Original Research Article

Mechanical Asphyxial Deaths: An Autopsy Based Cross Sectional Study in a Tertiary Care Hospital

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Abstract

Asphyxia is a condition caused by interference with respiration due to lack of oxygen in inspired air due to which the tissues are deprived of oxygen causing unconsciousness or death which could be due to any of the following causes such as Mechanical, Environmental or Toxic. To estimate the incidence and pattern of mechanical asphyxia deaths with epidemiological data such as age & sex wise distribution, various methods, manner, aggravating factors and substance abuse history of victim and to formulate certain measures for prevention. The autopsies of mechanical asphyxia deaths conducted at the mortuary of Government Stanley Medical College and Hospital, Chennai-01, during the period of 3months (October to December 2020).Information gathered from police inquest, postmortem reports, relevant history from relatives and friends of the deceased. During the period of study period, 581 deaths were autopsied in the mortuary, out of which 167 were of mechanical asphyxial deaths and the incidence was 28.74%. The most common form of mechanical asphyxial death was hanging (74.25%) followed by drowning (17.36%). The sex wise distributions of mechanical asphyxial deaths were most common in males 147 cases (88.02%) than females 27 cases (16.16%). Most of the deaths due to asphyxia were suicidal followed by accidental and most of the cases were suicidal hangings which is increasing day by day. With pattern of mechanical asphyxia deaths, we should also adopt certain measures for the prevention. Advised to the Public to cope up with the present scenario's causing mental stress in turn caused by unemployment, financial problems, family disputes etc.

Key words: Drowning, Hanging, Mechanical Asphyxia, Strangulation, Suffocation.

Introduction

Death is inevitable, but man and woman always try to fight against it. Modernization had made the life more stressful and hence incidence of suicide and accidents has been increased.

Asphyxia: An asphyxial death usually implies one due to mechanical blockage of the air passages. Asphyxia is a condition caused by interference with respiration due to lack of oxygen in inspired air due to which the tissues are deprived of oxygen causing

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unconsciousness or death and due to any of the following causes – Mechanical, Environmental, or Toxic.

Mechanical asphyxia: The term mechanical asphyxia is here applied to circumstances in which mechanical interference either (a) impedes access of air to the lungs or (b) reduces the blood supply to the head and neck or (c) causes sudden cardiac arrest due to stimulation of the carotid sinus – Vagal reflex mechanism. Example: Hanging, Strangulation, Drowning and Suffocation etc.

This study attempts to estimate the incidence and pattern of mechanical asphyxial deaths with epidemiological data such as age & sex wise distribution, various methods, manner, cause & precipitants and substance abuse history of victim and to formulate certain measures for prevention.

Materials and Methods

An autopsy based cross-sectional study performed in the department of Forensic Medicine, Stanley Medical College Hospital, Chennai during the study period from October 2020 to December 2020.

The details of the incident given by the relatives of the deceased were taken and the detail analysis of police inquest was done. Information collected from various sources like hospital case sheets, post mortem reports, inquest reports, FIR reports, and importantly information collected from the investigating officer, relatives and friends of the deceased accompanying the dead bodies.

All data regarding age, sex, religion, socioeconomic status, marital status, demographic area, occupation, and circumstances of death which includes the nature of incidence, precipitating cause, the time of occurrence, the time of death and the cause of death were collected from the police inquest report and FIR. Thorough detailed interviews of the friends, relatives, neighbors and police officials accompanying the dead bodies, also has to be done and finally the results were analyzed.

Observations and Results

A. Incidence of asphyxial death: Regarding the incidence of asphyxial death cases, out of the 581 cases being autopsied in mortuary, 167(28.74%) cases were of deaths due to asphyxia.

Table 1: Incidence of mechanical asphyxial death

Total Deaths	Mechanical Asphyxial Deaths	Other Deaths	Percentage Of Mechanical Asphyxial Deaths
581	167	414	28.74

B.Various methods of asphyxial deaths: The incidence of various asphyxial deaths was recorded. Out of 167 asphyxial death cases, hanging (74.25%) was found to be the commonest and out of 124 cases, 101 cases of were male and 23 cases were female. Next to hanging, drowning was the next common of all mechanical asphyxial deaths and out of 29 drowning cases (17.36%), 27cases were male. 3 cases were died due to strangulation with male preponderance and 3 cases were died due to aspiration and all were males.

