the time of injury underscore the importance of identifying factors that promote or prevent follow-up after receiving ED care for mTBIs. This investigation's objective was to identify key socio-economic and demographic factors and caregiver attitudes associated with obtaining PCP follow-up after initial ED evaluation. We hypothesized that commercial insurance and a specifically identified PCP would be associated with greater attendance at outpatient follow-up after ED discharge for initial care of mTBI. We also hypothesized that parental attitudes that mTBI is a serious injury, likely to involve protracted recovery and significantly interfere with academic activity, and likely to require close primary care management would be associated with greater attendance at outpatient follow-up. Other possible contributing factors such as caregiver education, primary language, review of standardized aftercare instructions (ACIs) and familiarity with concussion legislation were also explored.

METHODS

Study Design

From July 23, 2015 to February 22, 2017, we performed an observational cohort study of a convenience sample of children ages 8 to 18 years who sustained an mTBI in the preceding 48 hours and presented to a major metropolitan pediatric ED. Mild TBI was defined as a traumatically induced physiological disruption of brain function manifested by at least one of the following: loss of consciousness <30 minutes; any loss of memory for events immediately before or after the accident; any alteration in mental state at the time of the accident (e.g., feeling dazed, disoriented, or confused); and focal neurological deficit(s) that

may or may not be transient; an initial Glasgow Coma Scale (GCS) of 13–15; and posttraumatic amnesia (PTA) not greater than 24 hours.¹⁸ Participants also included one parent or legal guardian 18–85 years old accompanying eligible children at the ED visit. Patients presenting with complaints of head injury or mTBI symptoms were screened for enrollment 16 hours/day, 7 days/week by professional research assistants (PRAs) who obtained consent and administered all study procedures. All participants received identical standardized ED ACIs co-authored by the principal investigator and director of the institution's Concussion Program including recommendations for PCP follow-up within 2–3 days of the ED visit and indications for specialist referral (see attached document, Supplemental Digital Content 1, for an example of the ACIs). Participants were contacted by telephone 7 and 30 days after injury to complete study procedures including gathering data related to PCP follow-up and persistent symptoms. Participants were considered lost to follow-up after 3 failed attempts at contact. The study was approved by the local institutional review board.

Participants

Children with blunt head trauma or other injury forces transmitted to the head were considered to have a mTBI if they had of any of the following: witnessed loss of consciousness; independent report of post-traumatic amnesia; any alteration in mental state (confusion, disorientation, slowed thinking, etc.); Glasgow Coma Scale (GCS) score of 13 or 14; or at least two of eight symptoms typical of mTBI not present before injury or attributable to another cause.^{4,19} Children were excluded if they had: multi-system trauma; open head injury; injuries resulting from physical abuse; known central nervous system disorder; developmental delay; bleeding disorder; chronic pain syndrome; English or Spanish was not the primary language; or a parent/legal guardian was unavailable at the ED visit.

Measurements

The primary outcome was attendance at a PCP follow-up visit within 30 days of the ED visit assessed during telephone calls using a standardized study exit interview. The time point of 30 days post-injury was chosen, as most children with mTBI should have experienced symptom resolution by this time, and persistent symptoms at this point indicate a higher risk of protracted recovery warranting specialist referral.^{20,21}

During the ED enrollment visit, potential participant and caregiver characteristics associated with the primary outcome were collected. Characteristics included standard demographic information, insurance status, PCP information (identified PCP vs clinic only; private office vs community health center), primary language and caregiver education. We collected data regarding injury characteristics and mechanism, prior mTBI history, co-morbid mental health conditions previously diagnosed by a physician (as reported by caregiver), familiarity with state youth mTBI legislation²² and brain imaging (if obtained). A retrospective pre-injury symptom baseline (provided by parent/guardian) and acute mTBI symptom assessment were obtained using the Health and Behavior Inventory (HBI).^{23,24}

