

PICO Search Assignment Worksheet

Name: Jay Kolasinac

19-year-old, Caucasian, female, student, domiciled with mother, presents to the ER with multiple medical complaints [weight loss, hair loss, fatigue, heart palpitations, pallor of skin, and much more]. Pt has a history of 15 ER visits in the past 3 months stating nobody has been able to find a diagnosis for her. Multiple specialists have seen her and deemed her completely healthy. The patient was suffering from Somatic Symptom Disorder vs Depression. She stated all of her problems have started ever since she received an electrical shock while unplugging the computer.

Search Question: In adults, can electrical injuries result in the development of future mental disorders?

Question Type: What kind of question is this? (boxes now checkable in Word)

- Prevalence Screening Diagnosis
- Prognosis Treatment Harms

Assuming that the highest level of evidence to answer your question will be meta-analysis or systematic review, what other types of study might you include if these are not available (or if there is a much more current study of another type)?

Please explain your choices.

Along side meta-analyses and systematic reviews, I would look for cohort studies or even retrospective studies that could either follow patients who have suffered an electrical injury or look back on a population of patients who have already suffered electrical injuries and determine if there is any association to the development of mental disorders. RCTs are higher levels of evidence but certainly is not ethical to intentionally electrically injury an individual and follow them over a period of time.

PICO search terms:

P	I	C	O
Adults	Electrical injury	None	Develop mental disorders
	Electrical shock		Increased risk for mental disorders
			Mental illness
			Mental health

Search tools and strategy used:

Database	Terms	Filter	# of Articles
PubMed	electrical injury mental disorder outcome	Medline, last 5 years	2234
ScienceDirect	electrical injury mental disorder outcome	Research articles, last 5 years,	773
MEDLINE Complete	electrical injury mental disorder outcome	last 5 years	2

There seemed to much research on the topic of electrical injuries, but many articles did not focus on mental health. So I had to narrow down which articles were able to answer my question directly and were relevant within a 5 year period.

Results found:

ARTICLE 1

CITATION

Hahn-Ketter, A. E., Whiteside, D. M., Pliskin, N., & Rice, L. (2016). *Long-term consequences of electrical injury: neuropsychological predictors of adjustment. The Clinical Neuropsychologist, 30(2), 216–227.* doi:10.1080/13854046.2016.1155647

<https://sci-hub.se/10.1080/13854046.2016.1155647>

ARTICLE TYPE

Retrospective study

ABSTRACT

Objective: Electrical injury (EI) produces an assortment of consequences for individuals. Survivors perform poorly on measures of attention and mental speed, memory, and emotional functioning. Moreover, sequelae are not always reported immediately following injury and often increase over the months following injury. It remains unclear whether the observed increase in neuropsychological and emotional symptoms over time is attributable to the delayed physical effects of EI or other factors that arise subsequent to injury, such as difficulty adjusting to post-injury limitations.

Method: The current study utilized archival data to compare the neuropsychological and emotional complaints of EI survivors at two points during recovery, hypothesizing that Time 1 data would predict participants' outcome at Time 2. Specifically, those with worse neuropsychological performance and greater depressive symptomatology at Time 1 would have worse long-term adjustment to injury and psychological symptomatology.

Results: Multiple regression analyses revealed a significant predictive effect of Time 1 neurocognitive performance and depressive symptomatology on Time 2 adjustment to injury, psychological distress, and return to work. Participants with greater depressive

symptomatology endorsed during the initial neuropsychological evaluation had substantially more difficulty with overall psychosocial adjustment to electrical injury. Moreover, depressive symptomatology persisted or worsened over the course of recovery.

Conclusions: Findings demonstrate that poor outcome 4 years after EI is largely predicated by early emotional sequelae. Early screening and specialized interventions are needed to address psychological symptomatology among EI survivors.

KEY POINTS

- Poor outcomes are seen 4 years after electrical injury and largely predicted by early emotional sequelae
- Early screening of patients are needed to address any psychological symptomatology
- Depressive symptomatology was the only significant predictor of emotional and functional outcome
- Since participants with higher levels of depressive symptomatology shortly after injury have an increased likelihood of poor long-term outcomes
- Current data showed that neuropsychological complaints increase across time
- Survivors have demonstrated a significant level of neurocognitive and psychological symptomatology following EI in the absence of direct CNS exposure to the electric current or secondary traumatic brain injury

REASON FOR CHOOSING:

- This article focused directly on my PICO question
- Relatively recent being published in 2016

Article 2

CITATION

Radulovic, N., Mason, S. A., Rehou, S., Godleski, M., & Jeschke, M. G. (2019). *Acute and long-term clinical, neuropsychological and return-to-work sequelae following electrical injury: a retrospective cohort study. BMJ Open, 9(5), e025990.* doi:10.1136/bmjopen-2018-025990

<https://sci-hub.se/10.1136/bmjopen-2018-025990>

ARTICLE TYPE

Retrospective cohort study evaluating EI admissions between 1998 and 2015.

ABSTRACT

Objective To determine acute and long-term clinical, neuropsychological, and return-to-work (RTW) effects of electrical injuries (EIs). This study aims to further contrast sequelae between low-voltage and high-voltage injuries (LVIs and HVIs). We hypothesise that all EIs will result in substantial adverse effects during both phases of management, with HVIs contributing to greater rates of sequelae.

Design Retrospective cohort study evaluating EI admissions between 1998 and 2015.

Setting Provincial burn centre and rehabilitation hospital specialising in EI management.

