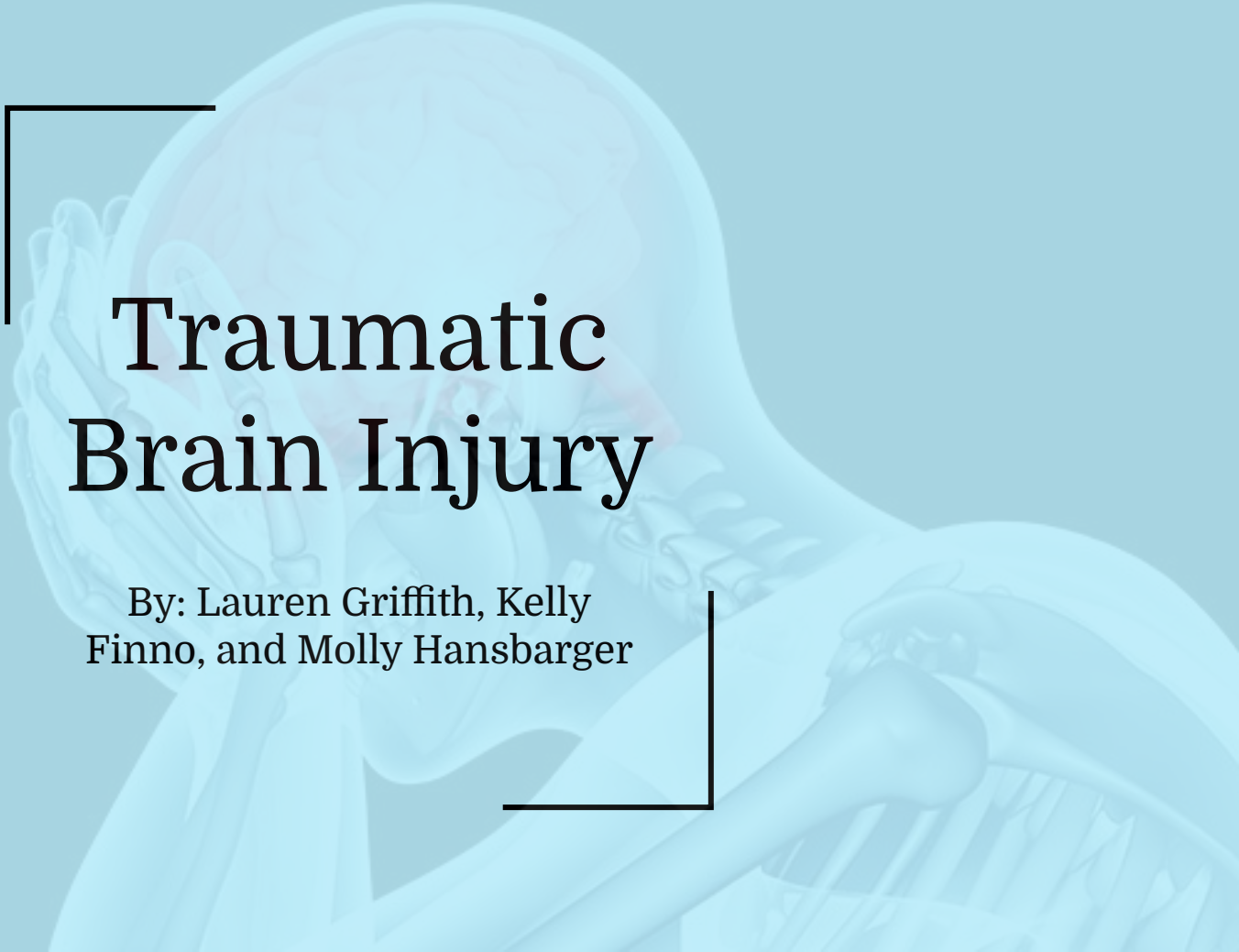
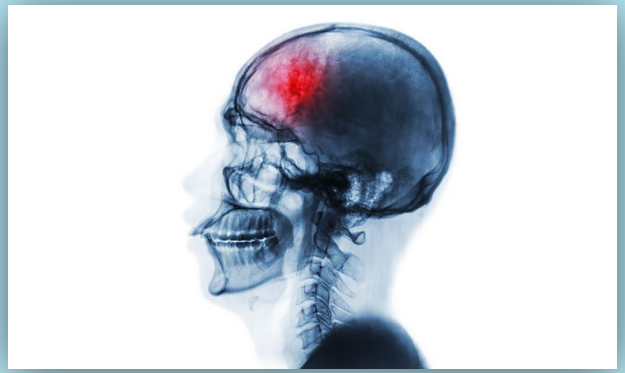


