A DISSERTATION ON

RISK FACTORS AND CLINICAL PROFILE OF SUBMERSION INJURY IN CHILDREN LESS THAN 12 YEARS

M.D (BRANCH VII)

PAEDIATRIC MEDICINE

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DR.MGR.MEDICAL UNIVERSITY

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INSTITUTE OF CHILD HEALTH AND HOSPITAL FOR CHILDREN,
MADRAS MEDICAL COLLEGE, CHENNAI.

CERTIFICATE

This is to certify that the dissertation entitled "**Risk factors and clinical profile of submersion injury in children less than 12 years**" submitted by **Dr.V.Gnanasekaran** to the faculty of Paediatrics, The Tamilnadu Dr.M.G.R. Medical University, Chennai in partial fulfilment of the requirement for the award of M.D. Degree Branch VII (Paediatrics) is a bonafide research work carried out by him under our direct supervision and guidance.

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    This is submitted to the **Tamilnadu Dr.M.G.R.Medical University**, Chennai in partial fulfilment of the rules and regulations for the M.D.Degree Examination in Paediatrics.

Place: Chennai

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BY GNANASEKARAN 20113004 M.D. PEDIATRICS

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CONTENTS

RISK FACTORS AND CLINICAL PROFILE OF SUBMERSION INJURY IN CHILDREN LESS THAN 12 YEARS

INTRODUCTION:

In Children; Submersion injury is becoming one of the common causes of accidental death. In survivors also it results in increased morbidity. The whole family is affected because of this tragedy. Submersion injury is most of the time preventable. Submersion injury has been a common problem for many years. It is not common in one or another country but it is present throughout the world. Under 14 children are a major victim for this submersion injury. Many of the submersion injury victims turn out to be in age group of 1-3 years. Particularly the boys in 10-19 years age group have increased incidence of submersion injury.

There are many antecedent factors which lead to drowning. The adolescents involve boldly in many activities which in turn lead to submersion injury. They often go for swimming with their friends in prohibited areas; and this is an important antecedent factor. Some adolescents are involved in alcohol drinking and abuse of drugs. They subsequently become victims to submersion injury. Adolescents also

involve in scuba diving. This is also an antecedent factor for submersion injury. There are also certain medical problems which are associated with increased risk of drowning. Children with cardiac problems are at risk of submersion injury. Another important medical problem which is an increased risk for submersion injury is epilepsy.

An apparently healthy child suddenly dies; or suffers a great neurological injury due to submersion injury; which occurs within few minutes. With many steps which have been taken by we human beings, the mortality rate due to submersion injury have come down. But; the sequence of damage central nervous system, because of submersion injury varies. It may result in some motor difficulties. Some children it may lead to the state that the cognition of child is affected. In some children; submersion injury will make them to be in a vegetative state.

In rural areas many submersion injuries occur. The drowning events in the rural areas occur commonly in age group of 1-3 years. Here there are many ponds in rural areas. May wells are also seen. So there children in age group of 1-3 years fall into these & experience submersion injury. If this is the case in rural areas; them how submersion injury occurs in high class people. The answer is that

submersion injury also occurs in them. But such children experience submersion injury in washing machines. The children of upper socio-economic class will have swimming pools and so; it is a place of drowning in such children. The children in age group of 0-1 years are increased to experience submersion injury in bath tubs. It is so because once these age group children are submerged in water; they are not able to become upright. Hence, bathtubs pose a greater risk for submersion injury in such age group of children.

Once the child has experienced the submersion injury; then the outcome or how the child will behave in future mainly depends upon the child's level of consciousness after the injury. If the child who was brought to the hospital is conscious; them he has a good chance of normal life in future. But if the child after resuscitation continues to be in altered level of consciousness or continuously throw seizures; or needs continuous cardio – pulmonary resuscitation; then the child will not have a normal life. Some children may even die.

So though we have improved many treatment modalities; the rapidity with which we act at the time of submersion injury to rescue the child is very important. How much ever money and time we spend after the child experiences severe cerebral injury; due to submersion

injury; it may not turn out to be fruitful. So; it is best that we prevent such submersion injuries. Prevention measures should be undertaken. This study was conducted with the aim of finding out the risk factors of submersion injury and the clinical profile. After knowing the risk factors, we can act accordingly to prevent the occurrence of submersion injury in our geographical area.

According to definition given by world congress on drowning on 2004; the word DROWNING does not mean final outcome. Outcome can be denoted as fatal or non-fatal drowning. (1)

PATHOPHYSIOLOGY OF SUBMERSION INJURY:

The Pathophysiology of drowning can be broadly classified as Primary disturbance and secondary disturbance. The primary disturbance includes the neurological sequlae, the pulmonary effects and temperature alterations. These are followed by secondary disturbances which includes electrolyte imbalances and secondary infections.

Once a child experiences submersion injury the sequence of events which occur is described below. If the submerged child is of older age groups; then he will start holding the breath and will struggle

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violently. In contrast ; if the submerged child is of younger age group them he would go to the bottom without much resistance or movements. The holding of breathe voluntarily by the child continuous only upto a particular time interval and after that point; the submerged child is forced to breathe under water.

Later within a short interval of first submerged breath; the child develops secondary apnea. So the child starts gasping. This act of gasping causes further aspiration and finally respiratory arrest occurs. Thus hypoxia is aggravated. The continuing hypoxia further leads to disturbance of rhythm in cardiovascular system; which in turn leads to cardiac arrest and brain death.

Neurological Sequlae: whether a child will ultimately improve or detoriate depends upon the hypoxic injury and ischaemic injury to the brain. This injury is caused because of the following mechanisms. First of all; when a child experiences submersion injury sudden chocking occurs. This chocking is due to the protective response of spasm of larynx. The diving reflex which helps to maintain the blood supply to brain fails. This is second reason why the brain suffers ischaemic injury. Thirdly, due to progressive failure of respiratory system; there is ischaemia of myocardium. Therefore; it fails to pump

blood properly to brain. The pressure in the central nervous system increases; and the child starts throwing seizures. Later the child's sensorium is altered; leading to confusion and then a stage of coma. These are some of the common features of the brain injury; in submersion injury.

CNS anoxic insult; is the important cause of mortality and long term neurological sequlae; in survivors. Although the duration of anoxia, before irreversible CNS injury is in certain, it is probably on the order of 3-5 minutes (1). Many times submersion victims of less than 5 minutes survive and appear normal at discharge.

Pulmonary Effects: In almost three – quarters of submersion injury victims pulmonary aspiration occurs. Water entering the lung causes pulmonary dysfunction. Even though pulmonary aspiration occurs in most children; only few drink enough volume of water causing severe pulmonary dysfunction. (1). The pathological consequences depend on amount of aspirated water; the contaminants which are present in the aspirated water and also on salinity of aspirated water. Sea-water is very hypertonic. So the submersion injury in such a place leads to sudden pulmonary edema. The lung surfactant is washed away in both fresh water and sea water

submersion injuries. Due to this, there is an collapse of the alveoli; leading to mismatch in the ventilation and perfusion of broncho – pulmonary segments. This in turn leads to Acute respiratory Distress Syndrome.

Non cardiogenic pulmonary edema, cardiogenic pulmonary edema Pneumonia resulting from aspirated pathogens are common events causing catastrophic results in lung during drowning.(1).

Temperature alterations – Hypothermia: Whenever the child comes in contact with cold water; there is a conductive heat loss. These events occur before rescue. After the child is rescued from submersion injury; there is heat loss from his wet body by process of convection and the next mechanism is loss due to radiation. Thus hypothermia develops in submersion injury. When core temperature falls below $35^{o}C$ cognition, co ordination, muscle strength becomes progressively impaired. Which adds difficulty in self rescue in drowning children (1). In brain injuries; hypothermia is protective to a little extent, by decreasing the metabolic needs. But in most of the cases because of shivering and an increase in sympathetic tone; hypoxia is aggrevated. If the child experiences severe hypothermia, it almost ends up in death.

Electrolytes and Hematological alterations: The amount of water which the drowning victim aspirates is very small. So; it does not make any alteration in blood volume and the level of electrolytes in serum in both fresh water submersion injury and sea water submersion injury (2) In submersion injury victims whenever there is increase capillary permeability and the loss in third space; hypovolemia occurs. So submersion injury can also be associated with hypovolemic shock.

Blood glucose level can increase in submersion injury victims. This is because of stress induced hyperglycemia; secondary to catecholamine release.

CLINICAL FEATURES:

The clinical features of submersion injury mainly involve 2 systems. One is respiratory system and other central nervous system. They are mainly determined by the submersion time. The child can have various presentations ranging from mild impairment in sensorium to the level of coma. The child may be having seizures. Some victims can also have neurological deficits.

Majority of submersion injury cases will have respiratory distress. The children who are severely affected will also have pulmonary edema. On clinical examination, the child will have cyanosis; and on auscultation he will have bilateral crackles and some victims will also present with features of congestive cardiac failure. Temperature should be recorded from Tympanic membrane as it reflects brain temperature. Rectal temperature is unreliable. (1) Many children will have distended abdomen because of swallowed water entering into stomach.

Some children will have a complicated picture of hemodynamic instability (ie) cardiogenic shock. Renal ischemia can occur which will lead to hematuria and albuminuria. This will lead to Acute renal failure in some victims. Head Injury can occur in some victims. Also rule out injury to cervical spine.

LABORATORY INVESTIGATIONS:

The laboratory investigations which can be done in drowning is as follows;

1. biochemical investigations
2. test for pulmonary function

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3. hepatic and renal function

4. chest x-ray

5. Electrocardiogram

6. CT scan of brain.

1. **Bio-Chemical Investigation**: Arterial Blood gas (ABG) analysis should be done. It will reveal metabolic acidosis, hypo-calcemia, electrolyte disturbance (Hypernatremia).The PaO2 will be variable. The ABG will show a decreased PcO2 value. Lactic dehydrogenase done will show increased value. Sometimes azotemia can occur. The disturbances of sodium like hypo-natremia and hypernatremia are usually uncommon. Potassium when measured may show hyperkalemia.

There is a hemoconcentration. The white blood cell count will be increased and there may be evidence of hemolysis. Coagulation profile may be abnormal due to consumptive coagulopathy. The blood glucose which is obtained initially, will influence the outcome of submersion injury. Hence taking blood glucose is important.

2. **Test for Pulmonary function:** Pulmonary function tests will reveal a decrease in forced expiratory volume. The lung compliance and vital capacity is also decreased. When a ventilation perfusion scan is done in submersion injury children; it will reveal a mismatch.

3. **Hepatic & Renal Functions**: They should be assessed whenever the history shows that child has a prolonged time of submersion in water

4. **Chest x-ray**: Chest x-ray should be taken to see if there is any patch or cardiomegaly with pulmonary congestion. X-ray skull and cervical spine should be taken to see if there is any fracture. Important role of Chest X-ray is in identifying ARDS. (1)

5. **Electrocardiogram: (ECG):** ECG has an immense role as it shows disturbances of cardiac rhythm like ventricular fibrillation, Ventricular tachycardia, asystole. Continuous monitoring is necessary, at least for few hours.(1)

6. **CT Brain**: The importance of CT scan of brain is that it helps in identifying cerebral edema.

MANAGEMENT OF SUBMERSION INJURY:

The important aspects of management include

1. First-aid on the spot
2. Care in hospital

First-aid in the spot of submersion injury:

The first step is quick clearance of airways. This is done for seeing if there are any foreign body in the airway. The child should be positioned . Place the child in a prone position. The head of the child should be lowered down. Turn the child's head to one side. These steps are undertaken so that child will not aspirate. This is the aim of our positioning of the victim.

Next is the basic cardio-pulmonary resuscitation. This includes assistance of child's breathing. Victim can also be given mouth to mouth breathing. If there is any abdominal distension noted in the child, then it must be decompressed. Decompression in such victims can be done with the help of an oro-gastric tube. Many a times it will not be available at the first-aid site. If it's available, then decompression of abdomen will be of immense help.

Next step is prevention of temperature alterations. Since there is increased chance for the child to become hypothermic, we should use blankets which are available at the site of submersion to prevent hypothermia. Sheets can also be used.

After undertaking the first aid steps, the child must be transported to the nearby hospital as early as possible. No delay should be made in transporting the child.

Things which should not be done:

Certain things should not be done while doing first-aid to the child. If a child after taking out of water is breathing normally, he should not be given abdominal thirsts. Neither should his thorax be compressed. This is because when such procedures are done then the chance of aspiration is high.

Care of the child in hospital:

Immediately after the arrival of submersion injury victim to the hospital, he should be clinically assessed. His vitals must be monitored. If the child on assessment is alert and his respiration shows that, he is not having any respiratory distress, then ; the child can be

sent home after observing for a few hours. If not, then the following steps should be undertaken.

1. Assessment of clinical status

2. Cardio-pulmonary resuscitation

3. Temperature maintainence

4. Correction of fluids and electrolytes

5. Management of complications of central nervous system

6. Secondary infection prevention

7. Treating other injuries

8. Providing psychosocial support.

Assessment of clinical status:

The vitals of the child should be rapidly assessed. Next should be the rapid assessment of his neurological status.

Cardio-pulmonary resuscitation:

The steps involved in cardio-pulmonary resuscitation is suctioning of airway and support of the child's breathing by intubating the child with appropriate size endotracheal tube under rapid sequence intubation , if needed. Some children might need only oxygen through

a non-rebreathing mask. The circulatory system of the child should be supported with intravenous fluids . Some children with hemodynamic instability will require inotrope support. Injection dobutamine can be used for this.

Temperature maintainence:

The child should be rewarmed in order to prevent hypothermia. Caution should be taken while rewarming the child. There are two ways of rewarming the child . One is surface-rewarming. In this only the child's surface is rewarmed. Another is core-rewarming. First method can be achieved by using blankets and warmers. Second can be achieved by using warm gastric lavage and by using warm intravenous solutions. The disadvantage of using only the warmers and blankets for rewarming is that, it may precipitate shock , due to movement of blood into dilated surface vessels.

Correction of imbalances in electrolytes:

The child is assessed clinically. The biochemical findings are seen and then the electrolyte imbalances are corrected accordingly. If the child has drowned in seawater and aspirated large amounts of it, then he will have hypernatremia. Due to the osmotic effects, he will be

having hemoconcentration. The child who has fallen into fresh water will have an altered picture. His serum sodium content will be low and he will be having features of water intoxication. Hemodilution will be seen in such children. Furthermore due to cell lysis , the child will show increased potassium in his serum.

Management of CNS complications:

If the child has features of increased intra-cranial pressure, then he can be managed with mannitol. The loop diuretics (frusemide) can also be used. In case if the child throws seizures then anti-convulsants should be given. Other supportive measures should be given to the child.

Secondary infections in submersion injury:

Secondary infections can occur in drowning due to aspiration. So appropriate antibiotics can be used to treat such infections.

Treating other injuries:

While the child is undergoing submersion injury , he has chances of getting other injuries like fractures and cervical spine

injuries. So, they should be kept in mind while managing a submersion injury child.

