Injury patterns and associated demographics of intimate partner violence in men presenting to U.S. emergency departments

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Abstract

Research suggests that there are ~~gender~~ differences between sexes~~differences~~ in physical intimate partner violence (IPV) victimization ~~that men and women sustain from their intimate partners~~ that could lead to different injury patterns. Additionally, research shows that men under-report their injuries yet may suffer grave consequences. It is thus vital to establish physical injury patterns in male IPV victims. A retrospective review of prospectively collected data was performed using the National Electronic Injury Surveillance System All Injury Program data from 2005 through 2015 for all IPV-related injuries in both male and female patients. Sex differences by demographics, mechanism, anatomic location, and diagnoses of IPV injuries were analyzed using statistical methods accounting for the weighted,~~d and~~, stratified nature of the data. IPV accounted for 0.61% of all ED visits; ~~with~~ 17.2% ~~visits~~ were in males and 82.8% in females. ~~.~~ Male patients were older (36.1% vs. 16.8% over 60 years), more likely to be Black (40.5% vs. 28.8%), sustained more injuries due to cutting (28.1% vs. 3.5%), more lacerations (46.9% vs. 13.0%), more injuries to the upper extremity (25.8% vs. 14.1%), and fewer contusions/abrasions (30.1% vs. 49.0%), compared to female IPV patients (p<.0001). There were also more hospitalizations in men (7.9% vs. 3.7% p = .0002). Knowledge of specific IPV-related injury characteristics in men will enable health care providers to counteract underreporting of IPV.

Key words: Male victims, domestic violence, injuries, hospitalization, lacerations

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Intimate partner violence (IPV) is defined as physical, sexual, or psychological maltreatment of one romantic partner against another. Although men are thought to be less vulnerable to IPV (Carmo et al., 2011), men do experience it. According to the National Intimate Partner and Sexual Violence Survey (NISVS), 33.6% of men reported lifetime IPV that encompassed contact sexual violence, physical violence, and/or stalking (Smith et al., 2018). In addition, over one's lifetime, 34.2% of men reported experiencing psychological aggression from an intimate partner. Over the previous year, 3.8% of men reported physical IPV victimization, 1.6% reported contact sexual violence, and 0.8% reported intimate partner stalking, with 5.2% of men reporting any IPV (Smith et al., 2018). In addition, 21.4% reported lifetime severe physical IPV victimization, and 1.9% reported past year severe physical IPV victimization. For lifetime rates, the NISVS showed that approximately 46.1% of all IPV victims were men, and approximately 46.8% of all IPV victims in the past year were men (calculated from Smith et al. 2018). ~~According to the National Intimate Partner and Sexual Violence Survey (NISVIS), 37.3% of women and 30.9% of men have experienced IPV in their lifetime, and 23.2% of women and 13.9% of men experienced severe physical IPV (Miller & McCaw, 2019; Smith et al., 2018).~~ The NISVS also showed relatively equal levels of IPV lifetime prevalence among bisexual (37.3%), gay (26%), and heterosexual (29%) men (Walters et al., 2011), with 97% of men who experienced physical violence, rape, or stalking by an intimate partner having only female perpetrators (Centers for Disease Control and Prevention, 2020).

Men are less likely to officially report IPV than women, at least in part because they are less likely to recognize it as criminal (Mihalic & Elliott, 1997; Moffitt et al., 2001). Also, men

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may see IPV as unmasculine and fear being ridiculed or incorrectly accused as the primary aggressor (Choi et al., 2017; Douglas & Hines, 2011; Goldenberg et al., 2016). As a result, even when men appear at an emergency department (ED) due to injuries resulting from IPV, they are unlikely to be forthcoming about the cause of their injuries (Douglas & Hines, 2011). Medical providers also are likely to carry societal biases that IPV is largely something that men do to women (Eckstein & Cherry, 2015; Russell, 2018) and thus, fail to suspect or ask more probing questions of men regarding the origins of their injuries and/or reinforce men's fears that they will be ridiculed or accused of being the primary aggressor. Thus, most male patients are being sent home from the ED without any helpful resources or safety plan (Douglas & Hines, 2011). Suchnon- detection by medical personnel likely perpetuates stigma and creates a destructive cycle, causing repeated and escalating violence (Hope et al., 2021). The purpose of this paper is to document the types of injuries that male IPV victims typically present with in an ED, particularly in comparison to female IPV victims.

