



**ORIGINAL RESEARCH PAPER**

**Forensic Medicine**

**A STUDY ON PROFILE OF DROWNING CASES AT J. L. N. MEDICAL COLLEGE, AJMER**

**KEY WORDS:** Drowning, Age & sex profile, manner of event, incidence.

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**ABSTRACT**

Drowning cases are dealt in casualties by the treating doctors or in the mortuary by the autopsy surgeon. Our aim was to obtain a statistical profile of survivors and dead persons among victims of drowning and to develop predictive study for factors associated and affecting incidences of drowning and affecting their prognosis and medicolegal stigma associated with drowning as well. The present prospective & observational study was carried out in the Department of Forensic Medicine & Toxicology, J.L.N. Medical College, Ajmer in cooperation with Department of Medicine & Pediatrics as well. The total number of cases studied were 105 (83 died due to drowning and 22 initial alive victim of drowning). The study reveals that the drowning is more common in males than their female counterpart while accidental drowning in children imposes no differences in sex ratio. Lastly several preventive measures are needed to be taken not only by the administration at water spots but also by the family members in solving family problems, depression etc.

**INTRODUCTION**

Water is associated with the mankind since the origin of the human species. Several cultures developed and prosper along the bank of river. Water is consider as a vital source of life but this prove may prove wrong if interaction with the water done under negligence or some time used to terminate the life in form of drowning.

Ajmer city which has important water sources like Anasagar, Foyasagar, Hindu pilgrim place Pushkar lake where millions of people came every year for holy bath so the incidence of drowning in Ajmer has prompted us to study prospects of drowning with its significant features epidemiological aspects, Pathophysiology of drowning pattern of drowning in population and after effects of drowning.

**Aims & objectives**

The study was aimed to study the incidences and impact of various factors on drowning cases example age, sex, marital status, occupation, religion as well as to find out manner of event in drowning cases eg. Accidental, Suicidal or homicidal.

**Material & methods**

The present study was carried out in the Department of Forensic Medicine & Toxicology, J L N Medical College & Hospitals in association with the Emergency Department; Department of Pediatrics & Department of Medicine in the hospital.

Source of Cases: Drowning cases (either dead or alive) bring to this institution in the year 2014-2015 were included in our study. Findings were noted in special designed Performa. Deceased either brought dead by the police to the Mortuary of the Department of Forensic Medicine or shifted from the casualty were included in the study. Alive victims of drowning informed to our Department either from the casualty of from the medicine ward or from the pediatric ward were also included in our study.

**Inclusion Criteria:** All cases of drowning whether they are alive or dead brought to the institute. All cases of drowning are

included of all age group and either gender, irrespective of religion and marital status. All cases of drowning in which body were recovered from the water. All cases of drowning were included whether they are identified or not. All cases of drowning in which whether the body will fresh or decomposed. All cases in which there is history of submersion in water irrespective of duration of submersion, age, sex, address, place of submersion.

**Observation & results**

In the present study we have discussed 105 drowning cases (83 died due to drowning & 22 initial alive victim of drowning) by taking various parameters.

In the present study, it is observed that out of total 105 cases, Males were 80% (83 out of 105) and Female were 20% (22 Out of 105) making a male: female ratio -4:1. Among persons died due to drowning males were surprisingly very high (73 out of 83) while in near drowning victims male female ratio was 1:1. There is higher incidence (26.66%) of drowning seen in the age group of 31-40 years. The age group 0-10 years (20.95%) and 21-30 years (20.00%) followed it. Out of 105 cases we study it is found that the majority cases 91.42% were from urban area while only 8.58% cases were from rural area.

In the present study it is observed that majority of cases belong to Hindu Community (79.04%), followed by Muslims (17.14%) and only (%) case was from Christian community. The higher percentage of cases of Hindus is explained by their higher population in the country. In one case the religion of a female 2 years old child who remains not identified, cannot be made possible.

In present study maximum numbers of victims were married involving 54.28% cases, followed by unmarried 38.09% cases while in 7.61% cases marital status could not be find out as they were not identified and history from their relatives remain absent. Among not married cases 29 victims out of 40 were children or below the age of legally valid age for marriage, 11 cases were above the age of legal valid age and were unmarried making 10.47% of actual unmarried cases.

In the present study, largest numbers of victims were those among who had jobs either government or private constituting 25.71% of all, followed by people from labor class with 22.85%. This may be because of the fact that the main occupation of the people in city is either job or they are labor at one or other firm. The higher incidence was noted among these two group show that these people are more exposed to the water resources related to their work.

