



Original Research Article

Socio-demographic profile of drowning deaths in a rural region - An autopsy based study

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ABSTRACT

Introduction: Drowning is one of the forms of violent asphyxial death due to aspiration of fluid into air-passages, caused by submersion in water or other fluid. Fatal drowning cases are subjected to medicolegal autopsy. During autopsy, many times the findings are nonspecific and hence the diagnosis of drowning rests on combination of circumstantial evidences and autopsy findings. The purpose of this study is to analyze socio-demographic factors of drowning deaths in rural region and to suggest the preventive measures.

Materials and Methods: It is a five-year retrospective autopsy based study carried out in the Department of Forensic Medicine, Swami Ramanand Teerth Rural Government Medical College and Hospital, Ambajogai Dist. Beed, Maharashtra, India from 1st January 2014 to 31st December 2018 to study the various socio-demographic factors such as age, sex, seasonal distribution, education, marital status and residence in drowning deaths.

Results: Predominance of males was seen i.e. 50 cases (58.8%). Age group 11-20 years was the most commonly involved i.e. 20 cases (23.5%). Maximum deaths were reported from well/pond 37 cases (43.5%). Least deaths (2.4%) were observed in post graduates. Maximum deceased were living in rural region i.e. 62 cases (72.9%).

Conclusion: Drowning deaths are commonly encountered in autopsy practice. It was seen commonly in males and in age group 11-30 years, in summer season and in well/pond. Students were more commonly involved. Maximum deceased were married and belonged to rural region. Proper safety precautions and water safety education can decrease incidence of accidental drowning.

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1. Introduction

Drowning is a form of asphyxia due to aspiration of fluid into air-passages, caused by submersion in water or other fluid.¹ As per report of WHO (World Health Organization) on 3rd of February 2020, Drowning is the 3rd leading cause of unintentional injury death worldwide, accounting for 7% of all injury-related deaths. There are an estimated 3.2 lakh annual drowning deaths worldwide. Global estimates may significantly underestimate the actual public health problem related to drowning. Low and middle-income countries account for over 90% of unintentional

drowning deaths; over half of the world's drowning occurs in the WHO Western Pacific Region and WHO South-East Asia Region.² As per Accidental Deaths and Suicides in India (ADSI) report by National Crime Records Bureau India, The major causes of accidental deaths were 'Traffic Accidents' (44.2%), followed by 'Sudden Deaths' (11.4%), 'Drowning' (7.5%), 'Poisoning' (5.3%), 'Falls (5.0%) and 'Accidental Fire' (3.1%).³

In a country like India the major sources of water supply are river, canals, dams and wells. Due to easy access and lack of safety measures drowning is a common cause of unnatural deaths in any autopsy center. Also due to easy and unsecured access to water bodies in India it becomes an easy way for disposing-off bodies after homicide.⁴

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In India, drowning deaths are not highlighted by the health authorities as a major area of concern. Water safety organizations, the public and legislature need adequate information about the circumstances of drowning to initiate the preventive action effectively.⁵

Fatal drowning cases are subjected to medicolegal autopsy. During autopsy, many times the findings are nonspecific and hence the diagnosis of drowning rests on combination of circumstantial evidences and autopsy findings.

This study is conducted in a rural region of Marathwada where due to scanty rainfall many canal and artificial ponds have been constructed for the purpose of agriculture. These manmade resources of water contribute to suicidal as well as accidental deaths due to drowning. Hence the purpose of this study is to analyze socio-demographic factors of drowning deaths in rural region and to suggest preventive measures.

2. Aims and Objectives

To analyze socio-demographic factors such as age, sex, seasonal distribution, education, marital status and residence of the deceased in drowning deaths. To suggest various preventive measures to reduce the incidences of accidental drowning.

3. Materials and Methods

It is a five-year retrospective autopsy based study carried out in the Department of Forensic Medicine, Swami Ramanand Teerth Rural Government Medical College and Hospital, Ambajogai Dist. Beed, Maharashtra, India from 1st January 2014 to 31st December 2018.

3.1. Inclusion criteria

Autopsy cases in which the cause of death was ascertained as death due to drowning.

3.2. Exclusion criteria

Decomposed bodies recovered from water. Bodies recovered from water in which the cause of death was other than drowning.

Proforma for study was prepared, various information and findings were collected like age, sex, seasonal distribution, education, residence of deceased who died due to drowning. Additional information was derived from police investigation report and statements of the relatives. Sources were reliable and strict data confidentiality was maintained. The information was compiled, tabulated and analyzed statistically using percentages method by Ms Excel 2013 tools.