We developed a 5-item Caregiver Attitudes Survey (CAS, Cronbach's $\alpha=0.73$) specific to the diagnosis of mTBI utilizing a five-point Likert-type scale to assess caregivers' attitudes toward: 1) overall seriousness of mTBI; 2) likelihood of symptoms lasting > 2 weeks; 3) likelihood that mTBI will interfere with academic activity; and 4) need for PCP involvement for injury care (2 items). The items chosen for this instrument were based on a separate survey of 344 parents of uninjured children evaluated in our emergency department that aimed to identify expectations regarding mTBI recovery (unpublished data presented at the Pediatric Academic Societies' Annual Meeting in Vancouver, Canada 2014). Higher scores indicate the caregiver believes mTBI is more serious and more likely to require ongoing support. Reliability analyses indicated that the internal consistency of the scale was not improved by the removal of any item. Exploratory factor analysis was conducted for the survey items. Responses to the survey were obtained prior to treatment team discharge counseling and receipt of ACIs.

Seven days after ED discharge, caregivers reported whether they had read the hospital's ACIs including recommendations for seeking PCP follow-up. We also asked the parent whether a follow-up visit with their PCP had been attended by or scheduled for the child. We chose the seven-day time point as this should minimize recall bias and allow sufficient time to at least schedule an appointment accounting for weekends and holidays. If no visit had occurred or been scheduled, reasons for not doing so were solicited. Finally, a 30-day call to all participating caregivers determined whether the child had attended a PCP follow-up visit since the ED encounter.

Effects of discharge planning on follow-up rates after mTBI in a pediatric ED population previously demonstrated a 29% improvement in follow-up in participants receiving specific ACIs.¹² Similarly, a study comparing follow-up attendance between participants allowed to make arrangements on their own versus those for whom ED staff arranged follow-up demonstrated a 22% increase in follow-up attendance in the intervention group.¹⁴ Based on these studies, we assumed a 25% difference in follow-up visit attendance to be clinically meaningful. To achieve 90% power to detect a difference of 0.25 in the proportion of participants attending a follow-up appointment with a significance level of 0.05 using the two-sided Z test with pooled variance, a total of 152 participants were required for analysis.

Analysis and Statistical Procedures

First, bivariate statistics comparing those who did and did not complete the 30-day call were completed to assess for non-response bias. Subsequently, bivariate statistics comparing independent variables and the primary outcome were calculated using chi-square, Kruskal-Wallis, or independent t-tests depending on the level and distribution of the independent variable. Unadjusted odds ratios were also calculated to measure the association between hypothesized predictors of interest and the outcome. Logistic regression was used to model the association between independent variables and the primary outcome ($p<0.10$ in bivariate analyses), using backwards elimination to create a parsimonious model including only significant independent variables. Statistical significance was determined at $\alpha<0.05$. We then calculated adjusted odds ratios with 95% confidence intervals for independent variables remaining in the final model. All analyses were completed using SAS version 9.4.

RESULTS

During the study period, 1313 children were screened for eligibility; 619 (47.1%) met inclusion criteria; 335 (54.1% of those eligible) were approached for participation (Figure 1). Some eligible participants were not approached due to lack of PRA availability (patient visit outside of PRA coverage hours or PRA unavailable due to other duties). One hundred seven potential participants declined, 3 withdrew from the study after providing consent and one was subsequently determined ineligible, leaving 224 (68.1%) participants. Of those 224 participants enrolled in the study, 183 (81.7%) completed the 30-day study call and constitute the evaluable cohort (Table 1). Participants who completed the 30-day study call were more likely to have a sport-related injury mechanism (44.4% vs 22.9%; $p = 0.02$) and prior mental health diagnosis (16.0% vs 0%; $p < 0.01$) compared to those lost to follow-up.

Participants attending PCP follow-up within 30 days of their ED visit were more likely to be female but did not differ on any other demographic characteristic compared to those who did attend follow-up (Table 1). There were no differences between the groups with respect to prior sports participation, past medical history, injury mechanism or signs and symptoms of injury. Symptoms returned to baseline for both groups by the 30-day call. The proportion of children who received a head computed tomography (CT) and mTBI ACIs at discharge were similar.

Table 2 shows comparison of those who did and did not attend follow-up with respect to PCP office setting, insurance provider, parental review of ACIs and knowledgebase regarding concussion legislation. Over 80% of participants in both groups identified a specific PCP. Therefore, we combined all participants into either private PCP office or community health center and did not further analyze differences in the subsets who did not identify a specific PCP. No group differences were seen in these variables.

