

# A Post-Mortem Medicolegal Study of Violent Asphyxial Deaths - An Autopsy Based Study

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## ABSTRACT

**Background:** The study was conducted in the mortuary of Babu Jagjivan Ram Memorial Hospital, Jahangir Puri, North-West district, Delhi to determine the frequency and epidemiology of violent asphyxial deaths in that region, in relation to age and gender variation. **Duration of study:** Autopsies conducted during January 1, 2012 to December 31, 2013. **Methods:** Out of 2479 (two thousand four hundred seventy nine) medico legal deaths autopsied at B.J.R.M. Hospital Delhi, during the study period, details were collected for those medico legal deaths identified to be due to violent asphyxial deaths. **Results:** 219 out of 2479 medico legal deaths were identified to be violent asphyxial deaths, making incidence rate 8.83%. There were 149 (68.03%) males and 70 (31.97%) females. Male predominance was seen in all asphyxial deaths except manual strangulation and smothering. Hanging and drowning were leading causes of violent asphyxial deaths. **Conclusions:** This study concludes that immuno-toxicity by cypermethrin insecticide is not similar in male and female subjects.

**Key words:** Violent asphyxial death, hanging, strangulation, throttling, smothering, choking, drowning, autopsy, suicide.

## INTRODUCTION

Death is said to have occurred due to asphyxia when, respiratory function ceases first and initiates the process of failure of other two vital systems. In asphyxia, there is prevention of exchange of air between the atmosphere and the alveoli of lungs and there is lack of oxygen supply to the tissues.<sup>[1]</sup> Unnatural causes of deaths include lethal sequelae of traumatic effects on body such as injury by fire arm, assault with sharp or blunt weapon, bomb blasts, violent compression of neck by ligature or hand, poisoning, thermal injuries, road traffic accidents etc.

Violent asphyxial deaths have significant contribution to unnatural suicidal, homicidal and accidental deaths. Among

various violent asphyxial deaths like hanging, strangulation, smothering, throttling, traumatic asphyxia, choking and drowning, hanging is one of the leading manner of suicide in which there is suspension of the body by a ligature material compressing the neck externally, the constricting force being the weight of the body.<sup>[2]</sup> Hanging is always considered suicidal except accidental hanging in sexual perverts, homicidal hanging in lynching and justifiable judicial hanging. In England and Wales, hanging accounts for about 2000 deaths each year and is considered the most common method of suicide.<sup>[3]</sup> In USA, 92.3% of all suicides were caused by firearms, hanging and poisoning.<sup>[4]</sup> A report from Canada has also indicated hanging as the second most common method of suicide after suffocation.<sup>[5]</sup>

Strangulation is another form of asphyxial death in which there is compression of neck structures by a constricting force other than the body's own weight. The force may be exerted by different means such as ligature, by use of hand, when it is known as throttling or manual strangulation, elbow (mugging) and bamboos (bansdola).<sup>[6]</sup> Death by strangulation is always considered homicidal but it may be accidental as seen in cases where law enforcers use choke holds to control the suspects as well as in wrestling, commonly known as mugging that is compressing the neck against elbow folds. Choking games are known by different

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names such as “Scarf game, black out game, pass out game or space monkey”.

In drowning, a global phenomenon, the access of air to lungs is prevented by submersion of body in water or fluid medium. It may be fresh or sea water depending upon the water in which the person is drowned.<sup>[8]</sup> Studies by United Nations World Health Organization have shown that in South Asia, about 90,000 people are drowned to death every year. Most South Asian countries have higher drowning death rates than the world average.<sup>[9]</sup> Italy, in a 20 years study from 1969 to 1998 has reported 24,496 deaths due to drowning. The death rate decreased from 22.7 to 5.2 deaths per million annually over the period of study, representing 77% decline.<sup>[10]</sup>

Fatal accidental or homicidal smothering as a result of occlusion of external air passages that is nose and mouth is commonly seen in infants or young children though the old, weak, debilitated adults, epileptic and persons under intoxication may be smothered. There may be no findings at autopsy if a soft pillow, cloth or cushion is used even in cases of homicides. Careful examination, interpretation of history and crime scene observation may be rewarding in such cases to avoid miscarriage of justice.<sup>[11]</sup>

Another form of asphyxial death is “Traumatic asphyxia” or Crush asphyxia” which is associated with prevention of respiratory movements due to compression of or penetrating trauma to the chest. Traumatic asphyxia is mostly accidental in nature. It presents with cervico-facial cyanosis, sub-conjunctival hemorrhages, marked petechial hemorrhages over face, neck and upper part of chest due to compressive force to thoraco-abdominal regions.<sup>[12]</sup>

There is paucity of literature in this respect except one study of AIIMS.<sup>[13]</sup> This study is therefore aimed to determine, the frequency of violent asphyxial deaths autopsied in the mortuary of Babu Jagjivan Ram Memorial, Hospital, North-West District, Jahangirpuri, Delhi, in relation to age and gender vulnerability.

