

Original Research Paper

An Epidemiological Study of Suffocation Deaths In Twin Cities of South India

¹Gandla Bala Maddileti, ²Sujan Kumar Mohanty, ³Virendra Kumar, ⁴K. Bhaskar Reddy, ⁵V. Bhuvan, ⁶K. Yamini

Abstract

In spite of advancement in medical facilities, the end of life is inevitable. Suffocation deaths have increased over the years and are becoming a large group in medico legal autopsies. In such deaths, a detailed and meticulous autopsy plays a major role to solve the case, while the scene visit and collection of samples have their own significance. To analyse the recent trends such as manner, methods, motive etc., in suffocation deaths, a prospective study was conducted for two years period. 34 suffocation deaths were studied, which comprised 0.18% of all Forensic autopsies; 38.23% of the cases were aged between 21-30 years. Males constituted 67.63% of all the cases. The most frequent method of suffocation death was smothering (35.29%) followed by environmental and traumatic asphyxia (20.58%), choking (17.64%) and positional asphyxia (5.88%). The most common manner of suffocation was found to be accidental (67.64%). But in homicidal cases (29%), the common motive was domestic disputes. Only 30% of suffocation victims were found positive for blood alcohol.

Key Words: Autopsy; Domestic Violence; Suffocation; Smothering; Traumatic Asphyxia

Introduction:

Suffocation is a type of asphyxial death upon which authors in different textbooks differ in definition and classification. Suffocation is a general term used to indicate death from deprivation of oxygen, either from lack of gas in the breathable environment or from obstruction of the external air passages. [1]

Suffocation is the most common term used for deaths associated with reduced availability of oxygen. [2] Di Maio [3] has described that in deaths from suffocation, there is failure of oxygen to reach blood. In the present study, suffocation is defined and classified.

It comprises of all forms of asphyxia where death occurs by deprivation of oxygen. It can be either from lack of oxygen in breathable environment (environmental asphyxia) or from obstruction of external airways (smothering).

It can also be due to internal airways (choking) or restriction of respiratory movement either by pressure over chest.

It also included abdomen (traumatic asphyxia) or by body position (positional asphyxia). Asphyxia caused by inadequate oxygen in the environment by rebreathing in an air-tight enclosure is also considered as environmental/ entrapment suffocation.

Positional asphyxia is caused due to mechanical impediment to adequate respiratory movement when a person remains in a certain position for an extended time, either due to being trapped or being in a drunken or drugged state. [1, 3] In India, as per National Crime Records Bureau [4], during the year of 2011 & 2012, the numbers of accidental suffocation deaths were 2013 and 2075 respectively.

Suffocation deaths can pose considerable difficulties for the Forensic expert to distinguish between accident, suicide and homicide because in many situations, it leaves no specific findings supporting the diagnosis of manner, which mostly relies on the circumstantial evidence or sometimes on eyewitness.

Though the normal dictum says that smothering are homicidal [3, 5] and choking, environmental, traumatic & positional asphyxia are usually accidental [3] in nature but the Forensic experts all around world come across

Corresponding Author:

¹Assistant Professor, Dept. of Forensic Medicine
Meenakshi Medical College & Research Institute
Kanchipuram, Tamilnadu India 631552
E-mail: drbala44@gmail.com

²Assist. Prof

³Prof & HOD

⁴Prof,

^{5&6}Tutor

DOR: 31.01.2015 DOA: 10.06.2015

DOI: 10.5958/0974-0848.2015.00059.7

suicidal smothering and choking and homicidal traumatic or positional asphyxia.

There were few studies available on a systematic study of all types of suffocation deaths. [6, 7] Mostly the studies of suffocation deaths were limited to a specific type in the form of case reports, case series and included specific studies such as lethal crush / traumatic asphyxia, suffocation in motor vehicle collisions, fatal entrapments in grain storage bins, cafe coronary deaths and suffocation by plastic bags.

In this part of India, no systematic study on suffocation has been carried out to our knowledge. The present study from victims profile has been under taken to find out the variables & specific pattern if any, in deaths due to suffocation.

Materials and Methods:

A total of 18648 medico-legal autopsies were conducted at the mortuaries of Gandhi Medical College and Osmania Medical College, Hyderabad, Andhra Pradesh, India, from 1st July 2009 to 30th June 2011 which includes 3960 cases (21.23%) asphyxial deaths. Among these asphyxial deaths, 34 deaths due to suffocation were taken as study material.

All the cases for study were meticulously examined externally and internally at autopsy. Data were collected from relatives, accompanying persons, eyewitnesses, investigating officer and inquest reports. The chemical analysis for alcohol and toxicological reports were incorporated.

Scene of Offences were visited. Suffocation associated with other types of major fatal injuries were excluded along with infants as in infant death, it is considered as SIDS rather than death due to any form of suffocation and it is quite impossible for autopsy surgeons to differentiate the two entities and stamp it as an absolute case of suffocation death.