CAS scores were significantly higher among children who attended follow-up at 30 days compared to those who did not (Table 2). Figure 2 shows the results of exploratory factor analysis indicating that all CAS items load onto a single factor. We added the Likert scale scores for each of the 5 items to create a composite CAS score for each research participant.

The final multiple logistic regression model included sex and the CAS score. Females had increased odds of attending follow-up visits compared to males (aOR: 2.27; 95% CI: 1.00–5.18). Children whose parents had attitudes indicating greater concerns about mTBI and endorsing the necessity of attending PCP follow-up had greater odds of attending follow-up visits (aOR: 1.12 per unit increase in composite score; 95% CI: 1.02–1.23).

A total of 182 participants had outcome data available regarding PCP follow-up visit attendance from *both* the 7-day and 30-day telephone follow-up. In the first week after ED discharge, 99 of these 182 participants (54.4%) had attended a PCP follow-up appointment; 83 (45.6%) had not. Of the 83 who had not yet attended a PCP follow-up appointment, 80 provided data indicating whether they had *scheduled* a follow-up appointment with their PCP. About half of those who had not already attended an appointment indicated that an appointment was scheduled (39/80, 48.8%), while the remainder had not scheduled appointments (41/80; 51.2%). Those who had scheduled an appointment within the first 7

days after ED discharge were significantly more likely to have attended a PCP follow-up by the time of the 30-day call than those who had not yet scheduled an appointment (71.8% vs. 36.6%; $p=0.002$). Among those who had not scheduled an appointment, 36.6% indicated as the *primary* reason for not doing so that they thought the child did not need an appointment; 51.2% of parents cited not thinking the child needed an appointment as at least one reason for not scheduling a PCP follow-up appointment (Table 3).

DISCUSSION

Female gender and parental expectations about mTBI recovery and management were the key drivers associated with attending a PCP follow-up appointment within 30 days of ED evaluation among a cohort of children with mTBI. Contrary to our hypothesis, commercial insurance coverage and having an identified PCP did not improve the likelihood a child would attend a follow-up visit. In addition, other demographic, socio-economic, behavioral (e.g. reading ACIs), and injury characteristics were not associated with attending a follow-up visit.

PCP follow-up after ED evaluation for mTBI has been found to be inconsistent in prior studies relative to insurance status. Zuckerbraun and colleagues demonstrated that 4-week PCP follow-up may be as low as 32% in a cohort of children with insurance coverage similar to that of our sample.¹² Although follow-up visit attendance significantly improved to 61% after implementing an intervention including written follow-up recommendations, there remained a significant disparity in follow-up between commercially and publicly insured children (63% vs 41%, respectively). In another pediatric ED cohort, adherence with standardized follow-up visit recommendations at ED discharge was similar (64%) at 4 weeks with 85% of participants having commercial insurance.¹¹ By comparison, 78% of our participants reported attending a PCP follow-up visit for their TBI within 30 days of the initial ED visit, despite the fact that substantially fewer participants had commercial insurance. One possible explanation for this difference may lie in PCP availability. Another study found that follow-up for ED patients was more common if patients had a PCP prior to their visit.¹⁴ Only three children in this study (one attending follow-up and two who did not) reported having no PCP. There was also a nearly equal split between private and community health centers, suggesting that PCP access for follow-up was high in this ED cohort. While the proportion of respondents identifying their child's PCP office as a community health center was greater among children not attending follow-up, this difference was not statistically significant. Additional research is needed, as few studies have reported PCP access specifically.

