VICTIMO-EPIDEMIOLOGICAL PROFILE OF VIOLENT ASPHYXIAL DEATHS IN MANIPAL, KARNATAKA.

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ABSTRACT

The violent deaths are increasing day by day in the developing world. Deaths due to asphyxia are one of the most important causes in the violent deaths. One hundred and thirty five asphyxial deaths were studied by the authors and described various epidemiological and demographical parameters of these deaths in the present study. The changing demographics and the increased incidence and variations observed are described here. Males outnumbered females in asphyxial deaths. Most common age group involved was 21 – 30 years. Hanging was the most common method of death constituting 56.3% of cases. Majority of the hanging cases took place in homes with suicide being the preferred manner. The victims drowned in river in most number of cases followed by well. The strangulation deaths constituted for 8.8% of total asphyxial fatalities. But not a single case of suffocation was reported.

Key words: *violent deaths; asphyxia; demographics; hanging; drowning*

INTRODUCTION

"Asphyxia" is a Greek term that literally translates as "stopping of the pulse".It is 'defective aeration of blood' due to any cause which is defined by Adelson as "the physiologic and chemical state in a living organism in which acute lack of oxygen available for cell metabolism is associated with inability to eliminate excess of carbon dioxide".[1] Barcroft[2] divided the condition into three groups as (1) anoxic anoxia (2) anaemic anoxia and (3) stagnant anoxia. The fourth type called 'histotoxic anoxia' was added by Peters and Van Slyke.[3]

In medical literature, the term 'asphyxia' used for medico-legal purposes is categorized as 'mechanical asphyxia' – meaning that the interference to the flow of air into the body through some physical obstructions, and 'non-mechanical asphyxia' – taken to mean physiological impediments where there occurs exclusion of oxygen by its depletion and replacement by another gas or by chemical interference with its uptake and utilization by the body itself or where there is insufficient oxygen in the atmosphere itself.[4]

Asphyxial deaths may be caused by different methods, such as hanging, strangulations (manual and ligature), suffocations (environmental, smothering, choking, mechanical, and suffocating gases), chemical asphyxia (carbon monoxide, hydrogen cyanide, and hydrogen sulfide), and drownings[4].
Asphyxial death is a common incident in forensic practice. In such deaths, a detailed and meticulous autopsy plays a major role to solve the case while the scene investigation and collection of samples have their own significance[4]. This study was undertaken to investigate features of asphyxial deaths in the Manipal region of South India and to compare them with other studies.

MATERIALS AND METHODS

The 5 years retrospective study was conducted on a total of 135 cases of asphyxial deaths that were autopsied in the mortuary of Kasturba Medical College, Manipal in the time period from January

2008 to December 2012. Before starting the study, the Institutional Ethical Committee permission was obtained. The data was collected from the previous case reports and post-mortem sheets that were available in the department. The data was recorded in the Microsoft windows excel working sheets. The data collected was sorted out into categories based on sex, age and year of incidence. The police inquest reports were used to collect the intent behind the act i.e. homicidal, suicidal or accidental. The place and time of occurrence was deciphered from police inquest reports and that data collected in hospital case sheets by the clinicians' in-charge of the patients admitted if any. The resultant data was analysed using Statistical Package for Social Services (SPSS) 16 software.

RESULTS

Total of 1362 autopsies were conducted in the previous 4 years, from January 2008 to December 2011 in the Department of Forensic Medicine, Kasturba Medical College, Manipal. Out of 1362 cases, 135 cases (9.91%) of asphyxia deaths were reported as shown in **Table 1**. Maximum number of deaths due to asphyxia were reported in third decade (n=42) followed by fourth decade (n=29) and least in the first decade (n=2) as depicted in **Figure 1**. Males were 63% and females were 37% of total violent asphyxial deaths as presented in **Table 2**. Incidence of hanging was 56.3% (n=76) of all asphyxial deaths (**Figure 2**) and 5.6% of total autopsies. The second most common method of violent asphyxia was drowning (34.81%, n=47) and strangulation was the least (8.8%, n=12) of all asphyxial deaths. Males outnumbered females in all methods of asphyxia deaths viz. hanging, drowning and strangulation. Out of total 76 cases of hanging, 76.3% of incidences occurred in houses followed by hostel as shown in **Table 3**. The suicide was the most preferred manner of death as shown in **Figure 3**. Most of the incidences (**Figure 4**) occurred during the latter half of the day (n=83).