Participants All EI admissions were reviewed for acute clinical outcomes (n=207). For long-term outcomes, rehabilitation patients, who were referred from the burn centre (n=63) or other burn units across the province (n=65), were screened for inclusion. Six patients were excluded due to pre-existing psychiatric conditions. This cohort (n=122) was assessed for long-term outcomes. Median time to first and last follow-up were 201 (68–766) and 980 (391–1409) days, respectively.

Outcome measures Acute and long-term clinical, neuropsychological and RTW sequelae.

Results Acute clinical complications included infections (14%) and amputations (13%). HVIs resulted in greater rates of these complications, including compartment syndrome (16% vs 4%, p=0.007) and rhabdomyolysis (12% vs 0%, p <0.001). Rates of acute neuropsychological sequelae were similar between voltage groups. Long-term outcomes were dominated by insomnia (68%), anxiety (62%), post-traumatic stress disorder (33%) and major depressive disorder (25%). Sleep difficulties (67%) were common following HVIs, while the LVI group most frequently experienced sleep difficulties (70%) and anxiety (70%). Ninety work-related EIs were available for RTW analysis. Sixty-one per cent returned to their preinjury employment and 19% were unable to return to any form of work. RTW rates were similar when compared between voltage groups.

Conclusions

This is the first investigation to determine acute and long-term patient outcomes post-EI as a continuum. Findings highlight substantial rates of neuropsychological and social sequelae, regardless of voltage. Specialised and individualised early interventions, including screening for mental health concerns, are imperative to improving outcomes of EI patients.

KEY POINTS

- Findings highlight substantial rates of neuropsychological and social sequelae, regardless of voltage
- Specialised and individualised early interventions, including screening for mental health concerns, are imperative to improving outcomes of EI patients
- More than half of all patients receiving rehabilitation were diagnosed with at least one psychiatric disorder after their injury, while one-third of patients were diagnosed with two or more
- PTSD, MDD, and Adjustment disorder were the most frequent diagnosed disorders
- More than 60% of the long-term patient cohort exhibited symptoms that were severe enough to warrant psychological/psychiatric treatment or medication

REASON FOR CHOOSING:

- Recently published article
- Retrospective study directly focusing on my PICO question
- Focused on both acute and long term sequelae

ARTICLE 3

CITATION

Biering K, Vestergaard JM, Kærgaard A, Carstensen O, Nielsen KJ (2021) Mental disorders following electrical injuries—A register-based, matched cohort study. PLoS ONE 16(2): e0247317.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7899322/pdf/pone.0247317.pdf>

ARTICLE TYPE

Prospective cohort study

ABSTRACT

Introduction Electrical injuries happen every day in homes and workplaces. Not only may these injuries cause physical damage and disability, they may also cause mental disorders. The aim of this study was to investigate if persons with an electrical injury suffer from mental disorders in the following years.

Material and methods In a prospective matched cohort design, we identified 14.112 electrical injuries in two Danish registries and matched these with persons with dislocation/sprain injuries or eye injuries, respectively, as well as with persons from the workforce from the same occupation, using year of injury, sex and age as matching variables. We identified possible outcomes in terms of mental diagnoses in the Danish National Patient registry, based on literature, including reviews, original studies and case-reports as well as experiences from clinical praxis. The associations were analyzed using conditional cox- and logistic regression.

Results We found that the following of the examined outcomes were associated with exposure to an electrical injury compared to the matched controls. Some of the outcomes showed the strongest associations shortly after the injury, namely ‘mental disorders due to known physiological condition’, ‘anxiety and adjustment disorders’, and especially the ‘Post Traumatic Stress Disorder (PTSD)’ subgroup. The same pattern was seen for ‘Depression’ although the associations were weaker. Other conditions took time to develop (‘Somatoform disorders’), or were only present in the time to event analysis (‘other non-psychotic mental disorders’ and ‘sleep disorders’). The findings were consistent in all three matches, with the highest risk estimates in the occupation match.

Conclusion Electrical injuries may result in mental disorders, both acute and several years after. However, the absolute risk is limited as most of the outcomes are rare

KEY POINTS

- Electrical injuries may result in mental disorders, both acute and several years after.
- We found increased risk of ‘mental disorders due to known physiological condition’ in all three matches and furthermore found that the risk was highest shortly after the injury in match 1, but highest after around 2 years in the other two matches
- We found only limited associations between electrical injuries and depression. Again, there was a tendency that the estimates were highest shortly after the injury and slightly higher for the working population compared to the full population.
- Risk of ‘Somatoform disorders’ seemed to increase over time in the two first matches, while the same pattern was difficult to identify in match 3, although the associations also were high

REASON FOR CHOOSING

- Recently published < 2mo ago
- Directly focused on mental d/o following electrical injuries
- Identified 14,000+ participants over 19-year period
- Observed both acute and long term risks for mental disorder development

What is the clinical “bottom line” derived from these articles in answer to your question?

All three of the selected articles focused on the sequelae resulting from electrical injury, specifically focusing on mental health disorders. Hahn-ketter et al. concluded that individuals can suffer significant level of neurocognitive and psychological symptomatology following EI even in the absence of direct CNS exposure to the electric current or secondary traumatic brain injury. Radulovic et al. concluded that, regardless of the voltage that was present at the time of electrical injury, there were substantial rates of neuropsychological and social sequelae. Greater than 50% of participants were diagnosed with at least 1 psychiatric disorder! Lastly, Biering et al. have even established an association with an increase for the risk of somatoform disorders that was saw with the patient presentation above. According to all the articles, there seems to be an association between electrical injuries and the subsequent development of mental disorders most seen in the acute phase status post electrical injury. Patients who suffer from electrical injuries should receive appropriate mental health screening if there are to be any sequelae from the injury.