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Similarities and Differences in IPV Between Men and Women

Research over the last 50 years has demonstrated the prevalence of IPV within relationships; twenty years ago, Archer's (2000) meta-analysis demonstrated that women reported perpetrating significantly more aggression to their male partners than men did to their female partners. More recently, through a systematic literature review of research from 2000-2010, Desmarais et al. (2012) found 23.1% of women and 19.3% of men experienced physical IPV. Over the last 15 years there has been a burgeoning body of literature that has explored men's experiences of IPV from both female and male partners. In one of the first and most cited studies in the area, Hines et al. (2007) analyzed the calls of 190 men to a U.S. domestic abuse helpline for male victims and found that all callers experienced physical abuse from their female

partners and over 90% experienced coercive and controlling behaviors. The literature demonstrates men experience a variety of types of abuse, including physical and sexual violence, coercive control, and psychological/emotional abuse (Bates, 2020; Bates & Weare, 2020; Dim, 2020; Hines et al., 2007; Hines & Douglas, 2016b, 2019), and that this is a pattern of abuse, rather than isolated incidents (Walker et al., 2020). In addition, IPV impacts the health of male victims. These health issues include many chronic diseases (Coker et al., 2002) including cardiovascular health problems (Hines & Douglas, 2015), poor physical health (Hines & Douglas, 2015), post-traumatic stress disorder (PTSD) (Bates, 2020; Dim, 2020; Hines & Douglas, 2011, 2015), depression (Dim, 2020; Hines & Douglas, 2015), anxiety (Dim, 2020), and suicidal thoughts and attempts (Bates, 2020a).

The literature often stresses that "sex matters" within discussions of IPV outcomes partly because women experience more injuries (Archer, 2000; Cho & Wilke, 2010; Desmarais et al., 2012; Lysova et al., 2019). However, men also experience injury. For example, in the NISVS study (Black, 2011), one in three male IPV victims experienced at least one impact, in that 18.4% were fearful, 15.7% were concerned for their safety, 13.9% were injured, and 16.4% had at least one PTSD symptom. Two larger-scale studies within the U.S. focusing on male victims of female-perpetrated physical IPV provide rates of injury. Combined, these studies showed that 72.8%-78.5% of the men reported an injury, the majority of which were minor (e.g., cuts, bruises), but 35.1%-40.9% reported at least one severe injury, needing medical attention (e.g., fracture, loss of consciousness) (Hines & Douglas, 2010a, 2010b, 2015, 2016a). Thus, it is likely that ED medical personnel will be treating male IPV victims andit is important they understand how it presents.

Although the relative rates of IPV against men and women are approximately equal in

Western countries, there are some differences in the types of physical IPV that men and women use against their opposite-sex partners that could influence *how* male victims' IPV injuries present in an ED and how they may be different from female IPV patients. For example, analyses of National Crime Victimization Survey (NCVS) data specific to opposite-sex IPV (Cho & Wilke, 2010) showed that men were significantly more likely than women to have been stabbed with a knife (6% v. 1%), hit by an object other than a gun (12% v. 3%), and hit by a thrown object (10% v. 3%), and they were significantly more often the victims of an attempted attack with an object (2% v. 0.6%). The NCVS findings are consistent with studies that show that women use a non-firearm weapon more than men do in IPV (Brown, 2004; Kernsmith & Craun, 2008; Melton & Belknap, 2003), while other studies also suggest that male IPV victims may be disproportionately victimized with blunt objects and knives (Drijber et al., 2013). Analyses of homicide data could also be informative for understanding how male injured IPV victims could present to an ED. In a recent study of opposite-sex IPV homicides reported by 27 states to the National Violent Death Reporting System between 2003-2015, Velopulos and colleagues (2019) found that men (42%) were significantly more likely than women (18%) to be killed with a cutting instrument, although firearms were the predominant weapon used for both men (47%) and women (59%) as victims.

Thus, we hypothesize that when male IPV victims present to an ED, they will be more likely than women to show evidence of having been stabbed, cut, or hit with a hard object. The current study investigates these potential differences among men and women ED patients identified as IPV victims in the National Electronic Injury Surveillance System All Injury Program dataset, along with the 95% confidence intervals (CIs) of the estimate, which are noted in brackets. In addition to testing our hypothesis, we explore injury causes, anatomic location of

injuries, and injury types among male IPV patients, as well as potential sex differences.

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Methods

Dataset and Participants

The National Electronic Injury Surveillance System (NEISS) All Injury Program (AIP) data was used for this study. The NEISS is a stratified, weighted dataset managed by the U.S. Consumer Product Safety Commission, which collects injury data from ~100 hospitals (the number varies slightly from year to year) in the U.S. and its territories having an ED. It was initially designed for injuries due to consumer products. However, not all injuries are from consumer products; thus, the USCPSC selected ~65 of these hospitals (actual numbers vary slightly from year to year) to obtain data for all injuries, regardless of the association with consumer products. This has been designated as the All--Injury Program (AIP). This data is in the public domain and housed by the Inter-University Consortium for Political and Social Research. NEISS data (*National Electronic Injury Surveillance System (NEISS) Series*, n.d.) has been extensively used in injury research and is well accepted, with over 300 studies in a PubMed search performed in January 2021 for NEISS and injury.