Psychiatric aspects

While managing a submersion injury child, the other aspects such as psychosocial support should be provided both to child and the whole family.

OUTCOME IN SUBMERSION INJURY CHILDREN:

The outcome in a submersion injury child depends on many factors. Most of the children who experience submersion injury survive. And only few develop neurological residue. The time interval for which the child was submerged in water is very important . Longer the time period poorer will be outcome. If the resuscitation measures which are undertaken at drowning spot is effective , then outcome will be good. Some children may develop features of raised intra –cranial pressures. Some children also can develop features of acute respiratory distress syndrome. In both the above mentioned condition the outcome is poor.

REVIEW OF LITERATURE:

Garen J; Wintemute et al ., conducted a population based study in Sacramanto country. It included 137 children and study period was from 1974 to 1984. The study population which he included was from zero to nineteen years of California children and adolescents. He observed that drowning rates in both males and females were age related. Children less than 5 years contributed to 35 percent of submersion injury cases. Infants in the age group of zero to one year accounted for 67 percent of submersion injury cases. He came to a conclusion that swimming pools in home were the site of submersion injury for one third of cases. So he recommended pool fencing to be done in sacramanto country.

Alfredo celis et al ., did a case control study in submersion injury. He studied pre-school age children in mexico . Home drowning in these children was his topic of study. He did his study in the Metropolitan area of Guadalajara. His study period was from 1991 to 1993. He included 33 children in his study as study population. The age group which he included was 1 to 4 years who were drowned at house. He estimated the number of times the increased risk of submersion injury for children whose parents were having a well at

home to those without a well. It was found to be seven times increased risk. He concluded that submersion injury is frequent in his area, but the causes are not in the same as reported in other developed countries. So the strategies to prevent submersion injury must also be different from those in developed countries.

Emmanuvel onyekwelu et al., did a retrospective study in west Africa in the paediatric emergency department . His study period was from September 1999 to the September month of 2008. He included 7 cases of submersion injury cases. His results showed that male children were likely to submerge more than female children. He also found that manner in which submersion injury occurred was accidental. He found that the most common place of event was river. There was also no premorbid psychopathology in his cases studied. He concluded that further observational epidemiological studies should be undertaken in submersion injury cases.

Bose A; George K; Joseph A et al ., did a population based study. His study was done in Christian medical college , vellore in the department of community health. His study period was from 1991 to the year 1997. He studied 288 deaths which occurred in the age group of one to twelve years. The kaniyambadi block residents in the age

group of 1 to 12 years who died between 1991 to 1997 was his study population. The results of his work showed that death in male sex was more than the death in female sex. Death in less than 5 years of age constituted 46 percent of submersion injury in his study. The month of july had no deaths and the month of November had maximum deaths of ten. He concluded that submersion injury is one among the important cause of childhood unintentional injury. So paediatric doctors must incorporate programs to prevent injury into primary care.

Anwarul Iqbal et al., did a study in rural Bangladesh . They studied about childhood mortality due to submersion injury . It was an observational study. They included children, in the age group of 0–19 year(s) who died from submersion injury. He showed the following results. Among 989 deaths due to submersion injury during a period of 1985–2000, 80% occurred in children in age group of 1–4 year(s). And 4.8% occurred among infants and about 14.7% occurred in greater than four years age-group. Death rate per 1,000 children in boys was 2.4 percent and girls were 2.0 percent. Risk of submersion injury was 20% higher among boys. They proposed intervention programme to prevent submersion injury-associated deaths. It was based on building of awareness about the risk of submersion injury,

and measures like door-fencing and also filling-up of ditches and holes

which are man- made.

STUDY JUSTIFICATION:

After having started to control infectious diseases in children, unintentional injury like submersion injury have started assuming importance as a important cause of death in childhood. But very little is known about the epidemiology of childhood submersion injury in our setting. Survival of the child following an immersion incident is dependent on the rapidity with which resuscitation can be delivered. Even in places where resuscitative facilities are easily available and accessible, cost of submersion injury in terms of morbidity is very high and also the financial outlay is very high.

Therefore prevention is a better strategy. So this study could help in knowing the clinical profile and risk factors of submersion injury in our setting and also the multi modal public health interventions needed or that can be taken to reduce the submersion injury in children.

AIM OF THE STUDY:

To describe clinical profile and

To study the risk factors for submersion injury in children <12 years of age.

MATERIALS AND METHODS

METHODOLOGY

Study design	:	Descriptive study
Study place	:	General medical wards & paediatric intensive care unit , Institute of child health & hospital for children, Egmore, Chennai 8.
Study period	:	January 2008 to November 2012
Study population	:	Cases admitted with submersion injury in general medical wards and PICU of ICH &HC, Egmore, Chennai – 8.
Sample size	**:**	105 over 5 year collection.

Inclusion Criteria

Children <12 yrs who met case definition for submersion injury.

Case definition: submersion injury is defined as respiratory impairment from drowning in a liquid medium.

Exclusion Criteria

Nil.

MANOEUVRE

Study population was recruited based on inclusion criteria after obtaining parent consent. The data was collected from all children admitted with submersion injury in general medical wards and PICU of our hospital in 2011 and 2012 and for the children admitted in previous years up to 2008 was extracted from our hospital medical records department. Using patient data entry form, information was gathered regarding child's age, sex, other demographic details and risk factors considered for this study from all patients and case records.

PATIENT DATA FORM

1. **PATIENT NAME :**
2. **AGE / SEX:**
3. **IP.NO / WARD NO. :**
4. **ADDRESS :**
5. **DATE & TIME OF ADMISSION :**
6. **INCOME :**

7. SOCIO ECONOMIC STATUS :

8. PARENTS EDUCATION LEVEL:

HISTORY

Fell into river water (y/n)

Fell into water collections(y/n)

Fell into bathtub(y/n)

Fell into septic tank(y/n)

Fell into seawater (y/n)

Previous medical disease

Developmental delay(y/n)

Seizure disorder(y/n)

Cardiac disease(y/n)

CLINICAL EXAMINATION

1. Respiratory distress(y/n)

2. Febrile response(y/n)

3.   Impaired consciousness(y/n)

4.   Cough (y/n)

5.   Vomiting(y/n)

6.   Tachypnea (y/n)

7.   Abdominal distension(y/n)

8.   Pre-hospital CPR(y/n)

RADIOLOGICAL FEATURES :

Cardiomegaly with pulmonary congestion(y/n)

Pneumonia(y/n)

Bilateral hyperinflation(y/n)

Normal(y/n)

TREATMENT

1. Intra-nasal oxygen(y/n)

2. Oro-nasal suctioning(y/n)

3. Antibiotics(y/n)

4. Crystalloids(y/n)

5. Anti-pyretics(y/n)

6. Mechanical ventilation(y/n)

STATISTICAL ANALYSIS

The sample size of the study was 105. Frequency of occurrence of clinical, radiological and treatment parameters were derived for all the 105 cases. The risk factors responsible for submersion injury was noted for all 105 cases. Means and proportions were arrived. Pearson chi-square test was applied wherever indicated and P value less than 0.05 was considered for statistical significance.

RESULTS AND ANALYSIS

TABLE : 1

FREQUENCY OF CHILDREN IN VARIOUS AGE GROUP

AGE GROUP (in months)	Frequency	Percent
<=12	42	40.0
12-24	30	28.6
24-36	14	13.3
36-48	8	7.6
>48months	11	10.5
Total	105	100.0

Children in age group of less than 12 months showed increased frequency of submersion injury and 36 to 48 months showed least frequency.
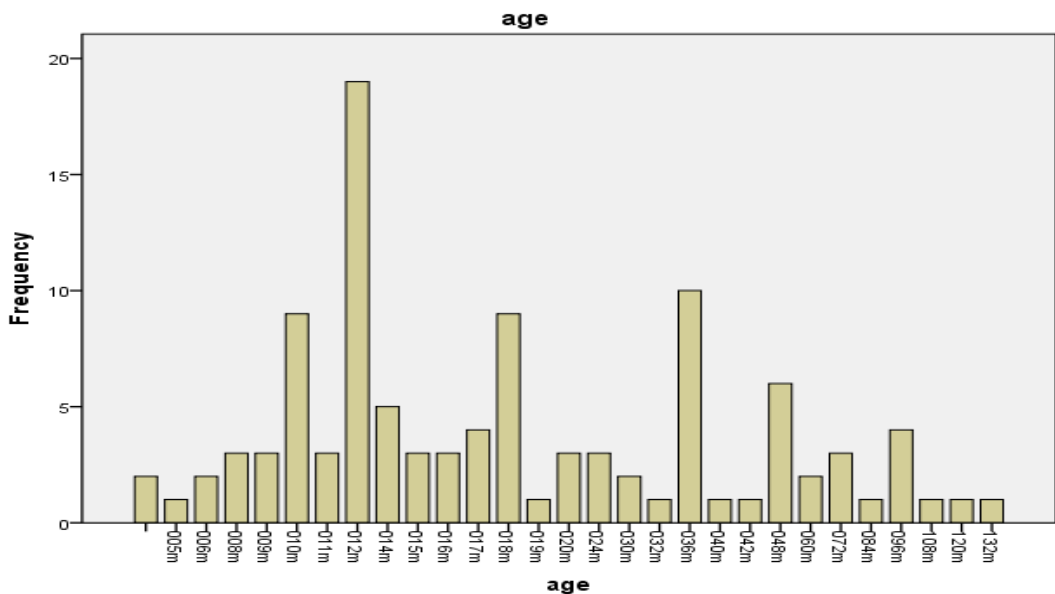
TABLE : 2

FREQUENCY TABLE

AGE GROUP	Frequency	Percent
<=1 yr	42	40.0
1-4 yr	52	49.5
4 yr above	11	10.5
Total	105	100.0

Children in age group of 1-4 years showed maximum percentage of

49.5%.
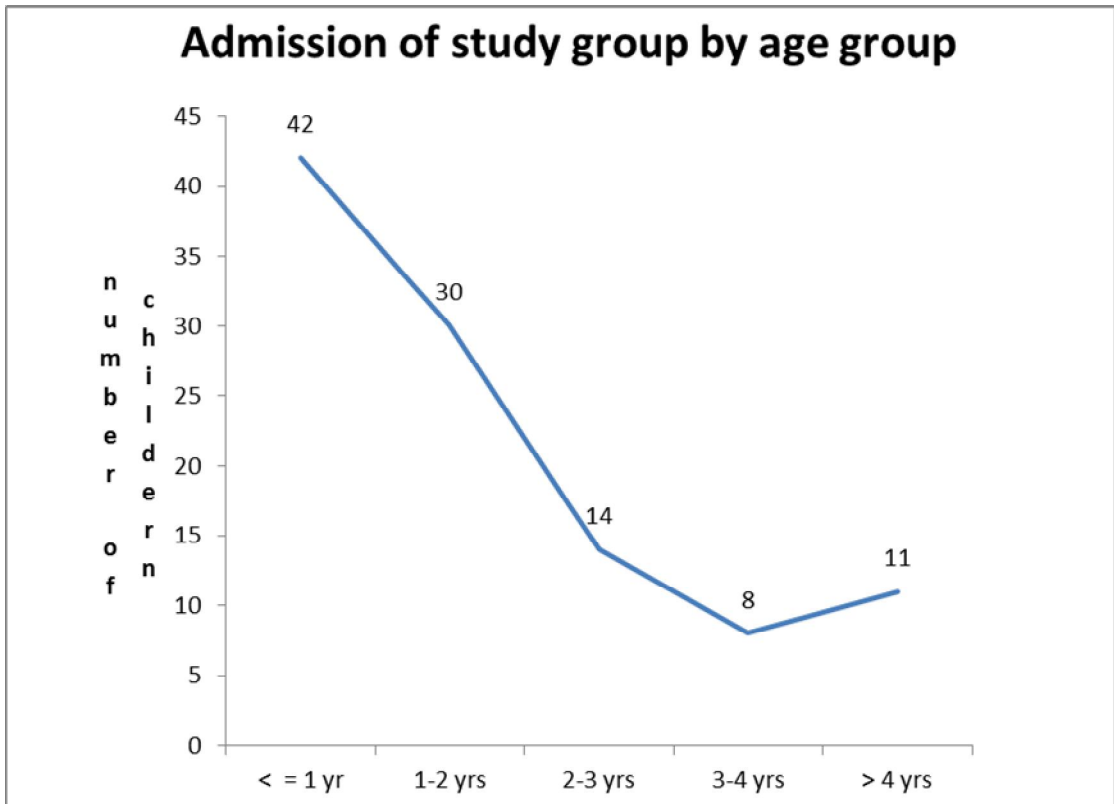
SEX DISTRIBUTION

Age group		Male	Female	Total
<=2 yrs	Count	27	15	42
	%within age group	64.3%	35.7%	100.0%
2-4 yrs	Count	37	15	52
	%within age group	71.2%	28.8%	100.0%
>4yrs	Count	3	8	11
	%within age group	27.3%	72.7%	100.0%
Total	Count	67	38	105
	%within age group	63.8%	36.2%	100.0%
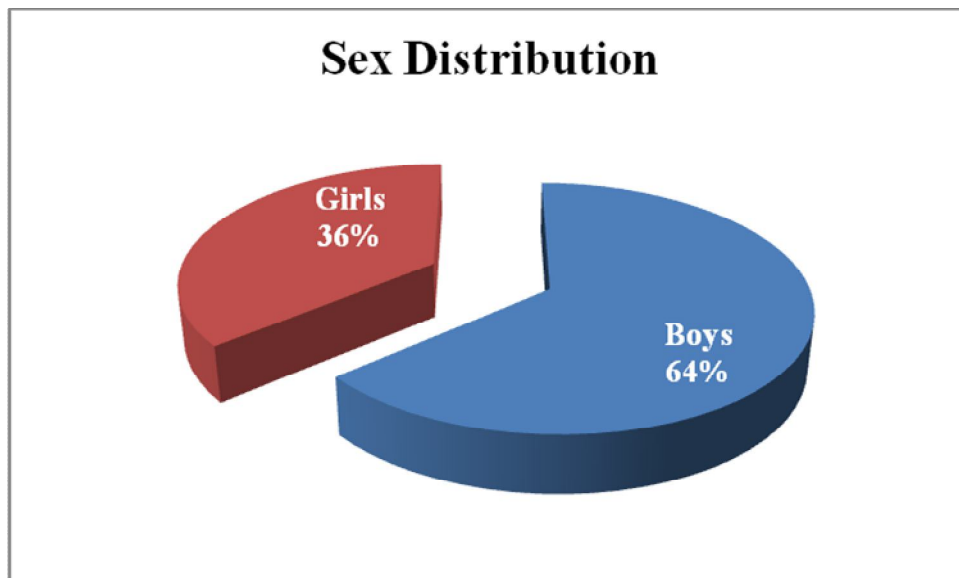
Out of 105 Children 67 (63. 8%) were boys and 38(36.2%) were females.

