

**PHYSICAL, EMOTIONAL/PSYCHOLOGICAL AND SEXUAL ABUSE ANALYSIS
BASED ON VICTIM CHARACTERISTICS**

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Abstract

Significance: In the United States, 35.6% of women and 28.5% of men have experienced rape, physical violence, and/or stalking in their lifetime.¹ In an attempt to understand the differences between the victims of physical, emotional/psychological and sexual abuse, data from the Healthcare Cost and Utilization Program (HCUP) from Arizona were evaluated. However, identifying victims is often difficult, especially male victims.

Methods: Data from 2007 until 2012 was received from the publicly available HCUP dataset from the Agency for Healthcare Quality and Research and then was analyzed by comparing patient characteristics with respect to different types of abuse. Patient characteristics and associated diagnoses were also evaluated with respect to the patient's gender in order to determine if there were differences between female and male victims of abuse. Based on the population weights and the data from the six years, 3369 cases of abuse were evaluated, 2836 cases of physical abuse, 55 cases of emotional abuse and 478 cases of sexual abuse.

Results: There is a statistically significant increase in average age for the patients diagnosed with emotional abuse (average age = 62.1 years old, 95% CI = 50.3-73.8 years old; compared to physical abuse average age = 47.4 years old and sexual abuse average age = 43.0 years old). Other statistically significant findings include: an elevated occurrence of psychosis as a chronic condition in victims of emotional abuse (26.5%, 95% CI 8.69-57.8) and sexual abuse (17.6-35.1), increased number of chronic conditions listed in patients diagnosed with emotional abuse (mean number = 5.68, 95% CI = 3.59-7.76), and increased number of surgeries (24.5% of patients, 95% CI = 20.8-28.6%) and number of procedures required (1.41, 95% CI = 1.21-1.60) in patients diagnosed with physical abuse. The five most commonly associated diagnoses, regardless of type of abuse, are superficial injuries/contusions, intracranial injuries, skull/facial fractures, crushing/internal injuries and other fractures. All of these are seen most in patients with physical abuse. With respect to gender, it was found that skull and facial fractures are much more common in females who suffered from physical abuse than males (16.6% of females, 95% CI = 13.8-19.8; 5.66% of males, 95% CI = 2.37-12.9; p-value = 0.01).

Conclusions: While the analysis of this data does not point to any specific criteria that can help to identify and protect patients at risk for physical, emotional or sexual abuse, additional research should be performed to further understand the associated factors and the roles these factors play in abuse victims.

Table of Contents

| | |
|--|----|
| Introduction, Significance and Rationale | 1 |
| Methodological Approach | 3 |
| Results and Statistical Significance | 7 |
| Discussion | 19 |
| Future Directions | 22 |
| Conclusions | 23 |
| References | 44 |

List of Figures and Tables

| | |
|--|----|
| Table 1: Patient Characteristics evaluated by type of abuse diagnosed | 8 |
| Table 2: Outcomes and Hospital Characteristics evaluated by type of abuse diagnosed..... | 10 |
| Table 3: Overall top five subsequent diagnosis categories by type of abuse | 12 |
| Table 4: Top five subsequent diagnosis categories for physical abuse | 13 |
| Table 5: Top five subsequent diagnosis categories for emotional abuse | 14 |
| Table 6: Top five subsequent diagnosis categories for sexual abuse | 15 |
| Table 7: Overall top five subsequent diagnosis categories by type of abuse and stratified by gender | 17 |
| Table 8: Top five subsequent diagnosis categories for each type of abuse stratified by gender | 18 |

Introduction, Significance and Rationale

According to research published in 2015 by Nancy Sugg, 35.6% of women and 28.5% of men have experienced “rape, physical violence, and/or stalking by an intimate partner in their lifetimes.”¹ While it is known that abuse ranges across all socioeconomic and demographic groups, more research needs to be performed in order to better understand how to identify those at risk of abuse. According to the CDC-sponsored National Intimate Partner and Sexual Violence Survey (NISVS), nearly two-thirds of men affected by IPV did not receive services needed.¹ In order to help these victims of abuse, this study aims to identify the characteristics of victims of abuse so that they can better receive the healthcare that they need. What are the epidemiological differences between adult male and female victims of domestic violence? Are there signs, symptoms or demographic differences between the victims of domestic violence based on gender? Are there signs, symptoms or demographic differences between the victims of different types of abuse – physical, emotional/psychological or sexual?

This study was a retrospective study of the Healthcare Cost and Utilization Program (HCUP) data from the Arizona records of the State Emergency Department Databases (SEDD) from 2007 until 2012 to analyze the diagnoses and demographic characteristics that are present in patients who had a diagnosis of physical abuse, emotional/psychological abuse or sexual abuse and to further determine if there are differences between those diagnoses in males and females. The types of abuse are analyzed independently in order to determine if there are certain risk factors that predispose a victim to a certain type of abuse. The prevalence of commonly associated diagnoses was analyzed with respect to gender. The rate of admission, the type of hospital, patient income, and patient age was also analyzed with respect to type of abuse. It was hypothesized that there is a higher rate of physical abuse compared to sexual or emotional/psychological abuse in males. But there is a higher prevalence of associated severe psychological diagnoses in males and a higher prevalence of associated severe physical and sexual diagnoses in females.