The database includes the date of ED visit; gender, race/ethnicity, and age of the injured patient; diagnosis; disposition from the ED; incident locale; body part injured; perpetrator and type of assault; hospital size (strata); and stratification weights. The hospital strata consist of five categories: four based on size (the total number of ED visits reported by the hospital, which are small [0–16,830], medium [16,831–21,850], large [28,151–41,130], and very large [>41,130]), and one encompassing children's hospitals of all sizes. These strata thus encompass both rural and urban hospitals in the U.S. An estimated nationwide number of patients is calculated from this weighted, stratified data set using appropriate statistical techniques. Due to

the stratified and weighted nature of the NEISS design, it encompasses and appropriately represents ED visits for the entire U.S. for all ages, races, rural/urban locations, and both sexes.

We used the NEISS-AIP data for the years 2005 through 2015. We chose these years because 2015 was the last available year at the time the study began in mid-2019, and data before 2005 was coded differently for many variables, making it difficult to combine the years before 2005 with those afterwards. Injuries due to IPV were identified using the NEISS AIP codes PERP = 1 (spouse/partner) having an intent code of INTENT_C = 1 (sexual assault) or 2 (other assault). The actual number of ED visits for injuries over the 11-year period was 5,702,369, for a nationwide estimate of 337,627,315 visits. Injuries due to assault from a spouse/partner accounted for an estimated 2,059,441 [1,873,208 – 2,260,893] visits, or 0.61%. Of the estimated ED visits due to IPV, 353,382 (17.2%) were by men and 1,706,058 (82.8%) by women. As this was a retrospective analysis of prospectively collected, publicly available de-identified data, it was considered exempt by the local Institutional Review Board.

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Measures

Demographics. We present information on the age, sex and race of the patients. Sex was classified as either men or women. Race was classified as White, Black, Amerindian (Hispanic and Native American), and Asian (Thomas et al., 2021). Native Americans and Hispanics were condensed into one group due to the small number of Native Americans, consistent with research that often groups Native Americans and Hispanics ~~often discussed~~ together regarding growth and other physical characteristics (e.g., Eveleth & Tanner, 1990).

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Cause/Mechanism of Injury. The dataset had the following causes/mechanisms of injury: (1) *Struck by/against or crushed*: Injuries resulted from being struck or crushed by another person or inanimate object, other than a vehicle, and the injury was caused by the person

being struck or hit by the other person or object; (2) *Cut/pierce/stab*: Injuries were caused by an incision, slash, perforation, or puncture by a pointed or sharp instrument, weapon, or object. These injuries do not include being struck by a blunt object (included under struck, above) or by being bitten; (3) *Bite*: Injury was caused by being bitten; (4) *Fall*: Injury was caused by the person falling and striking a surface at the same or lower level; (5) *Pedestrian*: Injury was caused when a person is struck by a motor vehicle (i.e., cars, pickup trucks, vans, heavy transport vehicles, buses, and SUVs), and the person was not a passenger in that motor vehicle at the time of the collision; (6) *Fire/burn*: Injury was caused by severe exposure to flames, heat, or chemicals that leads to tissue damage in the skin or places deeper in the body; (7) *Firearm /gunshot wound (GSW)*: Injury was caused by a penetrating force resulting from a bullet or other projectile shot from a firearm (powder-charged handguns, shotguns, rifles).

Anatomic Location of Injury. Injuries were categorized ~~as~~ occurring ~~to~~ in five different body areas: head/neck, upper trunk, lower trunk, upper extremity, and lower extremity.

Injury Diagnosis. Injury diagnoses were grouped into six~~-~~ categories: contusion/abrasion, laceration, fractures, internal organ injury, strain/sprain, and concussion.

Data Analysis

Statistical analyses were performed with SUDAAN 11.0.01™ software to account for the weighted, stratified nature of the data. Analyses between groups of continuous data were performed with the t-test or ANOVA. Differences between groups of categorical data were analyzed by the χ^2 test. The Cochran-Mantzel-Haenszel (CMH) was used to analyze for differences in categorical variables between sex by injury diagnosis and anatomical location.

Results

Demographics

Table 1 shows the sex differences for demographics, cause of the injury, anatomic location of the injury, and injury diagnosis. Men were significantly older than women (Men- 36.2 years; Women- 29.4 years). Men constituted 36.1% of all IPV victims above 60 years of age (Figure 1). The IPV was a sexual assault in 0.1% of males and 3.2% of females; non-sexual physical assaults occurred in 99.9% of males and 96.8% of females ($p < .0001$). There was an almost equal representation of people identifying as White (42.3%) and Black (40.5%) in the male cohort, while there were more patients identifying as White (55.3%) than Black (28.8%) in the female cohort ($p < .0001$). The male cohort was separated into those < 20 years (teen-agers) of age and those ≥ 20 years of age. There were 14,470 in those < 20 years of age and 263,335 in those ≥ 20 years of age. There were no differences between these age groups by race, type of assault disposition from the ED, diagnosis, or anatomic location of injury.