TABLE : 4

YEARWISE ADMISSION CROSS TABULATION

			Age group			Total
			<=2 yrs	2-4 yrs	4 yrs above	
year	2008	Count	6	6	4	16
		% within year	37.5%	37.5%	25.0%	100.0%
	2009	Count	12	8	1	21
		% within year	57.1%	38.1%	4.8%	100.0%
	2010	Count	12	12	3	27
		% within year	44.4%	44.4%	11.1%	100.0%
	2011	Count	8	15	1	24
		% within year	33.3%	62.5%	4.2%	100.0%
	2012	Count	4	11	2	17
		% within year	23.5%	64.7%	11.8%	100.0%
Total		Count	42	52	11	105
		% within year	40.0%	49.5%	10.5%	100.0%

Maximum admission has occurred in 2010, minimum in 2008.

33
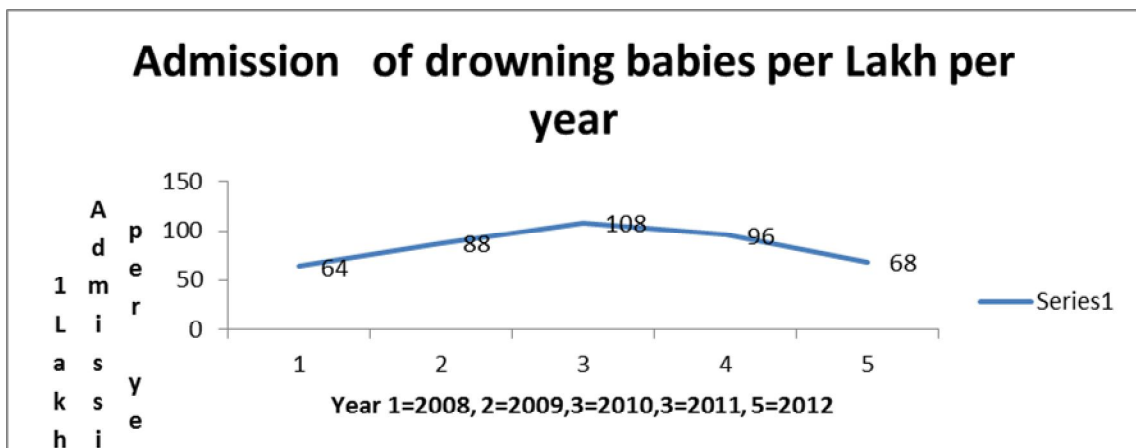
TABLE : 5

YEAR AND SEX CROSS TABULATION

			Sex		Total
			Male	Female	
year	2008	Count	9	7	16
		% within year	56.2%	43.8%	100.0%
	2009	Count	13	8	21
		% within year	61.9%	38.1%	100.0%
	2010	Count	18	9	27
		% within year	66.7%	33.3%	100.0%
	2011	Count	14	10	24
		% within year	58.3%	41.7%	100.0%
	2012	Count	13	4	17
		% within year	76.5%	23.5%	100.0%
	Total	Count	67	38	105
		% within year	63.8%	36.2%	100.0%

Male children were more than female. Percentage within year highest in 2012.

Percentage Distribution of drowning admission babies by Sex and Year
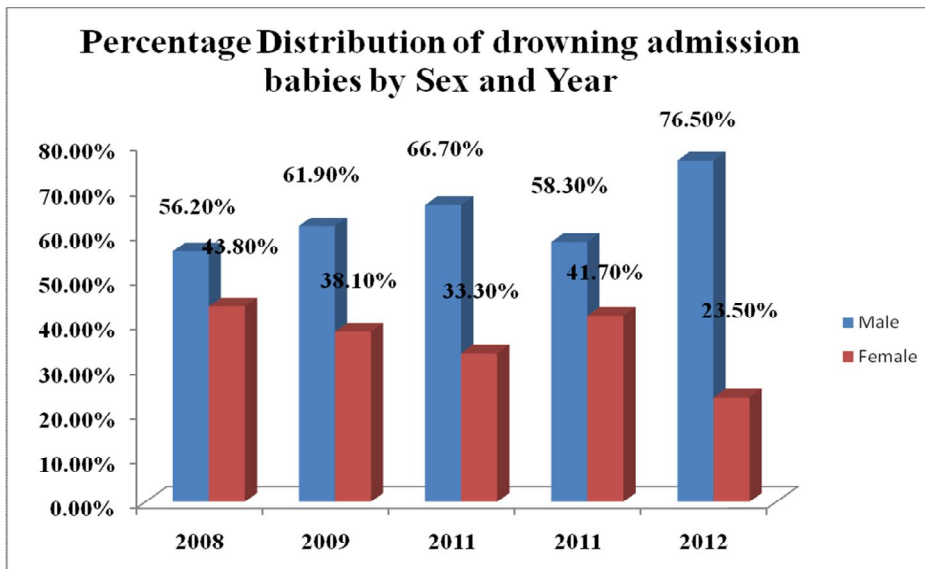
TABLE : 6

YEAR WISE ADMISSION

Year	Number	Percent
2008	16	15.2
2009	21	20.0
2010	27	25.7
2011	24	22.9
2012	17	16.2
Total	105	100.0

This again shows that 2010 had maximum cases and 2008 being minimum.
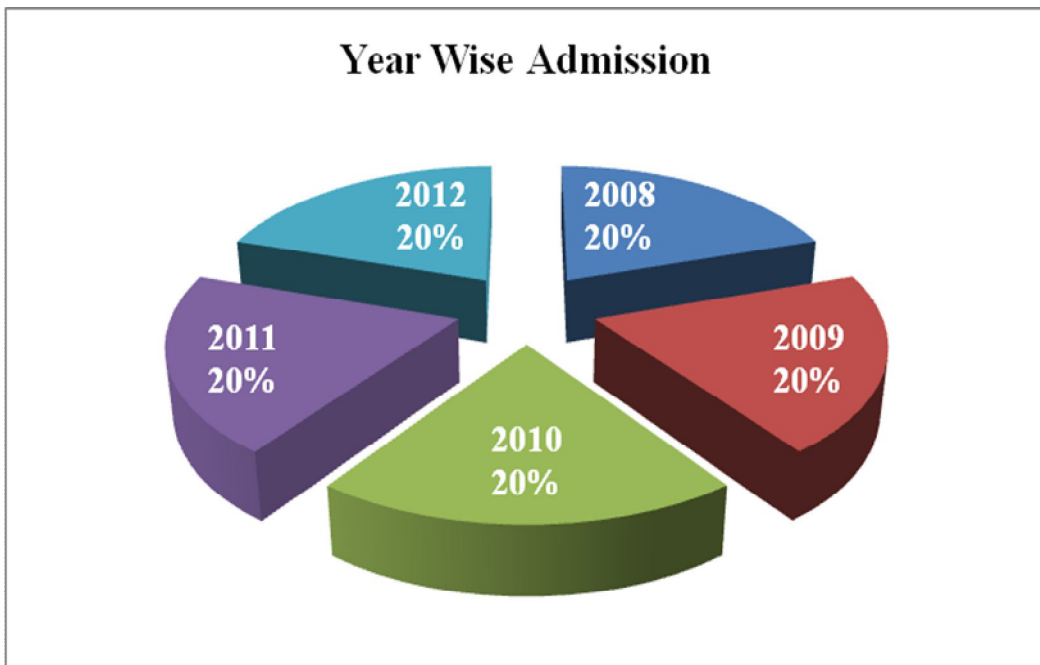
TABLE : 7

FREQUENCY TABLE OF WATER BODIES

	Frequency	Percent
Bath tub	48	45.7
Water Tank	21	20.0
Septic tank	7	6.7
Dirty water collection	11	10.5
Well water	13	12.4
Sea	5	4.8
Total	105	100.0

Bath-tubs are the frequent place of submersion injury in children
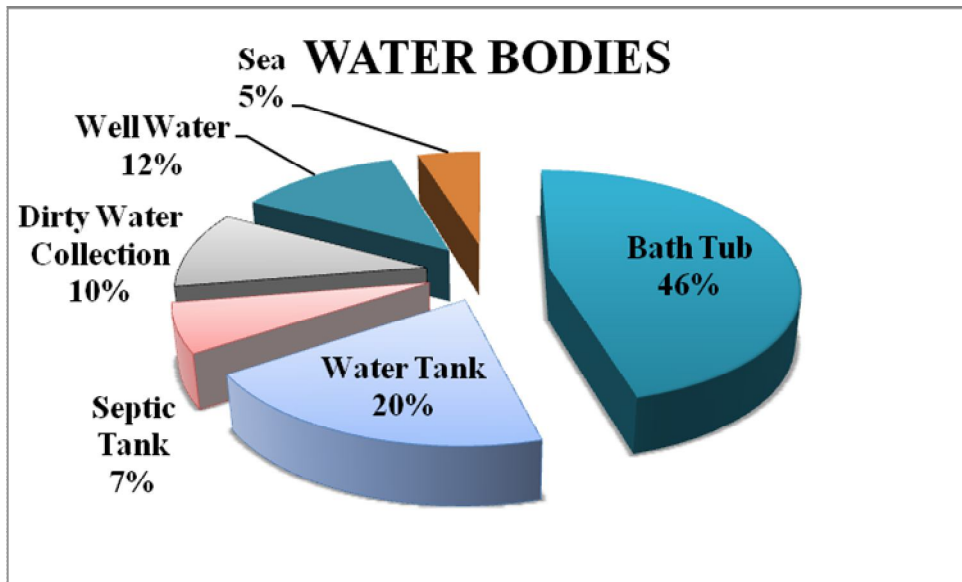
Piechart Of Various Water Bodies

TABLE : 8

WATER BODIES CROSS TABULATION

Body water			Age group			Total
			<=2 yrs	2-4 yrs	>4 yrs	
Bath tub	Count		31	17	0	48
	% within wb		64.6%	35.4%	.0%	100.0%
Water Tank	Count		6	15	0	21
	% within wb		28.6%	71.4%	.0%	100.0%
Septic tank	Count		1	6	0	7
	% within wb		14.3%	85.7%	.0%	100.0%
Dirty water collection	Count		3	7	1	11
	% within wb		27.3%	63.6%	9.1%	100.0%
Well water	Count		0	6	7	13
	% within wb		.0%	46.2%	53.8%	100.0%
Sea	Count		1	1	3	5
	% within wb		20.0%	20.0%	60.0%	100.0%
Total	Count		42	52	11	105
	% within wb		40.0%	49.5%	10.5%	100.0%

TYPE OF DROWNING IN VARIOUS WATER BODIES-
YEARWISE
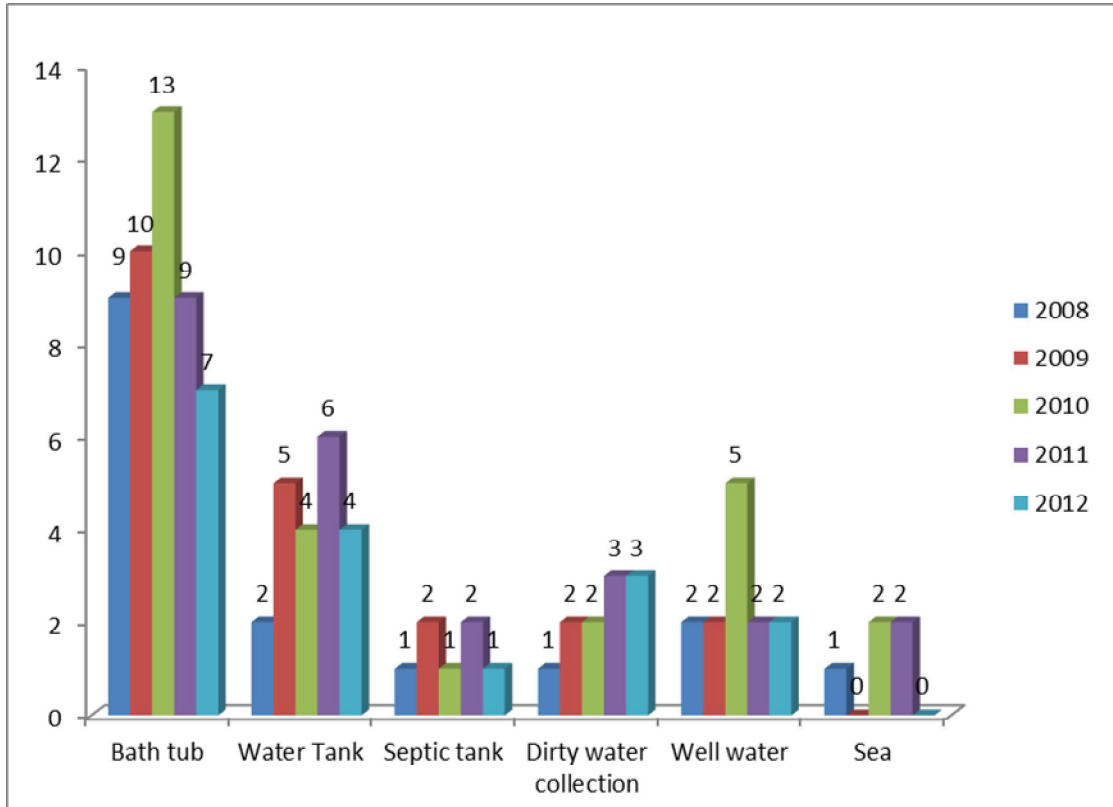
This bar diagram shows that in all the years bath-tub was the most common source of submersion injury. (Least sea-water) .
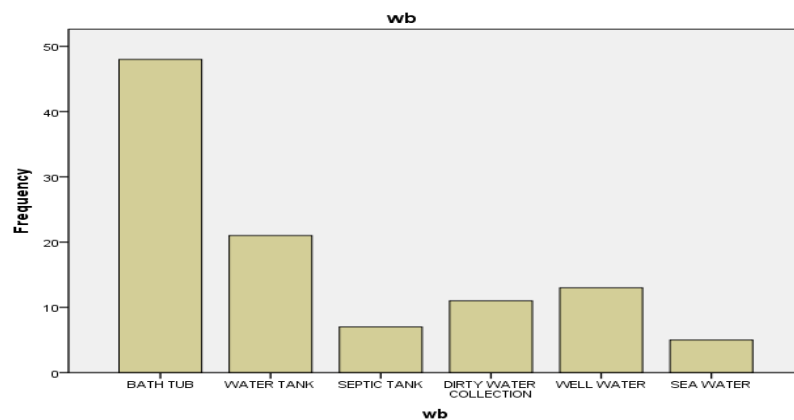
WB=Water Body

TABLE : 9

YEAR AND WATER BODY CROSS TABULATION

year		Water body						
		Bath tub	Water Tank	Septic tank	Dirty water collection	Well water	Sea	Total
2008	Count	9	2	1	1	2	1	16
	% within year	56.2%	12.5%	6.2%	6.2%	12.5%	6.2%	100.0%
2009	Count	10	5	2	2	2	0	21
	% within year	47.6%	23.8%	9.5%	9.5%	9.5%	0%	100.0%
2010	Count	13	4	1	2	5	2	27
	% within year	48.1%	14.8%	3.7%	7.4%	18.5%	7.4%	100.0%
2011	Count	9	6	2	3	2	2	24
	% within year	37.5%	25.0%	8.3%	12.5%	8.3%	8.3%	100.0%
2012	Count	7	4	1	3	2	0	17
	% within year	41.2%	23.5%	5.9%	17.6%	11.8%	0%	100.0%
Total	Count	48	21	7	11	13	5	105
	% within year	45.7%	20.0%	6.7%	10.5%	12.4%	4.8%	100.0%

In the year 2010, which had maximum number of submersion injury cases, maximum number of submersions occurred in bath-tub being, 48.1 percent. Least percentage of 3.7 percent was seen in septic tank related submersion injuries.