Table 1: Year wise distribution of asphyxial deaths

Year	Total Cases	Asphyxial Deaths	Percentage
2008	196	18	9.1
2009	236	19	8.0
2010	302	31	10.2
2011	308	31	10.0
2012	320	36	11.2
Total	1362	135	9.9

Table 2: Gender wise distribution of asphyxia deaths

Year of study	Male	Female	Total
2008	10	8	18
2009	13	6	19
2010	22	9	31
2011	20	11	31
2012	20	16	36
Total	85	50	135

Table 3: Place of occurrence of asphyxial deaths

Method	Place	Male	Female
Drowning	Ditch/Pit/Tank	2	1
	Lake	4	1
	River	13	2
	Sea	7	4
	Well	6	7
Hanging	Hostel	5	4

	House	32	26
	Forest	5	0
	Prison	1	0
	School	1	0
	Hotel	2	0
Strangulation	Forest	1	0
	House	4	4
	Workplace	1	0
Throttling	House	1	1

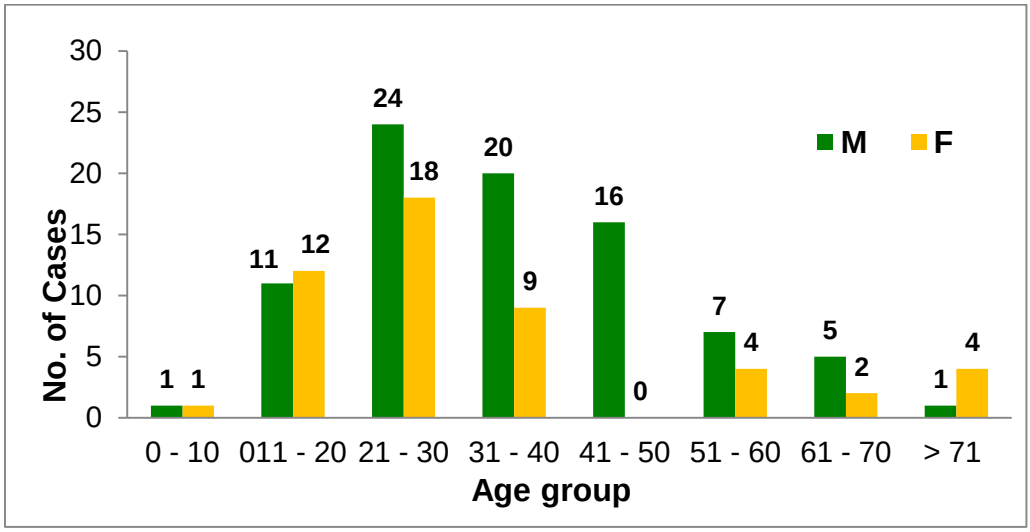

Figure 1: Age wise distribution of asphyxia deaths

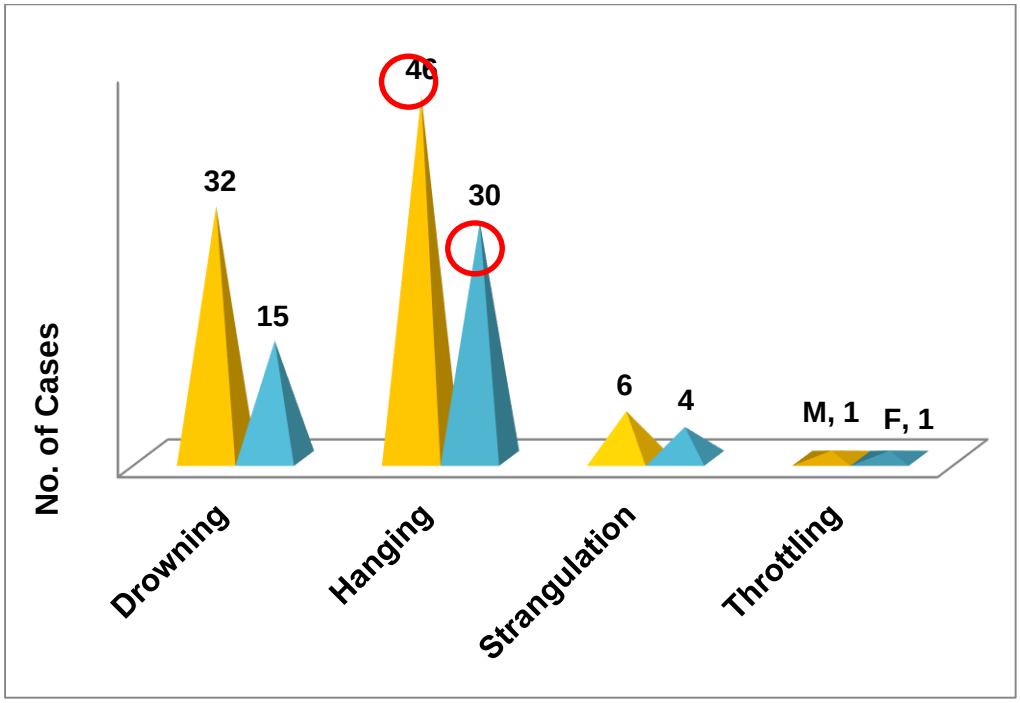

Figure 2: Distribution of methods of asphyxial deaths

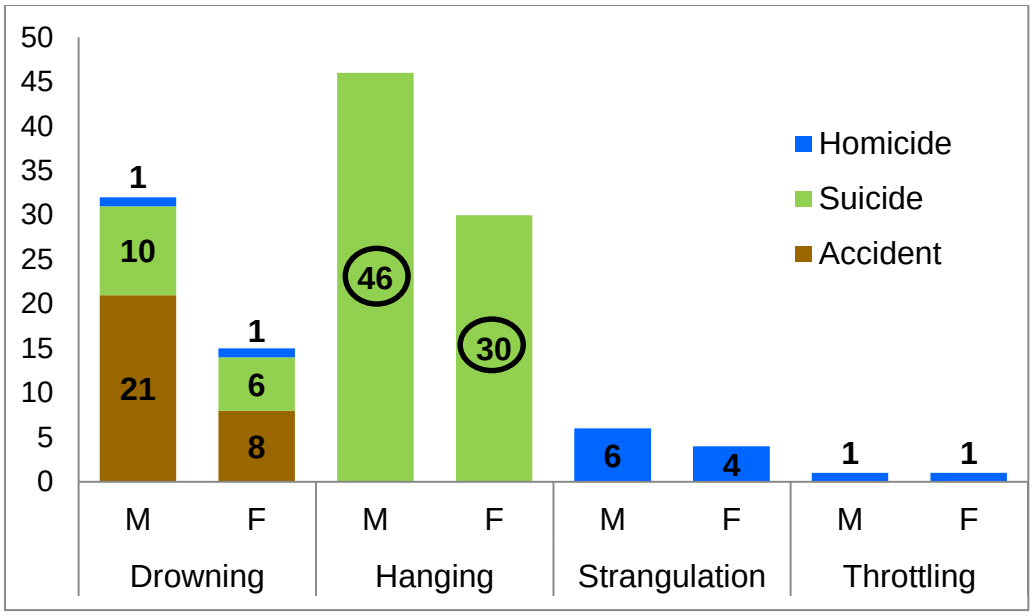