**METHODS**

A post-mortem examination based descriptive cross-sectional study was conducted on 219 violent asphyxial deaths out of a total 2479 medicolegal cases autopsied during the period from January 1, 2012 to December 31, 2013 at Babu Jagjivan Ram Memorial Hospital, Jahangirpuri, Delhi. A performa was prepared and findings were recorded as given in subsequent tables.

The study included only those cases in which deaths could be attributed to the direct effects of mechanical interference in the process of respiration leading to asphyxia and ultimately death.

All deaths other than due to violent asphyxia were excluded.

**RESULTS**

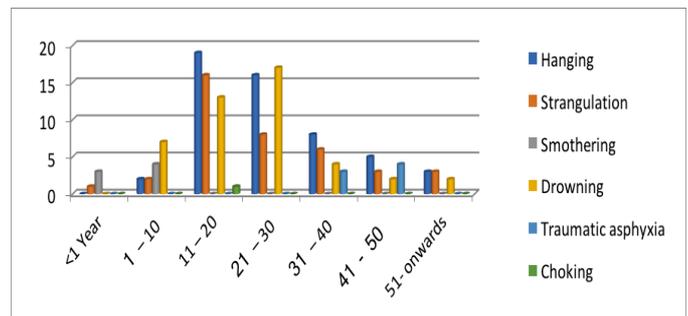
A total of 2479 Medico-legal autopsies were conducted during the period from January 1, 2012 to December 31, 2013, out of which 219 cases were due to violent asphyxial death, making the incidence rate 8.83%.

Among the deceased, there were 149 (68.03%) males and 70 (31.96%) females. Males featured predominantly in all asphyxial deaths, except in manual strangulation and smothering (Table 1).

**Table 1: Frequency of asphyxial death in relation to gender**

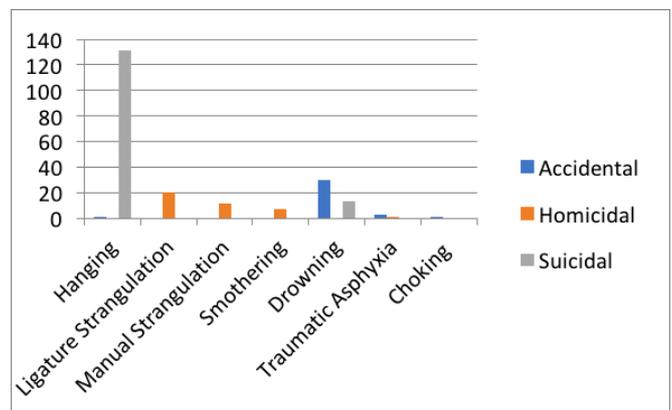
Cause of death	Male	Female	Total
Hanging	94	38	133 (60.73%)
Ligature Strangulation	11	09	20 (09.13%)
Manual Strangulation	07	05	12 (05.47%)
Smothering	04	03	07 (03.19%)
Drowning	29	14	43 (19.63%)
Traumatic Asphyxia	03	01	04 (01.82%)
Choking	01	-	01(0.45%)
	149(68.03%)	70(31.96%)	219 (100%)

Almost one third of the reported asphyxial deaths belonged to age group 11 – 30 years making 41.55 % of total deaths. Second largest age group was in the range of 31 – 50 years contributing 15.98 % of the total deaths.



**Fig 1: Frequency of asphyxial death in relation to age**

Hanging and drowning were the leading causes of violent asphyxial deaths contributing 60.27 % and 19.63 % respectively. All hanging cases were suicidal except one which involved a 7-year-old girl was accidental.



**Fig 2: Frequency of asphyxial death in relation to manner of death**

Most of the victims were belonged to low socio-economic status that is (98.17%)except one (0.45%) and three (1.36%) cases belongs to high and middle class families respectively (Table 2,3).

**Table 2: Frequency of asphyxia death in relation to Socio-economic status and religion. 5**

Cause of death	High class	Middle class	Lower class	Total
Hanging	01	02	129	132
Ligature strangulation	--	--	20	20
Manual strangulation	--	--	12	12
Smothering	--	--	07	07
Drowning	--	01	42	43
Traumatic asphyxia	--	--	04	04
Choking	--	--	01	01

**Table 3: Frequency of asphyxia death in relation to Socio-economic status and religion. 6**

Cause of death	Hindu	Muslims	Sikhs	Others	Total
Hanging	127	03	01	01	132
Ligature strangulation	17	03	--	-	20
Smothering	06	01	--	--	07
Drowning	42	--	01	--	43
Traumatic asphyxia	04	--	--	--	04
Manual strangulation	11	01	-	-	12
Choking	01	-	-	-	01
Total	208	08	02	01	219

It has been observed that most of cases of asphyxia deaths in North-West and Outer Delhi belongs to Hindu community i.e. 208(94.97%), followed by Muslims 08 cases (3.65%) and Sikhs others were negligible i.e. (0.45%) of the total cases (Table 3). It has been observed that most of the cases of hanging is in married individuals 98(44.74%), followed by unmarried that is 34(15.52%).