Observations and Results:

There were 34 deaths due to suffocation which constituted 0.85% of 3960 asphyxial deaths and 0.18% of total autopsies. Almost 2/3rd of the victims was males (Fig. 1) and belonged to 21-30 years of age group. (Fig. 2)

In our study smothering (35.29%) was the commonest of all suffocation types followed by environmental and traumatic asphyxia. (Table 1) Accidental suffocation deaths (67.64%) were way ahead of homicidal and suicidal suffocation. (Table 2) But in homicidal cases (29%), the common motive was domestic disputes. (Table 3)

Only 30% of suffocation victims were found positive for blood alcohol (Fig. 4) while in

accidental cases it increased to about 44%. (Table 4) Majority of incidents (62%) had happened at the home of the victim. (Table 5) In this study more than half of the victims were moderately built (Fig. 3) but all thin built victims were smothered to death.

Present study showed that most of the incidents took place during day time. (Fig. 5) Majority of victims were Hindu (82.35%) by religion & belonged to urban area. (Table 6) More than half of the victims were from the lower class society and either illiterate or educated up to school level. (Table 6) Majority of the victims were married and labourers by occupation. (Table 6)

Discussion:

The incidence of suffocation was found to be 0.85% of total asphyxial deaths and 0.18% of total autopsies. The incidence is a bit less as compared to the study from Canada [6] and a bit more when compared to the study from India. [8]

Strong male predominance was observed (M: F=1.47:1), consistent with the study from Canada and India. [6, 8] In Turkey, male preponderance was reported in deaths due to asphyxia. [9] Due to population explosion, poverty, stress due to competitive modern life and male dominated society, the males were more exposed to external environment being more susceptible to such incidents.

Suffocation deaths were most common in 21-30 years age group (35.79%) followed by 11-20 years and 31-40 years. This is consistent with studies on asphyxial deaths from India. [8, 10] Smothering is the most common type of suffocation but on subsequent gender wise analysis, traumatic and environmental asphyxia were the leading type of suffocation in males whereas smothering was the most common in females, in accordance with a study in Canada. [6] The victims were suffocated in accidental manner in majority of incidents.

All traumatic, environmental, positional asphyxial deaths and majority of choking and two smothering deaths were accidental in nature, similar to the study from Canada. [6]

Most of the smothering was homicidal (83.33%) in nature but in contrast, Boghossian E et al [6] observed smothering in a suicidal context (58.62%). Choking as a cause of sudden death has been recognized and well documented since the time of Hippocrates [11] and it is mostly accidental.

In our study, we encountered an elderly schizophrenic male with a long standing history and suicidal tendency, had committed suicide with a significant amount of cement powder in

the mouth, oropharynx and upper part of the larynx. The occasional occurrence of suicidal choking was also reported by Knight's Forensic Pathology [1] and Boghossian E et al. [6] Traumatic asphyxia were accidental similar to a study conducted by Gurudut K.S et al. [12]

Analysing homicidal suffocation deaths, it was observed that 80% of the victims were female & the main motive behind the crime was observed to be domestic disputes. Due to domestic disharmony, in sudden outrage of anger, the females were attacked and suffocated to death by hands of assailant (smothering), who happens to be a family member of the victim.

Murder was committed after sexual assault in two cases. It has also been reported that non domestic homicides are associated with sexual offences. [1]

In 62% of the cases, the time of occurrence was the day time. It could be explained by the fact that all suffocation occurring at workplace were during working hours of the day. Blood alcohol was detected in almost 30% of all suffocated victims. But on further analysis, it was observed that, all alcohol positive cases had died of accidental suffocation. Occasionally an alcoholic is found dead with face down on a pillow and death is attributed to smothering. [3]

Deaths due to Positional asphyxia virtually always an accident and are associated with alcohol or drug intoxication. [3] In our study, two accidental positional asphyxia cases were found dead with head down position from the bed on different incidents. Both had consumed large quantity of alcohol.

Deaths ascribed to acute alcohol intoxication are often the result of asphyxia caused by a depression of the respiratory centre or inhalation of vomit or die through positional asphyxia when lying face-down or in some other compromising position. [2] The chances of choking are higher if the subject is under the influence of alcohol (cafe coronary) as supported by Hangen RK. [13]

Amongst all suffocation deaths, majority of victims were moderately built, but most of the thin built victims were smothered to death. Usually children and weak or unconscious persons were killed by smothering. To affect a smooth act of smothering, there must be gross physical disparity between the victim and the assailant.

Majority of the victims were Hindu by religion & belonged to urban area similar to a study in India [8] and reflects the population structure of the locality. More than half of the victims were illiterates & belonged to low socio

economic group followed by middle socio economic group. Most of the victims resided in the slum areas of the city without education and poor standard of living. Almost two thirds of the victims were married. So far the occupation of the victims concerned, majority of them were labourer followed by house-wife.

