Annals of Medicine and Medical Sciences (AMMS)
Volume 04, 2025, *Page No.: 371 to 376*
Available at: *http://ammspub.com*

Systematic Review

OPEN ACCESS

Balancing Safety and Ethics: The TASER Consideration in Healthcare: A Systematic Review

Richa Choudhary [1], Rajat Maurya [2], Pradeep Kumar Yadav *[3], Krishna Kumar Singh [4], Madhulika Shukla [5], Vivek Pathak [5], Satendra Mohan [5], Dileep Kumar Yadav [5]

[1]Professor and HOD, Department of FMT, Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow, Uttar Pradesh, India.
[2]Research Scholer, Department of FMT, Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow, Uttar Pradesh, India.
[3]Associate Professor, Department of FMT, Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow, Uttar Pradesh, India.
[4]Assistant Professor, Department of FMT, Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow, Uttar Pradesh, India.
[5]Junior Resident, Department of FMT, Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow, Uttar Pradesh, India.

*Corresponding author: Pradeep Kumar Yadav, *dctrprdp@gmail.com*

Abstract

Background: Workplace violence is a growing concern in healthcare, especially in emergency departments and psychiatric settings. To address this, some institutions have turned to Conducted Electrical Weapons (CEWs), commonly known as TASERs, as a means of protecting staff and managing aggressive patients. While these devices can help in high-risk situations, their use also raises important ethical, legal, and health-related concerns. This review explores how TASERs are used in healthcare settings, and examines the safety implications, ethical challenges, and existing regulations. ***Methods:*** We conducted a systematic search across databases including PubMed (209), and Google Scholar (15826) for peer-reviewed literature on TASER use in healthcare, on date 11/04/2025. Search terms included "TASER" AND "healthcare", "TASER" AND "hospital, "emergency department" AND "TASER" and "TASER" AND "ethics." Studies were selected based on relevance to TASER use in healthcare environments. Data extraction and quality assessment were performed independently by two reviewers using Newcastle-Ottawa Scale (NOS). ***Results:*** A total of 37 studies were included in this review. Most reports focused on emergency or psychiatric settings where patients displayed violent or unpredictable behavior. TASERs were generally used as a last resort when verbal de-escalation and physical restraint failed. Health effects ranged from temporary discomfort to more serious outcomes such as arrhythmias or injuries from falls. Ethical concerns included lack of consent, use on vulnerable individuals, and insufficient staff training. Legal guidance varied significantly across regions, with many institutions lacking clear policies on CEW deployment. ***Conclusion:*** TASERs may offer a measure of protection for healthcare workers in dangerous situations, but their use must be carefully weighed against the potential for harm and ethical dilemmas. Clear, standardized guidelines and thorough training programs are essential to ensure that their use is both safe and justified. More research is needed to assess long-term impacts and support informed policy-making.

Keywords: ***TASER, Conducted Electrical Weapons, Healthcare Security, Emergency Medicine, Medical Ethics, Hospital Violence, Legal Regulation.***

Introduction

Healthcare facilities serve as the cornerstone of any public health system, offering essential services ranging from routine checkups and management of minor ailments to life-saving surgeries and complex medical interventions. These institutions are not only centers for healing but also workplaces for a wide spectrum of professionals including doctors, nurses, support staff, and administrators. Ensuring the safety of both patients and healthcare providers within these environments is vital for uninterrupted care delivery and for maintaining the trust of the community in the healthcare system [1].

In recent years, there has been a disturbing rise in incidents of workplace violence (WPV) within healthcare settings. These incidents may manifest in various forms from verbal abuse, threats, and harassment to physical assaults that can result in serious injuries or even fatalities. Emergency departments (EDs) and psychiatric units are particularly vulnerable due to the high-stress nature of these environments and the unpredictability of patient behavior. Studies

Received: April 05, 2025; **Revised:** May 17, 2025; **Accepted:** May 24, 2025

show that healthcare workers are several times more likely to experience workplace violence compared to other professions [1,2].

To address this growing concern, hospitals and healthcare institutions have implemented various security protocols, such as the deployment of security personnel, use of surveillance systems, and development of emergency response strategies. The primary objective of these security measures is to create a peaceful and secure environment for both healthcare providers and patients. However, as the complexity and frequency of violent incidents increase, so does the need for more robust intervention tools.