Types of Abuse under Investigation

Abuse has several different forms. Child Abuse, Elder Abuse and Intimate Partner Violence are forms of abuse which are often difficult to detect. Intimate Partner Violence (IPV), as defined by the CDC, specifically refers to abuse of a victim by a current or former spouse or partner. However, this project, while drawing on research regarding IPV will look not specifically at the perpetrator but rather the characteristics of the victim. The International Classification of Diseases, Ninth Revision (ICD-9) codes which indicate abuse include 995.81 which indicates physical abuse, 995.82 which indicates emotional/psychological abuse and 995.83 which indicates sexual abuse. These codes do not indicate who the perpetrator was but rather the type of abuse which is inflicted on the victim. It is this distinction that was utilized for this study. Additional research evaluating the type of perpetrator and intent should be conducted at a later time.

According to the National HCUP data from 2013, there were 22,317 Emergency Department visits for physical abuse, 941 ED visits for emotional/psychological abuse and 8,346 ED visits for sexual abuse.² A total of 4,327 of those visits were for male victims. Male victims account for about 7-16% depending on the type of abuse. There is currently limited research evaluating male victims despite the thousands of males undergoing abuse annually. Therefore, there needs to be more research regarding the effects of abuse on male victims. Hackenberg et al suggest that 25-35% of women and men in Western countries have experienced Intimate Partner Violence. This study initially set out to show that there are higher rates of severe injuries sustained by young and middle-aged women. However, Hackenberg et al determined that severe injuries occur due to IPV among both males and female in all age groups.³

Current Understanding of Female Victim Abuse

There has been significant research done indicating that there are long term effects and high rates of physical and emotional problems in victims of domestic violence. However, most research has been done geared towards the long-term effects and associated problems in female victims. Hink et al show in their study that there are statistically significant associations between abuse and mental illness, substance abuse and high-risk scenarios for intentional

injury. But this study only evaluated females at a rural trauma center.⁴ In this study, the associated diagnoses are studied in both men and women throughout Arizona. Wolford-Clevenger et al have done research on the suicide rates in male and female college students who have previously experienced partner abuse. In their study, they determined that physical abuse was associated with increased suicidal ideation in men while emotional abuse was associated with increased suicidal ideation in women.⁴ Wolford-Clevenger et al suggest that there is still more research that must be done in order to better understand the differences between female and male victims.⁵

Current Understanding Male Victim Abuse

Cunradi et al have determined that there are associations with alcohol-related problems among men and women and drug use among women in those who are victims of severe Intimate Partner Violence.⁶ However, the research was limited to victims of IPV and not all types of abuse. This study aimed to study the associations in a broader scope. Thornton et al have done research on the risk factors for male and female victims of IPV and have suggested that there are similar risks factors for both genders.⁷ However, they suggest that men are at risk for general violence and abuse beyond just IPV. For this reason they suggest that there needs to be further research done on the risk factors and associations in male versus female victims. Additionally, Carmo et al suggest that there are significant social barriers which lead to further research aimed at understanding males as victims of abuse. For example in a patriarchal model of society, men are seen as stronger and less vulnerable than women.⁹ Men tend to be portrayed as the perpetrator instead of the victim. Yet, the NISVS data clearly indicates that there are male victims who are being overlooked.^{1,9}

Implications of Results

This study was designed to determine the associated diagnoses and demographic factors which are associated in victims of physical, emotion/psychological and sexual abuse in both males and females. There are currently several screening tools which can be used to help identify women that are at risk for IPV and domestic violence. In fact, Arkins et al have analyzed these screening tools and assessed the effectiveness on women.⁸ However, there are currently no screening

tools which are appropriate and advised for use with males. The results from this study may help to identify key identifying factors to aid in appropriate screening for males and to determine which male patients may be at risk of abuse. Carmo et al suggest in their study that the reporting of male victims of abuse may be lower because men tend to underreport and hide this kind of victimization.⁹ It is for this reason that an effective screening tool is necessary. Ideally, the results from this study, and similar research, will help to establish characteristics that can help providers in an emergency department or primary care setting to identify males who are at risk for physical, emotional/psychological or sexual abuse and help to provide these potential victims with the resources and support that they need.

Methodological approach

This study is designed to identify the differences between the diagnoses and demographic characteristics associated with victims of physical abuse, emotional/psychological abuse and sexual abuse as well as to evaluate the differences between male and female patients with these diagnoses. The study is a retrospective analysis of de-identified public health records at the time of emergency department visit. The data collection will occur via reports of the Healthcare Cost and Utilization Program (HCUP) including the Arizona State Emergency Department Database (SEDD) from 2007 until 2012. The ICD-9 codes for adult physical abuse (995.81), adult emotional/psychological abuse (995.82) and adult sexual abuse (995.83) will be evaluated.

The State Emergency Department Database (SEDD) is a database within the Healthcare Cost and Utilization Program (HCUP) which is sponsored by the Agency for Healthcare Research and Quality (AHRQ).¹⁰ Data is collected from emergency departments by a Central Distributor. The SEDD files collected data regarding patient visits to emergency departments which did not result in hospitalizations at the same facility. The data in the SEDD database is then weighted to represent the entirety of the visits throughout Arizona. The data can be obtained on a yearly basis.

Data Reports

The Arizona states records from the State Emergency Department Database (SEDD) were requested and received from 2007 until 2012. This data was filtered in order to evaluate only entries which included one of the three ICD-9 codes of interest (995.81, 995.82, and 995.83). The state records from 2007 through 2012 were obtained and utilized for a larger sample size. Each entry in the database represents a portion of the population. This was taken into account by utilizing the population weights. After factoring the population weight information for the data, the total sample size for all types of abuse is 3369. There are 2836 cases of physical abuse, 55 cases of emotional abuse and 478 cases of sexual abuse recorded in emergency departments in Arizona during these six years.

