

TRAUMATIC BRAIN INJURY AMONG FEMALE SURVIVORS OF INTIMATE PARTNER VIOLENCE IN ILLINOIS

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Specific Aims/Hypothesis

- **Specific Aims:** Determine how frequently women in Illinois who are hospitalized (both outpatient and inpatient) due to injuries resulting from Intimate Partner Violence (IPV) are diagnosed with a Traumatic Brain Injury (TBI).
- Assess the severity of these TBIs
- **Hypothesis:** Traumatic Brain Injury among women in Illinois is associated with Intimate Partner Violence

Background

- Intimate Partner Violence: “physical violence, sexual violence, stalking and psychological aggression by a current or former intimate partner” (Black et al., 2011)
- Traumatic Brain Injury: An injury to the brain acquired during a rapid trauma (NIH, 2015)
 - Results from a number of injuries to head and neck including being struck with a hand or object, being shoved into an object or wall, violent shaking, a penetrating injury and attempted asphyxiation or strangulation (CDC, 2015)

Background

- **1 in 3** women have experienced violence perpetrated by an intimate partner (Black et al., 2011)
- Lack of reporting: Estimated only **56% of IPV cases reported** from 2003-2010 (DOJ, 2014)
- IPV is not isolated event: women assaulted by an intimate partner experienced an average of **6.9 physical assaults** (DOJ, 2000)
- Outcomes: Majority of physical IPV injuries (up to 94%) **occur on the head, neck and face area**
- Women who experience physical IPV more than once are **at a greater risk of TBI** (Banks, 2007)
- Repeated, mild TBIs can **result in cumulative neurological and cognitive deficits and death** (CDC, 2015)
- Physical assaults are responsible for about **10% of all TBIs** in U.S. (CDC, 2014)

Background

- TBI frequently not diagnosed in IPV survivors
 - ▣ Shared Outcomes for TBI and IPV:
 - Depression, anxiety and intellectual deterioration (Kwako, et al., 2011)
- Low screening levels for IPV and TBI (Davidov, Larrabee and Davis, 2014)
- Risk factors for IPV
 - ▣ Age (CDC, MMWR, 2014)
 - ▣ Separation or divorce (DOJ, 2000)
 - ▣ Leaving relationship (Banks, 2007)
 - ▣ Income (Black, et al., 2011)

Methods

- Database: Illinois Hospital Outpatient and Inpatient Database (2010-2013)
- Study design: Retrospective analysis of hospital data
- Patients: Women flagged for physical abuse, inpatient and outpatient
- Comparison Group: Women injured from an assault at home
- Statistical Approach: Median regression and nonparametric ANOVA, Wilcoxon two sample test

Results: Demographics

Table 1
General Characteristics of Potential Intimate Partner Violence (IPV) Cases (Physical Abuse) Among Women in Illinois (15 Years and Older)
Illinois Hospital Outpatient and Hospital Inpatient Database: 2010-2013

	Abuse Cases		Assault Not Abuse Cases		Incidence Rate (per 100,000)
	TBI (N=539)	No TBI (N=14,033)	TBI (N=334)	No TBI (N=6350)	
Age					
15-24	169 (31.35%)	4782 (34.08%)	110 (32.93%)	2196 (34.58%)	562.7
25-34	200 (37.11%)	4153 (29.59%)	96 (28.74%)	1788 (28.16%)	491.7
35-44	121 (22.45%)	2452 (17.47%)	66 (19.76%)	1201 (18.91%)	296.9
45-54	68 (12.62%)	1518 (10.82%)	39 (11.68%)	775 (12.2%)	166.7
55-64	14 (2.6%)	518 (3.69%)	8 (2.4%)	244 (3.84%)	69.8
65-74	8 (1.48%)	257 (1.83%)	5 (1.5%)	85 (1.34%)	57.6
75-84	11 (2.04%)	212 (1.51%)	8 (2.4%)	34 (0.54%)	71.9
85 years and older	2 (0.37%)	141 (1.0%)	2 (0.6%)	27 (0.43%)	88.3
Mean Age (sd)	33.54 (sd=13.4)	33.1 (sd=14.73)	33.23 (sd=14.7)	32.44 (sd=13.25)	
Race/Ethnicity					
Asian	5 (0.93%)	164 (1.17%)	1 (0.3%)	27 (0.43%)	57.24
Black or African American	175 (32.47%)	4892 (34.86%)	87 (26.05%)	2278 (35.87%)	510.9
Hispanic/Latina	67 (12.43%)	1671 (11.91%)	31 (9.28%)	558 (8.79%)	177.2
White	313 (58.07%)	6527 (46.51%)	181 (54.19%)	3135 (49.37%)	147.5
Other race*	33 (6.12%)	756 (5.39%)	33 (9.88%)	338 (5.32%)	171.3
Insurance Type					
Medicaid	82 (15.21%)	2352 (16.76%)	52 (15.57%)	1094 (17.23%)	
Medicare	15 (2.78%)	444 (3.16%)	10 (2.99%)	145 (2.28%)	
Private Insurance	49 (9.09%)	969 (6.91%)	21 (6.29%)	376 (5.92%)	
Other Insurance	8 (1.48%)	197 (1.4%)	5 (1.5%)	82 (1.29%)	
Self/Charity	54 (10.02%)	1185 (8.44%)	26 (7.78%)	482 (7.59%)	
Worker's Compensation	1 (0.19%)	12 (0.09%)	1 (0.3%)	3 (0.05%)	
Unknown	384 (71.24%)	8874 (63.24%)	219 (65.57%)	4168 (65.64%)	

