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AN EPIDEMIOLOGICAL STUDY OF VIOLENT ASPHYXIAL DEATHS IN LUCKNOW, UTTAR PRADESH

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Abstract

Background: Violent asphyxial deaths represent a significant subset of fatalities within forensic medicine, posing intricate challenges for accurate diagnosis and classification. By quantifying the prevalence of different modes of asphyxia, including strangulation, suffocation, and positional asphyxia, this study seeks to delineate the various mechanisms and contexts leading to fatal outcomes.

Methods: Study was conducted in the Department of Forensic Medicine & Toxicology, King George's Medical University, Uttar Pradesh. It was an analytical study where all the cases of asphyxia deaths and suspected asphyxia deaths with associated other injuries of any age and sex were included. Decomposed bodies were excluded from this study.

Results: Total number of autopsies done during the study period were 4369 however incidence of violent asphyxia deaths was reported to be 6.11% (267 deaths). Hanging was the most commonly reported violent asphyxia death. A male preponderance can be seen with 148 cases from a total of 267 deaths. Visceral congestion and cyanosis are the most commonly reported findings in 100% and 83.9% of cases respectively.

Conclusion: Concerted efforts are needed to implement the recommendations outlined in this study, including strengthening forensic investigation protocols, enhancing public awareness campaigns, promoting collaboration between health and law enforcement agencies, and providing support services for survivors and bereaved families. By addressing the recommendations we can work towards creating a safer and more resilient community where every individual's right to life and dignity is upheld.

Keywords: Epidemiological, Asphyxial deaths, Uttar Pradesh

Introduction

Violent asphyxial deaths represent a significant subset of fatalities within forensic medicine, posing intricate challenges for accurate diagnosis and classification. Amongst various urban centers, Lucknow, the capital city of Uttar Pradesh, India, stands as a focal point for understanding the epidemiological landscape of such occurrences. With its unique socio-cultural dynamics, demographic composition, and urban infrastructure, Lucknow presents an intriguing case study to explore the patterns and determinants of violent asphyxial deaths.[1]

By quantifying the prevalence of different modes of asphyxia, including strangulation, suffocation, and positional asphyxia, this study seeks to delineate the various mechanisms and contexts leading to fatal outcomes.

Moreover, this study acknowledges the broader public health implications of violent asphyxial deaths, recognizing the ripple effects on families, communities, and society at large. By addressing the root causes and modifiable risk factors associated with these fatalities, it aspires to catalyze proactive interventions that mitigate harm and promote well-being.

Secondly, this research endeavors to elucidate the circumstances and contexts surrounding violent asphyxial deaths, shedding light on the precipitating factors, interpersonal dynamics, and environmental conditions that contribute to fatal outcomes. Such knowledge is instrumental for devising targeted prevention strategies, enhancing forensic protocols, and fostering collaboration across medical, legal, and law enforcement domains.

The epidemiological investigation of violent asphyxial deaths is essential not only for forensic science but also for public health initiatives and law enforcement strategies. By systematically analyzing the incidence, demographics, circumstances, and associated factors of these deaths, this study aims to provide crucial insights that can inform preventive measures, improve medical and investigative practices, and ultimately contribute to reducing mortality rates from such incidents.[2]

Furthermore, by exploring demographic patterns such as age, gender, socioeconomic status, and geographical distribution, this study aims to identify vulnerable populations and potential risk factors associated with violent asphyxial deaths in Lucknow. Such insights are crucial for designing targeted interventions, enhancing forensic investigation protocols, and fostering collaboration between medical, legal, and public health authorities.

Material & Methods

Study was conducted in the Department of Forensic Medicine & Toxicology, King George's Medical University, Uttar Pradesh. It was an analytical study with a time frame of one year extending from April 2012 to April 2013. In this study incidence of asphyxial deaths, its relationship with the sex and age of the deceased, diurnal variations, manner of death, place of death, place of residence, ligature material and ligature mark in case of hanging as well as strangulation by ligature and various other post mortem findings were studied on autopsy like cyanosis, visceral congestion, petechiae, dribbling of saliva , hyoid fracture, frothing, goose skin and any other associated conditions.