The incidence among students contribute to 9.52% of all and this may be due accidental while being reckless or careless at water resources or may be due to the stress produced as a result of era of competition for successful career. 2 Among alive victims of drowning (22) reported to hospital with initial blood oxygen saturation <90% succumbs to death. One died on 2nd day and another on day 7th due to electrolyte imbalance and septicemia.

In distribution of cases according to the manner of death we found that majority of 83.52% cases death was accidental in nature followed by 11.76% cases in which death was suicidal in nature. In only 4.70% case the death was homicidal in nature. The chemical analysis report of blood showed presence of alcohol (blood alcohol levels varying from 82mg/100ml- 132mg/100ml) in 11 cases among 63 cases screened. There were 32 autopsy cases screened for diatom test mostly in putrefied bodies and in cases where in relatively dry lung found during autopsy, among which 26(81.25%) cases showed positive diatom test.

**DISCUSSION**

During the period of study total 105 (83 drowning & 22 near drowning) cases of drowning were reported to Department of Forensic Medicine & Toxicology, Ajmer. The mode of incidence is relied upon the statement given by the victim/relative of victim or information furnished by investigating officer.

The influence of marital status upon the incidence was also studied and in present study it was found that maximum number of victims were married involving 54.28% cases, followed by unmarried 38.09% cases while in 7.61% cases marital status could not be find out as they were not identified and history from their relatives remain absent. Among not married cases 29 victims out of 40 were children or below the age of legally valid age for marriage, 11 cases were above the age of legal valid age and were unmarried making 10.47% of actual unmarried cases. No doubt incidence of drowning was higher in married persons as compared to non married group. The reason for incidences of drowning in unmarried persons may be because that they do not have their family which acts like a shock absorber in the life of a person and secondly because of more stressful and ambitious student life while unmarried.

Thakar et al<sup>2</sup>, 2009 in Punjab found in their study that 80% of drowning victims were male. Higher incidences among males than in females were also noted in studies by Kumar AS et al<sup>3</sup>(2013).

The male predominance can be explained by the facts that more men than women are exposed in water related activities or are near water in their work or recreation. More ever, males are more active in various day to day outdoor activities, other social activities and customs and males are allowed to explore their surroundings more freely than females.

The incidence of drowning in various age groups is also studied in present study. In the present study we observed that there is higher incidence (26.66%) of drowning seen in the age group of 31-40 years. The age group 0-10 years (20.95%) and 21-30 years (20.00%) followed it. Pranab Chaudhary<sup>4</sup> & Kumar AS et al<sup>3</sup>(2013) noted the higher incidence of drowning in 21-30 yrs age group. So the above

studies do not match with the current study.

The higher incidence of drowning in 31-40 years age group can be explained by following fact that by nature the peoples of this age group are more active, violent and arrogant. They are more vulnerable to the fast changing social trends and cultures, as they are mentally a bit immature with little experiences of life. This is the most active period of one's life and there are great illustrations of emotions in this age group. Frequent exposure to water activities as well as tendency to be more reckless could explain the high incidence among this age group. As the people among this age group are mostly married and they may have to face some family problems, hazards of their occupation, money crisis and addiction in any form.

This peak incidence is followed by higher incidence in age group 0-10 years and this can be explained by the fact that this group children may be careless while playing, have interest in exploring every new thing they found and the most important being helpless when they found themselves in trouble. However, out of 22 cases 17 were from incidence of near drowning as this age group children can easily escape from the sight of guardian and prefer playing in water especially in summer season.

The incidence of drowning in different religion was studied and in the present study it is observed that majority of cases belong to Hindu Community (79.04%), followed by Muslims (17.14%) and only (%) case was from Christian community. The findings are in concordance with observations by Pathak A et al<sup>5</sup> (2009).

In current study distribution of cases according to the manner of death was studied and we found that majority of 83.52% cases death was accidental in nature followed by 11.76% cases in which death was suicidal in nature. In only 4.70% case the death was homicidal in nature. These observations are similar to the findings of Pranab Chaudhary<sup>4</sup> & Manoj Kumar Mohanty<sup>6</sup>, who observed that majority of cases, was of accidental drowning (84.5 %). This may be because of regional variations.