Given that insurance status and PCP availability were not significant predictors of attending PCP follow-up, we explored the effect of ACI recommendations. Nearly all participants reported receiving the written ACIs including instructions to seek PCP follow-up within 2–3 days after the ED visit. We did not find a significant difference in the proportion who reported reading the ACIs compared to those who did not, but we did identify a higher follow-up rate than reported in the previously cited studies.^{11,12} While ACIs did not have a significant effect on behavior in our ED cohort, the higher follow-up rate may result from improved awareness of recommendations suggesting ongoing care.¹³

Like insurance status and PCP access, other traditional barriers to healthcare access (race/ethnicity, primary language spoken, caregiver education) were not specific barriers to obtaining PCP follow-up within 30 days. Gender, however, played a substantial role with girls being more likely than boys to attend follow-up. This contrasts with previously reported data in a similar population.¹² One plausible explanation for this finding arises from the fact that females tend to report more post-concussive symptoms than do males.^{6,25,26} Increased symptom report could serve as a prompt to caregivers to seek on-going care. Indeed, the CAS demonstrated a significant difference in parental expectations of symptom duration between those who did and did not attend follow-up, supporting the hypothesis that mTBI symptom persistence indicates an ongoing need for medical management. We compared 30-day HBI scores between males and females and found no significant difference in reported symptoms. Thus, in our cohort, it is unlikely that gender differences in reported symptoms motivated caregivers to seek follow-up. However, we did not explore child disclosure of symptoms to caregivers. Limited evidence suggests that disclosure of mTBI symptoms may be more frequent among female children and adolescents than among males.^{27,28}

Over 90% of caregivers in both groups reported receiving and reading the ACIs recommending follow-up within 2–3 days of the ED visit. However, 45.6% had not attended appointments by the 7-day follow-up call, and just over half of these participants had not even scheduled an appointment. The most commonly cited reason was that the caregiver did not feel such follow-up was necessary; transportation, scheduling and cost issues were infrequently cited consistent with previous reports.¹² While one-third of children whose caregivers had not scheduled a follow-up by seven days eventually attended follow-up, this was significantly lower than those who had at least scheduled an appointment by seven days. Given that caregivers of children not attending follow-up expressed significantly less concern about the seriousness of an mTBI on the CAS *at the time of the ED visit* compared to those who did attend follow-up, our findings are not surprising. Although we did not directly assess the effect of reading the ACIs or the 7-day follow-up call among our participants, it is likely that caregivers who do not anticipate a benefit from follow-up require more proactive concerted efforts to obtain ongoing care for their children.

We were surprised to find no differences between those who did and did not attend PCP follow-up in the proportions of children with a witnessed loss of consciousness, post-traumatic amnesia, GCS score <15, or who underwent a CT scan. Similarly, there was no difference in HBI symptom scores. From a caregiver's perspective, these highly visible features may be indicators of a more substantial injury, prompting the caregiver to seek further reassurance at a follow-up appointment. Our data do not support such speculation. It is possible that the anticipatory guidance included in the ACIs (which nearly all participants received and reported reading) mitigated caregiver concerns.²⁹ Similarly, a normal head CT, whether clinically indicated or not, may have led caregivers to conclude that the head trauma was relatively inconsequential.

Limitations

As with most prospective longitudinal cohort studies, participant attrition (18.3%) was a limitation in this study. However, our cohort included 31 more participants than sample size calculations indicated were needed to demonstrate significant differences. In addition, the attrition rate was similar to those reported in other pediatric ED mTBI prospective cohort studies.^{5,6,11,12} There were also differences with respect to injury mechanism and prior mental health diagnosis between those who did and did not complete the study follow-up. Children with sport-related mechanisms may be more likely to attend follow-up to secure clearance to return to play though data on this are sparse.^{11,30} Children with heightened anxiety and somatization tendencies are more likely to exhibit persistent symptoms prompting caregivers to seek care.³¹ These variables were not explored in the present study. Our cohort represents a convenience sample from a single major metropolitan ED and a subset of the population for whom socio-economic factors did not prevent obtaining emergency care. Therefore, these factors are also less likely to have precluded attending follow-up; study of a more heterogeneous population may reveal differences on these variables. However, the two significant predictors for obtaining follow-up (gender and caregiver attitudes) are not necessarily restricted by socio-economic or geographic boundaries. We did contact participants seven days after their ED visit to ascertain barriers to appointment scheduling and attendance; this may have induced some parents who had not scheduled a follow-up appointment to do so. We note that only 11 participants who had scheduled but not attended follow-up ended up not attending; similarly, 15 participants who had not scheduled eventually did attend a follow-up visit. Thus, the effect on our overall study results is likely negligible and provides some additional insight on follow-up patterns after ED discharge.