All the cases of asphyxia deaths (drowning, hanging, strangulation, throttling, smothering or traumatic asphyxia) and suspected asphyxia deaths with associated other injuries of any age and sex were included. Decomposed bodies were excluded from this study.

Information relating to the family conditions, cause of death, manner of death etc. and other related information, particularly in cases of deaths due to hanging were gathered from police records and accompanying relatives of the deceased.

Data collection and analysis: Data was collected on predesigned, pretested open ended, semi structured schedule and analysis was done with the help of MS excel program.

Results

Total number of autopsies done during the study period were 4369 however incidence of violent asphyxia deaths was reported to be 6.11% (267 deaths).

Table 1: Incidence Classification of Various Violent Asphyxial Deaths

S. No.	Type of Asphyxial Deaths	Males	Females	Total Cases	Percentage
1	**Hanging**	129	107	236	88.3
2	**Strangulation**	9	7	16	5.9
3	**Drowning**	7	2	9	3.3
4	**Throttling**	3	3	6	2.2
	Total	148	119	267	100

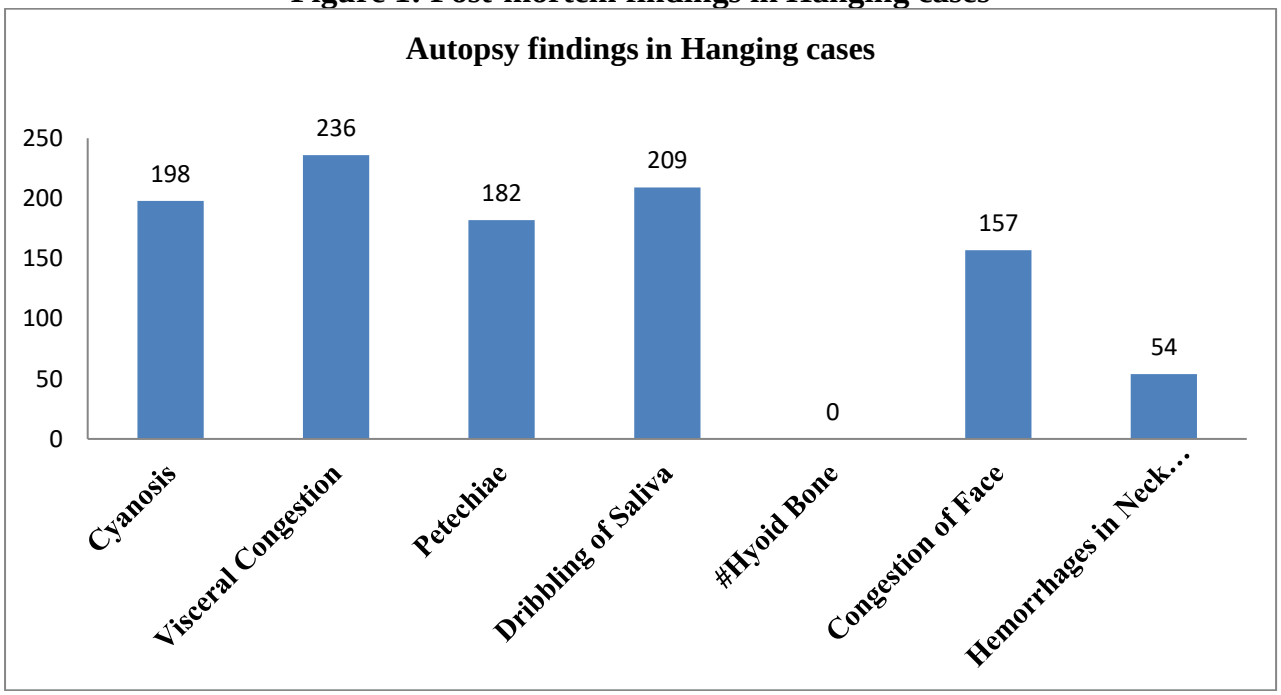
*As seen from the table, Hanging was the most commonly reported violent asphyxia death seen in 88.38% cases, followed by strangulation, drowning and throttling.