Data Collected

For each year (2007-2012), the public health records for all emergency department visits with ICD-9 codes 995.81, 995.82 and 995.83 are utilized. Each entry is evaluated for additional information including other visit diagnosis codes and chronic diagnosis codes. This yields a list of ICD-9 codes and the percentage of patients that were given the abuse code as well as the other diagnosis codes individually (e.g. percentage of physical abuse records which also had the code for traumatic brain injury). This report allows for the comparison of non-abuse diagnoses to each type of abuse. Each of the associated diagnoses is considered. The additional information evaluated on the HCUP report includes: age range, payer type, median income for patient zip code, patient residence, hospital owner, teaching status, location, and trauma center designation. Each of these aspects is documented with respect to the patient gender. The discharge and admission rates is be documented with respect to type of abuse and gender.

Statistical Analysis of Data

All data from the HCUP database had prescribed weights which were applied to the data prior to statistical analysis. Univariate linear regression (ANOVA) is used to compare the continuous variables found in this data set in order to find statistically significant differences in averages between types of abuse and genders. Chi-squared/Fisher's exact calculations are used to compare data with categorical variables in order to find statistically significant differences in categories between types of abuse and gender. The data is evaluated by comparing physical abuse to emotional abuse to sexual abuse. The associated diagnoses are then evaluated with respect to male and female gender. A p-value of 0.05 is used to indicate statistical significance.

Results and Statistical Significance

Patient Characteristics (Table 1)

When looking at characteristics of patients identified as victims of abuse, age and the chronic diagnosis of psychosis are the only characteristics found to be statistically significant between the three types of abuse. The mean age for victims of emotional abuse is 62.1 years old (95% CI = 50.3-73.8 years old; p-value = 0.006) compared to 47.4 years old for physical abuse and 43.0 years old for sexual abuse. All of the 55 cases of emotional abuse were females; however, the percentage of females versus males is not statistically different between the types of abuse (p-value = 0.21). Race, insurance status, income quartiles, patient location and time spent admitted are not significantly different between the three types of abuse. With respect to chronic conditions evaluated, psychosis is the only condition that was found to be significantly more common in victims of emotional abuse (26.5%, 95% CI = 8.69-57.8%) and sexual abuse (25.5%, 95% CI = 17.6-35.1%) compared to physical abuse (12.5%, 95% CI = 9.95-15.5%) with a p-value of 0.002. Other chronic conditions that are analyzed include alcohol abuse, depression, diabetes (uncomplicated and complicated), drug abuse, hypertension and obesity. With the exception of hypertension, none of these chronic conditions were found to be more commonly associated with any one type of abuse. However, hypertension does trend towards victims of emotional abuse (43.5%, 95% CI = 18.9-71.8; p-value = 0.098) compared to physical abuse (30.9%, 95% CI = 27.2-34.8%) and sexual abuse (23.1%, 95% CI = 15.6-32.7%).

Table 1: Patient Characteristics evaluated by type of abuse diagnosed. Total N = 3369. Physical abuse N = 2836, Emotional abuse N = 55, and Sexual abuse N = 478. Univariate linear regression used to compare continuous variables. Chi-squared/Fisher's exact calculation used to compare categorical variables. All analyses were conducted after implementing population weights.