Figure 3: Distribution of cases based on manner of death

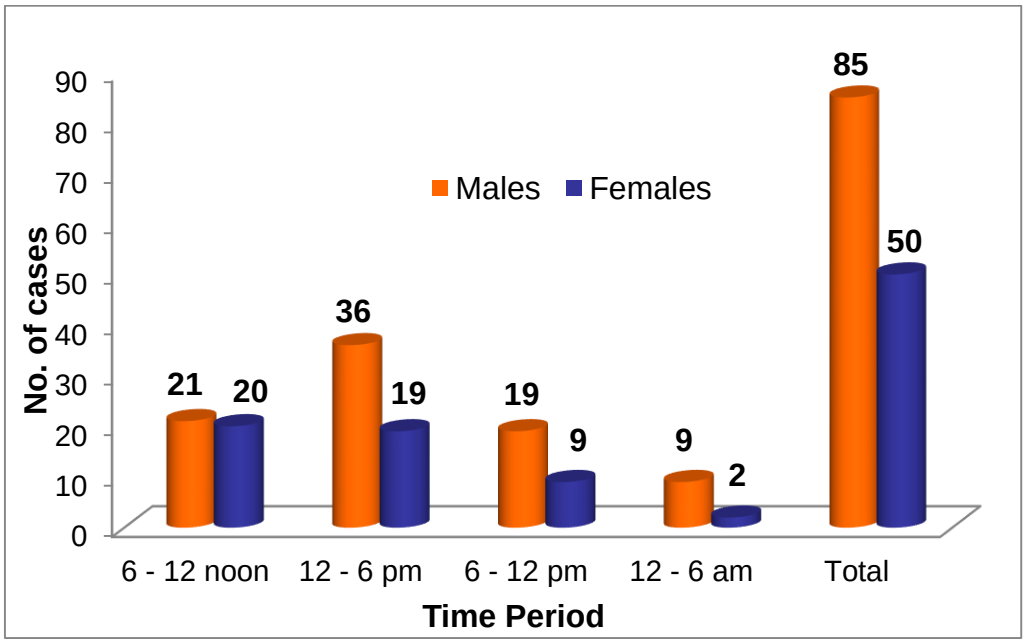

Figure 4: Distribution of cases based on based on time of incidence

DISCUSSION

Violence in any form is intolerable and unacceptable. But the incidents of violence in both the forms; killing self or someone are recorded since the existence of human being for one or the other reason. In today's world, violence against humans is increasing. In spite of progressing civilization and improvement of living standards in our society, the violence rate has not come down. Though the mortality rate is controlled by advancement in the technology, it is quite evident that there is definite increase in unnatural deaths due to accidents, suicides and even homicides. The violence in the form of asphyxia is also contributing to the increased number of deaths in this world.

Our present study showed a varied range of similarities and dissimilarities in outcomes regarding violent asphyxial deaths in relation to works of other authors. In this 4 years retrospective study, a total of 135 cases of fatal asphyxia cases

were autopsied constituting 9.91% of all the forensic autopsies. Similar observations were reported by other retrospective studies done in North India by Chaurasia N et al[4] (6.95%), Singh et al[5] (8.4%), Patel Ankur T et al [6] (5.63%), Amandeep et al[7] (5.26 %), Gargi et al[8] (3.9%) and Murthy OP et al[9] (10%). But in studies done by Reddy SP et al[10] and Azmac D et al[11] the incidences were 19.15% and 15.7% respectively. In other western studies done by Katkici U. Sivas'ta et al[12] and Salacin S [13] in Turkey the incidence of asphyxia deaths ranged from 6.7% to 14.7%. and Tirmizi SZ et al[14] study in Karachi it was 7.08%.