Conclusion:

Finally we conclude that suffocation deaths were predominant in males of 3rd decade. The common method of suffocation employed was smothering, common manner was accidental and houses of victims were the common place of occurrence. Suffocation deaths were predominant among illiterate, married, economically backward Hindus from urban area and labourers by occupation.

Some socio-cultural issues are to be addressed to reduce the homicidal & suicidal incidences in the domestic environment. Unemployment, marital disputes and family problems should be addressed by referring the parties to an appropriate agency or counsellor.

The police should be trained to recognize social problems which may lead to violence at home. Strict enforcement of law against sale of alcohol has to be done and awareness about the hazards of alcohol is to be conveyed to the public. Promote gender and social equality through the social and educational policies. Nonviolent methods of arbitration to resolve the conflicts at all levels possible, should be promoted.

To prevent industrial deaths, continuous observation on machineries and other protective measures are required. Further studies on different populations are required, particularly to obtain evidence-based data to support our common body of knowledge and assess the discrepancies with the textbook literature.

References:

1. **Saukko P, Knight B.** Suffocation and 'asphyxia'. In: Ueberberg A, project editor. Knight's forensic pathology, 3rd edn. London: Arnold Publishers, 2004; 352-67.
2. Encyclopedia of Forensic and Legal Medicine, 1stedn. Elsevier Academic press, 2005, 1:151.
3. **DiMaio VJ, DiMaio D.** Asphyxia. In: Geberth VJ, series editor. Forensic pathology, 2nd edn. Boca Raton, FL: CRC Press, 2001; 229-77.
4. National crime records bureau Report, India. Available on <http://ncrb.nic.in/CD-ADSI-2012/accidental-deaths-11.pdf> seen on 18.02.2014
5. **Spitz WU.** Asphyxia. In: Spitz WU, Spitz DJ, editors. Spitz and Fisher's medico-legal investigation of death: guidelines for the application of pathology to crime investigation, 4th edn. Springfield, IL: Charles C. Thomas, 2006; 783-845.
6. **Elie Boghossian, Silvia Tambuscio, Anny Sauvageau.** Nonchemical Suffocation Deaths in Forensic Setting: A 6-Year Retrospective Study of Environmental Suffocation, Smothering, Choking, and Traumatic/Positional Asphyxia. J Forensic Sci. May 2010;55(3):646-651

7. Celis A, Hernández P, Gómez Z et al. Asphyxiation by suffocation and strangulation in children younger than 15 years of age. [Article in Spanish] Gac Med Mex. 2004 Sep-Oct; 140(5):503-6.
8. Chaurasia N, Pandey SK, Mishra A. An Epidemiological Study of Violent Asphyxial Death in Varanasi Region (India) a Killing Tool. J Forensic Res 2012; 3:174).
9. Azmak D. Asphyxial deaths: a retrospective study and review of the literature. Am J Forensic Med Pathol. 2006Jun; 27(2):134-44.
10. Srinivasa Reddy P. Asphyxial Deaths at District Hospital, Tumkur A Retrospective Study J Indian Acad. Forensic Med. 2012; 34(2):
11. Shapiro, H. In: Gordon, I., Shapiro, H., Berson, S. Eds. Forensic medicine: A Guide to principles, 3rdedn. Edineburgh, Churchill, 1988
12. Gurudut K.S., Ajay Kumar S, Hareesh S. Gouda. Analysis of fatal cases of mechanical asphyxia at belgam, Karnataka. Journal of Forensic Medicine & Toxicology 2011; 28(2):51-53
13. Hangen RK. The Cafe Coronary, JAMA, 1963; 186:142 – 4