Traumatic Brain Injury

By: Lauren Griffith, Kelly Finno, and Molly Hansbarger

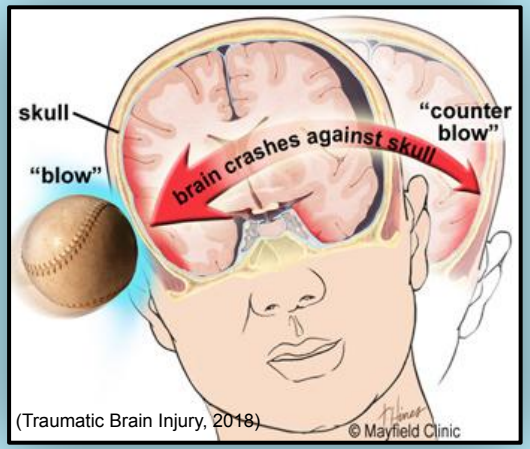
Overview



- Background
- Major Findings
- Methods
  - Study Design
  - Inclusion/Exclusion Criteria
  - Statistical Analysis
- Results
  - Descriptive Statistics
  - Chi Square of Independence
  - Significant Results
- Discussion
- Recommendations for Future
- References

Background

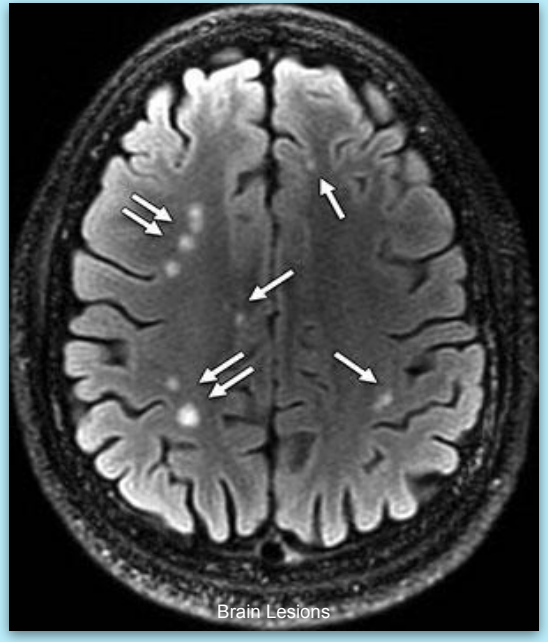
- Traumatic Brain Injury (TBI)
  - Sudden damage to the brain caused by a blow or jolt
  - 1.5 to 2 million adults & children per year
- Brain regions associated w/ pathological aggression
  - Frontal cortex → aggressive behavior control
  - Orbitofrontal cortex lesions → increased violence scores
  - Neuropsychiatric abnormalities → violent criminal behavior



(Traumatic Brain Injury, 2018)

Major Findings of Literature Review

- Association of TBI & disruptive symptoms
  - Frontal cortex damage associated w/ neuropsychiatric behaviors & conditions
- TBI associated w/ increased risk of incarceration
  - For serious & chronic offenses in both men & women
  - High prevalence of TBI history in prison populations