One such tool that has gained attention is the TASER a type of Conducted Electrical Weapon (CEW) originally designed for law enforcement agencies. These non-lethal devices deliver short bursts of high-voltage, low-current electrical pulses to temporarily incapacitate aggressive individuals. The term "TASER" stands for Thomas A. Swift's Electric Rifle, named by its inventor Jack Cover, a former NASA scientist, in the 1970s [2].

TASERs are increasingly being used by hospital security staff, particularly in high-risk zones such as EDs and psychiatric wards, where patients under the influence of substances or experiencing acute mental health episodes may pose an immediate threat to themselves or to healthcare personnel. The integration of TASERs into hospital security protocols is not without controversy, raising ethical, legal, and medical concerns, especially given the delicate nature of healthcare settings. Proponents argue that TASERs provide a safer alternative to firearms or physical restraint, while critics caution against the potential for misuse and the physical harm they may cause to vulnerable individuals [3].

This systematic review aims to explore the implications of TASER use in healthcare, particularly focusing on their application in emergency departments and psychiatric units. The review will assess safety outcomes, ethical considerations, and current guidelines, with the goal of informing policy decisions on the appropriate use of CEWs in medical settings.

Methodology

Search Strategy

This systematic review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure transparency and reproducibility. A comprehensive search was performed across two major electronic databases: PubMed and Google Scholar, on April 11, 2025, to identify relevant peer-reviewed literature discussing the use of TASERs in healthcare settings. The search yielded 209 results from PubMed and 15,826 results from Google Scholar.

A combination of keywords and Boolean operators was used to ensure a wide net was cast in capturing all potentially relevant studies. The specific search terms included: "TASER" AND "healthcare", "TASER" AND "hospital", "emergency department" AND "TASER" and "TASER" AND "ethics". These keywords were chosen to reflect the various contexts in which TASERs may be discussed in relation to clinical settings, particularly focusing on emergency departments, psychiatric care units, and ethical or legal debates regarding their use.The initial search results were screened by reviewing titles and abstracts. Duplicates were removed, and full-text articles were then assessed for eligibility based on predefined inclusion and exclusion criteria. The detailed is shown in PRISMA flowchart (Figure 1).

Eligibility Criteria

Inclusion Criteria

Studies were included in the review if they met the following conditions:

- Original research articles published in peer-reviewed journals.
- Focus on the use of TASERs in healthcare environments, including emergency departments, hospitals, and psychiatric wards.
- Discussion of outcomes related to TASER deployment such as safety, efficacy, ethical concerns, or patient/staff impact.

Exclusion Criteria

The following types of studies were excluded:

- Articles discussing TASERs solely in the context of law enforcement without a healthcare connection.
- Animal studies or in-vitro research.
- Editorials, opinion pieces, commentaries, and non-peer-reviewed literature.
- Articles not available in full text or in English.

Study Selection and Data Extraction

Two reviewers independently screened the studies at all stages—title/abstract screening and full-text review. Any disagreements during the selection process were resolved by consensus or, if needed, by consulting a third reviewer. A standardized data extraction form was used to systematically collect the following information from each study:

- Author(s) and year of publication
- Study design
- Population and setting (e.g., ED, psychiatric ward)
- Context and method of TASER use
- Reported outcomes (clinical, legal, ethical)
- Key conclusions and limitations

Quality Assessment

To assess the methodological quality of the included observational studies, the Newcastle-Ottawa Scale (NOS) was employed. This tool evaluates studies based on three broad perspectives:

- Selection of study groups (representativeness, exposure ascertainment, etc.)
- Comparability of groups (control for confounding variables)
- Outcome assessment (adequacy of follow-up, objectivity of outcome measures)

Each study could receive a maximum of 9 stars. Two reviewers independently rated each study, and any discrepancies were resolved through discussion.

