

Profile of Deaths Due to Drowning Autopsied at Tertiary Care Center

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Abstract

Background: World Health Organization described, drowning as serious and neglected public health problem. Near about 42 people every hour and 3.7 lakh every year die from drowning in the world. In India out of total cases of unnatural deaths 9.4% were died due to drowning, this was the second most common after road traffic accidents. This study analyses the profile of deaths during the period of 1/01/2022 to 31-12-2022 in Chengalpattu, Tamilnadu. A total of 176 cases were due to death due to Drowning. Of 176 cases,125 cases (71.02) were males. Peak incidence was observed in the age group 21-30 years(38 cases). 62.6% patients were from rural area. Majority of the victims were literate and married out numbered the unmarried cases. Fresh water drowning is common in Chengalpattu area.

Key Words: Drowning, Distribution of Drowning, Place of Drowning.

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Introduction

The well-known saying that “**Water is life**” itself reveals the fact that, there will be no existence of life without water. Millions of years ago, the first appearance of life on earth had occurred in water (The Archean, Paleobiology.si.edu 2014). In addition to its life sustaining role, water is one of the most destructive forces on earth in the form of tsunamis and flood disasters, which are responsible for the loss of life on a large scale. On the other hand, famine had claimed millions of lives in the world many times (Encyclopedia of earth, Eoearth.org 2014). So it could be said that water is a ‘**Double edged sword**’.

World Health Organization (WHO) had adopted the new definition at the first world congress on drowning in 2002 as “Drowning is the process of experiencing respiratory impairment from submersion or immersion in liquid.”(World Health Organization 2014) World Health Organization (WHO) described drowning is one of the top five causes of death in children aged between 1 and 14 years and one of the ten leading causes of death in children and young people aged between 1 and 24 years (World Health Organization 2014).

Aims & Objectives

To study the age, sex, religious and regional distribution of deaths due to drowning, the influence of socio economic status, occupation, chronic illness, marital status on drowning and to evaluate place of drowning.

Materials And Methods

This study was done in Government Chengalpattu medical college and hospital, Chengalpattu during the period from 1/7/2021 to 31/12/2021. During this **One year** period **176 cases** of Drowning has been reported. Officers from the local police department that were involved in the investigation acquired information about the suspect's family history and medical history, if applicable. The case files including the Postmortem certificate inquest report, chemical analysis and diatom report were studied. In treated instances, information was obtained by reviewing hospital records. A visit to the crime scene or images of the crime scene was used to enhance information in circumstances where there was an allegation. Before dissection, all organs were examined and weighed using the Lettulle evisceration technique. The organs were examined and dissected in accordance with the usual autopsy procedure.

Inclusion Criteria

- All age group
- Both sex
- Religion
- Occupation
- Socioeconomic status
- Marital status
- Chronic illness
- Place of drowning
- Region Of Occurrence

Exclusion Criteria

Since manner of death in drowning cannot be made out, the study excludes the **manner of death**.

The data of certain variables were collected and analyzed in latest version of SPSS. The statistical analysis of the data from this study was carried out using relevant tables as well as descriptive statistics such as percentages, in order to present the information in an understandable manner for the purpose of analysing the acquired data.

Results

Age And Gender

The drowning deaths were commonly seen in age groups of 21-30 years (27.84%) followed by 31- 40 years (22.73%) and 41-50 years (18.75%). Predominance of male was seen in all age groups in drowning death except in the age group 0-10 years age group and 50-70 year age group shows female predominance with 13.73% cases in both. Among the total cases, 71.02% victims were male and 28.98% were female. The male: female ratio was **2.45:1**.