39

TABLE : 10

YEARWISE FENCING OR LIDS FOR WATER-BODIES

			Fencing or lids	
			No	Total
year	2008	Count	16	16
		% within year	100.0%	100.0%
	2009	Count	21	21
		% within year	100.0%	100.0%
	2010	Count	27	27
		% within year	100.0%	100.0%
	2011	Count	24	24
		% within year	100.0%	100.0%
	2012	Count	17	17
		% within year	100.0%	100.0%
Total		Count	105	105
		% within year	100.0%	100.0%

All water-bodies did not have any fencing facilities available or any lids covering the water body.

TABLE : 11

YEARWISE SUPERVISION BY PARENTS WHEN CHILD HAD SUBMERSION INJURY

			UNSUPERVISED		
			Yes	No	Total
year	2008	Count	14	2	16
		% within year	87.5%	12.5%	100.0%
	2009	Count	20	1	21
		% within year	95.2%	4.8%	100.0%
	2010	Count	23	4	27
		% within year	85.2%	14.8%	100.0%
	2011	Count	21	3	24
		% within year	87.5%	12.5%	100.0%
	2012	Count	16	1	17
		% within year	94.1%	5.9%	100.0%
Total		Count	94	11	105
		% within year	89.5%	10.5%	100.0%

Most of submersion injury occurred due to unsupervision by parents at the time of submersion event

Supervision by parents or not:

	Frequency	Percent
Unsupervised	94	89.5
Supervised	11	10.5
Total	105	100

BAR DIAGRAMS SHOWING SUPERVISED VS UNSUPERVISED

1= UNSUPERVISED BY PARENTS DURING SUBMERSION
2= SUPERVISED BY PARENTS DURING SUBMERSION
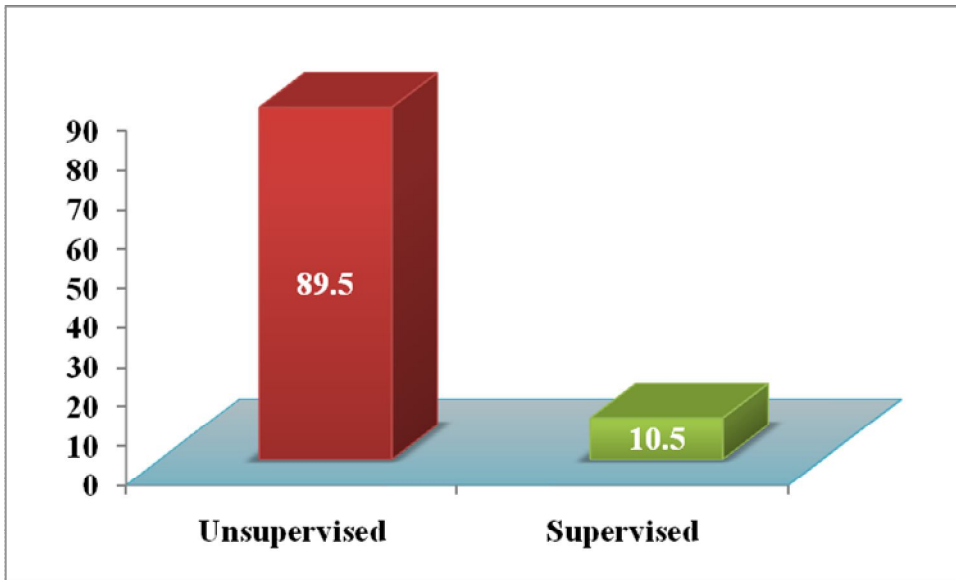
YEARWISE BAR DIAGRAM SHOWING SUPERVISION BY

PARENTS;(blue=unsupervised;red=supervised
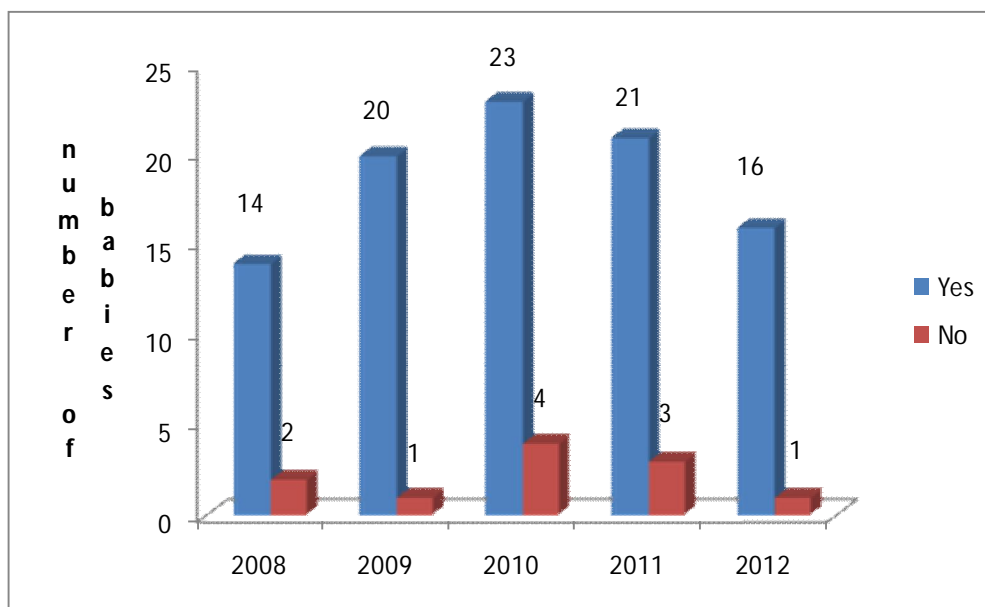
TABLE : 12

LITERACY OF MOTHERS OF CHILDREN WHO
EXPERIENCED SUBMERSION INJURY

Year			Literacy of mother			Total
			illiterate	Primary school	Middle school	High school	
2008	Count	2	4	7	3	16
	% within year	12.5%	25.0%	43.8%	18.8%	100.0%
2009	Count	3	5	9	4	21
	% within year	14.3%	23.8%	42.9%	19.0%	100.0%
2010	Count	6	4	10	7	27
	% within year	22.2%	14.8%	37.0%	25.9%	100.0%
2011	Count	4	6	8	6	24
	% within year	16.7%	25.0%	33.3%	25.0%	100.0%
2012	Count	3	6	3	5	17
	% within year	17.6%	35.3%	17.6%	29.4%	100.0%
Total	Count	18	25	37	25	105
	% within year	17.1%	23.8%	35.2%	23.8%	100.0%

Majority of the mothers were literate and about 32.5 % studied

upto middle school (which was the maximum).

43
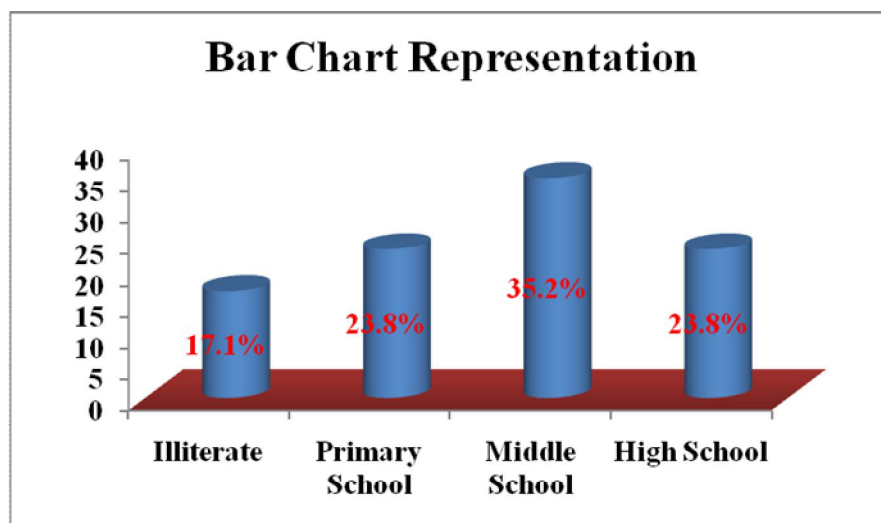
TABLE 13

FREQUENCY TABLE OF LITERACY LEVEL

Literacy level	Frequency	Percent
Illiterate	18	17.1
Primary school	25	23.8
Middle school	37	35.2
High school	25	23.8
Total	105	100.0

This shows many mothers studied upto middle school and only few, 18 out of 105 (17.1 %) were illiterate.

PIE CHART OF LITERACY LEVEL

High School 24%

Illiterate 17%

Primary School 24%

Middle School 35%
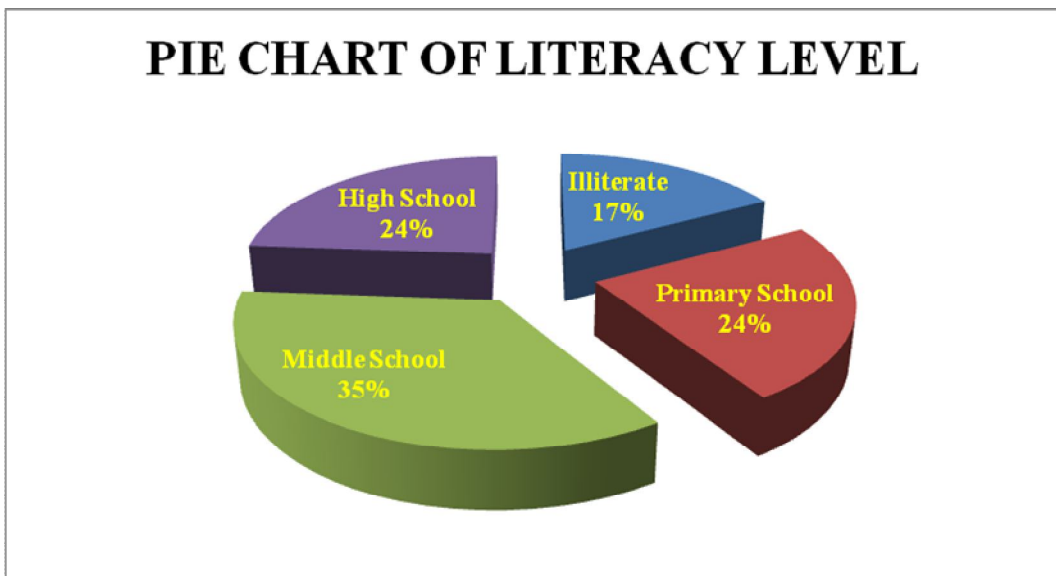
TABLE : 14

LITERACY OF MOTHER – CROSS TABULATION

			Age group			
			<=2 yrs	2-4 yrs	>4 yrs	**Total**
	Illiterate	Count	9	8	1	18
		% within illiteracy	50.0%	44.4%	5.6%	100.0%
	Primary School	Count	12	11	2	25
		% within primary school	48.0%	44.0%	8.0%	100.0%
	Middle School	Count	17	17	3	37
		% within middle school	45.9%	45.9%	8.1%	100.0%
	High School	Count	4	16	5	25
		% within high school	16.0%	64.0%	20.0%	100.0%
Total		Count	42	52	11	105
		% within	40.0%	49.5%	10.5%	100.0%

This table shows the break-up of literacy among mothers in various age group children**.**

TABLE : 15

ANTECEDENT MEDICAL PROBLEM AS A RISK FACTOR FOR SUBMERSION INJURY.

Antecedent medical problems	Frequency	Percent
Epilepsy	5	4.8
dev.delay	7	6.7
Cardiac	1	1.0
Total	13	12.4
No antecedent problem	92	87.6
Total	105	100.0

In the 5 years period, out of 105 children, thirteen had antecedent medical problems (12.4%). The remaining 87.6% did not have any
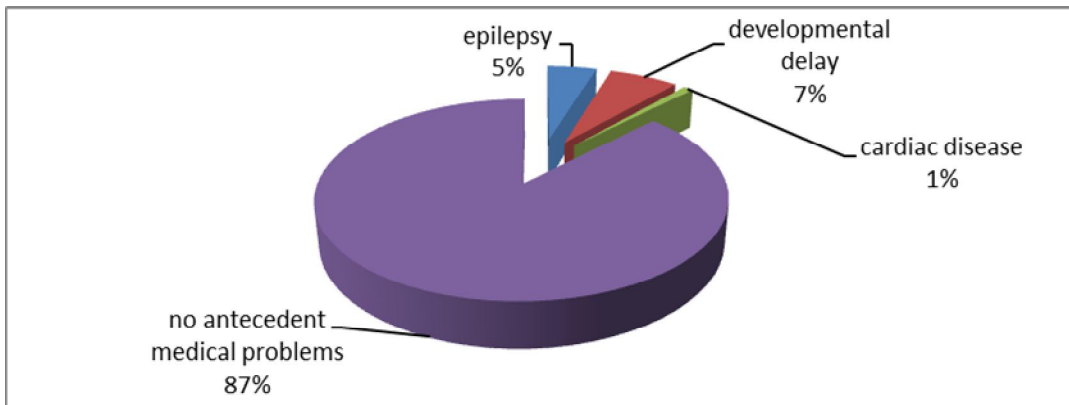
Pie chart representation of antecedent medical problems .

TABLE : 16

TABLE SHOWING SOCIO-ECONOMIC STATUS
OF FAMILY OF SUBMERSION INJURY CHILDREN.