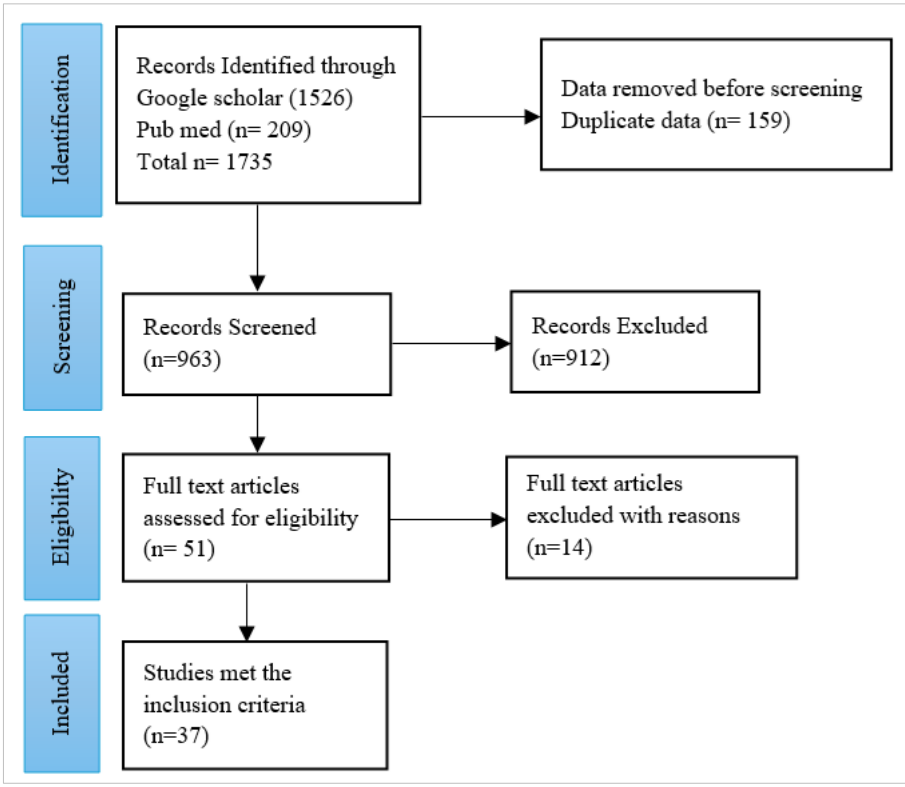

Figure 1: PRISMA flowchart

Results

This systematic review analyzed 37 peer-reviewed articles addressing the deployment, physiological outcomes, and ethical-legal concerns related to TASER (Conducted Energy Weapon) usage in healthcare and law enforcement settings.

1. TASER Models and Technical Parameters

The reviewed studies detailed the evolution of TASER models, with the M26, X26, X2, and X26P being the most widely used variants by police and security agencies. These devices operate by delivering high-voltage, low-current electric shocks that cause neuromuscular incapacitation. The electrical output typically ranges from 63 to 135 microcoulombs (μC) per pulse, depending on the model [4-7].

2. Physiological and Clinical Consequences

TASER deployment can cause a wide array of clinical outcomes:

- Cardiovascular Events: Multiple studies reported atrial fibrillation, elevated troponin levels, and myocardial infarction post-TASER exposure, particularly in individuals with underlying cardiac conditions [6,8-11].
- Neurological Outcomes: There are reports of seizures, altered consciousness, and direct CNS effects, though many are transient [12,13].
- Ocular Injuries: TASER darts have led to serious ocular trauma including cataracts, retinal injury, and perforating globe injuries [14-18].
- Pregnancy Complications: One case documented a miscarriage following TASER exposure, raising concern for use on pregnant individuals [19].
- Pediatric & Mental Health Risks: Children and individuals with mental illness have experienced heightened risks, raising significant medico-ethical issues [20-23].
- Biochemical Changes: Temporary metabolic derangements like elevated serum lactate and mild rhabdomyolysis were noted in volunteers without lasting effects [24,25].
- Other: The genitalia are a delicate region and are vulnerable to injury from a TASER. A research investigation into injuries resulting from TASER exposure revealed that one individual suffered from testicular torsion, while another indicated a loss of fertility [13]. However, his fertility status was not known before the TASER was used.

Injury to the gastrointestinal system has also been described. In one case a psychiatric patient removed the barb from his skin and swallowed it [26]. He was treated conservatively and passed the barb in his stool without incident. Researchers have also found that the TASER did not affect core body temperature [25]. The TASER has been reported as a weapon used in suspected child abuse in the USA [22,23]. However, it is not currently available to the public in Australia and New Zealand.

3. Ethical and Legal Implications

The literature consistently emphasizes restraint and context-based use of TASERs:

- TASERs should be avoided in populations such as children, elderly, pregnant women, and individuals with cardiovascular or psychiatric illness [4,20,21,27].
- Legal scrutiny surrounds excessive use, especially in cases of passive resistance or when targeting sensitive anatomical regions like the head or chest [28-32].
- Some jurisdictions require licensing for civilian use or ban the weapon entirely [33,34].