Table 1: Age and Gender Distribution

Age (In Years)	Male		Female		Total	
	Cases	%	Cases	%	Cases	%
0-10	3	2.40	7	13.73	10	5.68
11-20	13	10.40	5	9.80	18	10.23
21-30	38	30.40	11	21.57	49	27.84
31-40	32	25.60	8	15.69	40	22.73

41-50	24	19.20	9	17.65	33	18.75
51-60	6	4.80	7	13.73	13	7.39
61-70	6	4.80	3	5.88	9	5.11
> 70	3	2.40	1	1.96	4	2.27
Total	125	100 (71.02)	51	100 (29.98)	176	100

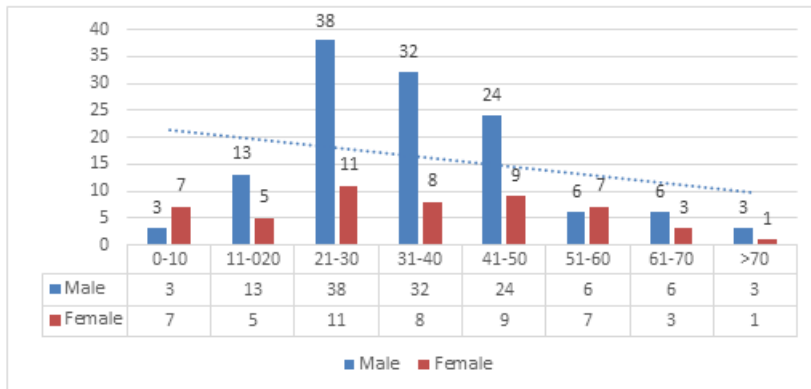


Figure 1: Age and Gender Distribution

Marital status

As per marital status, 46.59% victims were married and 32.95% were unmarried. Among the females 56.86% were married and (25.49%) were unmarried, and among the males 42.40% were married and were (36%) unmarried. And remaining cases status is not known Fig. 2.

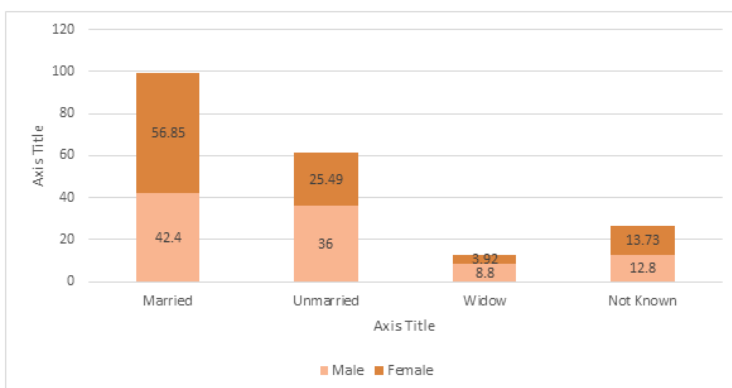


Figure 2: Distribution of drowning deaths as per marital status

Region of Occurrence

Maximum number of drowning deaths had occurred in urban region constituting 57.38% cases followed by rural region constituting 42.62% cases. In urban region, the male (59.20%) drowning deaths are more as compared to females (52.94%), whereas in rural region the females (47.06%) drowning death are more as compared to males (40.80%)Fig. 3.

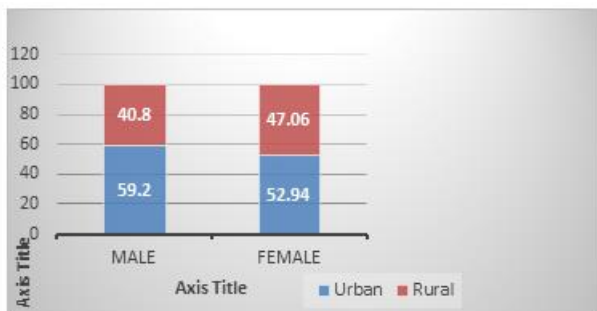


Figure 3: Chart Title

Occupation

Students were the most common victims in drowning deaths seen in 18.75% cases, followed by non-working victims in 17.62% cases, farmer in 16.48% cases and labourer in 11.36% cases

Table 2: Distribution of drowning deaths according to occupation

Occupation	Male		Female		Total	
	Cases	%	Cases	%	Cases	%
Student	24	19.20	9	17.65	33	18.75
Farmer	17	13.60	12	23.53	29	16.48
Labourer	17	13.60	3	5.88	20	11.36
Service	17	13.60	0	0.00	17	9.66
House wife	0	0.00	16	31.37	16	9.09
Business	9	7.20	0	0.00	9	5.11
Non-working	26	20.80	5	9.80	31	17.62
Not known	15	12.00	6	11.77	21	11.93
Total	125	100	51	100	176	100

Religion

Hindu community contributed to maximum number of cases with 60.23% cases, followed by Buddhist in 18.75%; Muslim in 6.25%, Jain in 1.14%, Christian in 0.57% cases.