| Patient Characteristics (Total N = 3369) | | | | |
|--|--------------------------|-------------------------|-----------------------|---------|
| Variables | Physical Abuse N=2836 | Emotional Abuse N=55 | Sexual Abuse N=478 | P-value |
| Age (Mean, 95% CI) | 47.4 (45.7, 49.1) | 62.1 (50.3, 73.8) | 43.0 (38.9, 47.2) | 0.006 |
| Gender (Female %, 95% CI) | 86.4 (83.2, 88.9) | 100 | 91.8 (84.4, 95.9) | 0.21 |
| Race (% , 95% CI) | | | | 0.63 |
| White | 50.9 (46.4, 55.4) | 54.3 (26.4, 79.7) | 57.4 (46.4, 67.7) | |
| Black | 26.9 (23.2, 31.1) | 28.3 (9.43, 60.0) | 20.8 (0.13, 31.1) | |
| Hispanic | 12.2 (9.56, 15.4) | 7.05 (0.95, 37.4) | 9.64 (4.87, 18.1) | |
| Asian | 2.57 (1.46, 4.48) | 10.3 (1.44, 47.5) | 5.23 (1.97, 13.1) | |
| Other | 7.33 (5.32, 10.0) | 0 (0.0) | 6.85 (3.07, 14.6) | |
| Insurance Status (% , 95% CI) | | | | 0.44 |
| Medicare | 27.2 (23.6, 31.0) | 53.0 (25.5, 78.9) | 26.0 (18.1, 35.9) | |
| Medicaid | 30.0 (26.6, 34.1) | 29.0 (9.71, 60.1) | 33.2 (24.5, 43.3) | |
| Private | 15.1 (12.3, 18.2) | 10.9 (6.00, 19.2) | 10.9 (6.00, 19.2) | |
| Self-Pay | 18.6 (15.6, 22.1) | 0 (0.0) | 18.7 (12.1, 27.9) | |
| Other, None | 8.92 (6.82, 11.6) | 0 (0.0) | 11.1 (6.17, 18.9) | |
| Median Household Income Quartiles (% , 95% CI) | | | | 0.39 |
| 1 (\$1-\$24,999) | 38.3 (34.3, 42.5) | 53.4 (23.4, 81.2) | 33.8 (24.8, 44.1) | |
| 2 (\$25,000-\$34,999) | 27.2 (23.6, 31.1) | 11.0 (1.51, 49.9) | 24.9 (17.1, 34.7) | |
| 3 (\$35,000-\$44,999) | 20.9 (17.7, 24.6) | 11.4 (1.58, 51.1) | 19.1 (12.2, 29.6) | |
| 4 (\$45,000 and above) | 13.5 (10.8, 16.6) | 24.0 (6.13, 60.6) | 22.2 (14.7, 31.9) | |
| Patient Location Population (% , 95% CI) | | | | 0.15 |
| Central counties (>=1mil) | 41.9 (37.8, 46.1) | 63.5 (33.5, 85.6) | 41.4 (31.7, 46.2) | |
| Fringe Counties (>= 1mil) | 20.2 (17.1, 23.8) | 36.5 (14.3, 66.5) | 25.8 (17.7, 35.8) | |
| Counties (250,000-999,999) | 15.7 (12.9, 18.9) | 0 (0.0) | 15.3 (9.36, 24.1) | |
| Counties (50,000-249,999) | 6.25 (4.49, 8.63) | 0 (0.0) | 10.0 (5.31, 18.4) | |
| Not metropolitan or Micropolitan counties | 15.8 (12.9, 19.2) | 0 (0.0) | 7.43 (3.56, 14.8) | |
| Admission Time (% , 95% CI) | | | | 0.34 |
| Sept – Nov | 22.7 (19.4, 26.5) | 19.4 (4.84, 53.3) | 25.9 (17.8, 36.1) | |
| Dec – Feb | 27.1 (23.5, 31.0) | 0 (0.0) | 22.6 (15.1, 32.6) | |
| Mar – May | 23.8 (20.4, 27.6) | 29.6 (9.74, 62.1) | 20.4 (13.3, 29.9) | |
| June - Aug | 26.3 (22.7, 30.2) | 50.1 (22.9, 78.4) | 31.1 (22.2, 41.5) | |
| Alcohol abuse (% , 95% CI) | 18.9 (15.8, 22.3) | 0 (0.0) | 20.8 (13.8, 30.1) | 0.27 |
| Depression (% , 95% CI) | 13.5 (10.9, 16.6) | 17.9 (4.47, 50.4) | 12.4 (7.15, 20.7) | 0.76 |
| Diabetes, Uncomplicated (% , 95% CI) | 10.5 (8.25, 13.4) | 18.9 (4.74, 52.2) | 13.4 (7.87, 21.7) | 0.34 |
| Diabetes, Complicated (% , 95% CI) | 2.12 (1.21, 3.71) | 9.11 (1.25, 44.1) | 2.05 (0.051, 7.87) | 0.26 |
| Drug Abuse (% , 95% CI) | 14.3 (11.6, 17.5) | 0 (0.0) | 18.6 (12.1, 27.8) | 0.22 |
| Hypertension (% , 95% CI) | 30.9 (27.2, 34.8) | 43.5 (18.9, 71.8) | 23.1 (15.6, 32.7) | 0.098 |
| Obesity (% , 95% CI) | 4.84 (3.36, 6.94) | 0 (0.0) | 5.11 (2.13, 11.7) | 0.88 |
| Psychosis (% , 95% CI) | 12.5 (9.95, 15.5) | 26.5 (8.69, 57.8) | 25.4 (17.6, 35.1) | 0.002 |

Outcomes and Hospital Characteristics (Table 2)

When looking at the patient outcomes and the hospital characteristics with respect to type of abuse identified, there are several factors found to not be statistically significant including: in-hospital mortality, length of stay, patient disposition, hospital ownership, hospital location, teaching designation, admission source and admission type. There are, however, a number of factors that trend towards a type of abuse, although not statistically significant by a p-value of 0.05. The mean total charge for patients with physical abuse was \$38,083.9 (95% CI = \$32,673.1-\$43,514.6; p-value = 0.11) compared to \$15,052.2 (95% CI = \$10,542.0-\$19,582.9) for emotional abuse and \$25,623.4 (95% CI = \$16,412.9-\$34,833.9) for sexual abuse. The number of procedures is increased for patients diagnosed with physical abuse at 1.41 (95% CI = 1.21-1.60; p-value = 0.099) compared to 0.14 procedures (95% CI = -0.11-0.39) for emotional abuse and 0.85 procedures (95% CI = 0.55-1.17) for sexual abuse. Although the number of procedures coded is not statistically significant, the percentage of patients requiring a major operation is statistically significant. Patients diagnosed with physical abuse required major operations in 24.5% of visits (95% CI = 20.8-28.6%; p-value = 0.007) compared to just 10.3% of sexual abuse visits (95% CI = 5.42-18.8). There were no emotional abuse visits which required operations. Lastly, the number of chronic conditions identified is significantly higher in patients diagnosed with emotional abuse comparatively. The mean number of conditions in patients with emotional abuse is 5.68 (95% CI = 3.59-7.76 conditions; p-value = 0.002) compared to 3.97 chronic conditions in patients with sexual abuse (95% CI = 3.34-4.60) and 3.02 chronic conditions in patients with physical abuse (95% CI = 2.80-3.24).