In U.S. the 1-14yrs drowning victims, ranks 2nd among the leading causes of unintentional injury related death. About one in five people who die from drowning are children up to age of 14. For every child who dies from drowning, another five receive emergency department care for nonfatal submersion injuries. The fatal drowning rate for African American children ages 5-14 is almost three times that of white children in the same age range<sup>7</sup>.

In Australian studies, of the 266 drowning deaths that occurred in Australian waterways in 2013/14, 215(81%) were male & this data is very close to our study. The maximum number of cases was occurred in summer followed by spring and then autumn. They found positive recordings for alcohol in 47 cases out of 266 cases<sup>8</sup>.

**Table No. 1 showing distribution of cases according to Gender**

Incidence	Males	Females	Total
Drowning	73	10	83
Near Drowning	11	11	22
Total	84	21	105

**Table No. 2 showing Age wise distribution**

Age group	Males	Females	Total number of cases
0-10 years	12	10	22
11-20 years	7	6	13
21-30 years	20	1	21
31-40 years	26	2	28

41-50 years	13	1	14
51-60 years	6	0	6
61-70 years	0	1	1
Total	84	21	105

**Table No. 3 showing distribution of cases according to their Religion**

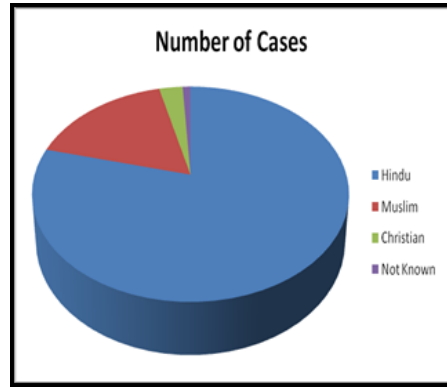
Religion	Number of Cases
Hindu	83
Muslim	18
Christian	3
Not Known	1
Total	105

**Table No. 4 showing distribution of cases according to Marital Status**  
 Number of Cases Married 57  
 Unmarried 40  
 Not Known 8

Marital Status	Number of Cases
Married	57
Unmarried	40
Not Known	8

**Table No. 5. Showing distribution of cases according to manner of death**

Manner of Death	Number of Cases
Accidental	71
Suicidal	10
Homicidal	4



Pie Diagram showing number of cases according to religion

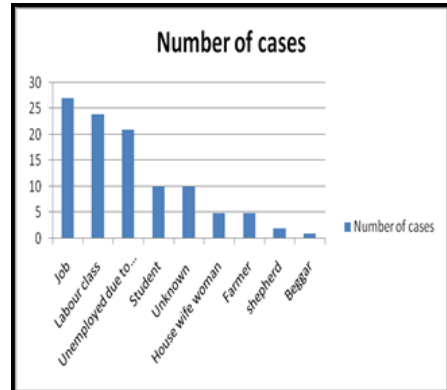


Chart showing distribution of cases according to their professional status

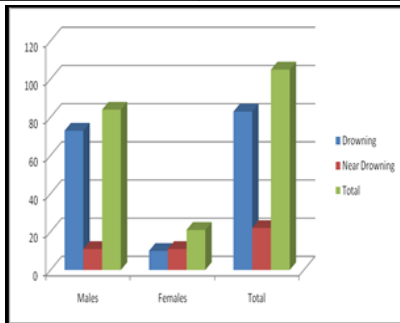


Chart showing Drowning and near drowning pattern in males and females

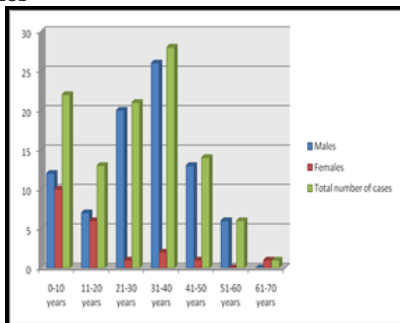


Chart showing number of cases in different age groups

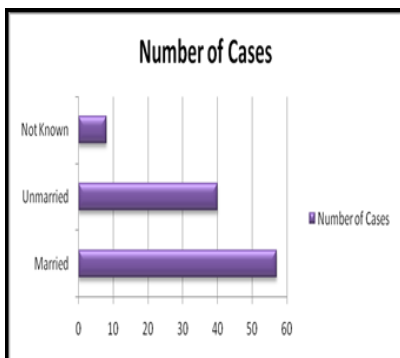


Chart showing cases according to their marital status

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