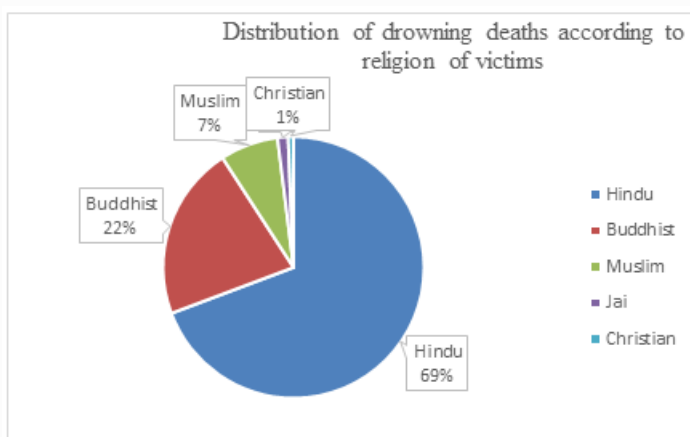


Figure 4: Distribution of drowning deaths according to religion.

Socioeconomic status

Depending on the socioeconomic status, most of the victims of drowning deaths belong to upper-lower class seen in 35.23% followed by lower class in 20.45% cases and lower middle

class in 14.77% cases, and 6.25% of the victims of drowning death belong to upper class of socioeconomic status.

Table 3: Distribution of drowning deaths as per socioeconomic status

Socioeconomic status ^a	Male		Female		Total	
	Cases	%	Cases	%	Cases	%
I / Upper class	5	4.00	6	11.76	11	6.25
II / Upper middle class	17	13.60	1	1.97	18	10.23
III / Lower middle class	17	13.60	9	17.64	26	14.77
IV / Upper lower class	48	38.40	14	27.45	62	35.23
V / Lower class	22	17.60	14	27.45	36	20.45
Not known	16	12.80	7	13.73	23	13.07
Total	125	100	51	100	176	100

Personal History

In drowning deaths 21.02% of victims had familial and financial problems. The second most common history associated with drowning death was depression seen in 20.45% cases, followed by chronic alcoholism in 18.18% cases and chronic illness in 17.61% cases. Male predominance was seen in almost all of the associated history except psychiatric illness (7.38%) in which female outnumbered male in drowning deaths

Table 4: Distributions of drowning deaths as per personal history (n = 176)

Personal History	Male (n = 125)		Female (n = 51)		Total (n = 176)	
	Cases	%	Cases	%	Cases	%
Familial and Financial problems	27	21.60	10	19.60	37	21.02
Depression	31	24.80	5	9.80	36	20.45
Chronic alcoholism	32	25.60	0	0.00	32	18.18
Chronic illness	18	14.40	13	25.49	31	17.61
Psychiatric illness	5	4.00	8	15.68	13	7.38
Failure in love	4	3.20	2	3.92	6	3.40
Epilepsy	0	0.00	1	1.96	1	0.56

Seasonal Variation

The maximum number of drowning deaths occurred in rainy season (43.75%). This was followed by summer season (32.95%) and winter season (23.30%) Fig.5.

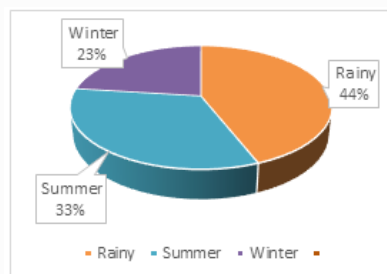


Figure 5: Seasonal Variation

Place of Occurrence

Most of the drowned victims were retrieved from lakes (44.32%), followed by wells (34.66%), rivers (8.52%) and ponds (5.68%). Most of the male victims was retrieved from lake (53.60%) followed by well in 29.60% cases, but most of the female victims was

retrieved from the well (47.05%) followed lakes (21.56%) by river in 11.76%. Rarely the body was found in swimming pool, water tank, canal (gutter) and water tub.