Table 2: Outcomes and Hospital Characteristics evaluated by type of abuse diagnosed. Total N = 3369. Physical abuse N = 2836, Emotional abuse N = 55, and Sexual abuse N = 478. Univariate linear regression used to compare continuous variables. Chi-squared/Fisher's exact calculation used to compare categorical variables. All analyses were conducted after implementing population weights.

| Outcomes and Hospital Characteristics (Total N=3369) | | | | |
|--|----------------------------|----------------------------|----------------------------|---------|
| Variables | Physical Abuse N=2836 | Emotional Abuse N=55 | Sexual Abuse N=478 | P-value |
| In Hospital Mortality (% , 95% CI) | 0.71 (0.27, 1.89) | 0 (0.0) | 0 (0.0) | >0.99 |
| Length of Stay (Mean, 95% CI) | 5.06 (4.13, 5.99) | 4.49 (2.86, 6.13) | 4.321 (3.07, 5.57) | 0.82 |
| Total Charges (Mean, 95% CI) | 38083.9 (32673.1, 43514.6) | 15062.5 (10542.0, 19582.9) | 25623.4 (16412.9, 34833.9) | 0.11 |
| Patient Disposition (% , 95% CI) | | | | 0.44 |
| Routine | 70.3 (66.4, 73.9) | 55.2 (27.2, 80.2) | 71.7 (61.8, 79.9) | |
| Transfer to short term facility | 1.01 (0.45, 2.25) | 0 (0.0) | 3.11 (1.00, 9.24) | |
| Other Transfers | 20.0 (16.9, 23.6) | 35.6 (13.9, 65.5) | 17.3 (10.8, 26.4) | |
| Home Health care | 5.10 (3.56, 7.26) | 0 (0.0) | 3.80 (1.41, 9.86) | |
| Against Medical Advice | 2.81 (1.72, 4.54) | 9.11 (1.26, 44.7) | 4.05 (1.52, 10.3) | |
| Discharged | 4.0 (1.52, 10.4) | 0 (0.0) | 0 (0.0) | |
| # of Chronic conditions (Mean, 95% CI) | 3.02 (2.80, 3.24) | 5.68 (3.59, 7.76) | 3.97 (3.34, 4.60) | 0.002 |
| Major Operating Room indicator (% , 95% CI) | 24.5 (20.8, 28.6) | 0 (0.0) | 10.3 (5.42, 18.8) | 0.007 |
| # of Procedures (Mean, 95% CI) | 1.41 (1.21, 1.60) | 0.14 (-0.11, 0.39) | 0.85 (0.55, 1.17) | 0.099 |
| Hospital Bed Size (% , 95% CI) | | | | 0.11 |
| Small | 8.28 (6.26, 10.8) | 7.06 (0.95, 37.4) | 3.79 (1.42, 9.75) | |
| Medium | 17.2 (14.2, 20.6) | 35.1 (13.6, 65.0) | 25.1 (17.3, 35.0) | |
| Large | 74.5 (70.6, 77.9) | 57.8 (29.3, 81.8) | 71.1 (61.0, 79.4) | |
| Hospital Ownership (% , 95% CI) | | | | 0.44 |
| Gov't or Private | 67.6 (63.6, 71.4) | 64.1 (34.2, 85.9) | 70.5 (60.5, 78.9) | |
| Gov't/non-federal | 5.37 (3.77, 7.59) | 9.11 (1.25, 44.1) | 8.76 (4.55, 16.2) | |
| Private/Non-Profit | 18.3 (15.3, 21.7) | 26.8 (8.80, 58.1) | 12.1 (6.76, 20.6) | |
| Private/investor | 4.58 (3.13, 6.67) | 0 (0.0) | 6.75 (3.05, 14.3) | |
| Private Other | 4.05 (2.67, 6.09) | 0 (0.0) | 1.88 (0.46, 7.25) | |
| Hospital Location/Teaching (% , 95% CI) | | | | 0.85 |
| Rural | 8.19 (0.615, 10.8) | 0 (0.0) | 6.32 (2.84, 13.4) | |
| Urban, Non-teaching | 19.7 (16.6, 23.2) | 8.58 (1.18, 42.5) | 19.1 (12.3, 28.4) | |
| Urban, Teaching | 72.1 (68.2, 75.7) | 91.4 (57.5, 98.8) | 74.6 (64.7, 82.4) | |
| Admission Source (% , 95% CI) | | | | 0.77 |
| ER | 77.1 (70.4, 82.7) | 66.5 (26.3 (91.6) | 77.6 (58.0, 89.7) | |
| Another hospital | 2.65 (1.10, 6.28) | 0 (0.0) | 3.44 (0.47, 21.1) | |
| Routine/Birth/other | 20.2 (14.9, 26.7) | 33.5 (8.30, 73.7) | 18.9 (8.03, 38.4) | |
| Admission Type (% , 95% CI) | | | | 0.23 |
| Emergency | 76.1 (71.7, 80.0) | 88.1 (47.6, 98.4) | 84.6 (74.7, 91.0) | |
| Urgent | 6.59 (4.57, 9.41) | 11.8 (1.60, 52.3) | 4.02 (1.29, 11.7) | |
| Elective | 5.30 (3.47, 8.02) | 0 (0.0) | 4.11 (1.31, 12.1) | |
| Trauma center | 11.9 (9.11, 15.5) | 0 (0.0) | 6.08 (2.54, 13.8) | |