4. Results

During the study period of five years, a total of 2280 autopsies were conducted, out of which in 85 (3.7%) cases cause of death was ascertained as drowning. Predominance of males was seen in 50 cases (58.8%) with male: female ratio of 1.4:1. Age group 11-20 years was more commonly involved i.e. 20 cases (23.5%) followed by age group 01-10 years and 21-30 years i.e. 14 cases each (16.5%). More deaths were seen in summer season i.e. 33 cases (38.8%). It was evident that in 37 cases (43.5%) the place of drowning was well/pond followed by canals 23 cases (27.1%). Maximum victims were having education between 1st standard to 12th standard 53 cases (62.3%) followed by uneducated 22 cases (25.9%). Least deaths (2.4%) were observed in post graduates. More number of deaths was observed in married persons (55.3%). Maximum victim belonged to rural residence i.e. 62 cases (72.9%).

Table 1: Education wise distribution of victims died due to drowning (N=85)

S. No.	Month	Total (%)
1	Uneducated	22 (25.9)
2	1 st Std to 12 th Std	53 (62.3)
3	Graduate	08 (9.4)
4	Post graduate	02 (2.4)
5	Total	85 (100)

Table 2: Distribution of deaths due to drowning as per Marital Status (N=85)

S. No.	Marital Status	Total (%)
1	Married	47 (55.3)
2	Unmarried	38 (44.7)
3	Total	85 (100)

Table 3: Distribution of deaths due to drowning as per residence (N=85)

S. No.	Residence	Total (%)
1	Rural	62 (72.9)
2	Urban	23 (27.1)
3	Total	85 (100)

5. Discussion

In our study, drowning deaths contributed 3.7% of the total cases. The drowning deaths were predominantly seen in males (58.8%) with male: female ratio of 1.4:1. Similar results were also observed by T. Kanchan, FNP Monterio (2012),⁶ K V Radhakrishna (2017),⁴ Mukesh Kumar Thakar (2018).⁷ The probable reason behind preponderance of 11-30 years age group (34 cases, 40%) in drowning is carelessness and adventurous nature usually seen in teenagers and youngsters while swimming or doing

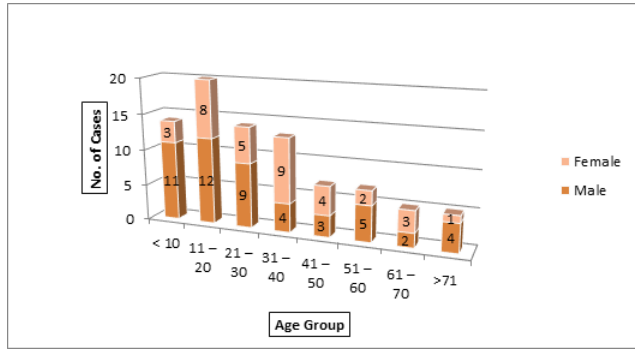


Fig. 1: Age and gender wise distribution of cases (N=85)

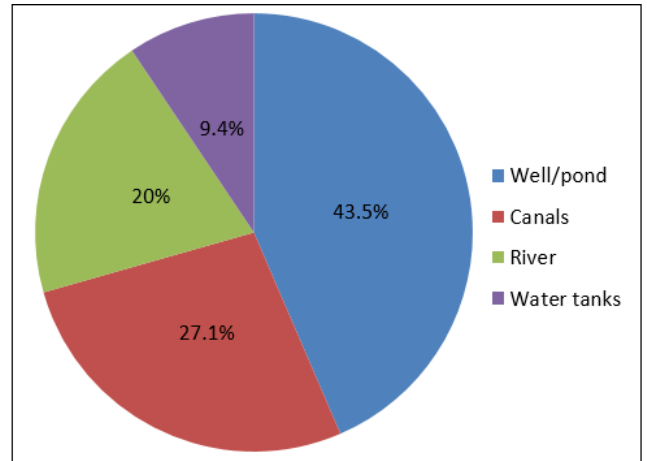


Fig. 4: Location wise distribution of deaths due to drowning (N=85)

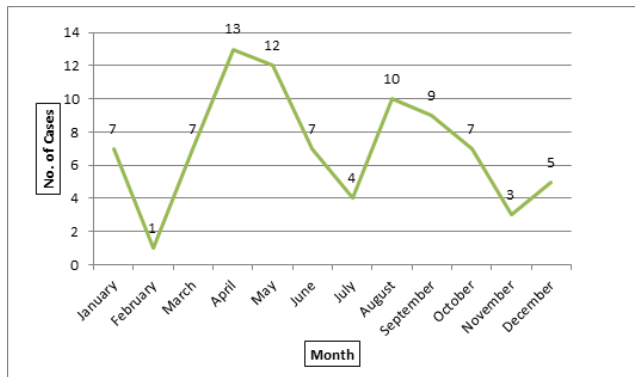


Fig. 2: Month wise distribution of cases (N=85)