Table 5: Distribution of drowning deaths as per place of retrieval of body (source of drowning)

Place of retrieval (Source)	Male		Female		Total	
	Cases	%	Cases	%	Cases	%
Lake	97	77.60	25	49.00	146	82.95
Well	27	21.60	23	45.00	50	28.4
Water tank	1	0.80	1	1.97	2	1.14
Water Tub	0	0.00	2	3.92	2	1.14
Total	125	100	51	100	176	100

Discussion

The drowning deaths were predominantly seen in male (71.02%) with male: female ratio of 2.45:1, they were commonly seen in age groups of 21-30 years (27.84%) followed by 31-40 years and 41-50 years. Predominance of male was seen in all age groups except below 10 years and between 50 and 70 years of age. The probable reason behind preponderance of 21-30 years age group in drowning is carelessness and adventurous nature usually seen in youngsters while swimming or doing recreational activities in or around water source leading to accidental deaths. This is followed by the age group of 31-40 years, it may be due to familial and financial problems arising in life and their inability to deal with them. As per marital status, 46.59% victims were married and 32.95% were unmarried. Among the females 56.86% were married and (25.49%) were unmarried, and among the males 42.40% were married and were (36%) unmarried. And remaining cases status is not known. It may be due to over exposure of married and working people in and around water sources leading to accidental deaths. Also they prefer to commit suicide by drowning due to inability to handle familial and financial problems.

Maximum number of drowning deaths had occurred in urban region constituting 57.38% cases followed by rural region constituting 42.62% cases. In urban region, the male (59.20%) drowning deaths are more as compared to females (52.94%), whereas in rural region the females (47.06%) drowning death are more as compared to males (40.8).

The most common victims of drowning deaths were the student seen in 18.75% cases. It may be due to carelessness and adventurous nature usually seen in youngsters while swimming or doing recreational activities in or around water source. This is followed by non-working victims in 17.62% cases, farmers in 16.48% cases and labourer in 11.36% cases; it is probably due to financial and familial problems,

Hindu community contributes to maximum number of cases with 60.23%, followed by Buddhist in 18.75%; Muslim in 6.25%, Jain in 1.14%, Christian in 0.57% cases. In 13.06% cases, the religion of victim was not known. This is due to the predominance of the Hindu population where the study was carried out. Depending on the socioeconomic status, most of the victims of drowning deaths belong to upper-lower class seen in 35.23% followed by lower class in 20.45% cases, lower middle class in 14.77% cases upper class in 6.25% cases. In 13.07% cases, the socioeconomic status of the victims of drowning deaths was not known. 21.02% of victims of drowning death had familial and financial problems. The second most common history associated with drowning death was depression seen in 20.45% cases. This is followed by chronic alcoholism in 18.18% cases and chronic illness in 17.61% cases. Male predominance was seen in almost all the associated history except psychiatric illness (7.38%) in which female (15.68%) outnumbered male (4%) in drowning death The maximum number

of drowning deaths occurred in rainy season (43.75%). This is followed by summer season 32.95% cases and winter season 23.30% cases.

Most of the drowned victims were retrieved from lake in 82.95% cases. This is followed by well in 28.40% cases. Most of the male victims was retrieved from lake (77%) followed by well in 49% cases, but most of the female victims was retrieved from the well (21%) followed by lake (45%). Rarely the body was found in water tank and water tub.

Conclusion

In above study we concluded that, **Male predominance** seen in drowning deaths with highest incidence seen in third and fourth decades. Drowning deaths are most common in urban region followed by rural region. Students are the most common victims of drowning deaths followed by non-working, farmers and laborers. Drowning deaths are most commonly found in Hindu community followed by Buddhist and Muslims. Drowning deaths are most common in married people as compared to unmarried people. Drowning deaths are most commonly found in upper lower class, followed by lower class, lower middle class and upper middle class. Familial and financial problems is the most common history seen in drowning deaths followed by depression, chronic alcoholism, chronic illness and psychiatric illness. Drowning deaths are most common in rainy season followed by summer and winter season. Lake is the most common place from where the bodies were retrieved followed by well.

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