Table 2: Sex and Age wise distribution of Asphyxia Deaths

Age Group	Males	Females	Total	Percentage
0-10 years	1	0	1	0.3
11-20	29	49	78	29.2
21-30	48	45	93	34.8
31-40	43	15	58	21.7
41-50	19	4	23	8.6
51-60	6	6	12	4.4
61-70	1	0	1	0.3
>71	1	0	1	0.3
Total	148	119	267	
	55.4%	**44.5%**		**100**

*A male preponderance can be seen with 148 cases from a total of 267 deaths being male i.e.55.43% while 44.56% cases were females. It can be seen that maximum numbers of cases were present in the age group of 21-30 years as far as total number of cases are concerned. If seen individually, maximum cases in males were reported from the age group of 21-30 years followed by 31-40 years age group while maximum number of females belonged to the age group of 11-20years followed by 21-30years.Only a single case was reported in 0-10year age group which was a child of 1&1/2years, died of drowning.

Figure 1: Post-mortem findings in Hanging cases



*As shown, visceral congestion and cyanosis are the most commonly reported findings in 100% and 83.9% of cases respectively.

Table 3: Autopsy findings in ligature strangulation cases

Autopsy findings	Present	Absent	% Present
#Hyoid	3	13	18.7
#Thyroid Cartilage	7	9	43.7
Congestion of face	10	6	62.5
Signs of struggle	11	5	68.7

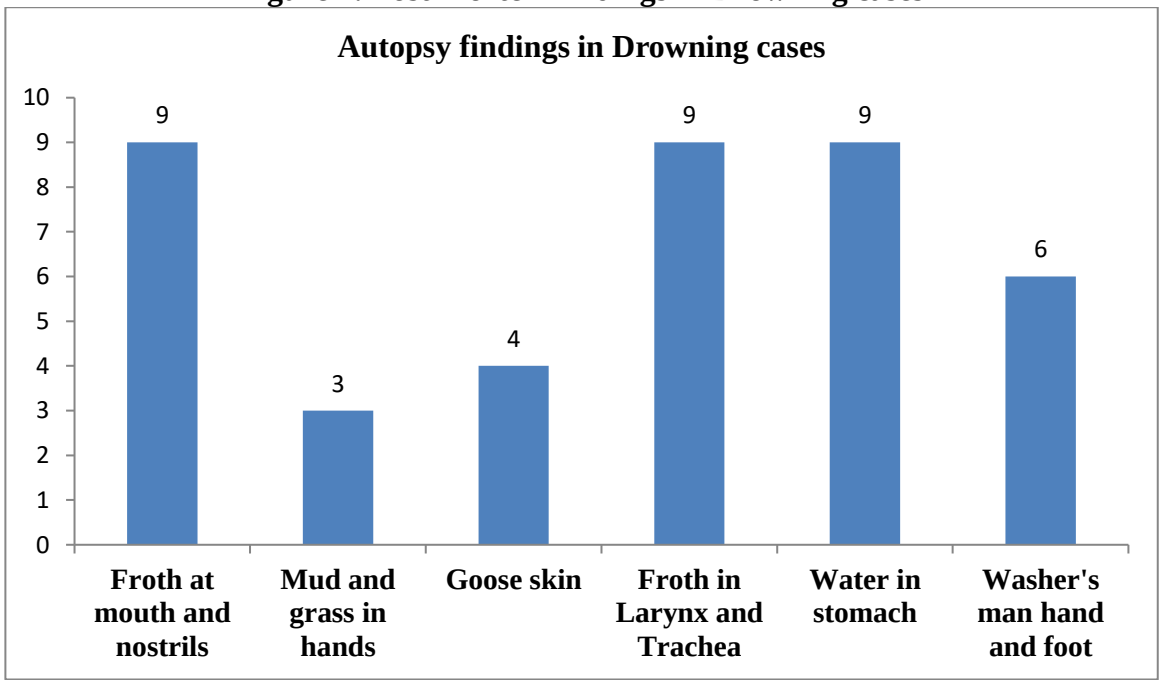
*Hyoid fracture was present in 3 out of 16 cases i.e.18.75% cases, while thyroid cartilage fracture was present in 7 out of 16 cases accounting for 43.75% cases. Signs of struggle were seen in 68.75% cases.