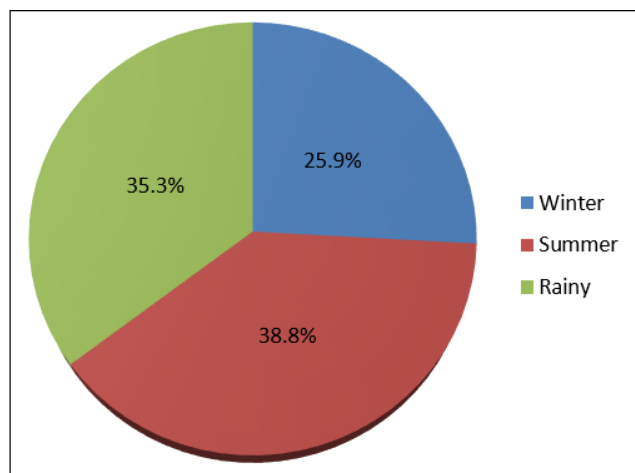


Fig. 3: Seasonal distribution of deaths due to drowning (N=85)

recreational activities in or around water source leading to accidental deaths. This is followed by the age group of 01-10 years; it may be due to the negligence of family members towards their children who might accidentally fall in water tub, tanks or well. Similar observation was found by L Quan (2003),⁸ Sujan Kumar Mohanty (2016).⁹ Female victims were more in number in the age group of 31-40 years. Reason behind this finding might be familial and financial problems arising in life and their inability to deal with them making them prone for suicides. Another reason might be accidental fall in well while harvesting water especially in summer season.

The maximum number of drowning deaths occurred in the month of April (13 cases, 15.3%), followed by May (12 cases, 14.1%). Least deaths were reported in the month of February (01 case, 1.2%). Similar results were observed by R K Gorea (2005),¹⁰ K V Radhakrishna (2017),⁴ Mukesh Kumar Thakar (2018).⁷ The maximum number of drowning deaths occurred in summer season (38.8%) followed by rainy season (35.3%). This finding is consistent with R K Gorea (2005),¹⁰ K V Radhakrishna (2017),⁴ Mukesh Kumar Thakar (2018)⁷ and in contrast with Pathak and Mangal (2009),¹¹ Ambade (2013)¹² and Laxman Phad (2018).¹³ They found maximum drowning deaths in rainy season.

The present study reflected that wells/ponds (43.5%) were the places with the highest number of drowned victims, followed by canals (27.1%), rivers (20%) and water tanks (9.4%) which are considered to be the next three important places of drowned victims. The present study is in accordance with B. Suresh Kumar Shetty (2007),⁵ Pathak and Mangal (2009).¹¹

Most common victims of drowning deaths were the students (62.3%). It may be due to carelessness and adventurous nature usually seen in teenagers and youngsters while swimming or doing recreational activities in or around

water source. This is followed by uneducated persons (25.9%) working as farmers and laborers. This finding is consistent with Laxman Phad (2018).¹³

As per marital status, 55.3% victims were married and 44.7% were unmarried. It may be due to over exposure of married and working people in and around water sources leading to accidental deaths. Marital disharmony in the society may contribute to the emotional disturbances and hence lead to suicidal drowning. This finding is consistent with that of R K Gorea (2005)¹⁰ and S V Kuchewar (2013).¹⁴

Maximum number of drowning deaths (72.9%) had occurred in rural region. This finding is in accordance with L Quan (2003),⁸ R K Gorea (2005),¹⁰ Murkey (2008)¹⁵ and S V Kuchewar (2013).¹⁴

6. Conclusion

Deaths due to Drowning are common in males and age group 11-30 years, in summer season and well/pond as a more common place of occurrence. Students were more commonly involved. Maximum victims were married. More number of victims belonged to rural region.

7. Suggestions

The education regarding basic swimming, water safety, awareness, use of safety equipment should become a significant element of school curriculum. Constant supervision of children in or near any source of water, including wells, water tanks and water tubs is recommended.

We also suggest that, water sources near residences should have barricades so that there is not an easy access to water sources. Psychiatric help should be readily available to people in stress. Mass education should be provided so that seeking of psychiatric help should not be considered a taboo.

It should be preferable if water sources are covered rather than open canal system particularly near the inhabited areas. It is necessary to develop a national water safety strategy to raise awareness of safety around water.

8. Source of Funding

The authors declare that there is no conflict of interest.

9. Conflict of Interest

None.

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