Table 1: Summary of TASER Models and Associated Clinical, Ethical, and Legal Observations

Model / Year	Electrical Output (µC)	Notable Medical Findings	Ethical/Legal Concerns
M26 (1999)	70-120	Muscular spasm, skin burns [4,5]	Overpowering force; limited targeting precision [7]
X26 (2003)	80-135	Arrhythmia, miscarriage, retinal damage [6,9,14,19]	Widely used; controversies over use in passive detainees [4,29,30]
X2 (2011)	~63 ± 9	Slight lactic acidosis, elevated CK [24]	Dual-barrel system raises excessive exposure concerns [4,7]
X26P (2013)	63 ± 9	Elevated troponin; otherwise, safe in studies on healthy adults [10,11]	Ethical limits on deployment against vulnerable populations [20,27]
X3 (2009)	63 ± 9	Comparable to X2; no long-term effects in controlled settings [12,25]	Multiple discharges increase cumulative risk [5,32]
Unspecified	Variable	Ocular perforation, miscarriage, pediatric death [19,15-28,22,23,25,26]	Improper or unlawful use leading to fatal outcomes and litigation [22,23,28]
µC = microcoulombs; values approximated based on available data			

Discussion

The introduction of TASER use for the management of violence in healthcare facilities in emergency departments (EDs) and to control the psychiatric patients. The use of TASER requires serious consideration and proper training for police officers and hospital security. They are primarily because the TASER acts on the central nervous system, creating an electrical wave that can cause an involuntary contraction of the muscles in the body, including those in the ocular region. This contraction can cause a series of unwanted ocular effects, including temporary loss of vision, corneal edema, rupture of blood vessels, and retinal injury [6]. Human research on the effects of CEDs is limited, with most physiologic investigations having been conducted in animal models. In one of the very few studies in human subjects, a study monitoring 67 subjects ECG immediately before and after TASER shocks during police training sessions. The investigators reported no changes in cardiac rhythm or ECG morphology following the TASER discharge. Mean heart rate increased by just over 19.4 beats/min following the taser shock, but no abnormal cardiac dysrhythmias were identified [35-37]. These findings suggest that while TASER shocks may cause a transient increase in heart rate, they do not appear to induce significant cardiac disturbances in healthy individuals. Further research is needed to explore the long-term effects of TASER use and its implications for different populations, particularly those with pre-existing cardiac conditions. Given the lack of extensive human studies, it is crucial for researchers to prioritize further investigations into the long-term consequences of Taser use on human subjects. Understanding these effects can help inform guidelines for safe deployment and provide critical insights into potential risks associated with high-voltage applications.

Conclusion

Non-lethal weapons rarely cause serious injuries; however, exceptions do occur, and changes can still be implemented to refine outcomes. For instance, better training for users and enhanced technology could minimize the risk of unintended harm. Additionally, thorough assessments of non-lethal weapon effects could lead to safer designs and more effective protocols in various situations. This paper provides a comprehensive review of the TASERs used in healthcare facilities, covering aspects from biochemical effects and injuries to the individuals, including psychiatric patients. It also highlights the importance of the need for further research to study the impact of these weapons on human physiology as well as the underlying conditions of individuals. Furthermore, understanding these factors is crucial for developing guidelines that prioritize patient safety while ensuring that healthcare professionals can effectively manage potentially dangerous situations. By addressing these gaps in research, the healthcare community can better navigate the complexities associated with the use of non-lethal weapons in sensitive environments. The deployment of TASER devices in police response to mental health emergencies remains an under-investigated phenomenon about which there are many important questions, unresolved debates, and legitimate concerns among mental health professionals.

There is insufficient evidence exists to prove these devices are lethal, nor is there strong evidence to suggest they are non-lethal. The need for comprehensive studies is crucial to understand the full impact of TASER deployment on individuals with mental health issues. As research progresses, it is essential to establish guidelines that prioritize safety and efficacy, ensuring that both law enforcement and mental health considerations are balanced in crisis situations.

List of Abbreviations

CEW: Conducted Electrical Weapons
ECG: Electrocardiogram
ED: Emergency Department
NASA: National Aeronautics and Space Administration
Tn-I: Troponin I

Declarations

Ethical Clearance

As this study is a systematic review of previously published literature, ethical clearance was not required.

Conflict of Interest Declaration

The authors declare no conflict of interest related to this study.

Funding/Financial Support

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Contributors

Dr. Richa Choudhary and Madhulika Shukla, [Dr RMLIMS] - Conceptualization, data extraction, and manuscript drafting.
Dr. Rajat Maurya and Vivek Pathak, [Dr RMLIMS] - Screening of studies, reference management, and formatting.