We created an instrument for assessing caregiver attitudes (CAS) which has not been formally evaluated for validity. A statistical measure of the survey reliability was reasonably strong, and exploratory factor analysis indicates that the survey items are evaluating a single construct: specifically, caregiver's attitude about the need for ongoing mTBI care. Coupled with the preparatory work for the survey to assess parental expectations about mTBI recovery and the behaviors demonstrated regarding scheduling and attending PCP follow-up that align with the findings from the CAS, this survey represents a reasonable first attempt at quantifying a heretofore missing novel factor associated with seeking follow-up care after ED evaluation for TBI.

Finally, we did not independently verify the primary outcome with PCP records. Outcome data were based on caregiver self-report and may have been subject to social desirability bias; that is, caregivers may have believed that the correct response was that they should have scheduled a follow-up appointment and thus may have provided inaccurate responses. However, the significant difference between the groups on the CAS suggests this was unlikely. Despite these limitations, this study provides important new information regarding factors that appear to be associated with ED pediatric mTBI patients' compliance with ACI recommendations for PCP follow-up.

Conclusion

Among an ED cohort of children with mTBI, female gender and caregiver attitudes regarding the seriousness of an mTBI and importance of follow-up were significantly associated with attending a PCP follow-up visit within 30 days after ED discharge. Conversely, PCP practice setting, insurance status and other patient demographic, socio-economic and injury characteristics were not associated with attending follow-up. Caregivers of children who did not attend follow-up frequently cite such follow-up as unnecessary. These findings may inform more tailored interventions to improve follow-up in general and, more specifically, targeted interventions for males. Furthermore, these findings indicate the need to revise ACIs to highlight the specific purposes of follow-up care after an mTBI including monitoring for symptom resolution, securing academic support and preventing premature return to play.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Abbreviations:

ACI	Aftercare Instructions
CAS	Caregiver Attitudes Survey
CT	computed tomography
ED	Emergency Department
GCS	Glasgow Coma Scale
mTBI	mild traumatic brain injury
PCP	primary care provider
STAI	State-Trait Anxiety Inventory

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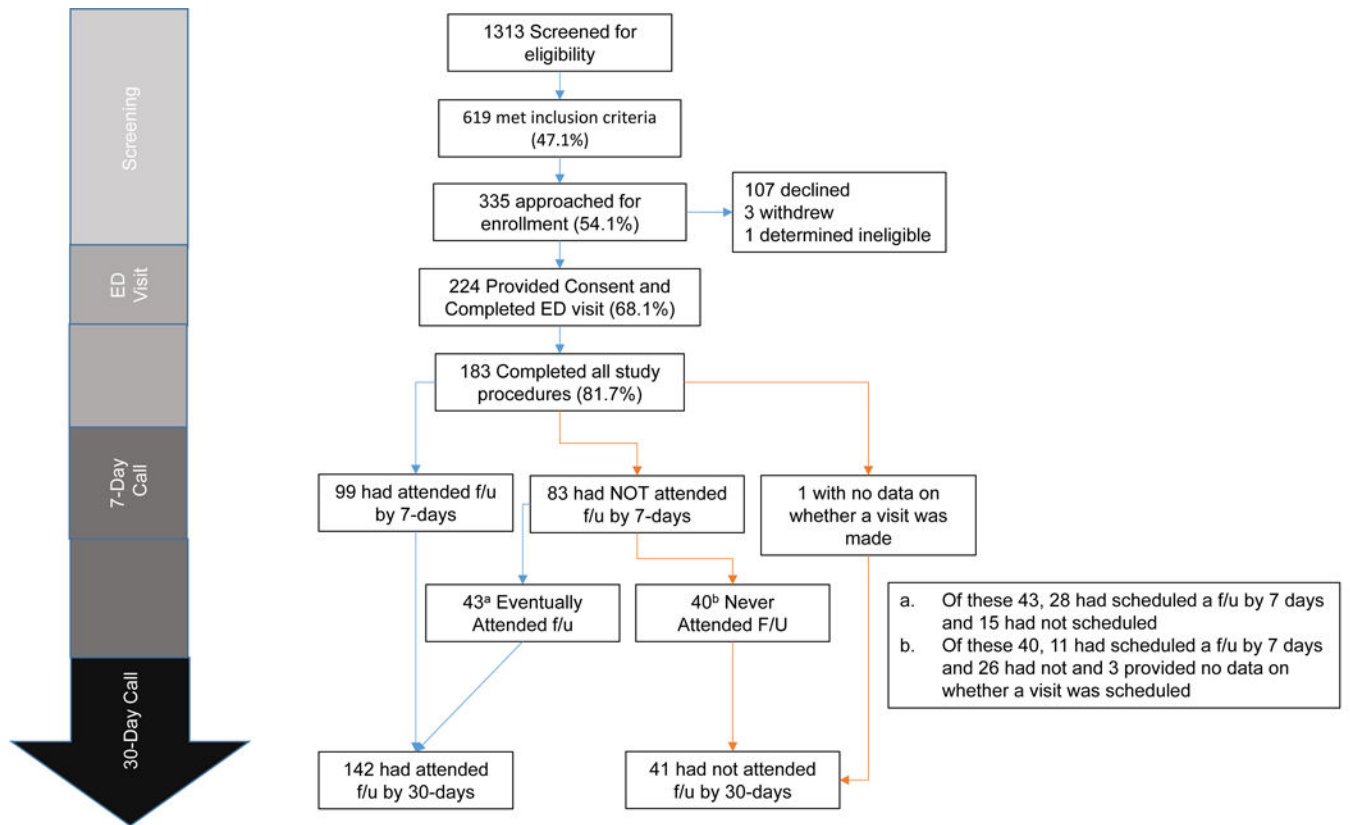