MODIFIED KUPPUSWAMY SCALE*	Frequency	Percent
Lower middle class	72	68.6
Upper middle class	33	31.4
Total	105	100.0

*The Indian Journal of Pediatrics March 2012, Volume 79, Issue 3, pp 395-396.
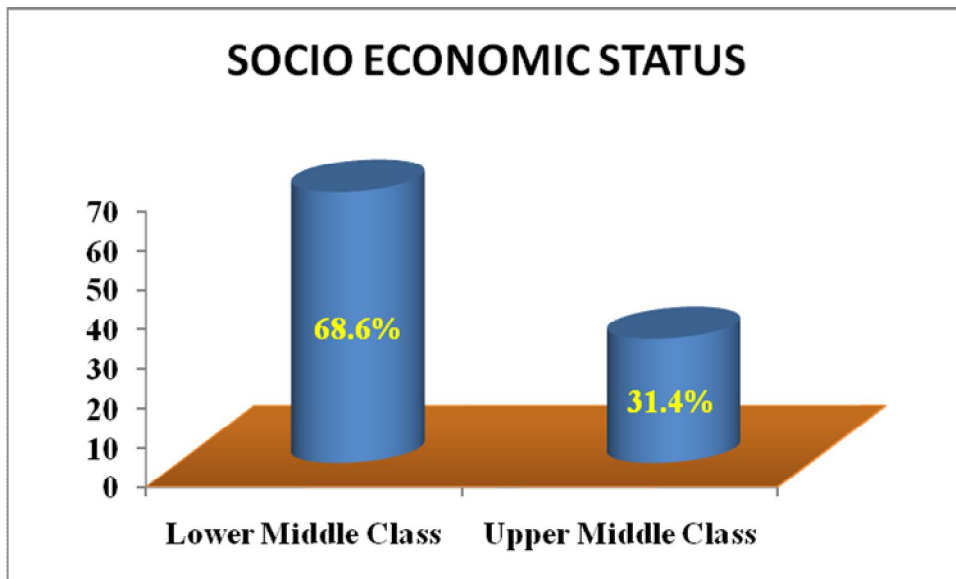
TABLE : 17

YEAR WISE SOCIOECONOMIC STATUS CROSS TABULATION

		Socio Economic Status		Total
		Lower middle class	Upper Middle class	
2008	Count	11	5	16
	% within year	68.8%	31.2%	100.0%
2009	Count	16	5	21
	% within year	76.2%	23.8%	100.0%
2010	Count	18	9	27
	% within year	66.7%	33.3%	100.0%
2011	Count	15	9	24
	% within year	62.5%	37.5%	100.0%
2012	Count	12	5	17
	% within year	70.6%	29.4%	100.0%
total	Count	72	33	105
	% within year	68.6%	31.4%	100.0%

Percentage of children of lower middle socio economic status were more in number.(68.6%).

TABLE : 18

Socio economic status aggregate Cross tabulation

		Age group			Total
		<=2 yrs	2-4 yrs	>4 yrs	
Lower middle class	Count	37	30	5	72
	% within	51.4%	41.7%	6.9%	100.0%
Upper middle class	Count	5	22	6	33
	% within	15.2%	66.7%	18.2%	100.0%
Total	Count	42	52	11	105
	% within	40.0%	49.5%	10.5%	100.0%

This cross table shows the number and percentage of children in different age groups and the socio-economic status of their family. Less than 2 years age group 42 children were admitted. Out of this, 37 belonged to lower middle class and 5 to upper middle class. In the age group of 2 to 4 years 52 children were admitted. Out of which, 30 belonged to lower middle class and 22 belonged to upper middle class. In the age group of more than 4 years , 11 children were admitted . out of which , 5 belonged to lower middle class and 6 to upper middle class.

TABLE : 19

FREQUENCY TABLE OF CLINICAL FEATURES

CLINICAL FEATURES (DESCRIBED IN FOLLOWING PAGE)

		Frequency	Percent
	A(respiratory distress)	5	4.8
	C(impaired consciousness)	18	17.1
	D(cough)	5	4.8
	AC	19	18.1
	AB(febrile response)C	2	1.9
	ACE(vomiting)	3	2.9
	ACF(tachypnea)	4	3.8
	ACI(ent bleed)	1	1.0
	ABCE	2	1.9
	ABCF	3	2.9
	ACDF	2	1.9
	ACEF	3	2.9
	ABCEF	1	1.0
	ACDEF	4	3.8
	ACDFH(seizures)	1	1.0
	ABCDEF	6	5.7
	ABCEFH	1	1.0
	ACDEFI	1	1.0
	ABCDEFG(abdominal distension)	1	1.0
	ABCDEFH	3	2.9
	ABCDEFI	1	1.0
	ACDEFGH	2	1.9
	ABCDEFGH	4	3.8
	Total	92	87.6
Missing	System	13	12.4
	Total	105	100.0

TABLE : 20

FREQUENCY TABLE OF CLINICAL GROUPS

	Frequency	Percent
Single clinical feature	28	26.7
Multiple clinical feature	64	61.0
Total	92	87.6
MISSING SYSTEM	13	12.4
Total	105	100.0

The children who presented with single clinical feature was 28 and those with multiple clinical features were 64. A total of 13 children did not have any clinical features. 19 children had clinical features of respiratory distress and impaired consciousness. It was the maximum combination of clinical features which the drowning children showed. Missing system include those children who did not have any clinical features when the child was examined.
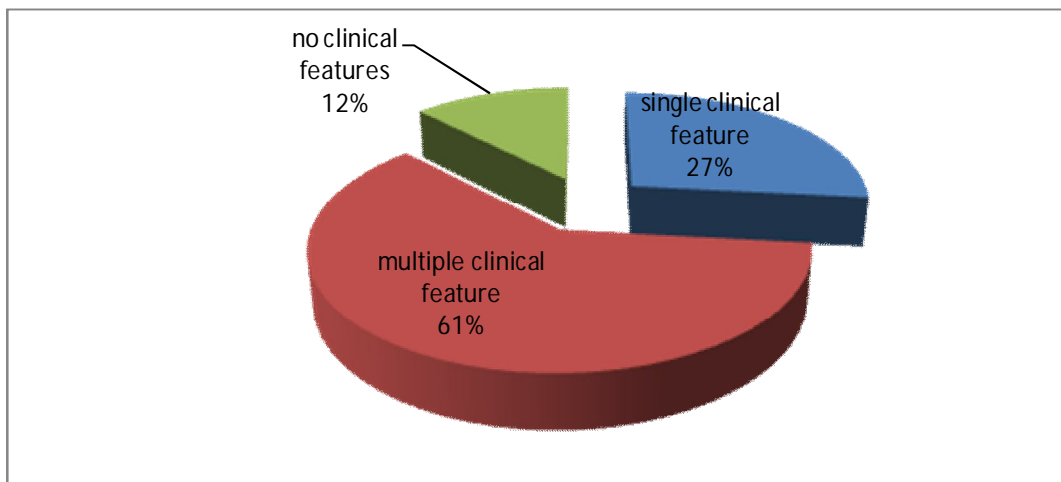
TABLE : 21

RESPIRATORY DISTRESS – FREQUENCY TABLE

RD	Frequency	Percent
Absent	36	34.3
Present	69	65.7
Total	105	100

RD=respiratory distress.

Respiratory distress was seen in 69 children and 36 children did not have any.
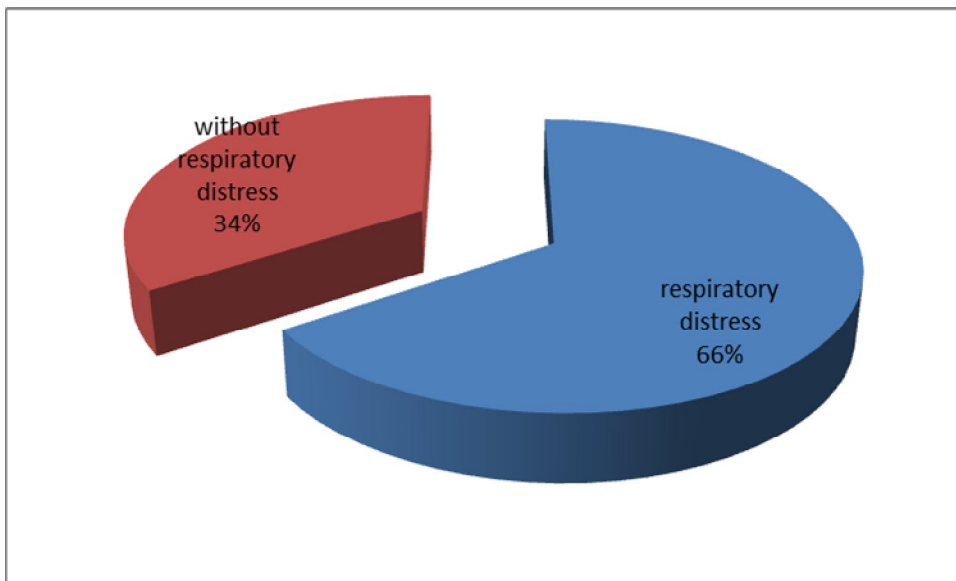
66 percentage of children had respiratory distress and 34 percent did not have respiratory distress.

TABLE : 22

FREQUENCY TABLE OF FEBRILE RESPONSE

Febrile Response	Frequency	Percent
Absent	81	77.1
Present	24	22.9
Total	105	100.0

Febrile response was seen in 24 children while 84 were afebrile.
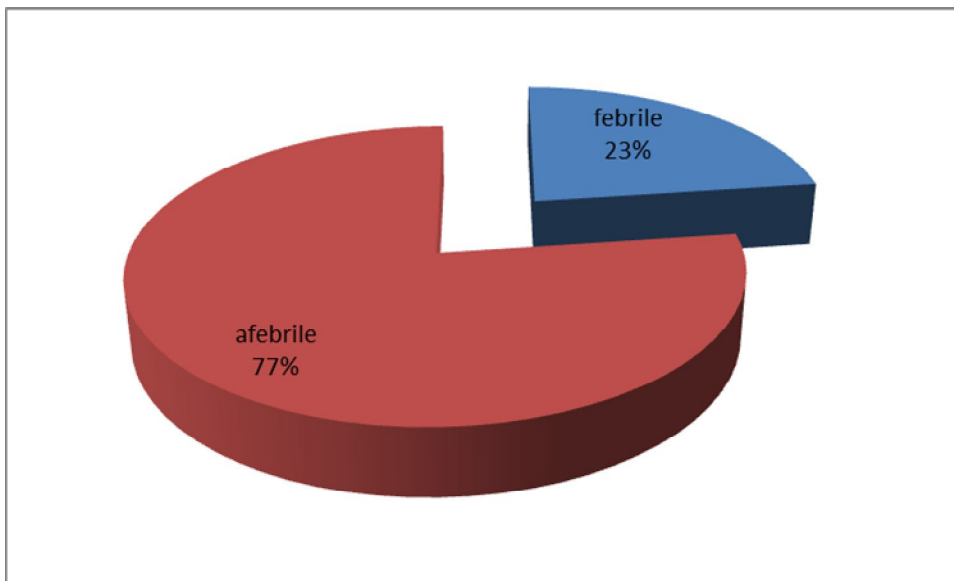
PIE CHART SHOWING PERCENTAGE DISTRIBUTION

BETWEEN FEBRILE AND AFEBRILE CHILDREN:

TABLE : 23

FREQUENCY TABLE OF CHILDREN WHO PRESENT WITH IMPAIRED CONCIOUSNESS

	Frequency	Percent
Absent	23	21.9
Present	82	78.1
Total	105	100.0

Out of 105 admitted children, 82 had impaired consciousness. Other 23 did not have.
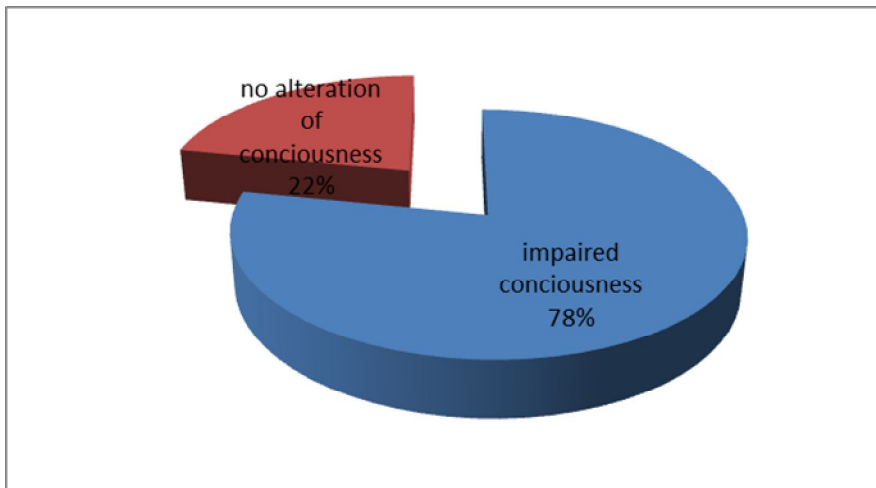
78 % had impaired consciousness at presentation to hospital.

TABLE : 24

FREQUENCY TABLE OF COUGH AS A CLINICAL FEATURE

	Frequency	Percent
Absent	75	71.4
Present	30	28.6
Total	105	100.0

This frequency table shows that 30 children had cough as a clinical feature and 75 did not have cough.

PIE CHART
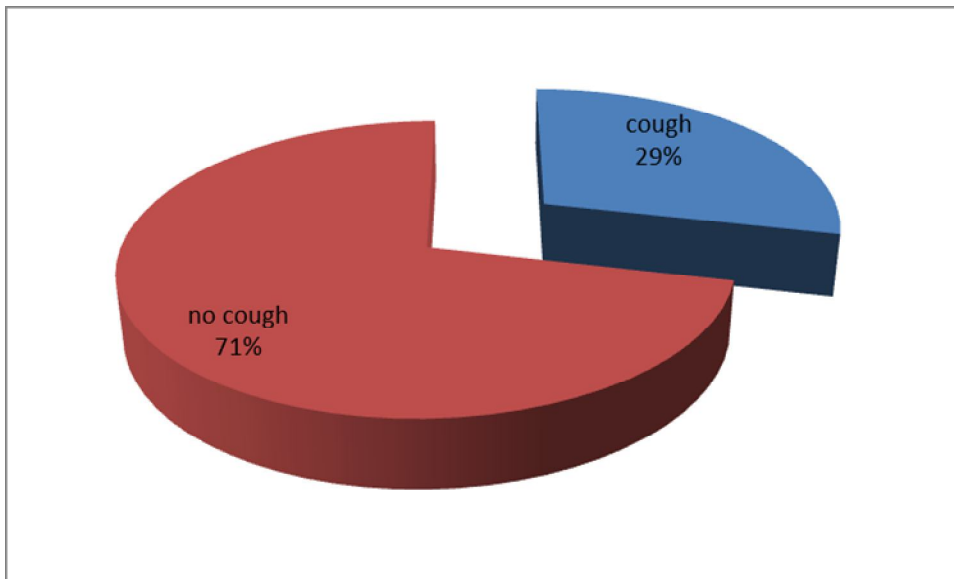
29% children had cough, while 71% did not have

TABLE : 25

FREQUENCY TABLE SHOWING VOMITING AS A

CLINICAL FEATURE

Vomiting	Frequency	Percent
Absent	73	69.5
Present	32	30.5
Total	105	100.00

Out of 105 children, 32 children had vomiting and 73 did not have vomiting.
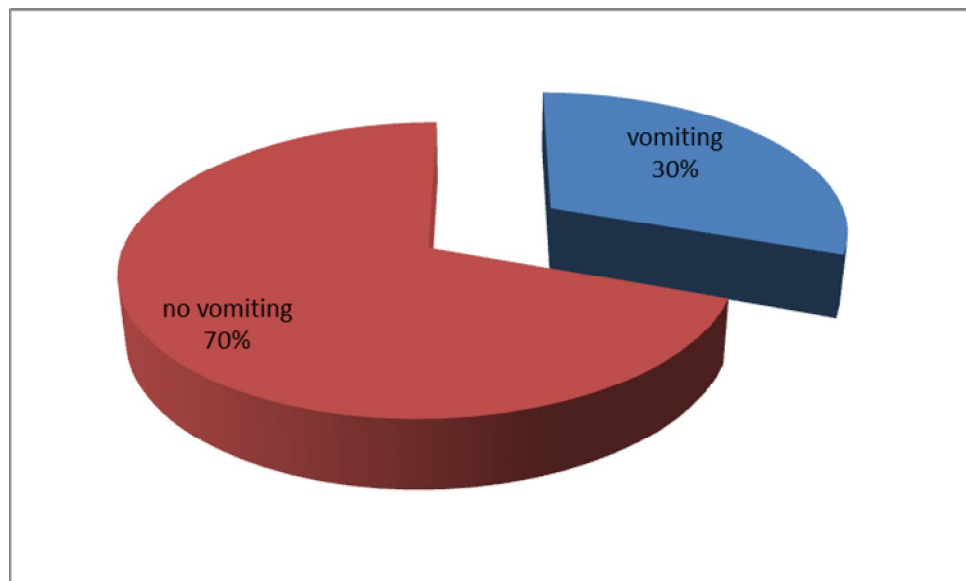
This pie chart shows 30 % of admitted children had vomiting and 70% did not have any vomiting.