Table 2: Type of Mechanical Asphyxial Deaths

S. NO.	TYPE OF MECHANICAL ASPHYXIAL DEATHS	MALE	FEMALE	PERCENTAGE
1	Hanging,	101	23	124 (74.25%)
2	Drowning.	27	2	29 (17.36%)
3	Strangulation	2	1	3 (1.79%)
4	Gagging	0	0	0 (0%)
5	Positional asphyxia	1	0	1 (0.59%)
6	Traumatic asphyxia.	3	0	3 (1.79%)
7	Choking	1	0	1 (0.59%)
8	Aspiration	3	0	3 (1.79%)
9	Suffocation.	1	0	1 (0.59%)
10	Smothering	1	1	2 (1.19%)
	TOTAL	140	27	167

C. History of substance abuse: 102 victims (61.07%) did not have any habit of taking either tobacco or alcohol or any other drugs; 23 victims (13.77%) used to take alcohol only, 17 (10.17%) victims used to take both smoking and pan masala and 11 victims (6.58%) were addicted to alcohol, tobacco and betel nut and also 2% of victims used to take drug abuse.

Table 3: Number of cases with history of substance abuse:

CATEGORY	NO OF CASES WITH HISTORYOF SUBSTANCE ABUSE	PERCENTAGE
Alcohol	23	13.77%
Alcohol + betel nuts	3	1.79%
smoking	6	3.59%
Smoking + betel nuts	17	10.17%
Alcohol + smoking + betel nuts	11	6.58%
Drug abuse	2	1.19%
Combined	3	1.79%
Nil	102(<20 years-29; others-73)	61.07%
Total	167	99.95%

D. Manner of death: Out of 167 asphyxial deaths, Suicidal deaths constitute the maximum number. It is observed from the table that among the 128 suicidal cases, 104 cases were male comprising 81.25% and 24 cases were female comprising 18.75%. In suicidal deaths, majority of cases were died due to hanging. Among 34 accidental deaths, 24 cases were drowning (85.29%), 3 cases were aspiration (8.82%) and 3 cases were traumatic asphyxia(8.82%). Out of 5 homicidal cases, 3cases were died due to strangulation. In homicide, one case of smothering and one case of drowning were reported.

Table 4: Incidence of manner of death in different types of mechanical asphyxia deaths:

S. NO.	TYPE OF MECHANICAL ASPHYXIAL DEATHS	SUICIDAL		HOMICIDAL		ACCIDENTAL		TOTAL
		M	F	M	F	M	F	
1	Hanging	101	23	0	0	0	0	124
2	Drowning	3	0	1	0	23	1	29
3	Strangulation	0	1	2	1	0	0	3
4	Gagging	0	0	0	0	0	0	0
5	Positional asphyxia	0	0	0	0	1	0	1
6	Traumatic asphyxia	0	0	0	0	3	0	3
7	Choking	0	0	0	0	1	0	1
8	Aspiration	0	0	0	0	3	0	3
9	Suffocation.	0	0	0	0	1	0	1
10	Smothering	0	0	0	1	1	0	2
	TOTAL	104	24	3	2	33	1	167

E. Cause and precipitants: Out of 167 deaths due to mechanical asphyxia, depression was the main causative factor in 58 deaths. Acute & chronic illness were played major role in the causative factor in 15 deaths, not specified history noted in 28 deaths, work pressure in 4 deaths, family dispute in 1 death and financial problems in 22 deaths.

Table 5: Cause &Precipitants vs Sex wise distribution of mechanical asphyxia deaths:

S. NO.	MOTIVE	MALE	FEMALE	TOTAL
1	Family Disputes	1	0	1
2	Depression	49	9	58
3	Work pressure	3	1	4
4	Not Specified History	23	5	28
5	Illness (acute & chronic)	11	4	15
6	Financial Problems	16	6	22
7	Affairs	0	1	1
8	Mental Status	4	0	4
	Total	107	26	133

Discussion

An autopsy based cross-sectional study was performed in the department of Forensic Medicine, Stanley Medical College Hospital, Chennai during the study period from October 2020 to December 2020 to estimate incidence and pattern of mechanical asphyxia death. Out of 581 autopsies, 167 cases were mechanical asphyxia deaths. This present study showed wide similarities and dissimilarities with other authors studies.

The incidence rate of asphyxial death in the present study is found to be 28.74%. Singh A et al[1], Palimar Vikram et al[2], Chaurasia N, Pandey SK et al[3], and Dhillon Sangeet et al[4]who observed slightly lower incidence of asphyxial deaths in their study. Choudhury BL et al[5], Patel-A et al [6]and Azmak D et al [7]observed slightly higher incidence rate of asphyxial death. The reason for variation in the incidence of asphyxial death in the different parts of world may be due to cultural, ethnic, geo-graphical and genetic difference.