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Cause of Injury

The omnibus chi-square test indicated significant ~~gender~~ differences by sex~~differences in~~ and injury cause (see Table 1). ~~Overall, i~~Intentional striking was the most commonly reported mechanism for both men (57.6%) and women (85.3%). The second most common cause among men was being cut/pierced, accounting for 28.1% of all injuries (3.5% for women). Post hoc analyses with a Bonferroni adjustment showed that men were significantly more likely than women to have cut/pierce, bite, pedestrian, fire/burn, and firearm/gunshot wound as ~~a~~ the cause of injury, although it should be noted that with the exception of cut/pierce, the other causes each comprised less than 6% of injuries for men. Women were significantly more likely to have been struck or to have fallen. Most injuries occurred at home for both men (53.3%) and women (54.7%).

Anatomic Location of Injury

The head/ and neck region was the most common injury location for both cohorts, followed by the upper extremity (see Table 1). An omnibus chi-square test indicated significant gender sex differences in location of injury. However, pPost hoc analyses indicated that in the male cohort, there was a significantly lower percentage of head andhead/ neck (49.8% vs. 61.2%) and lower trunk injuries (5.4% v. 7.8%), and a significantly higher percentage of the upper extremity (25.8% vs. 14.1%) injuries compared to the female cohort.

Injury Diagnosis

Six diagnoses (contusion/abrasion, fracture, laceration, internal organ injury, strain/sprain, and concussion) accounted for 82.7% of all the IPV related injuries in men. The most common injury diagnoses were laceration and contusion/abrasion (see Table 1). An omnibus chi-square test indicated significant gender sex differences, and post hoc analyses showed that men were significantly more likely than women to have a laceration. Women, however, were significantly more likely than men to have a contusion, internal organ injury, concussion, fracture, and sprain/strain. Also of note is that men had significantly more hospital admissions for their injuries than women (7.9% vs 3.7%; $p = .0002$).

Injury Diagnosis by Anatomic Location

We specifically analyzed the six major diagnoses by five anatomic locations: head and neck, upper extremity, upper trunk, lower trunk, and lower extremity (see Table 2). The three-way analyses of sex (male vs. female) by anatomic location by diagnosis was statistically significant (CMH = 397.7, df = 20, $p < .0001$). Follow up analyses indicated that these differences in anatomic locations by diagnosis were all statistically significant for each of the male and female cohorts (Men: $\chi^2 = 211.0$, $p < .0001$; Women: $\chi^2 = 432.7$, $p < .0001$). Focusing on men, head/neck, followed by upper extremity, are the most likely places where for IPV

~~injuries manifest~~injuries. For both men and women, contusions/abrasions were most commonly seen in the head/neck (men: 52.8%; women: 57.9%), upper trunk (men: 17.2%; women: 16.1%), and upper extremity (men: 17.2%; women: 12.4%). For fractures, once again for both men and women, the most common injury locations were head/neck (men: 39.7%; women: 51.7%), upper extremity (men: 31.1%; women: 25.1%) and upper trunk (men: 14.6%; women: 12.4%). Lacerations were also most common in the head/neck for both men and women (men: 49.2%; women: 68.0%), followed by upper extremity (men: 36.7%; women: 22.3%). For both ~~genders~~sexes, internal organ injuries and concussions (by definition) were most common in the head/neck, and strains/sprains were more distributed across all body locations for both men and women.

We next analyzed the injury diagnoses by anatomic locations differently by flipping the axes of the table (see Table 3). While contusion/abrasions ~~were~~ was the most common diagnosis for all anatomical locations in women, ~~they were~~it was the most common only in the trunk (upper and lower) for men. Lacerations were the most common injury ~~diagnosis~~ in the upper extremity and accounted for 68% of all upper extremity injuries in men (compared to 21% of upper extremity injuries in women). Lacerations accounted for 42.7% of all head and neck injuries in men (compared to 14% in women).

Upper Extremity Lacerations and Fractures

Given prior research suggesting that hand and finger fractures among victims of IPV, particularly in combination with injuries to the head and neck (Thomas et al., 2021), we further explored the characteristics of upper extremity injuries in the IPV victims in this dataset. For men, 25.8% of all IPV injuries were ~~to IN~~in the upper extremity~~, with~~; 68% of upper extremity injuries ~~due t~~were~~o~~ lacerations (14.2% of all injuries), ~~followed by~~and 8.6% ~~due to~~ fractures

(1.8% of all injuries). We analyzed specific anatomic locations in terms of the shoulder, arm, elbow, forearm, wrist, hand, and fingers (see Table 4). The forearm was the most common site of lacerations in men (32.9%), followed by the hand (23.1%), while the hand was the most common site of laceration in women (28.4%) and thefollowed by the forearm as the second most common site (25.3%). There was a lower percentage of finger lacerations (18.8% vs. 24.7%), and a higher percentage of the arm (10.5% vs. 4.7%) and shoulder (6.1% vs 3.0%) lacerations in men. These differences in location of upper extremity lacerations by sex were statistically significant ($p < .0001$).