Dr. Pradeep Kumar Yadav and Satendra Mohan, [Dr RMLIMS] - Literature review, critical revision, and methodology guidance.
Dr. Krishna Kumar Singh and Dileep Kumar Yadav, [DrRMLIMS] - Review design, data interpretation, and final editing.

All authors have read and approved the final version of the manuscript.

Trial Details

Not applicable. This study is a systematic review and does not involve a clinical trial.

Acknowledgements

The authors would like to acknowledge the support of Institution library for providing access to necessary resources required for the completion of this review.

References

[1] Choudhury, Richa & Sabri, Imran & Sabri, S.K.A. (2012). Using taser gun on patients: A critical review. Medico-Legal Update. 12. 149-151.

[2] MacDonald, J. M., Kaminski, R. J., & Smith, M. R. (2009). The effect of Less-Lethal weapons on injuries in Police Use-of-Force events. American Journal of Public Health, 99(12), 2268-2274. https://doi.org/10.2105/ajph.2009.159616

[3] Robb M, Close B, Furyk J, Aitken P. (2009) Emergency department implications of the TASER. Emerg Med Australas. ;21(4):250-258.

[4] Soleimanirahbar A, Lee BK. The TASER safety controversy. Expert Review of Medical Devices. 2011;8(6):661-663. doi:10.1586/erd.11.53

[5] Dymond A. Electric-Shock weapons, Tasers and policing.; 2021. doi:10.4324/9781003002864

[6] Kroll MW, Luceri RM, Lakireddy D, Calkins H. Do TASER electrical weapons actually electrocute? Canadian Journal of Cardiology. 2016;32(10):1261.e11. doi:10.1016/j.cjca.2015.12.030

[7] Bozeman WP, Hauda WE, Heck JJ, Graham DD, Martin BP, Winslow JE. Safety and injury profile of conducted electrical weapons used by law enforcement officers against criminal suspects. Annals of Emergency Medicine. 2009;53(4):480-489. doi:10.1016/j.annemergmed.2008.11.021

[8] Multerer S, Berkenbosch JW, Das B, Johnsrude C. Atrial fibrillation after TASer exposure in a previously healthy adolescent. Pediatric Emergency Care. 2009;25(12):851-853. doi:10.1097/pec.0b013e3181c399a9

[9] De B, R N, Sp H, et al. Myocardial infarction after taser exposure. PubMed. 2010;162(5):291-295. https://pubmed.ncbi.nlm.nih.gov/21141261.

[10] Ho JD, Miner JR, Lakireddy DR, Bultman LL, Heegaard WG. Cardiovascular and physiologic effects of conducted electrical weapon discharge in resting adults. Academic Emergency Medicine. 2006;13(6):589-595. doi:10.1197/j.aem.2006.01.017

[11] Sloane CM, Chan TC, Levine SD, Dunford JV, Neuman T, Vilke GM. Serum Troponin I measurement of subjects exposed to the TasEr X-26®. Journal of Emergency Medicine. 2008;35(1):29-32. doi:10.1016/j.jemermed.2007.08.073

[12] Ho JD, Dawes DM, Bultman LL, et al. Respiratory effect of prolonged electrical weapon application on human volunteers. Academic Emergency Medicine. 2007;14(3):197-201. doi:10.1197/j.aem.2006.11.016

[13] Ordog GJ, Wasserberger J, Schlater T, Balasubramanium S. Electronic gun (Taser®) injuries. Annals of Emergency Medicine. 1987;16(1):73-78. doi:10.1016/s0196-0644(87)80292-5

[14] Aulino G, Giannuzzi F, Carlà MM, et al. Taser-Related Ocular Injuries: A Review of the literature and Medico-Legal Implications. Seminars in Ophthalmology. 2024;39(5):334-339. doi:10.1080/08820538.2024.2322452

[15] Chen SL, Richard CK, Murthy RC, Lauer AK. Perforating ocular injury by Taser. Clinical and Experimental Ophthalmology. 2006;34(4):378-380. doi:10.1111/j.1442-9071.2006.01228.x

[16] Seth RK, Abedi G, Daccache AJ, Tsai JC. Cataract secondary to electrical shock from a Taser gun. Journal of Cataract & Refractive Surgery. 2007;33(9):1664-1665. doi:10.1016/j.jcrs.2007.04.037