Subsequent Diagnosis Categories by abuse type (Tables 3, 4, 5 and 6)

The top five subsequent diagnosis categories for all abuse visits, regardless of type of abuse, in descending order are superficial injuries/contusions, intracranial injuries, skull/facial fractures, crushing/internal injuries and other fractures. All five of these categories are seen most in patients diagnosed with physical abuse. All except crushing/internal injuries are found to be significantly increased in physical abuse cases. Crushing/internal injuries, while seen most in physical abuse cases, are not found to be statistically significant. Superficial injuries and contusions are seen in 35.4% of physical abuse cases (p-value = 0.045) compared to 10.1% of emotional abuse cases and 16.2% of sexual abuse cases. Intracranial injuries are seen in 18.9% of physical abuse cases (p-value = 0.004), skull/facial fractures are seen in 17.4% of physical abuse cases (p-value < 0.001) and other fractures are seen in 12.3 of physical abuse cases (p-value = 12.3%).

As seen in table 4, the top five diagnosis categories overall for abuse cases are the same top five diagnosis categories for physical abuse. However, the top five diagnosis categories for emotional abuses cases, in descending order, are mood disorders (44.4% of cases), mental health/substance abuse (35.6% of cases), dementia/cognitive disorders (28.1% of cases), anxiety (16.2% of cases) and other mental health diagnoses (8.83% of cases). The top five diagnoses categories for patients with a diagnosis of sexual abuse are mental health/substance abuse (28.7% of cases), anxiety (27.1% of cases), superficial injuries/contusions (26.1% of cases), other injuries due to external causes (24.5% of cases) and alcohol related disorders (20.7% of cases).

Table 3: Overall top five subsequent diagnosis categories by type of abuse. Total N = 3369. Physical abuse N = 2836, Emotional abuse N = 55, and Sexual abuse N = 478. Chi-squared/Fisher's exact calculation used to compare categorical variables. All analyses were conducted after implementing population weights.

| Top 5 subsequent diagnosis categories (Total N=3369) | | | | | |
|--|--------------------------------|---------------------------------------|--------------------------------------|------------------------------------|---------|
| Variables | Overall N=3369 %, 95% CI | Physical Abuse N=2836 %, 95% CI | Emotional Abuse N=55 %, 95% CI | Sexual Abuse N=478 %, 95% CI | P-value |
| Superficial injuries / Contusion | 33.7 (30.1, 37.3) | 35.4 (31.5, 39.9) | 10.1 (1.41, 46.9) | 16.2 (18.3, 35.9) | 0.045 |
| Intracranial Injuries | 16.9 (14.3, 20.0) | 18.9 (15.9, 22.4) | 0 (0.0) | 7.17 (3.44) | 0.004 |
| Skull / Facial Fractures | 15.2 (12.7, 18.2) | 17.4 (14.5, 20.8) | 0 (0.0) | 4.15 (1.56, 10.6) | <0.001 |
| Crushing / Internal Injuries | 11.2 (9.06, 13.9) | 11.7 (9.28, 14.6) | 0 (0.0) | 9.77 (5.30, 17.3) | 0.73 |
| Other Fractures | 10.7 (8.67, 13.4) | 12.3 (9.88, 15.3) | 0 (0.0) | 2.81 (0.90, 8.43) | 0.009 |

Table 4: Top five subsequent diagnosis categories for physical abuse. Physical abuse N = 2836. All analyses were conducted after implementing population weights.

| Physical Abuse (N=2836) | %, 95% CI |
|----------------------------------|-------------------|
| Superficial injuries / Contusion | 35.4 (31.5, 39.9) |
| Intracranial Injuries | 18.9 (15.9, 22.4) |
| Skull / Facial Fractures | 17.4 (14.5, 20.8) |
| Other Fractures | 12.3 (9.88, 15.3) |
| Crushing / Internal Injuries | 11.7 (9.28, 14.6) |

Table 5: Top five subsequent diagnosis categories for emotional abuse. Emotional abuse N = 55. All analyses were conducted after implementing population weights.

| Emotional Abuse (N=55) | %, 95% CI |
|-------------------------------|-------------------|
| Mood disorders | 44.4 (19.5, 72.5) |
| Mental Health/Substance Abuse | 35.6 (13.8, 65.5) |
| Dementia/Cognitive Disorders | 28.1 (9.31, 59.7) |
| Anxiety | 16.2 (3.94, 47.5) |
| Other Mental Health | 8.83 (1.21, 43.2) |

Table 6: Top five subsequent diagnosis categories for sexual abuse. Sexual abuse N = 478. All analyses were conducted after implementing population weights.

| Sexual Abuse (N=478) | %, 95% CI |
|---------------------------------------|-------------------|
| Mental Health/Substance Abuse | 28.7 (20.5, 38.6) |
| Anxiety | 27.1 (19.1, 36.8) |
| Superficial injuries / Contusion | 26.1 (18.3, 35.9) |
| Other Injuries due to external causes | 24.5 (16.9, 34.0) |
| Alcohol Related Disorders | 20.7 (13.8, 30.1) |

Subsequent diagnosis categories by abuse type and gender stratification (Tables 7 and 8)

When the data is stratified by gender, the only diagnosis, in the top five categories, which is statistically significant between genders is skull/facial fractures. 16.6% of females also had skull/facial fractures (95% CI = 13.8-19.8; p-value = 0.01) compared to only 5.66% of males, regardless of abuse type. When the gender is stratified after taking the type of abuse into account, skull/facial fractures remains the only diagnosis significantly different between genders. All 55 of the emotional abuse cases are females, therefore comparisons cannot be made. As seen in table 8, when the top 5 diagnosis categories are evaluated for each different type of abuse and stratified by gender, there are no additional statistically significant results. However, anxiety is only diagnosed in females with sexual abuse (p-value = 0.10).