The finger was the most common fracture site in men (36.1%) and women (33.8%). The hand was the second most common fracture site for both groups but there was a greater percentage of hand fractures in men (33.4%) than in women (20.6%). There was an equal representation of forearm fractures in both groups (13.2%).

Discussion

Research documents the ways in which men can experience IPV, yet there is still debate as to the extent to which men suffer physical consequences from their IPV experiences. One area that is lacking is an understanding of established injury patterns and the ways in which men may present differently to health care providers. This U.S. nationwide study is the first study to provide further insight into the similarities and differences of demographics and injury patterns between male and female IPV patients.

Demographic Findings

Consistent with the literature that shows that women are more likely to be injured than men (Archer, 2000; Cho & Wilke, 2010; Desmarais et al., 2012; Lysova et al., 2019), we found that women were more likely to be IPV victims in this dataset of ED visits, with 17.2% of IPV

injuries occurring in men. ~~Interestingly, h~~However, ~~the current study also~~our study shows that ED male IPV victims ~~in the ED~~ are ~~significantly~~ more likely to be admitted to the hospital than female IPV victims, ~~probably underlining the likelihood~~likely due to the fact that men ~~are~~ only seek~~ing~~ help when their injuries are more severe (Cho & Wilke, 2010). ~~Indeed, even though~~ Hines and Douglas (2010) found that 35.1% of their male sample reported an injury severe enough to need medical attention, later analyses showed that only 18.1% actually went to a medical provider for help (Douglas & Hines, 2011) ~~which fits with~~supporting other findings suggesting that men perceive~~d~~ the consequences of their victimization as less serious and often try to "brush it off" (Cho et al., 2020, p. 724) This disparity between men's and women's health care utilization is not new (Williams & Giorgianni, 2010), and neither is the need for the development of ~~gender~~sex-sensitive services to facilitate men's medical help-seeking (McCullagh, 2011).

Another ~~gender~~ sex difference was that the average age ~~of a male~~of male IPV patients was greater than ~~a~~ female IPV patients~~, and~~; men ~~constituted~~ comprised more than one-third of all IPV patients ~~above~~ over 60 years of age. Taken together and consistent with the greater vulnerability/severity hypothesis, these findings suggest that men may need additional vulnerabilities (such as age) or severity of ~~victimization~~ injury to seek help.

Black men were over-represented as male IPV patients in the ED, ~~which is similar~~ consistent with analyses of the NISVS 2010 dataset (Black et al., 2011) and with studies on ~~akin to their over-representation as~~ IPV homicide victims (Velopulos et al., 2019). Most U.S. studies of male IPV victims have an under-representation of Black men (Hines & Douglas, 2019; Hines & Douglas, 2010), but our data suggest that Black men may be more at risk for IPV victimization. Taken together, these findings suggest that there may be additional stereotypes

and barriers that Black men must overcome to be recognized as victims of IPV.

Types and Locations of Injuries

In the current ~~sample~~study, the most likely causes of injury for male IPV patients were being struck, followed by being cut/pierced, with men being significantly more likely than women to have experienced the latter. These findings are consistent with the literature that female perpetrators are significantly more likely to use objects and knives (Brown, 2004; Cho & Wilke, 2010; Kernsmith & Craun, 2008; Melton & Belknap, 2003). Although each represented less than 6% of injuries for men, men were also significantly more likely to have the following causes of injury: bitten, pedestrian, fire/burn, and firearm/GSW. These findings are somewhat consistent with Archer (2000), who found that women were significantly more likely than men to throw something at the other, slap, kick, bite, ~~or~~ punch, ~~and~~ or hit with an object. In the partner homicide literature, Allen and Fox (2013) found that younger husbands are more likely to be killed with knives, while older husbands were more likely to be killed with handguns. The age differences between men and women victims in this sample could ~~thus~~ explain why we ~~are seeing~~saw higher rates of firearm/GSW among ~~the men as~~male IPV victims.

The injury patterns are ~~also~~ indicative of the ~~difference in~~ the underlying mechanism. More lacerations suggest more penetrating or cutting type of injuries. Consistent with previous literature (Brown, 2004; Cho & Wilke, 2010; Kernsmith & Craun, 2008; Melton & Belknap, 2003), our study revealed that IPV injuries due to cuts were seven times higher in men. These findings ~~are a continuation of establishing~~continue to establish patterns ~~a pattern that will be~~that are helpful in the clinical context. Unlike women, a laceration (and not a contusion) is a potential marker for IPV in men. Even though the head/neck was the most common anatomical location of all IPV-related injuries in both men and women, the percentage of lacerations in men was almost

similar to that of contusions in women. Similarly, there was a higher proportion of upper extremity injuries, especially lacerations and fractures in men. Victims generally sustain upper extremity injuries as part of self-defense (Khurana et al., 2021; Thomas et al., 2021).