Methods - Study Design

- **Goal**: investigate temporal relationship b/w TBI & aggressive behavior
  - Measured by *pre-injury incarceration* & *post-injury arrest*
- Cross sectional study design
  - Estimate magnitude of TBI & incarceration history
- Secondary data analysis
  - National Data and Statistical Center for Traumatic Brain Injury Model System (TBIMS)
- **Variables**:
  - Pre-injury Incarceration History, Post-Injury Arrest History, Gender, Age, Education, Employment, and Race

Methods - Inclusion/Exclusion Criteria

- **<u>Data Cleaning & Recoding Variables</u>**:
  - 50,000 data points → 6,492 data points
  - 7 variables

Race:
1 = White
2 = Black
3 = Asian/Pacific Islander
4 = Native American
5 = Hispanic Origin
7 = Other

Gender:
1 = Female
2 = Male

Age:
1 = 18-25 years old
2 = 26-35 years old
3 = 36-45 years old
4 = 46-55 years old
5 = 56-65 years old

Pre-Injury History of Incarceration:
1 = No
2 = Yes

Education:
1 = Less than high school diploma
2 = High school diploma or GED
3 = Some College Education
4 = College Degree
5 = Graduate Education

Arrests Post-Injury:
1 = No
2 = Yes

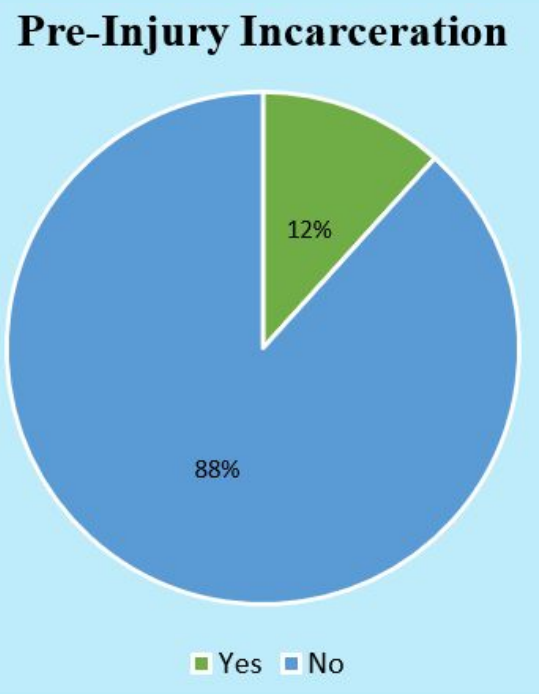
Employment:
1 = Student
2 = Employed
3 = Unemployed
4 = Retired

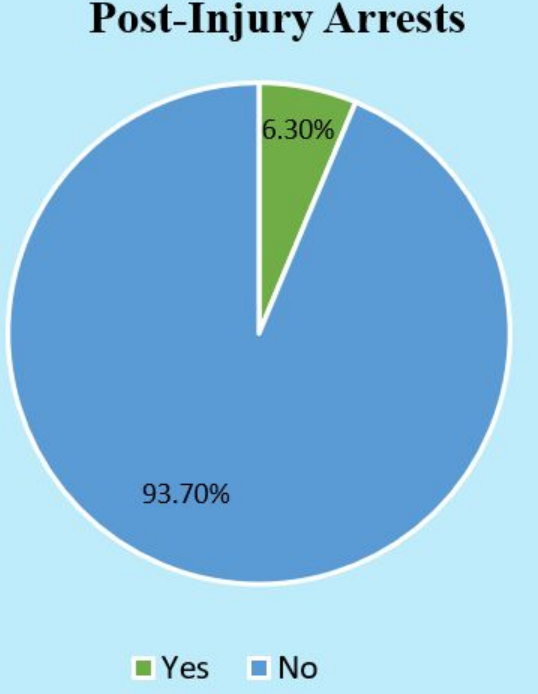
Methods - Statistical Analysis

- **Descriptive Statistics:**
  - Assess data frequencies for each variable
  - Original data vs. modified recoded data → similar distribution
- **Chi Square Test of Independence:**
  - Assess association b/w categorical variables
  - Cross Tabulation → indicate which categories in each variable are significant
    - **Pearson Chi Square**
    - **Bonferroni Correction**