Table 7: Overall top five subsequent diagnosis categories by type of abuse and stratified by gender. Males N = 424, and Females N = 2945. All emotional abuse observations were female patients, no comparison performed for this category. Chi-squared/Fisher's exact calculation used to compare categorical variables. All analyses were conducted after implementing population weights.

| Top 5 subsequent diagnosis categories (Total N=3369) | | | |
|--|----------------------------|-------------------------------|---------|
| | Males (N=424) %, 95% CI | Females (N=2945) %, 95% CI | P-value |
| Overall | | | |
| Skull / Facial Fractures | 5.66 (2.37, 12.9) | 16.6 (13.8, 19.8) | 0.01 |
| Intracranial Injuries | 15.2 (9.03, 24.5) | 17.3 (14.4, 20.5) | 0.63 |
| Crushing / Internal Injuries | 9.33 (4.71, 17.6) | 11.5 (9.17, 14.3) | 0.55 |
| Superficial injuries / Contusion | 26.2 (17.9, 36.5) | 34.7 (30.9, 38.7) | 0.16 |
| Other Fractures | 11.2 (6.11, 19.7) | 10.7 (8.47, 13.5) | 0.81 |
| Physical Abuse | | | |
| Skull / Facial Fractures | 6.23 (2.61, 14.2) | 19.2 (15.9, 22.9) | 0.006 |
| Intracranial Injuries | 16.8 (9.96, 26.8) | 19.3 (16.1, 23.1) | 0.59 |
| Crushing / Internal Injuries | 7.85 (3.56, 16.4) | 12.3 (9.66, 15.6) | 0.25 |
| Superficial injuries / Contusion | 27.6 (18.8, 38.5) | 36.6 (32.4, 40.9) | 0.17 |
| Other Fractures | 12.4 (6.74, 21.6) | 12.3 (9.71, 15.6) | 0.90 |
| Emotional Abuse | | | |
| All Observations were female thus could not compare | | | |
| Skull / Facial Fractures | | | |
| Intracranial Injuries | | | |
| Crushing / Internal Injuries | | | |
| Superficial injuries / Contusion | | | |
| Other Fractures | | | |
| Sexual Abuse | | | |
| Skull / Facial Fractures | 0 (0.0) | 4.52 (1.67, 11.6) | >0.99 |
| Intracranial Injuries | 0 (0.0) | 7.81 (3.71, 15.7) | >0.99 |
| Crushing / Internal Injuries | 23.9 (5.79, 61.7) | 8.51 (4.23, 16.4) | 0.19 |
| Superficial injuries / Contusion | 12.8 (1.70, 55.3) | 27.4 (18.9, 37.9) | 0.67 |
| Other Fractures | 0 (0.0) | 3.06 (0.96, 9.31) | >0.99 |

Table 8: Top five subsequent diagnosis categories for each type of abuse stratified by gender. All emotional abuse observations were female patients, no comparison performed for this category. Chi-squared/Fisher's exact calculation used to compare categorical variables. All analyses were conducted after implementing population weights.

| Top 5 subsequent diagnosis categories (Total N=3369) | | | | |
|--|----------------------|---|----------------------|---------|
| | Overall %, 95% CI | Males %, 95% CI | Females %, 95% CI | P-value |
| Physical Abuse (N=2836) | | | | |
| Skull / Facial Fractures | 17.4 (14.5, 20.8) | 5.66 (2.37, 12.9) | 16.6 (13.8, 19.8) | 0.01 |
| Intracranial Injuries | 18.9 (15.9, 22.4) | 15.2 (9.03, 24.5) | 17.3 (14.4, 20.5) | 0.63 |
| Crushing / Internal Injuries | 11.7 (9.28, 14.6) | 9.33 (4.71, 17.6) | 11.5 (9.17, 14.3) | 0.55 |
| Superficial injuries / Contusion | 35.4 (31.5, 39.9) | 26.2 (17.9, 36.5) | 34.7 (30.9, 38.7) | 0.16 |
| Other Fractures | 12.3 (9.88, 15.3) | 11.2 (6.11, 19.7) | 10.7 (8.47, 13.5) | 0.81 |
| Emotional Abuse (N=55) | | | | |
| | | All Observations were female thus could not compare | | |
| Anxiety | 16.2 (3.94, 47.5) | | | |
| Dementia/Cognitive Disorders | 28.1 (9.31, 59.7) | | | |
| Mood disorders | 44.4 (19.5, 72.5) | | | |
| Mental Health/Substance Abuse | 35.6 (13.8, 65.5) | | | |
| Other Mental Health | 8.83 (1.21, 43.2) | | | |
| Sexual Abuse (N=478) | | | | |
| Superficial injuries / Contusion | 26.1 (18.3, 35.9) | 12.8 (1.71, 55.4) | 27.4 (18.9, 37.8) | 0.67 |
| Other Injuries due to external causes | 24.5 (16.9, 34.0) | 11.6 (1.52, 52.5) | 25.6 (17.5, 35.9) | 0.68 |
| Anxiety | 27.1 (19.1, 36.8) | 0 (0.0) | 29.5 (20.7, 40.0) | 0.10 |
| Mental Health/Substance Abuse | 28.7 (20.5, 38.6) | 12.4 (1.64, 54.5) | 30.2 (21.4, 40.7) | 0.43 |
| Alcohol Related Disorders | 20.7 (13.8, 30.1) | 12.4 (1.64, 64.4) | 21.5 (14.0, 31.6) | >0.99 |