Figure 1: Participant Study Progression a) Of these 43, 28 had scheduled a f/u by 7 days and 15 had not scheduled b) Of these 40, 11 had scheduled a f/u by 7 days and 26 had not and 3 provided no data on whether a visit was scheduled

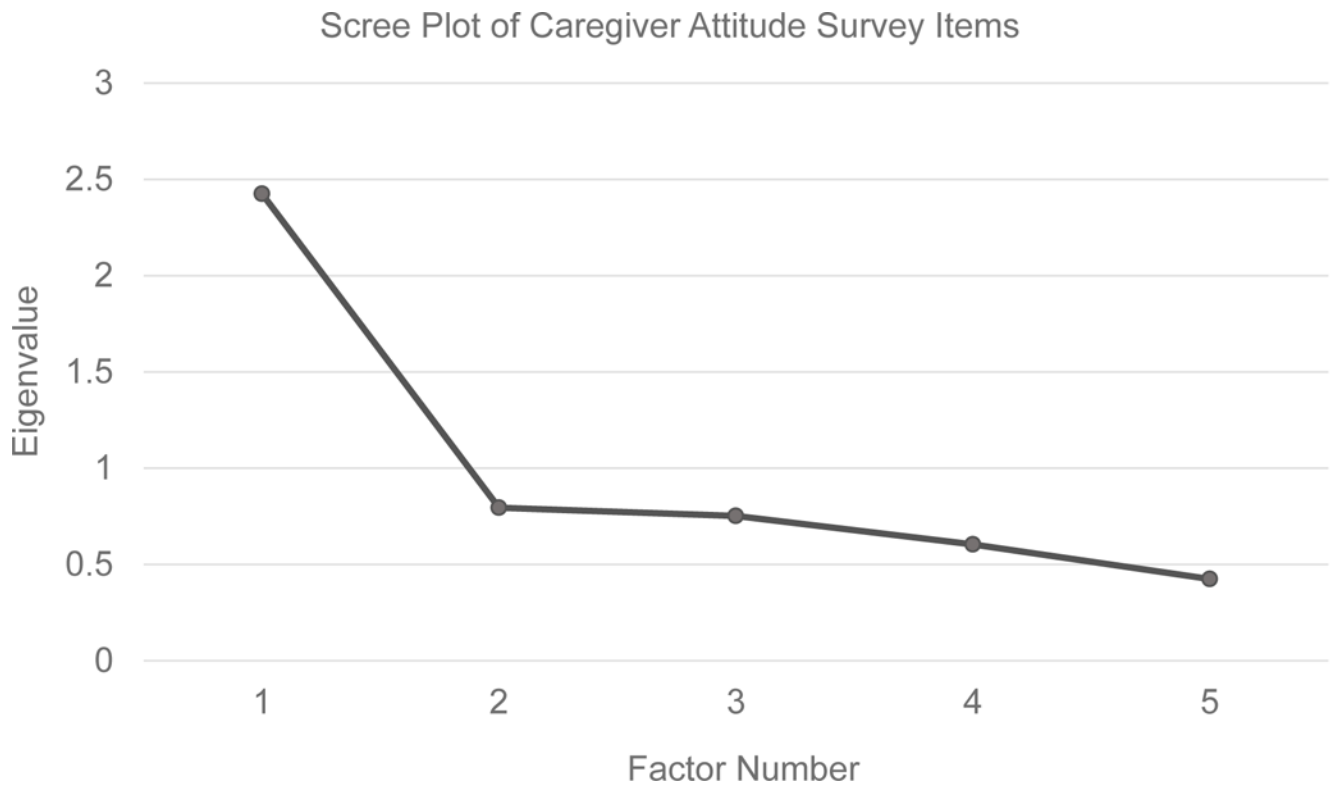


Figure 2: Exploratory Factor Analysis Scree Plot for 5 Items of Caregiver Attitude Survey. Sharp drop in eigenvalues for survey items 2–4 indicate all items load onto a single factor.

Table 1.

Demographic, Past Medical History and Injury Variables between those Attending or Not Attending a PCP Follow-up Visit 1 Month after ED Visit

	Attended Follow-up By 30 Days (n=142)	Did Not Attend Follow-up By 30 Days (n=41)	p
Age, yrs (SD)	12.6 (2.6)	12.1 (2.9)	0.42
Gender, n (%)			0.02
Female	59 (41.5%)	9 (21.9%)	
Male	83 (58.5%)	32 (78.1%)	
Race, n (%)			0.42
White	105 (73.9%)	29 (70.7%)	
Black	24 (16.9%)	10 (24.4%)	
Other	13 (9.2%)	2 (4.9%)	
Ethnicity, n (%)			
Latino/a	54 (38.0%)	18 (43.9%)	0.50
Child Primary Language, n (%)			0.77
English	127 (89.4%)	36 (87.8%)	
Spanish	15 (10.6%)	5 (12.2%)	
Caregiver Primary Language, n (%)			0.53