Interestingly, there was a higher percentage of forearm lacerations and a lower percentage of hand and finger lacerations in men compared to women. This pattern of findings could be related to the use of a sharp weapon, such as a knife, by the assailant in victimizing men, forcing them to raise their arms and forearms to protect the face and central part of the body. Women are more likely to be assaulted with blunt force via punches in the face that would often cause them to grab the assailant's fist with their hands resulting in lacerations of hands and fingers. Women are also typically smaller than men and therefore women's head, face, and neck would be more accessible to a male assailant if both parties were standing.

A higher representation of hand fractures in men could also be the result of ~~the~~ men punching their partner, in which case they are not the victims of IPV, ~~rather~~ but the perpetrators. Also likely is that men use displaced aggression in an attempt to not ~~aggress against or hurt~~assault their female partner (Slotter et al., 2020); thus ~~such that~~ hand injuries could result from hitting inanimate objects in an attempt to find catharsis (Denzler & Förster, 2012). The higher ~~representation~~ percentage of upper trunk fractures in men could be due to the height difference in men and women. Previous studies have postulated that perpetrating women are more likely to use a weapon to make up for a height, weight, or strength discrepancy between them and their partner (Chan et al., 2013; Purcell et al., 2020; Thureau et al., 2015). Rib fractures are often due to blunt force - fist or using an object such as baseball bat (Porter et al., 2019). ~~We are seeing r~~Rib fractures ~~as~~ were the most common IPV chest injury in our cohort -- for both men and women~~,~~ -- although more for women. Older adult and ~~women~~ female IPV victims ~~will~~

have a higher likelihood of rib fractures (Khurana & Loder, 2021).

For men, the most likely location of their injuries was the head/neck, followed by upper extremity. On the head/neck, the most likely injuries were contusion/abrasion, followed by laceration and then internal organ injury. For upper extremity, the most likely injuries were lacerations, followed by contusion/abrasions and then strains/sprains. The pattern we found in our study suggest some important similarities and differences with the literature on female IPV victims. Research on female IPV victims shows that centrally located injuries involving the head, neck, front of the torso, and back are typical of abuse, and injuries to extremities such as arms and legs were more likely the result of accidents (Allen et al., 2007; Ferris et al., 1997).

The high percentage of head injuries among male IPV victims suggests a need to focus on the potential of acquired brain injuries among men. Recently, Ivany et al. (2021) discussed the importance of acquired brain injuries among IPV victims, but focused entirely on women. To our knowledge, there is no mention in the literature on male IPV victims' risk for brain injuries, even though there's evidence from the current study and others that this is a risk for male IPV victims (Hines & Douglas, 2010a, 2010b, 2015, 2016a, 2019).

Limitations

The limitations of this study must be acknowledged. While this is the largest study to date of the demographics and associated injury patterns in male IPV patients, it is important to highlight the patients in this study are those where the injured patient specifically informed the ED providers that there was an assault by an intimate partner. There are likely many more cases of male IPV in the NEISS AIP database but were not divulged to the ED providers. Additionally, NEISS captures only those who sought care in the ED and therefore our study does not include patients seeking care in outpatient or urgent care centers, thus underestimating the number of

IPV patients. Large data sets inherently possess inaccuracy; however, the NEISS data collection protocols have 89–98% accuracy (Annest et al., 1995). Another limitation is the absence of information on socioeconomic status, substance use, mental health illness, sexual orientation and relationship. The percentage of same-sex assaults cannot be determined from the NEISS data. The database does not have any information on associated injuries as only the most severe injury is recorded. Similarly, the severity, mechanism of injuries, whether related to victimization or perpetration, whether the IPV is unidirectional or bidirectional, and whether it was part of an isolated versus recurrent pattern are not reported, nor do we know whether the injury occurred despite the patient having receive support in the past. These issues are important to understand because they have very different treatment and intervention implications. Another limitation is the accuracy of the sex and racial identification. The sex/race is what was recorded in the ED record; whether it was self-reported or coded by the ED health care providers is unclear. Another limitation is missing data, such as for race; no imputation methods were used for missing data Finally, the AIP only tabulates non-fatal injuries, preventing us from studying fatal injuries.