## DISCUSSION

The incidence rate of asphyxial death in this study was found to be 8.83%. A study conducted by Singh RK (8.40%) in Manipur shows almost similar incidence<sup>14</sup>. Tirmizi et al (7.08%) and by Singh A, et al in Punjab (India) has also reported 2110 medico legal deaths out of which 111 cases belonged to violent asphyxial death with 5.26% incidence rate of asphyxial death over a period of

four years which is close to our study.<sup>[15,16]</sup> Violent asphyxial deaths comprised 15.7% of all forensic deaths reported from Turkey<sup>[17]</sup> which is considerably high. This might be due to the longer duration of study.

**Table 4: Frequency of asphyxia death in relation to marital status. 7**

Cause of death	Married	Unmarried	Total
Hanging	98 (44.74%)	34 (15.52%)	132
Ligature strangulation	08 (3.65%)	12 ((5.47%)	20
Smothering	02 (0.91%)	05 (2.28%)	07
Manual strangulation	07 (3.19%)	05 (2.28%)	12
Drowning	27 (12.32%)	16 (7.30%)	43
Traumatic asphyxia	02 (0.91%)	02 (0.91%)	04
Choking	--	01 (0.45%)	01
Total	144 (65.75%)	75 (34.24%)	219

Our study shows 68.3% males and 31.7 % females, similar to the study of Turkey<sup>[17]</sup> in which males constituted 79.8% of all cases. Another retrospective study of autopsies conducted in Tumkur District hospital, reported 59.14% male cases and 40.86% female cases died due to violent asphyxia.<sup>[18]</sup> In our study, the manner of death comprised of hanging 60.27%, drowning 19.63% followed by strangulation 14.61% of total cases, almost similar pattern was observed by Gurudut et.al.<sup>[19]</sup> in Belgaun, Karnataka (India).

Deaths due to drowning has shown remarkable male involvement in our study i.e. 67.44% , which is almost similar to a study conducted in Lahore (Pakistan)<sup>[20]</sup> which showed 64.28% male involvement. Similar trend was observed in Varanasi region of India by Chaurasia et.al.<sup>[21]</sup> In our study 04 cases of traumatic asphyxia were recorded in which 03 were due to fall of roof and beam and one case being homicidal in nature where in a person was murdered by fellow prisoners in Rohini Jail. A study conducted in Punjab (India)<sup>[16]</sup> during 2000 to 2003 has also shown 7 medico legal deaths due to traumatic asphyxia out of which 6 were males. The major involvement of male in traumatic asphyxial deaths is due to their strenuous physical work and environmental exposure to work disasters.

Our study has reflected male predominance in two types of violent asphyxial deaths i.e. smothering and manual strangulation in comparison to females, that is 10.04% male and 8.21% females which is almost similar to study conducted by Tirmizi et al<sup>[16]</sup>, but slightly defers with other studies.

In this study, most of the victims of belong to low socio-economic class i.e. 98.17%. In this study, the incidence of violent asphyxial deaths seen in age group 11–20, 21–30 and 31-40 years was 33.1%, 27.7% and 14.18% respectively which is similar to a study from Ahmadabad Gujarat, which almost similar to study that is 74.22% in age group 11-40 years of age.<sup>[22]</sup>

In our study, violent asphyxial deaths comprised of 94.97% Hindus, 3.65% Muslims, and other religions shows negligible incidence that is Sikhs 0.4%, Christians nil. Almost similar pattern observed in Varanasi (India) by Chaurasia et al.<sup>[21]</sup>

All these studies are in accordance with our study and reported suicidal manner of death in hanging and accidental in case of drowning. Ligature and manual strangulation in our study is found to be homicidal in most of the cases. Most of the studies conducted in various countries reported strangulation as common method of homicide particularly practiced on women and young children.<sup>[24,25]</sup> Manual strangulation and smothering are the methods of homicide usually adopted by criminals who are physically strong as compared to their victims and this is furnished by our finding of female predominance in manual strangulation and smothering. Jahangir Puri is a thickly populated area of North-West Delhi, accommodating all racial groups of its various states of India. Violence in this area has increased due to unemployment, low socio-economic status and marital discord which has demanded responsibility particularly from those who handle these aspects of death to investigate on scientific basis, so that miscarriage of justice is avoided. We have, therefore, conducted this study to find out the exact frequencies of violent asphyxial deaths with gender and age vulnerability.

## CONCLUSION

Males and young age group population between 15–30 years are more vulnerable victims of violent asphyxial deaths. Suicidal deaths as a result of hanging and accidental deaths as a result of drowning seem to be the major contributing causes of asphyxial deaths. Both these manner of deaths, somehow, indicates frustration and carelessness on the part of population which are preventable and needs to be rectified on urgent basis. More over these cases of suicide should serve as an eye opener for organizations working for socio economic justice in our country.

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