Table 4: Manner of death in strangulation cases

Manner	Cases
Suicidal	0
Homicidal	16
Total	16

*It can be seen that out of total 16 cases none was reported to be suicidal. All the cases were homicidal. Homicidal nature was decided on the basis of signs of struggle, circumstantial evidence and reporting by investigating officer and relatives.

Figure 2: Post-mortem findings in Drowning cases



*****It can be seen that out of 9 cases of drowning, froth in the larynx and trachea was found in 100% of cases as well as froth at mouth and nostrils, and water in the stomach was also found in 100% of cases. Mud and grass in hands were found in 33.3% of cases.

Discussion

Unnatural death is one of the indicators of the level of social and mental health. An increasing death rate as a result of violence constitutes a large group in medico-legal autopsies. Especially, death due to asphyxia is one of the most important causes of violent death. During one year of study, a total of 267 cases of fatal asphyxia were examined. These constitute 6.11% of forensic autopsies conducted. In a study in north east and north west regions of Punjab, the incidence of violent asphyxia deaths out of total autopsies conducted both in north-west (1.26%) and north-east (l.27%) was found to be

almost the same. The incidence of death due to violent asphyxia found by Amandeep Singh et al [3]was 5.26% which was at variance from the study conducted by Gargi et al i.e. 3.9% [4]

In another study by Prajapati Pranav et al [5]on violent asphyxia deaths in Gujrat, the incidence of violent asphyxia deaths was reported as 146 cases per year while during a 4-year study in Varanasi by Chaurasia N et al [6] the incidence was found to be 6.95% of all the forensic autopsies conducted.

In a study in Tumkur by Srinivas Reddy P et al [7]incidence of asphyxia deaths among males (59.1%) was reported to be more than among females (40.8%). The asphyxia deaths were more in age group of 21-30 years (34.9%) followed by 11-20 years (20.1%) and 3-40 years (17.8%) respectively.

In a study by Roger W Byard et al [8]from Australia on asphyxia death in adolescence review of 69 cases of lethal asphyxia in individuals aged from 10 to 18 years was undertaken. In the population studied a preponderance of male victims as seen, similar to our study (19). In a separate study, same authors have shown that the proportion of hanging suicides in young south Australians (aged 17 years) has increased from 33.3 to 93.3% over two 5 year periods, 1995-1999 and 2005-2009, despite an overall decline in suicide numbers. [9]

Death due to drowning has shown remarkable male involvement in the study by Tirmizi et al. ie. with 97.9% males and 2.0% females.[10] This is in accordance with our study.

Luke J L et al [11] in their study on pathological findings in asphyxia deaths by hanging reported that the presence of conjunctival and facial/periorbital petechial hemorrhages correlates with increasing levels of body support below the point of ligature suspension. Hyoid bone and/or thyroid cartilage fractures (found in 26% of cases) are most frequently identified in those persons found completely suspended and in victims in the older age ranges. No hyoid bone/ thyroid cartilage fractures, internal soft tissue injury or petechiae were present in 13 (21%) of the study cases. This is in accordance with the present study where petechiae was present in 77 (12%) of cases. But surprisingly an interesting finding in the literature reviewed is that fracture of hyoid bone is also present in young individuals. Simosen observed fracture of Hyoid bone in 30% of cases aged less than 40 years.[12]