TABLE: 26

FREQUENCY TABLE OF TACHYPNEA

AS A CLINICAL FEATURE

Tachypnea	Frequency	Percent
Absent	68	64.8
Present	37	35.2
Total	105	100.0

Out of 105 children , 37 had tachypnea and 68 did not have any tachypnea.
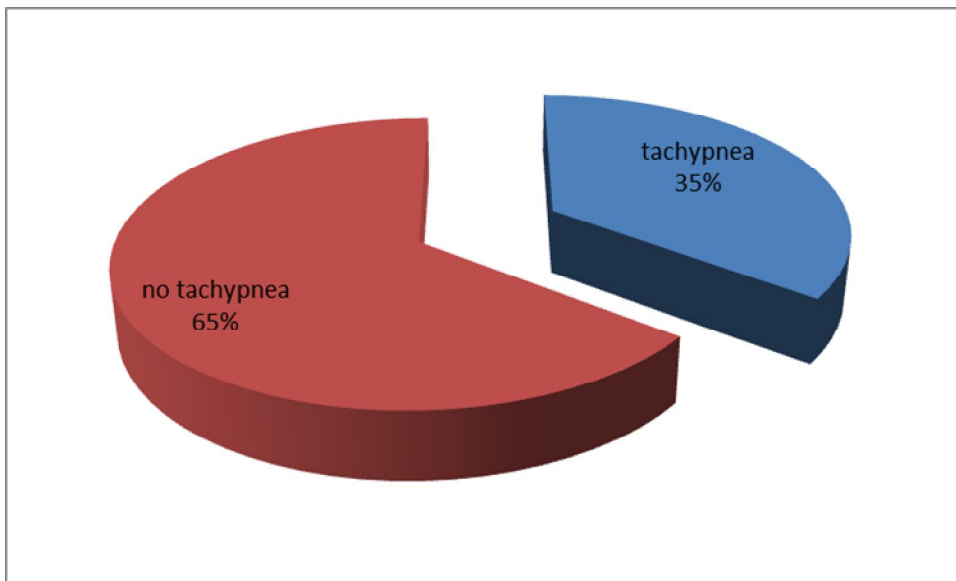
This pie chart shows, 35 % of admitted children had tachypnea as a clinical feature and 65 % did not have tachypnea.

TABLE : 27

FREQUENCY TABLE OF ABDOMINAL DISTENSION

AS A CLINICAL FEATURE

Abdominal Distension	Frequency	Percent
Absent	98	93.3
Present	7	6.7
Total	105	100.0

This shows that out of 105 children, 7 children had abdominal distension and 98 did not have any abdominal distension.
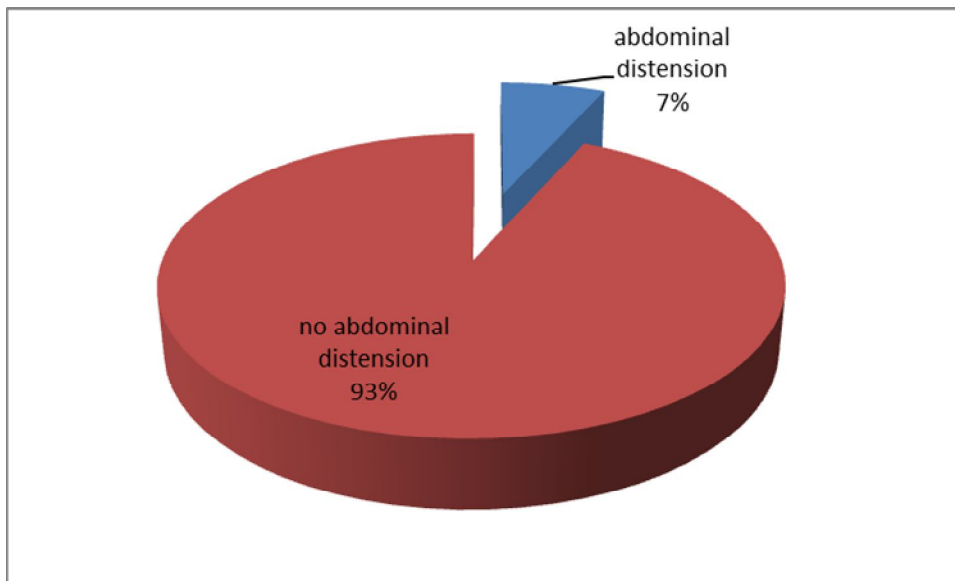
This pie chart shows 7 % did had abdominal distension and 93 % did not have abdominal distension.

TABLE : 28

FREQUENCY TABLE SHOWING SEIZURES AS A CLINICAL FEATURE

Seizures	Frequency	Percent
Absent	94	89.5
Present	11	10.5
Total	105	100.0

Out of 105 children, 11 presented with seizures and 94 did not have any seizures.
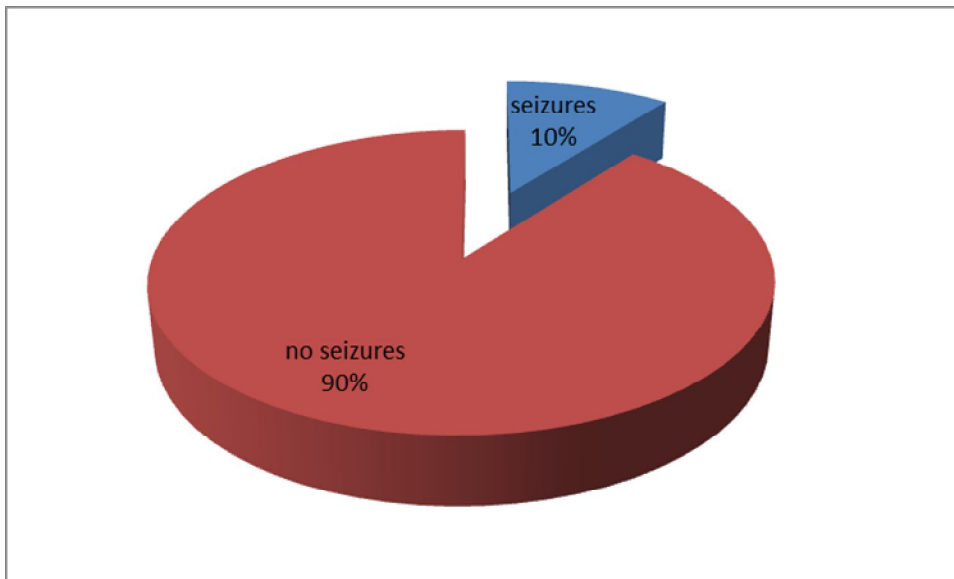
Pie chart shows that 10 % children presented with seizures and 90% did not have any seizures

TABLE : 29

FREQUENCY TABLE SHOWING ENT BLEED AS A CLINICAL FEATURE

ENT Bleed	Frequency	Percent
Absent	102	97.1
Present	3	2.9
Total	105	100.0

Out of 105 children , only 3 had ENT bleed as a clinical feature.

Remaining 102 did not have any ENT bleed.
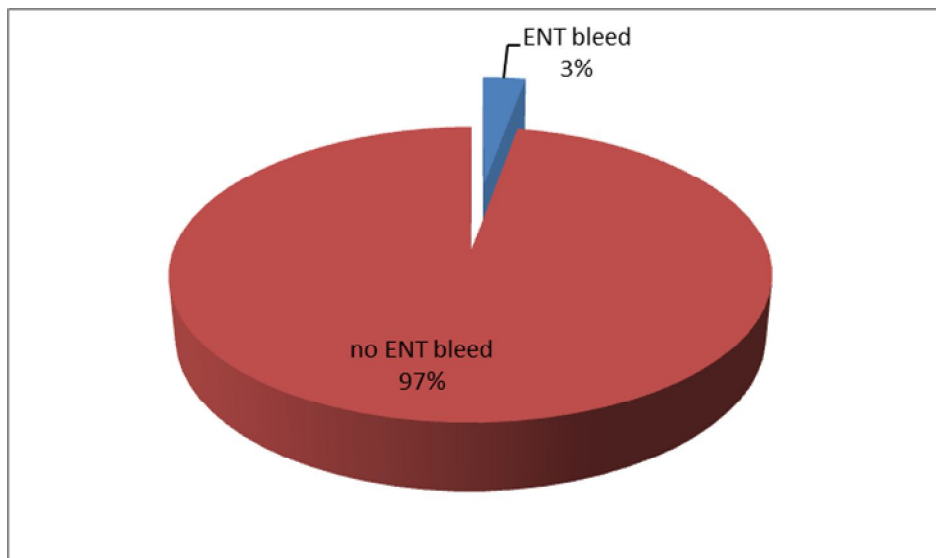
Pie chart shows ENT bleed was seen in 3 % of children

TABLE : 30

FREQUENCY TABLE SHOWING RADIOLOGICAL

FEATURES

Chest x-ray	Frequency	Percent
Cardiomegaly with pulmonary congestion	7	6.7
bilateral hyperinflation	14	13.3
Normal	68	64.8
Broncho-pneumonia	16	15.2
Total	105	100.0

68 had a normal chest x-ray, 16 had bronchopneumonia, 14 had

bilateral hyperinflation and 7 had cardiomegaly with pulmonary
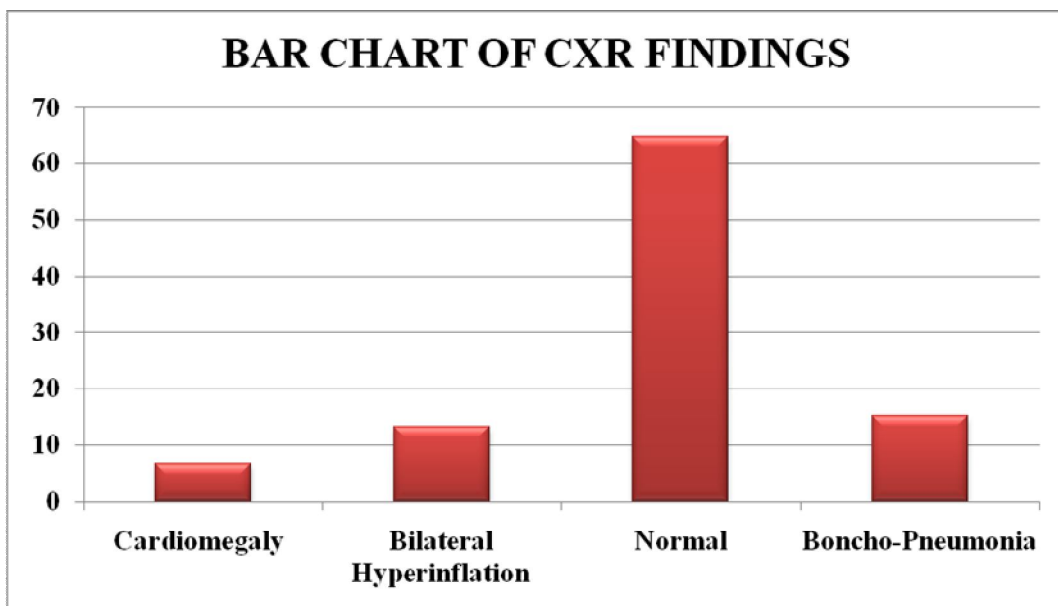
congestion.

BAR DIAGRAM

This is the bar diagram comparing the clinical features of children admitted in year 2008.
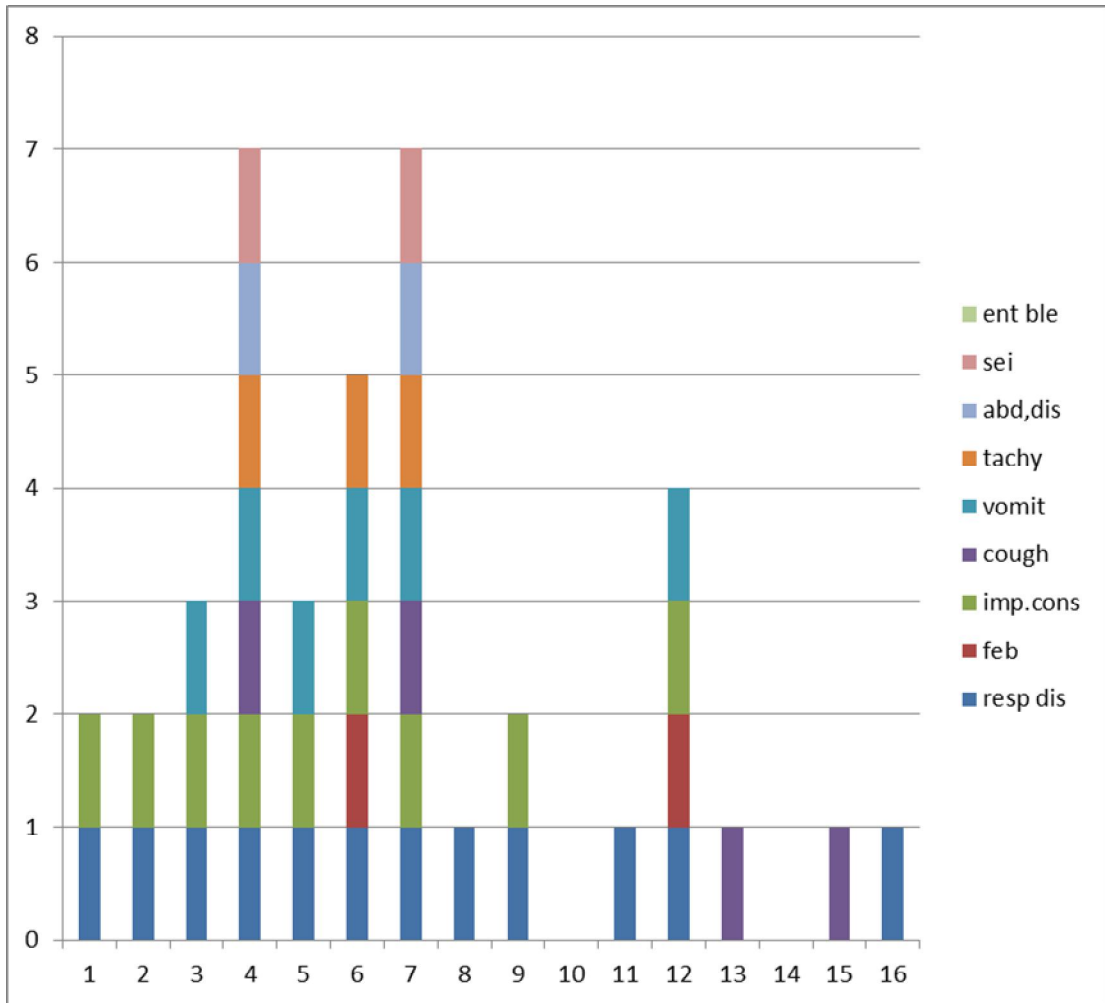
Out of 16 children admitted in year 2008, 2 children did not have any clinical features. 2 other children had maximum combination of 7 clinical features and none of the children had any ENT bleed. 5 children had only single clinical feature.