*Includes American Indian or Alaskan Native, Native Hawaiian or Pacific Islander and Unspecified Race

Results: Severity

Table 3
Severity of Injury Among Women Experiencing Potential Intimate Partner Violence
Illinois Hospital Outpatient and Hospital Inpatient Database: 2010-2013

	Abuse Cases		Assault Not Abuse Cases	
	TBI (N=539)	No TBI (N=14033)	TBI (N=334)	No TBI (N=6350)
Hospital Treatment				
Mean Days in Hospital	4.9 (sd=6.84)	5.95 (sd=8.12)	3.9 (sd=5.05)	4.5 (sd=5.26)
Inpatient	77 (14.29%)	1299 (9.26%)	53 (15.87%)	257 (4.05%)
Outpatient	516 (95.73%)	12734 (90.74%)	281 (84.13%)	6093 (95.95%)
Put on Ventilator	11 (2.04%)	46 (0.33%)	8 (2.4%)	20 (0.31%)
Mean Days on Ventilator	11.2 (sd=14.6)	8.9 (sd=7.92)	6 (6.63)	12.5 (sd=9.9)
Underwent Operation	21 (3.9%)	283 (2.02%)	12 (3.59%)	131 (2.06%)
Mean Total Charges	\$11,324 (sd=\$30,769)	\$5,538.5 (sd=\$12,310)	\$11,294.95 (sd=\$25,550.8)	\$4,298.8 (sd=\$13,944)
Severity of Injury				
Penetrating Injuries (N=770)	3 (0.56%)	256 (1.82%)	15 (4.49%)	494 (7.78%)
In-Hospital Fatalities	4 (0.74%)	103 (0.73%)	5 (1.5%)	77 (1.21%)
In-Hospice Fatalities	5 (0.93%)	119 (0.85%)	6 (1.8%)	78 (1.23%)
Mean Injury Severity Score NISS ≥ 16	6.87 (sd=4.2)	1.26 (sd=1.6)	6.95 (sd=4.9)	1.68 (sd=2.1)
	45 (8.35%)	11 (0.08%)	25 (7.49%)	18 (0.28%)
Outcome at Discharge				
Discharged Home	508 (94.25%)	12348 (87.99%)	283 (84.73%)	5860 (92.28%)
Transferred to a Rehab Facility	5 (0.93%)	18 (0.13%)	2 (0.6%)	5 (0.08%)
Transferred to Hospice Care (home or facility)	1 (0.19%)	16 (0.11%)	1 (0.3%)	1 (0.02%)
Transferred to Another Short-Term Hospital	18 (3.34%)	94 (0.67%)	10 (2.99%)	46 (0.72%)
Other*	61 (11.32%)	2150 (15.32%)	38 (11.38%)	438 (6.9%)

*Other includes left against medical advice, still a patient, transferred to another type (unspecified situation), etc.

Results: Types of Injury and Body Location

Table 2

Most Frequent Types of Injury and Body Locations of Women Suffering Potential Intimate Partner Violence (IPV) in Illinois Hospital Outpatient and Hospital Inpatient Database: 2010-2013

Body Region	Abuse Cases (N=14626)	Assault Not Abuse (N=6684)
Fracture		
Any Fracture	676 (4.62%)	463 (6.93%)
Head and Face	748 (5.1%)	350 (5.24%)
Upper Extremity	282 (1.92%)	286 (4.28%)
Contusion		
Any Contusion	6732 (46%)	3280 (49%)
Open Wound		
Any Open Wound	1212 (8.3%)	1185 (17.7%)
Head and Face	1328 (9.1%)	887 (13.27%)
Upper Extremity	414 (2.83%)	494 (7.39%)
Internal Injury		
Any Internal Injury	252 (1.7%)	151 (2.2%)
Skull	549 (3.75%)	294 (4.40%)
Superficial Injury		
Any Superficial Injury	1706 (11.6%)	867 (13%)
Sprain/Strain		
Any Sprain/Strain	1706 (11.6%)	840 (12.6%)

Results: Multivariable Analysis

- **Crude results:** Length of stay significantly different for abuse and non-abuse
 - ▣ Total charges not significantly different for abuse and non-abuse cases
- **Adjusted results:** Length of stay significantly different for abuse and non-abuse, median difference of .6 more days for the abuse cases
 - ▣ Total charges not significantly different for abuse and non-abuse cases

Discussion

- TBI and overall injuries similar among abuse and home assault cases
 - ▣ Possible unreported abuse cases within home assault group
- 94% of abuse cases discharged home
 - ▣ Barriers to leaving an abusive relationship:
 - Lack of money, no place to go, homelessness, poor support from police (Anderson, et al. 2003)
 - Lack of social services

Limitations

- Imperfect comparison group
- Lack of marriage status and income
- Hospital codes make it difficult to determine IPV
- Underreporting

Final Summary

- While there was not a high percentage of reported TBIs among the abuse cases and the majority of these TBIs were outpatient, these cases need to be taken seriously, particularly considering the concerns surrounding repetition of TBI and IPV
- Higher rates of screening for both TBI and IPV
- Increased funding for interventions, social services
- More research is needed on the topic, particularly to assess effective interventions

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