Dribbling of saliva is considered an important finding of ante-mortem hanging as secretion of saliva being a vital function which cannot occur after death, and was reported in 88.5% cases in present series. This was consistent with the findings reported by Patel Ankur P et al [13](71.2%) whereas Vijaynath et al [14]found it in only 31.9% cases (51). Present study has recorded no hyoid bone fracture in any case of hanging which is same as study by Patel Ankur P et al [13]and Naik S [15]while Vijaynath [14]has note it in 3.3% cases.

Recommendations

- **Strengthening Forensic Investigation Protocols:** Enhancing the capacity and training of forensic professionals in Lucknow to conduct thorough investigations into violent asphyxial deaths is paramount. Standardized protocols for the collection, preservation, and analysis of evidence should be established to ensure accuracy and consistency in determining the cause and manner of death
- **Public Awareness and Education Campaigns:** Implementing targeted public awareness campaigns to educate the community about the signs, symptoms, and risks associated with violent asphyxial deaths can help prevent such incidents.
- **Collaboration Between Health and Law Enforcement Agencies:** Promoting collaboration and information-sharing between health care providers, law enforcement agencies, and forensic experts is essential for improving the detection, investigation, and prosecution of cases involving violent asphyxial deaths.
- **Support Services for Survivors and Bereaved Families:** Establishing comprehensive support services for survivors of violent asphyxial assaults and bereaved families who have lost loved ones to such incidents is critical. This includes access to counseling, legal advocacy, and social support networks to help them cope with trauma and navigate the aftermath of violence.

- **Research and Data Collection Initiatives:** Encouraging ongoing research and data collection initiatives to further understand the epidemiology and underlying factors contributing to violent asphyxial deaths in Lucknow.
- **Community-Based Interventions:** Engaging communities in the prevention of violent asphyxial deaths through grassroots initiatives, neighborhood watch programs, and community policing efforts. Empowering local residents to identify signs of abuse, support victims, and collaborate with authorities can help create a culture of safety and accountability.

Limitations

- **Underreporting and Misclassification:** One of the primary limitations of this study is the potential underreporting and misclassification of violent asphyxial deaths in Lucknow. Due to various factors such as cultural stigma, lack of awareness, and inadequate forensic documentation, some cases may go unnoticed or be inaccurately classified, leading to incomplete or biased data
- **Temporal Trends and Changes in Reporting Practices:** Temporal trends in violent asphyxial deaths and changes in reporting practices over time may influence the interpretation of findings and comparisons across different time periods.
- **Confounding Factors:** The analysis of violent asphyxial deaths in Lucknow may be confounded by various factors, including co-morbidities, environmental conditions, and external influences.
- **External Validity:** The findings of this study may have limited external validity beyond the specific context of Lucknow, Uttar Pradesh, and may not be generalizable to other urban or rural settings in India or other countries.

Conclusion

Our findings highlight the significant burden of violent asphyxial deaths in Lucknow, underscoring the urgent need for targeted strategies to address this public health issue. We have identified demographic trends, risk factors, and contextual factors associated with violent asphyxial deaths, informing preventive measures aimed at reducing morbidity and mortality in our community.

However, it is essential to acknowledge the limitations of this study, including potential underreporting, data quality issues, and confounding factors, which may have influenced the accuracy and reliability of our findings. Future research endeavors should strive to overcome these challenges and build upon our findings to further elucidate the underlying determinants of violent asphyxial deaths.

Moving forward, concerted efforts are needed to implement the recommendations outlined in this study, including strengthening forensic investigation protocols, enhancing public awareness campaigns, promoting collaboration between health and law enforcement agencies, and providing support services for survivors and bereaved families. By addressing these recommendations, we can work towards creating a safer and more resilient community where every individual's right to life and dignity is upheld.

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