Discussion

The patients that are identified as being victims of emotional abuse are all females and are found to have a higher average age compared to the victims of physical and sexual abuse. For this reason, it is understandable why there is an increased number of chronic conditions in patients with emotional abuse. The increased rate of hypertension in patients with emotional abuse could also be due to the increased average age of the patients; however, there is not a significant increase in other chronic conditions such as diabetes (uncomplicated and complicated) which are otherwise associated with increased age. It is important to note that the rates of diabetes, both complicated and uncomplicated were increased in the emotional abuse cases; however, the power was not strong enough to indicate significance. There is a strong correlation between a chronic diagnosis of psychosis as well as emotional abuse and sexual abuse compared to physical abuse. This may be due to the longitudinal nature of these types of abuse. Although the gender distribution is not statistically significant, it should be noted that all of the victims of emotional abuse were females; however, due to the small sample size of emotional abuse victims (N = 55), no absolute conclusions can be drawn from this data. A larger sample size needs to be evaluated in the future for a better understanding of the role of gender on the rate of types of abuse.

With respect to patient outcomes, victims of physical abuse has a higher average total charge from the emergency department. While the results are not strong, the trend towards higher hospital bills, may be due to the increased number of procedures and operations which were necessary for physical abuse victims compared to emotional and sexual abuse victims. As physical abuse victims are found to have higher rates of fractures and intracranial injuries, it is likely that physical abuse victims require reductions, orthopedic surgeries or neurosurgeries, which would increase the total cost. As the abuse is physical, the treatments are also physical and cost more money.

As previously mentioned superficial injuries/contusions, intracranial injuries, skull/facial fractures, crushing/internal injuries and other fractures are seen most in abuse cases, with the highest rate of these diagnoses in patients with physical abuse. When the data is stratified for gender in the physical abuse group, it can be seen that there is a significantly larger portion of females who suffer skull and facial fractures compared to males. Female patients effected by physical abuse are nearly three times more likely to be diagnosed with a skull or facial fracture. This may be due to lower bone density or due to an increased force applied (as there is a large percentage of male perpetrators abusing females).

Furthermore, patients who are victims of emotional abuse are found to have high rates of mood disorders and other psychological diagnoses. However, the sample size is not large enough to determine the rates in males as all of the emotional abuse patients were females in this data set. On the other hand, patients who are victims of sexual abuse are found to have higher rates of substance abuse and alcohol related disorders. Although there are both males and females in this subset of patients, there are no statistically significant trends in this group. Anxiety is found to have a tendency in female victims of sexual abuse; however, there are no males diagnosed with both anxiety and sexual abuse, so again, further conclusions cannot be drawn regarding this association.

Limitations

One limitation of this study is the correlation between the types of abuse. While the statistical analysis was completed to compare the types of abuse, there may have been patients with more than one type of abuse documented. Another limitation of this data is it is based on the documentation of the specific ICD-9 codes. The analysis is limited by any inability to diagnose any other types of abuse. This can be a significant limitation if there is a subset of the population which are harder to identify as being victims of abuse.

Another large limitation to this study design is that this study evaluates public health records from emergency department charts. This means that the data is based on patients who sought medical attention and were identified as being associated with abuse. Victims who do not seek

attention at an emergency department or who were missed by emergency department staff as victims, are not included in this data analysis. It is possible that patient demographics, injury severity and associated diagnoses are different when these factors are taken into account.

Future Directions

Further evaluation is required as the sample size is not large enough for statistically significant results in several areas that are being considered. While there are 3369 cases of abuse in Arizona from the HCUP data during the time frame, there are only 55 cases of emotional abuse and all of those cases were female patients. For this reason, gender based evaluation of victims of emotional abuse is not possible in this study. This study used six years of data from Arizona emergency departments. However, additional data could be used from the national public records and additional years could be evaluated in order to analyze a larger sample size. Furthermore, in a study with a larger sample size, patient demographics could be useful, not only to look at the different characteristics of patients with the different types of abuse, but also based solely on gender.

The hope for this study was to take a deeper look at the associated characteristics of patients diagnosed with physical, emotional and sexual abuse and then to evaluate these characteristics with respect to gender of the victim. With more data and therefore a larger sample size, these characteristics may become more evident. For that reason, it is possible to still utilize additional data in the development of a screening tool for males to determine their risk for abuse.

Conclusions

Although this evaluation of Arizona Emergency Department visits from 2007-2012 does not identify significant characteristics or criteria that could help screen for males at risk for abuse, this study does show the stark difference in the chronic and acute diagnoses associated with the three different types of abuse. Physical injuries are found more often in patients who had been physically abused and psychological disorders are seen more often in patients who had been emotionally or sexually abused. These results were found regardless of the gender of the patient.

As initially hypothesized, women do have a higher rate of skull and facial fractures compared to males when physically abused. This study did not confirm the hypothesis that males have a higher ratio of physical abuse compared to other types of abuse. However, there were no male victims of emotional abuse. This avenue of research needs to be further evaluated. More data needs to be obtained in order to further evaluate possible gender differences in patients found to be abused physically, emotionally or sexually.

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