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Implications

A UK study showed that a majority of men, including self-identified male IPV victims, felt that universal or targeted screening for IPV among men is necessary, yet only 1.6% had reported that they had ever been asked by a health care professional about potential IPV victimization (Morgan et al., 2014). A study in the U.S. showed that 91.8% of male IPV victims who saw a medical doctor for their injuries were asked about how they obtained their injuries; however, only 60.4% were truthful and only 14% were provided IPV resources (Douglas & Hines, 2011). There are a variety of successful educational programs that train medical providers on screening, identifying, and providing treatment for *women* who experience IPV (Sprague et

al., 2018). To our knowledge, no such program includes men as victims, an omission which perpetuates the stereotype that IPV happens only to women and is perpetrated only by men. Furthermore, research shows that among the factors contributing to medical providers screening for IPV among women patients, preparedness emerged as the key construct; if medical providers are unaware of the potential for IPV among their male patients and are not provided any educational resources, they are unlikely to screen, identify, or provide treatment for men. Thus, explicit education on male IPV victimization and how male IPV victims present to an ED and other medical facilities is necessary. Such education will likely result in providers asking about IPV victimization, provide an accurate diagnosis, and give the men the resources they need. They can also help male IPV victims realize that their experiences are not unique – that men are the victims of IPV much more often than the general public realizes – which will likely help the men seek resources and services.

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A recent paper from the UK analyzed 22 Domestic Homicide Reviews where ~~there was a~~the ~~male~~ man was the victim of female-perpetrated partner homicide (Hope et al., 2021), and found multiple missed opportunities for interventions in both the criminal justice system and health care services related to gender biases. Half of the reviews stated there was insufficient guidance around how to identify and treat male victims. Relevant to the current study were cases that involved missed opportunities by health care staff to follow up on serious injuries, including where there had been multiple visits. Many of the men were never questioned alone and were not asked about IPV. Men often do not seek help through fear of not being believed (Bates, 2020b), or based on previous negative experiences (e.g., Lysova et al., 2020). To effectively encourage men to seek help and disclose ~~when their injuries are~~ IPV-related injuries, there is a need for a coordinated effort by health care and criminal justice services to recognize and respond to male

victims.

Conclusions

Men are less likely to seek help when experiencing IPV than women, making the role of health care teams even more important in identifying possible IPV patients. With men under-reporting their victimization because they fear being an object of ridicule (Lysova et al., 2020) and with a lack of established injury patterns in male patients, it is vital for health care providers to be better equipped with the knowledge to identify IPV in men and recognize the gender differences. Knowledge of IPV injury patterns in male IPV victims presenting to the ED can help health care providers identify IPV victims, allowing for appropriate triage and intervention with safety plans and resources. Hopefully, this will disrupt the cycle of abuse and decrease subsequent more severe injury, with either assaults or self-inflicted suicide/suicide attempts. As such, this study gives clues to indicators of IPV in men. With men constituting one-third of older IPV victims, it is essential to consider the possibility of IPV, especially if the patient is an older male presenting with an ~~upper extremity laceration and~~ unclear mechanism of injury. Unlike women, IPV related injuries in men are often due to cutting or piercing with sharp instruments and therefore, men are more likely than women to present with lacerations. While head and neck is the most common anatomic location of all IPV related injuries in both men and women, there is a higher proportion of upper extremity injuries, especially lacerations and fractures in men. Most importantly, IPV related injuries in men are more severe resulting in more hospitalization. Due to significant under-reporting of IPV among men, it is critical for the health care provider to recognize that there is a higher likelihood of a male IPV victim to present with lacerations and not with head and neck contusions that are otherwise considered pathognomonic for IPV in women.

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Eveleth and Tanner, Worldwide Variation in Human Growth, Cambridge University Press, 2nd edition, 1990

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Table 1

Differences between men and women IPV based on race, disposition from the E.D., cause, anatomic location, and injury diagnosis

	Male Patients		**Female Patients**			
Variable	n = 353,382 (17.2%)		n = 1,706,058 (82.8%)		*t or* χ^2	*p*
Mean Age	36.2 (SD 12.6) ~~95% CI~~Interquartiles: [25.5, 44.5]		32.1 (SD 11.1) ~~95% CI~~Interquartiles: [22.9, 38.9]		17.36	<.0001
	n	**%**	**n**	**%**		
Race/Ethnicity						
White	117,427	42.3*	741,129	55.3	21.57	.0001
Black	112,554	40.5*	386,354	28.8		
Amerindian	46,231	16.6	201,187	15.0		
Asian	1,614	0.6	11,811	0.9		
Disposition from the E.D.						
Rx/release	313,120	92.1	1,595,270	96.3	13.71	.0002
Admit	27,000	7.9	61,508	3.7		
Cause						
Struck	202,847	57.6*	1,451,418	85.3	110.50	<.0001
Cut/pierce	98,856	28.1*	58,998	3.5		
Bite	20,639	5.9*	20,277	1.2		
Fall	9,035	2.6*	120,726	7.1		
Pedestrian	7,324	2.1*	11,148	0.7		
Fire/burn	5,782	1.6*	5,876	0.3		
Firearm GSW	3,089	0.9*	3,861	0.2		
Anatomic location						
Head/neck	173,534	49.8*	1,013,996	61.2	65.62	<.0001
Upper extremity	90,006	25.8*	233,830	14.1		
Upper trunk	43,601	12.5	182,672	11.0		
Lower extremity	22,697	6.5	96,130	5.8		
Lower trunk	18,916	5.4*	129,976	7.8		
Injury Diagnosis						
Laceration	137,182	46.9*	197,936	13.0	80.32	<.0001
Contusion/abrasion	87,965	30.1*	748,863	49.0		
Internal organ injury	31,565	10.8*	232,781	15.2		
Fracture	20,414	7.0*	156,423	10.2		
Strain/sprain	10,781	3.7*	153,679	10.1		
Concussion	4,287	1.5*	38,694	2.5		