In our study, males outnumbered females. Males and females contributed 63% & 37% victims of total violent asphyxia deaths. Similar findings were observed in the study done by Chaurasia N et al[4] (Males:60.89% & and females: 39.11 %), Reddy SP et al[10] (Males: 59.14% & and females: 40.86 %)and Tirmizi SZ et al[14] (Males: 75.68% & and females: 24.32 %). The study done by Azmak and Derya DM,[11] the percentage of male incidences was little higher than our study (79.8%). In the present study, maximum number of cases (31.11%) was in 21- 30 years age group. This was quite similar to the study done by Sharma et al.[15] [57%], Chaurasia N et al[4] (35.79%), Reddy SP et al[10] (34.93%) and Patel Ankur P et al[6] (32.99%). But in Azmak and Derya DM[11] study the more number of cases (20.8%) was in the age group of 30 – 39 years. The age groups <10 years and >70 years, comprised only 5% victims.

Hanging was the commonest method used in deaths due asphyxiation in our study accounting to (56.3%) which was in agreement with the studies done by Sharma et al.[15] [69%], Reddy SP et al[10] (61.19%) and Chaurasia N et al[4] (52.21%), Azmak and Derya DM[11] (41.8%), Tirmizi SZ et al[14] (36.48%) and Patel Ankur P et al[6] ((82.48%). The victims of hanging preferred the houses (76.3%) for their violent act. Cooke CT et al[16] and Guarner J et al[17] were also found the same place in maximum number of cases (76%) for the act. Hanging deaths are always suicidal in nature unless proved otherwise. The common manner employed for hanging was suicide (100%) in both the genders in our study. This was in agreement with study done in Karachi by Tirmizi SZ et al.[14] But Chaurasia N et al[4] found only 53.71% males in comparison to 46.29% females of total hanging cases by suicide as a manner. Even the finding of Petrauskienė J et al.[18] differed with our study.

WHO released the first "Global report on drowning: preventing a leading killer" in November 2014. The report reveals that the drowning is the 3rd leading cause of unintentional injury death worldwide, accounting for 7% of all injury-related deaths. It is among the 10 leading causes of death for children and young people in every region and it claims the lives of 372 000 people each year.More than 90% of drowning occurs in low- and middle-income countries, with the highest rates in the African, South-East Asia and Western Pacific regions.[19]Drowning followed hanging in terms of number of violent deaths in our study with 34.81% cases. Similar results were found by Tirmizi SZ et al [14] with the incidence of (32.43%). But the study done by Patel Ankur P et al[6] with 14.43 %, Sharma et al [15] with 11% and Chaurasia N et al [4] with 45.02% of cases differed with our findings. Overall, the incidence of males drowning was twice than that of females. Males were found to use rivers (40.6%) and females, the wells (40.6%) to end the life by drowning. Increasing stress due to personal and family problems is the reason for drowning deaths in this part of the world.

Strangulation deaths (8.8%) in our study differed in incidence when compared to other studies done by Reddy SP et al[10] (4.31%), Patel Ankur P et al[6] (3.09%), Chaurasia N et al[4] (2.21%) and Tirmizi SZ et al[14] (24.31%). The strangulation deaths are always homicidal in nature unless the contrary is proved.

CONCLUSION

Medico legal autopsies provide an important statistical data related to legal incidents in the regions. It is difficult task for forensic pathologists to find out the exact cause of swelling unnatural violent asphyxial deaths. Our observations conclude that most of the victims are died due to hanging, 21- 30 years age victims was most commonly involved group. Most

of asphyxial deaths were in young males and suicidal in manner in our study which can be prevented by education, adopting safety measures in case of accidental drowning, addressing the problems of the youths and needy persons and improving the quality of life of people in the locality. More and more researches in the field can provide an idea in understanding the magnitude of the problems in other parts of the world so that the further deaths by violent asphyxia may be reduced.

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