English	117 (82.4%)	117 (82.4%)	
Spanish	25 (17.6%)	9 (21.9%)	
Caregiver Highest Education, n (%)			0.77
Did not complete high school	25 (17.6%)	10 (24.4%)	
High school graduate/Graduation Equivalency Diploma	23 (16.2%)	7 (17.1%)	
Some college coursework	30 (21.1%)	7 (17.1%)	
College graduate or higher degree	64 (45.1%)	17 (41.5%)	
Prior Involvement in Organized Sports, n (%)	118 (83.1%)	33 (80.5%)	0.70
Prior mTBI, n (%)	30 (21.1%)	12 (29.3%)	0.27
History of migraine headache, n (%)	18 (12.7%)	7 (17.1%)	0.47
History of Mental Health Diagnosis, n (%)	20 (14.1%)	9 (22.0%)	0.22
History of Learning Disability, n (%)	11 (7.8%)	3 (7.3%)	0.99
Mechanism of Injury = Sport, n (%)	69 (48.6%)	14 (34.2%)	0.10
Loss of Consciousness, n (%)	35 (24.7%)	8 (19.5%)	0.49
Post-traumatic Amnesia, n (%)	67 (47.2%)	17 (41.5%)	0.52
GCS Score <15, n (%)	9 (6.3%)	3 (7.3%)	0.73
HBI Baseline (med, IQR)	16 (8–23)	17 (12–25)	0.20
HBI at ED visit (med, IQR)	25 (16–39)	27 (21–39)	0.29
HBI at 30 Days Post-Injury (med, IQR)^a	12.0 (5–25)	17.5 (9.5–27.5)	0.19
Head CT Obtained, n (%)	32 (22.5%)	12 (29.3%)	0.37