BAR DIAGRAM

This is the bar diagram comparing the clinical features of children admitted in year 2009.
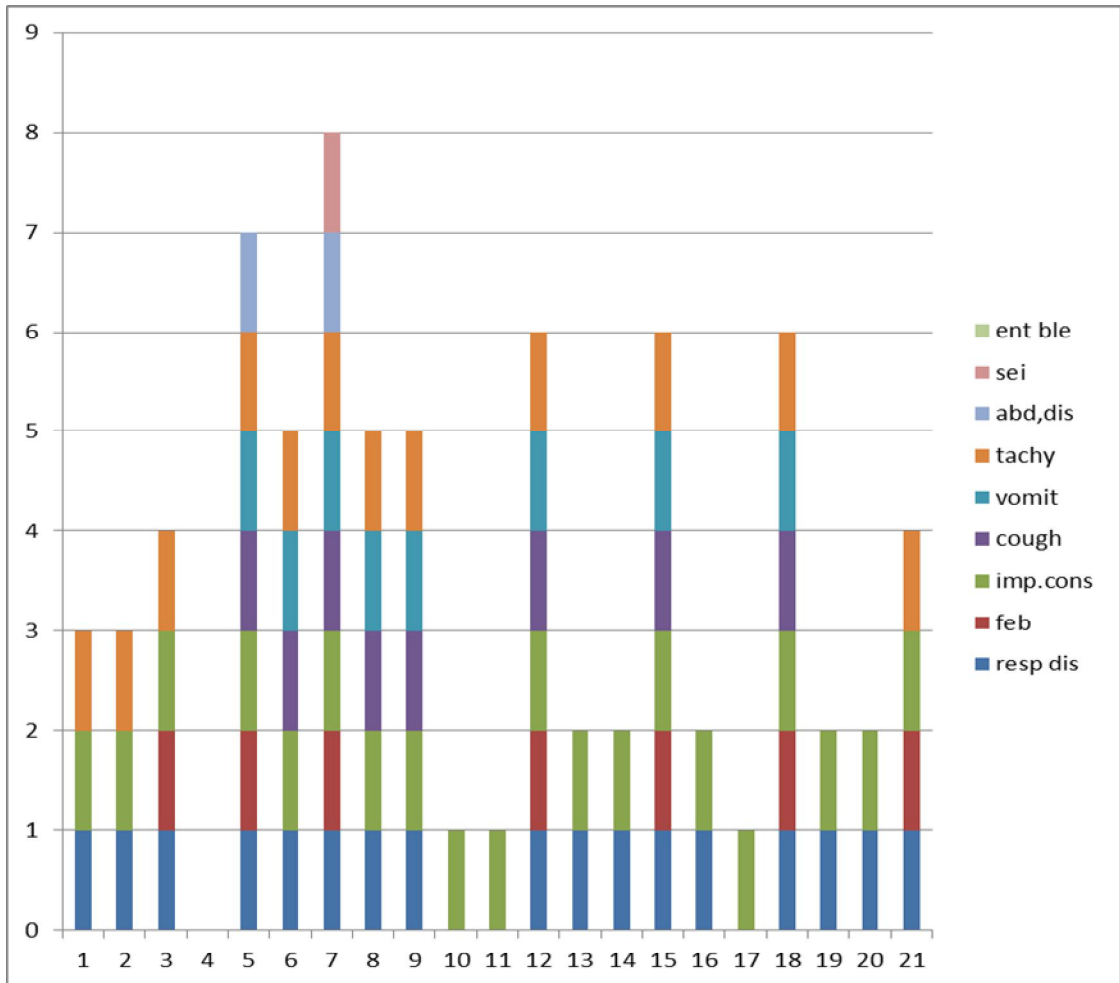
Out of 21 children admitted in year 2009, 1 child did not have any clinical features. 1 child had maximum combination of 8 clinical features and none of the children had any ENT bleed. 3 children had only single clinical feature.

BAR DIAGRAM

This is the bar diagram comparing the clinical features of children admitted in year 2010.
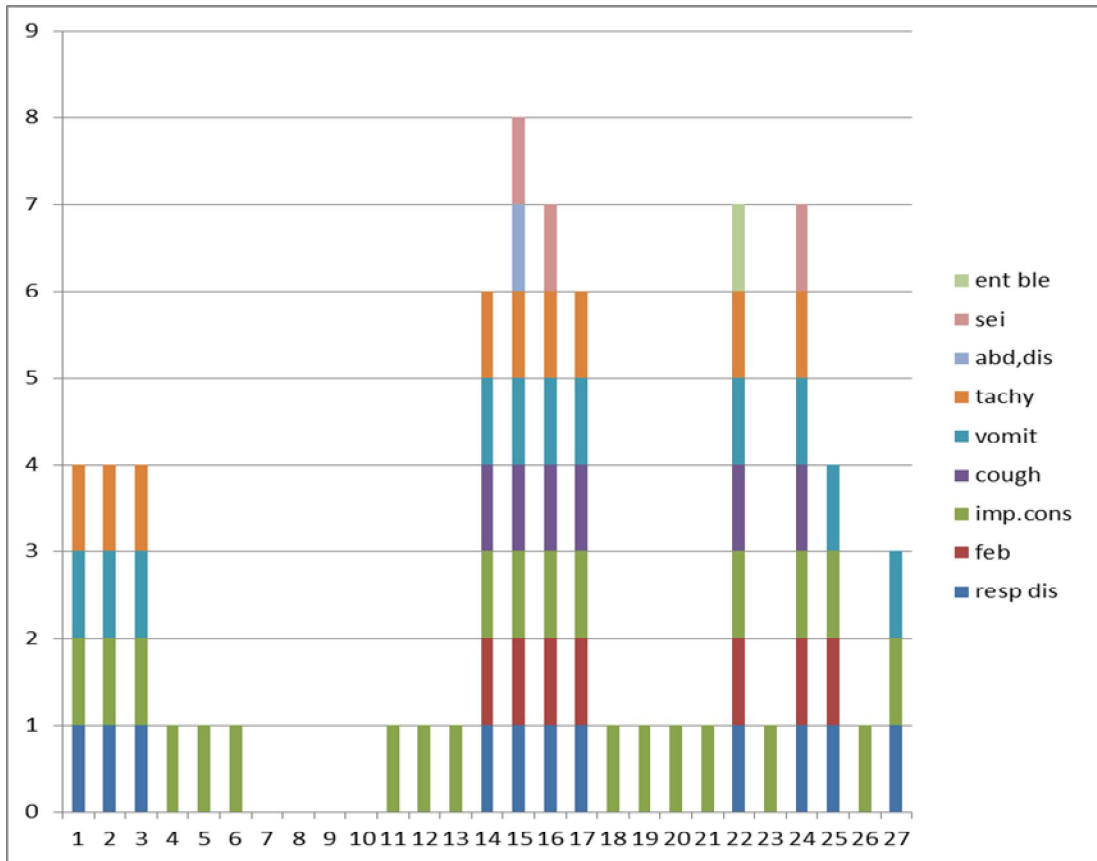
Out of 27 children admitted in year 2010, 4 children did not have any clinical features. 1 child had maximum combination of 8 clinical features and one of the children had ENT bleed. 12 children had only single clinical feature of impaired conciousness .

BAR DIAGRAM

This is the bar diagram comparing the clinical features of children admitted in year 2011.
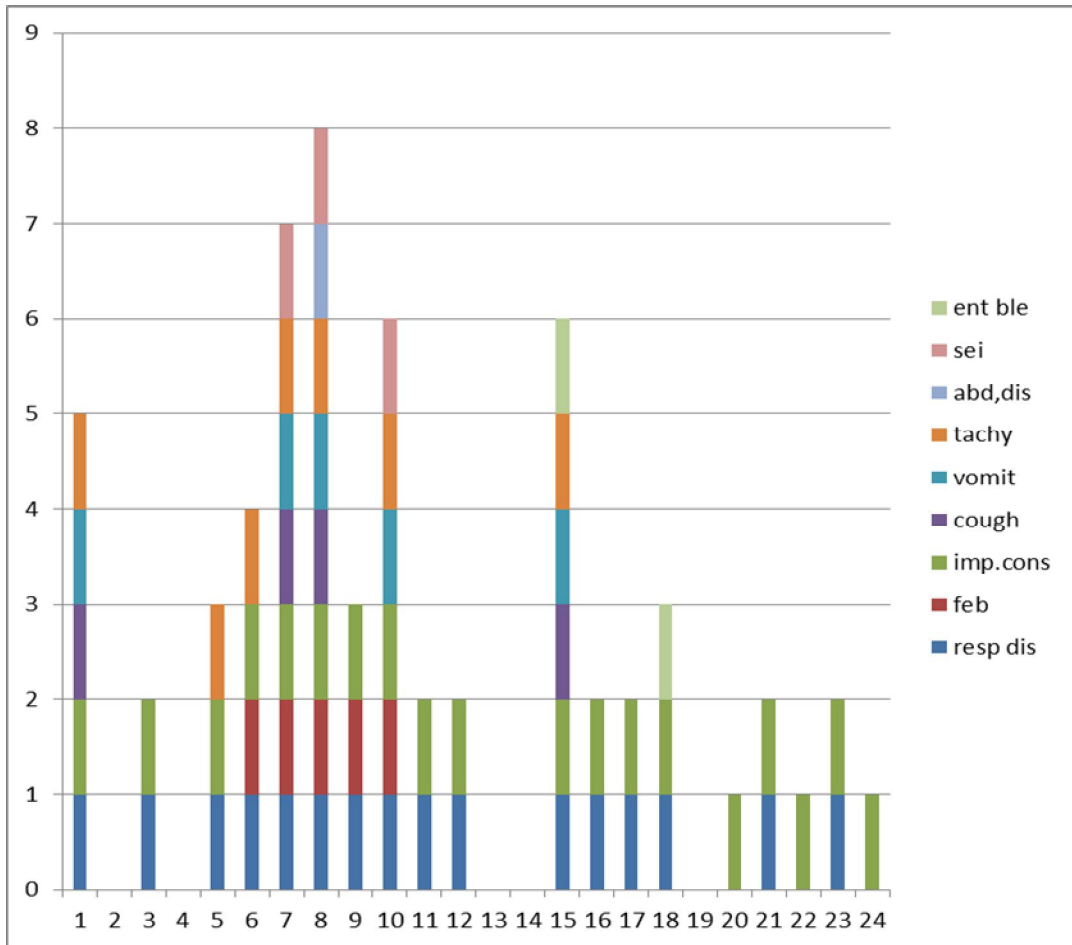
Out of 24 children admitted in year 2011, 5 children did not have any clinical features. 1 child had maximum combination of 8 clinical features and 2 children had ENT bleed. 3 children had only single clinical feature.

BAR DIAGRAM

This is the bar diagram comparing the clinical features of children admitted in year 2012.
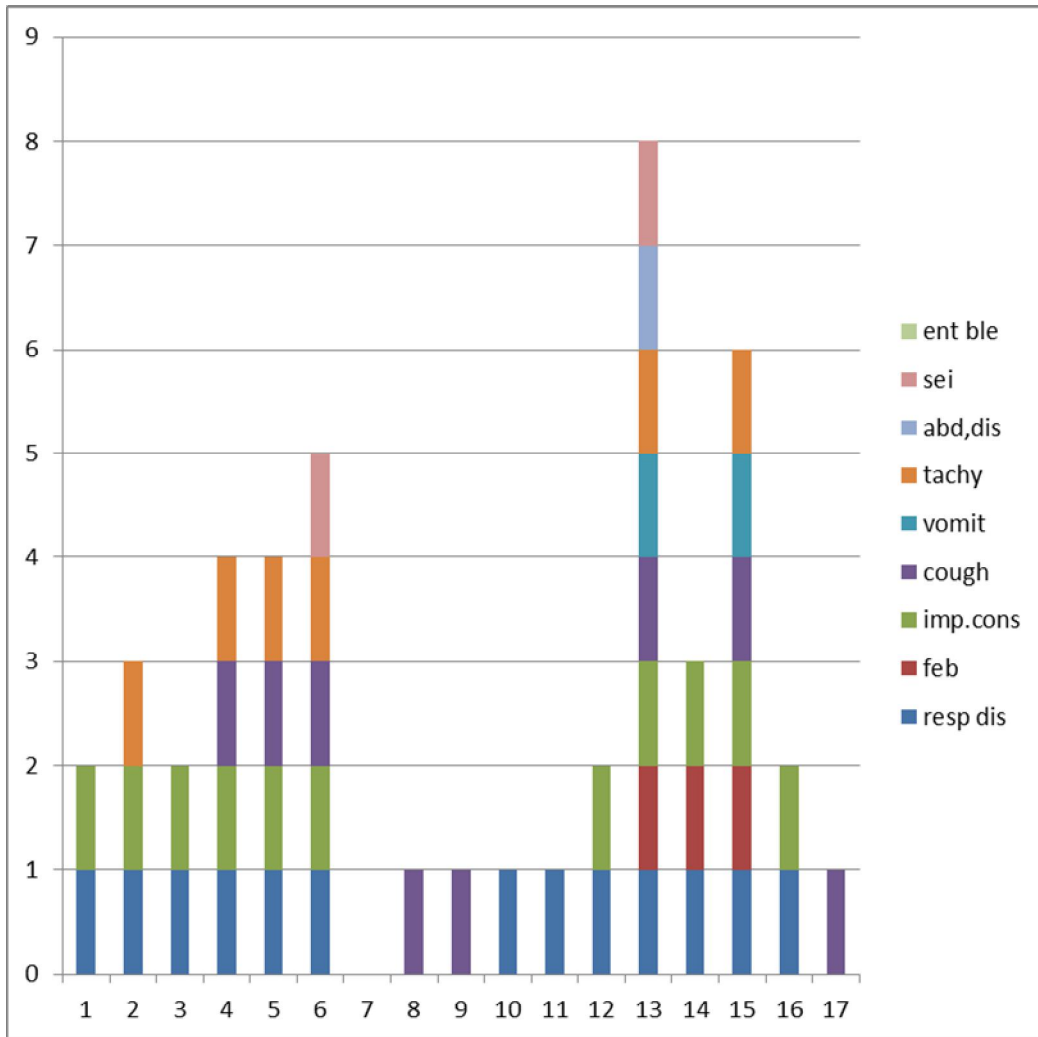
Out of 17 children admitted in year 2012, 1 child did not have any clinical features. 1 child had maximum combination of 8 clinical features and no children had any ENT bleed. 5 children had only single clinical feature.