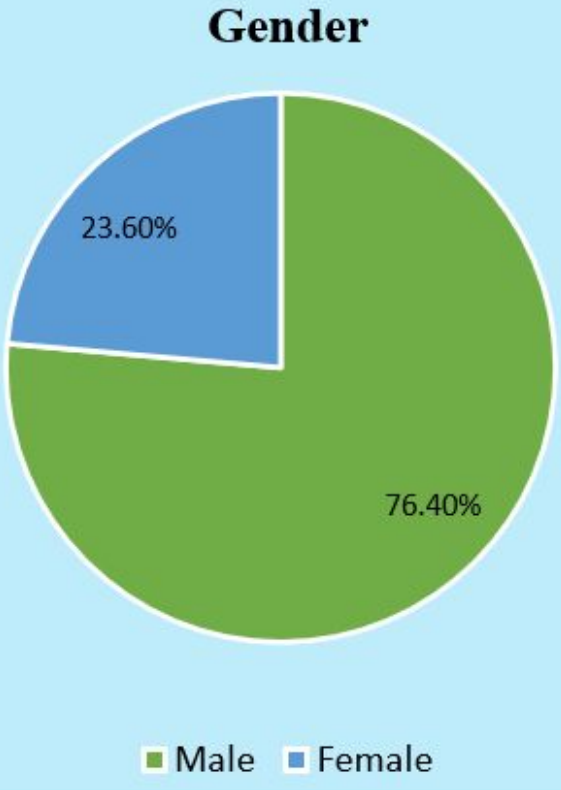
(Beasley et al., 1995)