	Attended Follow-up By 30 Days (n=142)	Did Not Attend Follow-up By 30 Days (n=41)	p
Received mTBI ACI, n (%)	132 (93.0%)	37 (90.2%)	0.56
Specialist Visit Within 30 days, n (%)	20 (14.1%)	4 (9.8%)	0.47

^{a)} There was no significant difference in 30-day HBI scores between females and males. Additionally, there was no significant difference between 30-day HBI scores of females who did and did not attend follow-up.

mTBI-mild traumatic brain injury, GCS-Glasgow Coma Scale, ED-emergency department, HBI-Health Behavior Inventory, CT-computed tomography, ACI-after-care instructions

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Table 2.

Bivariate Analysis of Health Care Access, Caregiver Attitudes and mTBI-Related Knowledge and Behavior Associated with Attending a Follow-up Visit

	Attended Follow-up By 30 Days n=142	Did Not Attend Follow- up By 30 Days n=41	OR w/ 95%CI	p
Insurance, n (%)				
Public ^a	82 (58.6%)	28 (68.3%)	Ref	
Commercial	58 (41.4%)	13 (31.7%)	1.52 (0.73–3.19)	0.26
PCP Office Type, n (%)^b				
Community Health Center	66 (46.8%)	23 (58.9%)	Ref	
Private Office	75 (53.4%)	16 (41.0%)	1.63 (0.80–3.35)	0.18
Caregiver Attitudes Survey (mean, SD; range 5–25)	19.4 (3.4)	17.9 (4.1)	1.12 (1.02–1.23)	0.03
Read mTBI ACIs, n (%)				
Yes	136 (95.8%)	37 (92.5%)	Ref	
No	6 (4.2%)	3 (7.5%)	0.54 (0.13–2.28)	0.41
Aware of Concussion Law, n (%)				
Yes	97 (69.3%)	23 (57.5%)	Ref	
No	43 (30.7%)	17 (42.5%)	0.60 (0.29–1.24)	0.16

^a) Only 2 participants reported having no insurance – both attended a follow-up visit. Statistical comparison did not change significantly when these subjects were included.

^b) 1 participant who did and 2 participants who did not attend follow-up did not provide information on PCP office setting.

PCP-primary care physician, mTBI-mild traumatic brain injury, ACIs-after-care instructions

Table 3.

Characteristics of Patients Not Attending Follow-up by the 7-day post-ED visit phone call (n=80)

Appointment scheduled (y/n)	n (%)
Yes	39 (48.8%) ^a
No	41 (51.2%) ^b
Primary reason for not scheduling	
I did not think child needed appointment	15 (36.6%)
Other circumstances interfered	11 (26.8%)
Have not had a chance to make one	7 (17.1%)
No appointment time soon enough	4 (9.8%)
Forgot to make one	2 (4.9%)
Could not afford to miss work	1 (2.4%)
Office copay too expensive/no insurance	1 (2.4%)
All reasons cited for not scheduling^c	
I did not think child needed appointment	21 (51.2%)
Other circumstances interfered	19 (46.3%)
Have not had a chance to make one	9 (22.0%)
Could not afford to miss work	5 (12.2%)
No appointment time soon enough	4 (9.8%)
Too expensive	3 (7.3%)
Forgot to make one	2 (4.9%)
No transportation or too far to travel	2 (4.9%)
If scheduled but not attended, primary reason for not attending	
Appointment is in future	35 (89.7%)
Weather conditions	2 (5.1%)
Cancelled by PCP	1 (2.6%)
Other circumstances interfered	1 (2.6%)

^{a)} 28 of these participants attended follow-up by the time of the 30-day call.

^{b)} 15 of these participants attended follow-up by the time of the 30-day call. 3 participants did not report whether a follow-up was scheduled.

^{c)} Totals do not sum to 100% as participants could select all reasons that applied; PCP-primary care provider