Fig. 1: Sex Wise Distribution of Suffocation Deaths

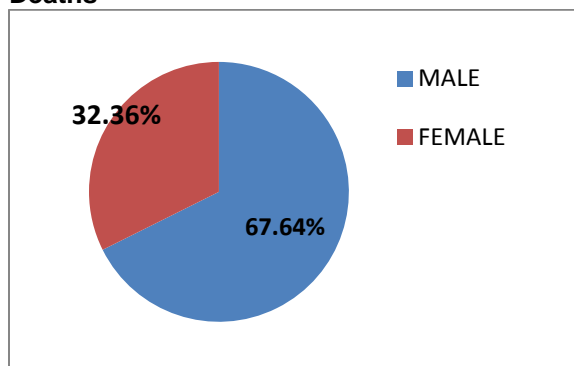


Fig. 2: Age Wise Distribution of Suffocation Deaths

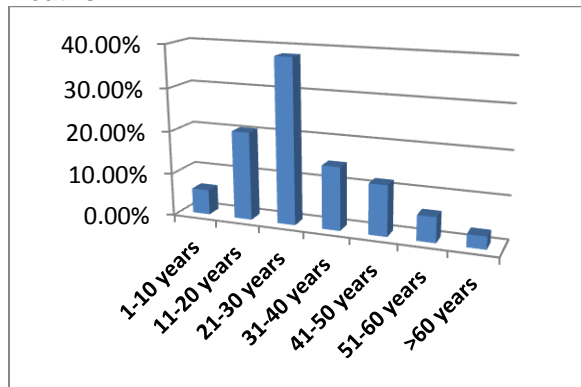


Fig. 3: Body Built of Suffocation Victim

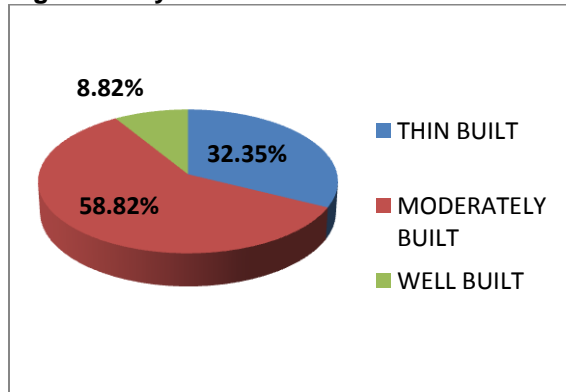


Fig. 4: Analysis of Blood Alcohol

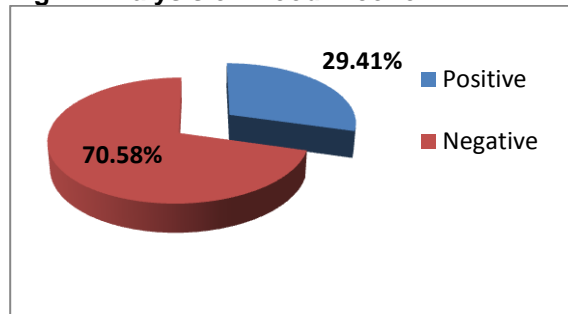


Fig. 5: Diurnal Variation

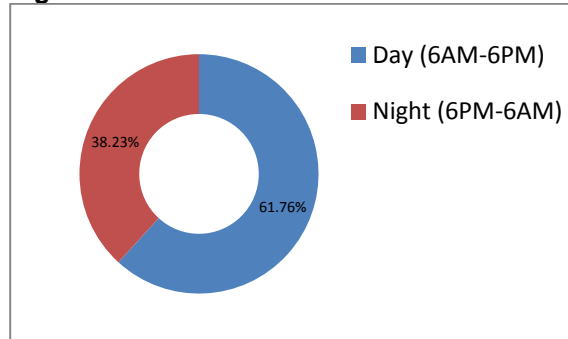


Table 1: Profile of Suffocation Deaths

Type of Suffocation	Cases	Percentage
Smothering	12	35.29
Choking	6	17.64
Environmental Asphyxia	7	20.58
Traumatic Asphyxia	7	20.58
Positional Asphyxia	2	5.88
Total	34	100

Table 6: Socio-Demographic Profile

Religion	Cases	Percentage
Hindu	28	82.35
Muslim	4	11.76
Christian	2	5.88
Total	34	100
Area of Domicile		
Rural	10	29.41
Urban	24	70.58
Total	34	100
Socio - Economic Status		
Lower Class	18	52.94
Middle Class	11	32.35
Higher Class	5	14.70
Total	34	100
Educational Status		
School Level	11	32.35
Graduation and above	5	14.70
Illiterate	18	52.94
Total	34	100
Marital Status		
Married	25	73.52
Un Married	9	26.47
Total	34	100
Occupation		
Students	4	11.76
Labourer	12	35.29
Employee	6	17.64
House Wife	10	29.41
Business persons	2	5.88
Total	34	100

Table 2: Manner of Suffocation

Manner of Death	Cases	Percentage
Accidental	23	67.64
Suicidal	1	2.94
Homicidal	10	29.41
Total	34	100

Table 3: Motive in Homicidal Suffocation

Motive	Cases	Percentage
Revenge	1	10
Domestic Disputes	5	50
Lust	2	20
Dowry	2	20
Total	10	100

Table 4: Analysis of Blood Alcohol in Accidental Suffocation Deaths

Types of Suffocation	Alcohol +VE	Alcohol -VE	Total
Smothering	2	0	2
Choking	3	2	5
Environmental Asphyxia	1	6	7
Traumatic Asphyxia	2	5	7
Positional Asphyxia	2	0	2
Total	10	13	23

Table 5: Place of Occurrence

Place of Occurrence	Cases	Percentage
Home	21	61.76
Work Place	11	32.35
Open Field	2	5.88
Total	34	100