Results - Descriptive Statistics

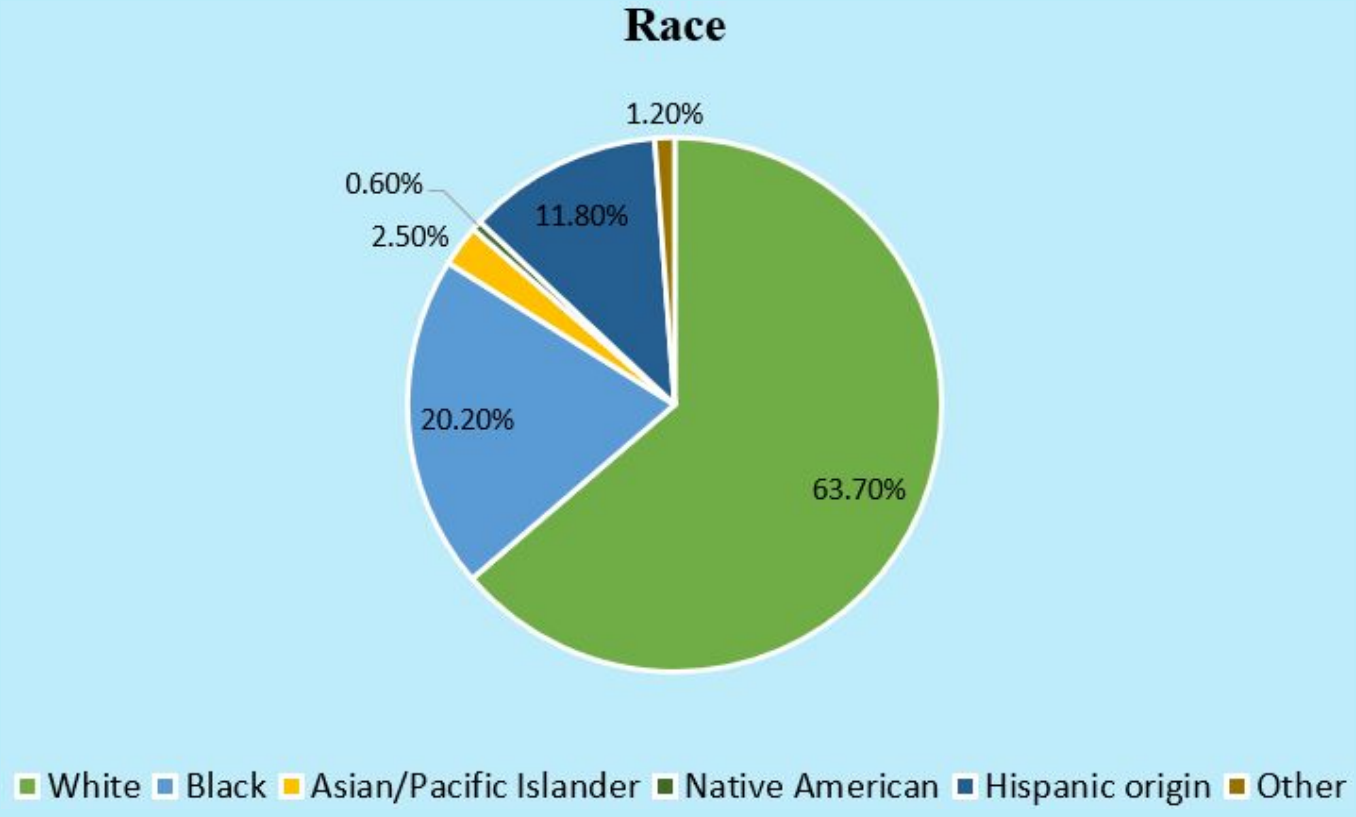




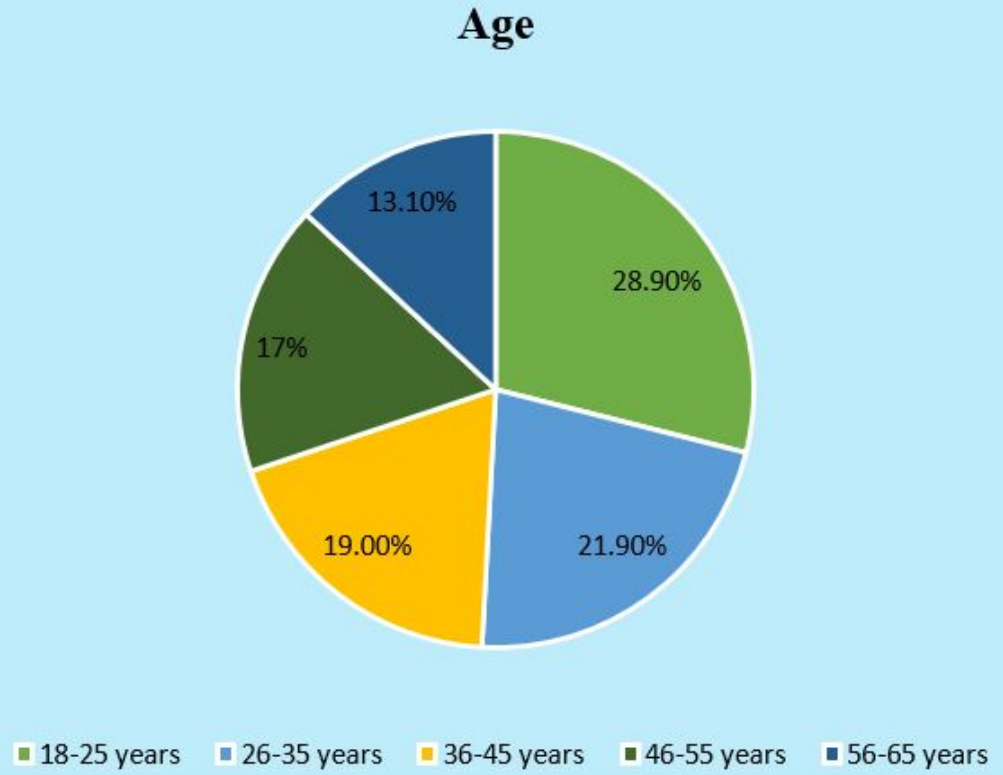
Results - Descriptive Statistics



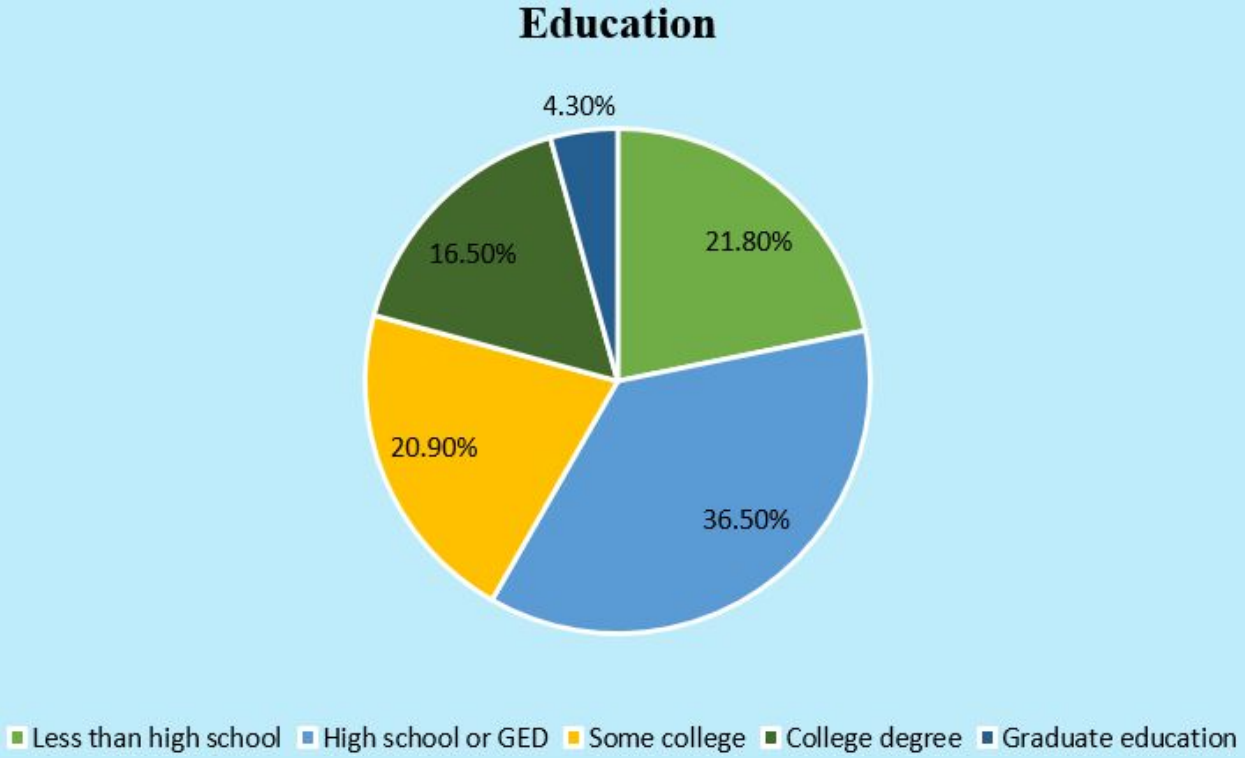
Results - Descriptive Statistics



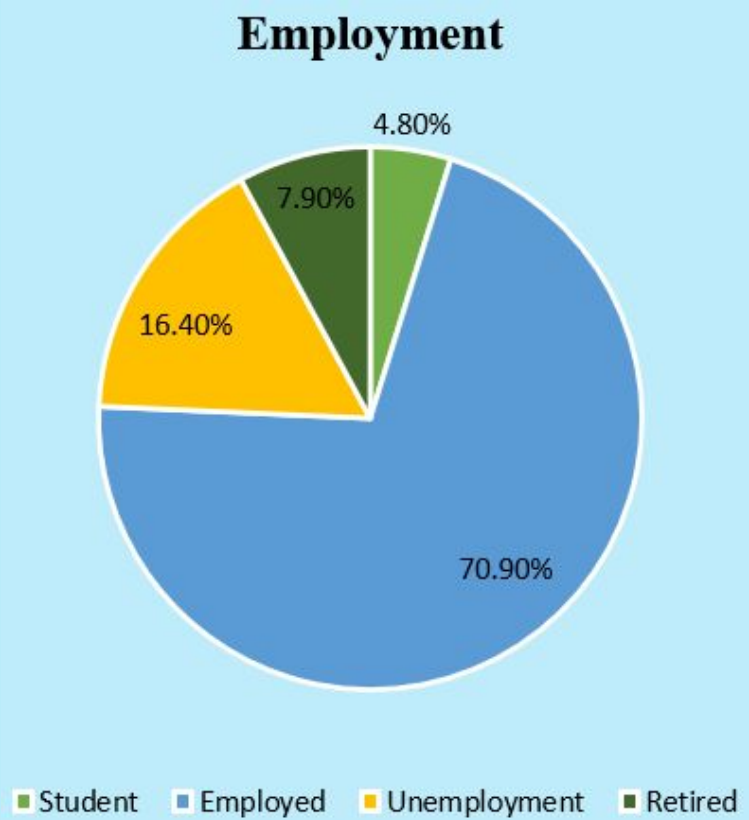
Results - Descriptive Statistics



Results - Descriptive Statistics



Results - Descriptive Statistics



Significance by Pre-Injury Incarceration

$\alpha = 0.05$

- **Race**
  - White & Black participants significantly associated w/ a TBI after incarceration
- **Gender**
  - All categories significantly associated w/ a TBI after incarceration
- **Education**
  - All categories significantly associated w/ a TBI after incarceration
- **Age**
  - 18-45 years old & 56-65 years old significantly associated w/ a TBI after incarceration
- **Employment**
  - Employed & unemployed significantly associated w/ a TBI after incarceration

✶ NOTE: Post-Injury Arrests x Race ($p = 0.052$)