Note. Due to missing data in several groups, the sum in each subsection does not equal the total N. An * in the male patients percentage column indicates a significant sex difference in post-hoc analyses after Bonferonni adjustment for multiple pairwise comparisons. For race/ethnicity, the adjusted alpha level was .0125; for cause, the adjusted alpha level was .007; for anatomic location, the adjusted alpha level was .01, and for injury diagnosis, the adjusted alpha level was .0083.

Table 2.
Injury location by the type of injury in men and women

	Contusion		Fracture		Laceration		Internal Organ		Strain/Sprain		Concussion	
Men	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Head/neck	45,579	52.8	8,096	39.7	67,442	49.2	30,029	95.1	2,636	24.5	4,287	100.0
Upper trunk	14,883	17.2	2,977	14.6	8,826	6.4	1,041	3.3	1,854	17.2	0	0.0
Lower trunk	4,648	5.4	477	2.3	4,169	3.0	496	1.6	1,574	14.6	0	0.0
Upper extremity	14,890	17.2	6,339	31.1	50,287	36.7	0	0.0	2,469	22.9	0	0.0
Lower extremity	6,334	7.3	2,525	12.4	6,241	4.6	0	0.0	2,248	20.9	0	0.0
Women												
Head/neck	418,817	57.9	80,806	51.7	134,404	68.0	228,675	98.3	57,339	37.4	38,694	100.0
Upper trunk	116,074	16.1	19,363	12.4	3,862	2.0	2,372	1.0	23,984	15.6	0	0.0
Lower trunk	55,936	7.7	3,326	2.1	3,147	1.6	1,606	0.7	13,749	9.0	0	0.0
Upper extremity	89,398	12.4	39,243	25.1	44,051	22.3	0	0.0	36,758	24.0	0	0.0
Lower extremity	42,545	5.9	13,685	8.7	12,182	6.2	0	0.0	18,024	11.7	0	0.0

Table 3

Injury type based on location of injury in men and women

	Head/Neck		Upper Trunk		Lower Trunk		Upper Extremity		Lower Extremity	
Men	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Contusion/abrasion	45,579	**28.8**	14,883	50.3	4,648	40.9	14,890	20.1	6,334	36.5
Fracture	8,096	5.1	2,977	10.1	477	4.2	6,339	8.6	2,525	14.6
Laceration	67,442	**42.7**	8,826	**29.8**	4,169	36.7	50,287	68.0	6,241	36.0
Internal organ	30,029	19.0	1,041	3.5	496	4.4	0	0.0	0	0.0
Strain/sprain	2,636	1.7	1,854	6.3	1,574	13.9	2,469	3.3	2,248	13.0
Concussion	4,287	2.7	0	0.0	0	0.0	0	0.0	0	0.0
Women										
Contusion/abrasion	418,817	**43.7**	116,074	70.1	55,936	71.9	89,398	42.7	42,545	49.2
Fracture	80,806	8.4	19,363	11.7	3,326	4.3	39,243	18.7	13,685	15.8
Laceration	134,404	**14.0**	3,862	**2.3**	3,147	4.0	44,051	21.0	12,182	14.1
Internal organ	228,675	23.9	2,372	1.4	1,606	2.1	0	0.0	0	0.0
Strain/sprain	57,339	6.0	23,984	14.5	13,749	17.7	36,758	17.5	18,024	20.9
Concussion	38,694	4.0	0	0.0	0	0.0	0	0.0	0	0.0

Table 4

Distribution of upper extremity lacerations and fractures in men and women

	Injury Type							
	Laceration				Fracture			
	Men		Women		Men		Women	
Upper Extremity Location	N	%	N	%	N	%	N	%
	53,531		45,400		6,491		43,457	
Shoulder	3,244	6.1	1,349	3.0	152	2.3	4,215	9.6
Humerus	5,605	10.5	2,115	4.7	165	2.5	2,111	4.8
Elbow	1,463	2.7	1,921	4.2	420	6.5	1,816	4.1
Forearm	17,591	32.9	11,499	25.3	857	13.2	5,717	13.2
Wrist	3,230	6.0	4,367	9.6	382	5.9	5,948	13.6
Hand	12,360	23.1	12,913	28.4	2,169	33.4	8,970	20.6
Fingers	10,038	18.8	11,236	24.7	2,346	36.1	14,680	33.8

Figure 1

IPV prevalence for different age groups in men and women 10 years or older