In present study most common mode of death due to mechanical asphyxia is hanging (74.25%) followed by drowning (17.36%). Other mode were strangulation (1.79%) and throttling (1.79%) and choking (0.59%). Similar results were reported and endorsed by Chourasia et al[3] i.e: hanging (75.01%), drowning (22.79%), smothering (1.48%) and strangulation (0.74%). Study of Kanchan et al[15] were also reported more or less similar findings and these findings were endorsed my view of study findings. Study at mortuary of RCSM GMC Kolhapur was showing that hanging (58.55%) followed by drowning (39.90%) and other mode of deaths due to asphyxia were strangulation (1.03%) and throttling (0.5%). The findings of the present study were also similar with the several workers like Singh B et al[12], Momochand A et al[13], Azmak D[7], Palimer Vikram et al [2], Chaurasia N, Pandey SK et al[3], Choudhury BL et al [5] and Patel Ankur et al[6] in which hanging constitutes the majority of cases. In present study, there was no fracture of hyoid in hanging cases. Gagging was not reported in present study.

In this study, maximum incidence of asphyxial deaths was seen in age group from 31- 40 years, 21-30 and then in 11-20 years of age, contributing 25.74%, 22.75% and 14.37% of the total asphyxial deaths respectively. It clearly indicates that young adults are the main victims of asphyxial deaths. Out of 167 deaths 140 were male (83.83%), 27 were female (16.16%). It shows preponderance of male sex over female in mechanical asphyxial deaths. Males were the most common victims with male to female ratio being 2.5:1. The findings of the present study are similar with the study of study of Copeland AR et al [8], Auer A et al [9], Majumder BC et al[10], Lalwani S et al[11], Chaurasia N et al[3] and Patel-A et al[6]i.e: young adults are the main victims of asphyxial deaths and males were the most common victims.

In the present study, majority of the victims were in illiterate level followed by middle school level and primary level. Least affected group were in high school level and intermediate/diploma level. Number of illiterate people committing suicide is also high, poverty and struggles for survival being the main reason among this group of people which increased the number of incidences of suicide among them.

In the present study, 76.64% of mechanical asphyxial deaths were suicidal followed by accidental (20.35%) and homicidal (2.99%). All the cases of strangulation were homicidal whereas all the cases of choking were accidental. The present study is similar with the findings of Davidson A, Marshall TK et al [17], Majumder BC et al [10], Lalwani S et al[11], Azmak D et al [7], Kanchan T, Rastogi P et al[15], Chaurasia N, Pandey SK et al[3] , Patel Ankur et al[6] and Musaib Mohammed Shaikh M et al[18]

Alcohol abuse may lead to suicidal tendency through disinhibition, impulsiveness and impaired judgement. Compared to other substance abuse, alcohol played major role in association with occurrence of mechanical asphyxial deaths (hanging). The findings were endorsed by Choudhury BL et al [5]

In this study no deaths were reported due to sexual asphyxia among male and females. In this study, main causative factor was depression followed by financial problems. There were no specified/ relevant history mentioned in 28 cases. In females, depression was the leading causes where as in males, depression, ill health, financial crisis and mental status and family disputes were leading causes. The findings were endorsed by Palimer Vikram et al [2], Chaurasia N, Pandey SK et al[3], Choudhury BL et al [5] and Patel Ankur et al[6]

Conclusion

In the present study, suicidal deaths as a result of hanging and accidental deaths as a result of drowning seems to be the major contributing causes of asphyxial deaths. Hence the numbers of suicidal hanging cases are increasing day by day. Both these manners of deaths, somehow, indicates frustration and carelessness on the part of population which are preventable and needs to be rectified on urgent basis. A well designed and comprehensive mental health programs are needed to identify the causative factors and prevention of suicidal behaviors. Measures to improve the socioeconomic conditions through reforms in the fields of education, health, increase in employment opportunities are expected to lessen the existing stress and strain of the society. Advised to the Public to cope up with the present scenario's causing mental stress. They may be resolved by simple means of discussing and sharing facts with close friends, family members and colleagues and do practicing meditation, Yoga etc, to relieve mental stress and its consequences. This in turn will help to decrease the incidence of suicidal, homicidal or accidental cases of asphyxia. Drowning prevention strategies should be comprehensive and include: engineering methods which help to remove the hazard, legislation to enforce prevention and assure decreased exposure, education for individuals and communities to build awareness of risk and to aid in response if a drowning occurs, and prioritization of research and public health initiatives to further define the burden of drowning worldwide and explore prevention interventions.

Conflict of interest if any: NA

Privacy / Confidentiality of the study subjects: Will be maintained.

Sponsor details: NA

Compensation: NA

Insurance: NA

Ethical Clearance: Obtained from Institutional Ethics Committee. Stanley Medical College, Chennai -1 dated 12.12.2019.

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