Discussion

- Significance associated with Pre-Injury History of Incarceration → association w/ sustaining a TBI while in prison or after being in prison
- **Strengths**:
  - Quick & low cost w/ minimal ethical implications
    - De-Identified data
- **Limitations**:
  - Unable to analyze deleted subjects
  - No control over collection & inconsistency in variable definition
    - Pre-injury and post-injury
  - Only access to last 2 years of data & no geographical info

Discussion - Prison Reform Intervention

- **Aim**:
  - ⇩ possibility of sustaining a TBI for previously/currently incarcerated individuals
  - ⇧ management of TBI in prison populations
- **Prison Staff Reform**
  - Common misconceptions about TBI (CM-TBI) questionnaire assesses TBI knowledge of prison staff
    - Identify barriers in identification & rehabilitation of offender TBI
  - Intervention: require TBI training to improve awareness of TBI outcomes
    - Identify injuries & ensure offender receives care
    - Headway: The Brain Injury Association digital Seminar/Course

Discussion - Prison Reform Intervention

- **Prison Health Education Reform**
  - Health-promoting prison concept
    - The settings-approach useful in school & workplace environments in Europe
      - Focus on organization → not just individual
    - i.e. the “captive population”
  - Adoption of community education
    - Promotes TBI education in prison population

Recommendations for Future

- Scale up current study
  - Larger sample → arrests x race significant?
- Extrapolate missing data
  - Predict future data based on historical data
- Dataset for IRB approved research comprehensive
  - Include geographic location
- **Interventions**:
  - Use CM-TBI questionnaire → assess prison staff TBI education in US
  - Run pilot studies → effective forms of education in the prison population

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Picture URLs in Notes