[17] Miller BK, Goldstein MH, Monshizadeh R, Tabandeh H, Bhatti MT. Ocular manifestations of electrical injury: a case report and review of the literature. PubMed. 2002;28(4):224-227. doi:10.1097/01.icl.0000032345.79593.24

[18] Ng W, Chehade M. Taser penetrating ocular injury. American Journal of Ophthalmology. 2005;139(4):713-715. doi:10.1016/j.ajo.2004.11.039

[19] Mehl LE. Electrical injury from tasering and miscarriage. Acta Obstetricia Et Gynecologica Scandinavica. 1992;71(2):118-123. doi:10.3109/00016349209007967

[20] O'Brien, A. J., & Thom, K. (2014). Police use of TASER devices in mental health emergencies: A review. International Journal of Law and Psychiatry, 37(4), 420-426. https://doi.org/10.1016/j.ijlp.2014.02.014

[21] O'Brien AJ, McKenna BG. Concerns About the Use of TASERs® On People with Mental Illness in New Zealand. Journal of Forensic Nursing. 2007;3(2):89-92. doi:10.1097/01263942-200706000-00008

[22] Frechette A, Rimsza ME. Stun gun injury: a new presentation of the battered child syndrome. Pediatrics. 1992;89(5 Pt 1):898-901.

[23] Turner MS, Jumbelic ML. Stun gun injuries in the abuse and death of a seven-month-old infant. J Forensic Sci. 2003;48(1):180-182.

[24] Vilke GM, Sloane CM, Bouton KD, et al. Physiological effects of a conducted electrical weapon on human subjects. Annals of Emergency Medicine. 2007;50(5):569-575. doi:10.1016/j.annemergmed.2007.05.004

[25] Dawes DM, Ho JD, Johnson MA, Lundin E, Janchar TA, Miner JR. 15-Second conducted electrical weapon exposure does not cause core temperature elevation in non-environmentally stressed resting adults. Forensic Science International. 2008;176(2-3):253-257. doi:10.1016/j.forsciint.2007.09.014

[26] Koscove EM. Taser® dart ingestion. Journal of Emergency Medicine. 1987;5(6):493-498. doi:10.1016/0736-4679(87)90212-5

[27] Dyer O. Tasers. BMJ. 2015;351(nov17 2):h6070. doi:10.1136/bmj.h6070

[28] Vilke GM, Chan TC. Less lethal technology: medical issues. Policing an International Journal. 2007;30(3):341-357. doi:10.1108/13639510710778787

[29] Koscove EM. The Taser® weapon: A new emergency medicine problem. Annals of Emergency Medicine. 1985;14(12):1205-1208. doi:10.1016/s0196-0644(85)81030-1

[30] Kornblum R, Reddy S. Effects of the Taser in fatalities involving police confrontation. Journal of Forensic Sciences. 1991;36(2):434-448. doi:10.1520/jfs13046j

[31] Ho JD, Miner JR, Lakireddy DR, Bultman LL, Heegaard WG. Cardiovascular and physiologic effects of conducted electrical weapon discharge in resting adults. Academic Emergency Medicine. 2006;13(6):589-595. doi:10.1197/j.aem.2006.01.017

[32] Manhas NS, Stahl D, Schellenberg M, Gholamrezanezhad A. Non-lethal weapon: Injury patterns and imaging correlates for firearm alternatives. Clinical Imaging. 2021;79:165-172. doi:10.1016/j.clinimag.2021.03.007

[33] Is it legal to carry a taser? sustainable-markets.org. http://sustainable-markets.org/post/is-it-legal-to-carry-a-taser. Published December 22, 2024.

[34] School SL. Home | Stanford Law School. Stanford Law School. http://www.law.stanford.edu/academic/programs/criminal justice.

[35] Levine SD. Cardiac monitoring of subjects exposed to the TASER. Academic Emergency Medicine. 2005;12(Supplement 1):71. doi:10.1197/j.aem.2005.03.195

[36] Singh RR, Srivastava UK, Choudhary R, Yadav PK, Tripathi SK, Ttripathi SS. Impact of Overload on Emergency Medicine Department during Festive Season in a Tertiary Care Centre in North India: A Systematic Review. International Medicine ISSN: 2667-7008. 2023 Nov 23;9(3).

[37] Singh RR, Jha S, Mittal R, Tripathi SK, Kumari S, Yadav PK. Ethical Dilemmas in Emergency Anesthesia: A systematic review. International Medicine ISSN: 2667-7008. 2023 Nov 3;9(3).