TABLE : 31

FREQUENCY TABLE OF TREATMENT GIVEN

Treatment given	Frequency	Percent
A(intra nasal oxygen)	2	1.9
C(antibiotics)	4	3.8
F(anti-pyretics)	2	1.9
AB(oro-nasal suctioning)	1	1.0
AC	7	6.7
AF	1	1.0
ABC	16	15.2
ACD(crystalloids)	1	1.0
ACF	2	1.9
ABCD	12	11.4
ABCF	1	1.0
ACDH(prehospital CPR)	1	1.0
ABCDE(inotropes)	2	1.9
ABCDF	5	4.8
ABCDH	1	1.0
ABCEF	1	1.0
ACDFH	1	1.0
ABCDEF	1	1.0
ABCDEFG(mechanical ventilation)	15	14.3
ABCDEFGH	5	4.8
Total	81	77.1
Observation	24	22.9
Total	105	100.0

The capital alphabetical letters mentioned above are the treatment given to submersion injury children and their various combinations.

BAR DIAGRAM : TREATMENT COMPARISON
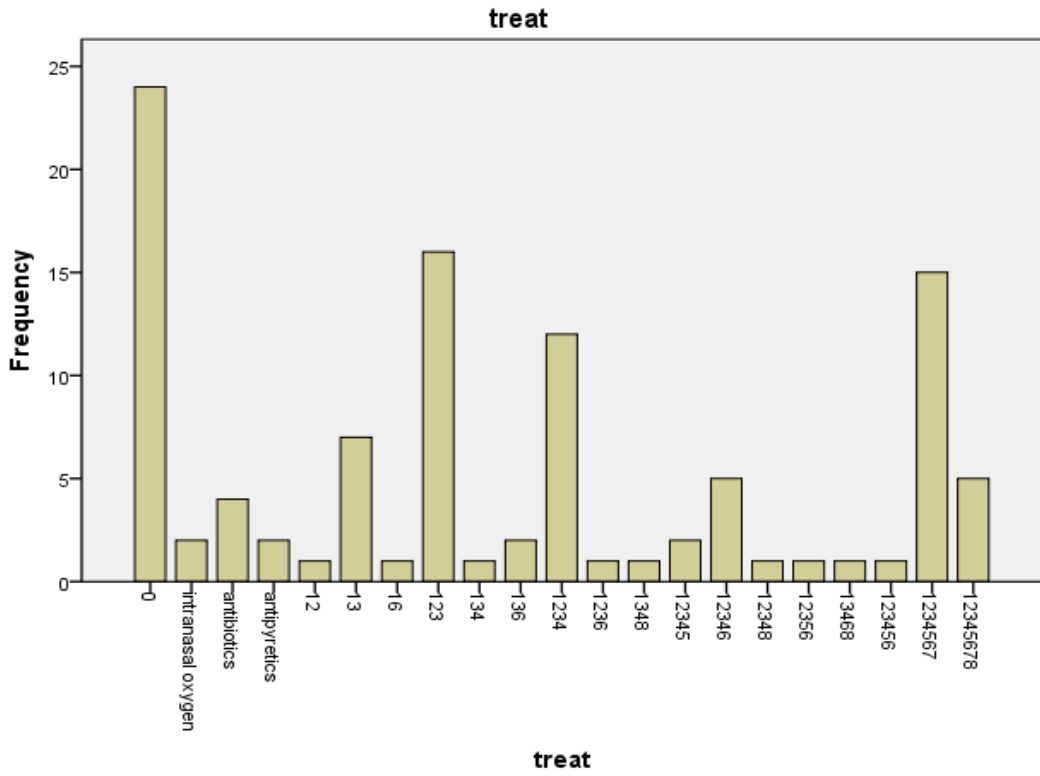
In this the numerical values denote;

0= no treatment

1= intra-nasal oxygen

2= oro-nasal suctioning.

3= antibiotics

4= crystalloids

5= inotropes

6= anti-pyretics

7= mechanical ventilation

8= pre hospital CPR.

TABLE : 32

FREQUENCY TABLE OF MECHANICAL VENTILATION

Mechanical Ventilation	Frequency	Percent
Who did not need	85	81.0
Needed ventilation	20	19.0
Total	105	100.0

Out of 105 children admitted due to submersion injury 20 children needed mechanical ventilation. 85 children did not need any mechanical ventilation.
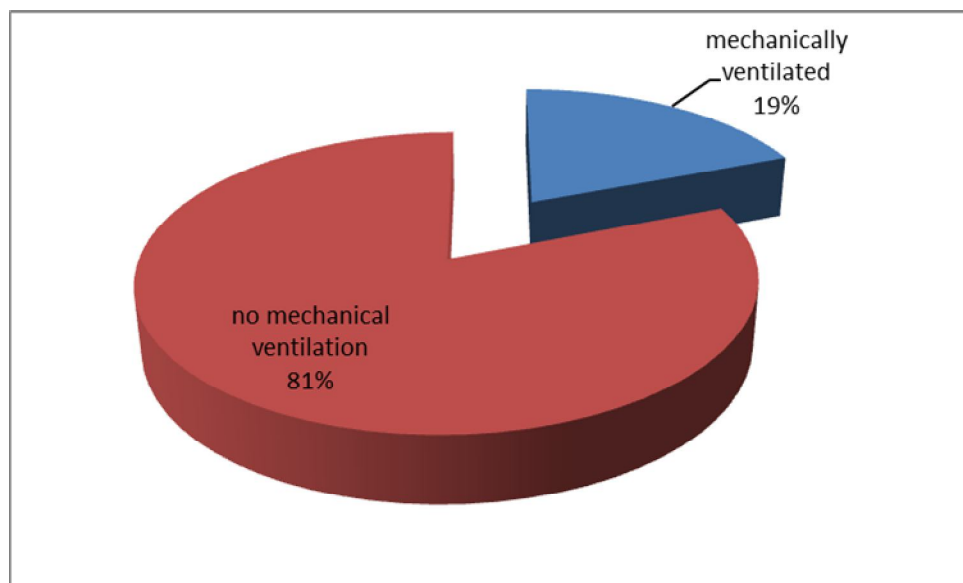
Pie chart shows 19 % children needed mechanical ventilation.

TABLE 33

FREQUENCY TABLE OF PRE-HOSPITAL

CARDIO-PULMONARY RESUSCITATION (CPR)

CPR (Prehospital)	Frequency	Percent
Not done	97	92.4
CPR done	8	7.6
Total	105	100

This table shows that pre-hospital CPR was done in 8 children and 97 children did not have any pre-hospital CPR.
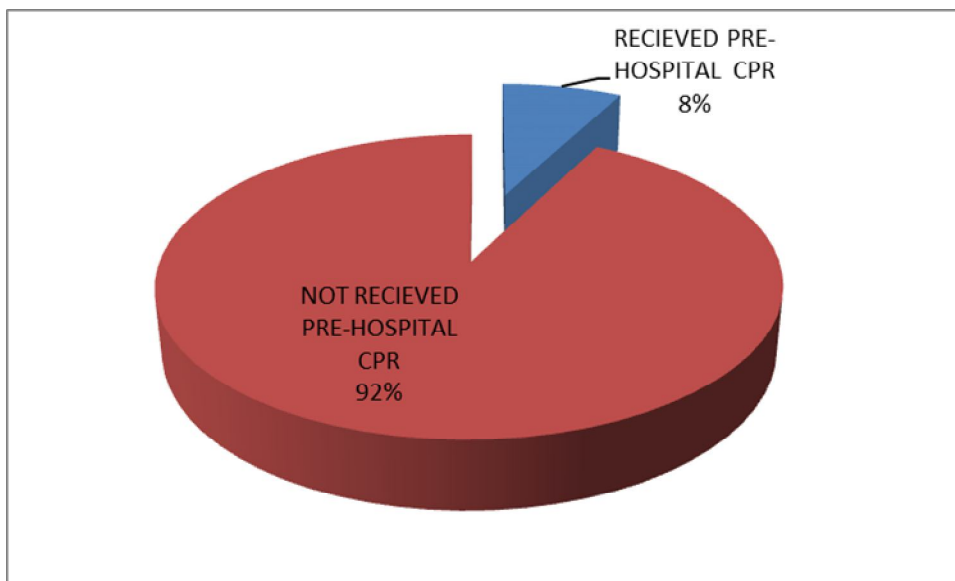
Pie chart shows that only 8 % children had received pre-hospital CPR.

TABLE : 34

FREQUENCY TABLE SHOWING OUTCOME

Outcome	Frequency	Percent
Improved	99	94.3
Death	6	5.7
Total	105	100.0

Out of 105 children , 6 children expired. And remaining 99 children improved.

TABLE :34

YEARWISE COMPARISON OF OUTCOME:

			outcome		Total
			Improved	Death	
year	2008	Count	16	0	16
		% within year	100.0%	.0%	100.0%
	2009	Count	20	1	21
		% within year	95.2%	4.8%	100.0%
	2010	Count	25	2	27
		% within year	92.6%	7.4%	100.0%
	2011	Count	22	2	24
		% within year	91.7%	8.3%	100.0%
	2012	Count	16	1	17
		% within year	94.1%	5.9%	100.0%
Total		Count	99	6	105
		% within year	94.3%	5.7%	100.0%

TABLE : 35

Age group and outcome Cross tabulation.

| | | | outcome | | Total |
			Improved	Death	
Age group <=2 yrs		Count	40	2	42
		% within age group	95.2%	4.8%	100.0%
		% within outcome	40.4%	33.3%	40.0%
	2-4 yrs	Count	49	3	52
		% within age group	94.2%	5.8%	100.0%
		% within outcome	49.5%	50.0%	49.5%
	4 yrs above	Count	10	1	11
		% within age group	90.9%	9.1%	100.0%
		% within outcome	10.1%	16.7%	10.5%
Total		Count	99	6	105
		% within age group	94.3%	5.7%	100.0%
		% within outcome	100.0%	100.0%	100.0%

Pearson Chi-Square P-value = 0.859   NS

This cross table shows comparison between age group and outcome. In the age group of less than 2 years 42 children were admitted. Out of which 2 expired and 40 survived. In the age group of 2 to 4 years 52 children were admitted. Out of which 3 expired and 49 survived. In the age group of more than 4 years, 11 children were admitted . of them 10 survived and 1 child expired. On applying Pearson Chi-Square test to the above comparison, p value came to be 0.859 (not significant).

TABLE: 36

AGE GROUP AND WATER BODY CROSS TABULATION

Age		Bath tub	Water Tank	Septic tank	Dirty water collection	Well water	Sea	Total
<=2 yrs	Count	31	6	1	3	0	1	42
	% within age group	73.8%	14.3%	2.4%	7.1%	.0%	2.4%	100.0%
	% within water body	64.6%	28.6%	14.3%	27.3%	.0%	20.0%	40.0%
2-4 yrs	Count	17	15	6	7	6	1	52
	% within age group	32.7%	28.8%	11.5%	13.5%	11.5%	1.9%	100.0%
	% within water body	35.4%	71.4%	85.7%	63.6%	46.2%	20.0%	49.5%
>4 yrs	Count	0	0	0	1	7	3	11
	% within age group	.0%	.0%	.0%	9.1%	63.6%	27.3%	100.0%
	% within water body	.0%	.0%	.0%	9.1%	53.8%	60.0%	10.5%
Total	Count	48	21	7	11	13	5	105
	% within age group	45.7%	20.0%	6.7%	10.5%	12.4%	4.8%	100.0%
	% within water body	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Pearson Chi-Square P-value = 0.001   Significant

Out of 42 children in age group of less than 2 years 31 children submerged in bath-tub. Out of 52 children in age group of 2 to 4 years, majority submerged in bath tub (17) and water tank (15). In more than 4 years, 11 children submerged . Out of which 7 in well water and 3 in sea water. On applying Chi-Square test p value was 0.001(significant).

TABLE : 37

SUBMERSION IN WATER BODY AND SUPERVISION BY PARENTS

CROSS TABULATION

| | | Unsupervised | | |
		Yes	No	Total
Bath tub	Count	38	10	48
	% within water body	79.2%	20.8%	100.0%
Water Tank	Count	21	0	21
	% within water body	100.0%	.0%	100.0%
Septic tank	Count	6	1	7
	% within water body	85.7%	14.3%	100.0%
Dirty water collection	Count	11	0	11
	% within water body	100.0%	.0%	100.0%
Well water	Count	13	0	13
	% within water body	100.0%	.0%	100.0%
Sea	Count	5	0	5
	% within water body	100.0%	.0%	100.0%
Total	Count	94	11	105
	% within water body	89.5%	10.5%	100.0%

Pearson Chi-Square P-value =0.043 Significant

Out of 105 children, 94 children were unsupervised by their parents at the time of submersion. On applying Chi-Square test, p value came to be 0.043 (significant).

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TABLE : 38

SUBMERSION IN WATER BODY AND SUPERVISION BY PARENTS CROSS TABULATION

		Unsupervised		Total
		Yes	No	
Bath tub	Count	38	10	48
	% within Unsupervised	40.4%	90.9%	45.7%
Water Tank	Count	21	0	21
	% within Unsupervised	22.3%	.0%	20.0%
Septic tank	Count	6	1	7
	% within Unsupervised	6.4%	9.1%	6.7%
Dirty water collection	Count	11	0	11
	% within Unsupervised	11.7%	.0%	10.5%
Well water	Count	13	0	13
	% within Unsupervised	13.8%	.0%	12.4%
Sea	Count	5	0	5
	% within Unsupervised	5.3%	.0%	4.8%
Total	Count	94	11	105
	% within Unsupervised	100.0%	100.0%	100.0%

Pearson Chi-Square P-value =0.043 Significant

Unsupervised drowning is more commonly seen in our case series in bath-tub (40.4%), followed by water tank(22.3%) , well water (13.8%), dirty water collection (11.7%) and sea (5.3%).

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TABLE : 39

ANTECEDENT MEDICAL PROBLEMS(AMP) AND OUTCOME CROSS TABULATION

		Outcome		Total
		Improved	Death	
Epilepsy	Count	4	1	5
	% within amp	80.0%	20.0%	100.0%
	% within outcome	33.3%	100.0%	38.5%
Dev.delay	Count	7	0	7
	% within amp	100.0%	.0%	100.0%
	% within outcome	58.3%	.0%	53.8%
Cardiac	Count	1	0	1
	% within amp	100.0%	.0%	100.0%
	% within outcome	8.3%	.0%	7.7%
Total	Count	12	1	13
	% within amp	92.3%	7.7%	100.0%
	% within outcome	100.0%	100.0%	100.0%

Pearson Chi-Square P-value =0. 420 Not Significant

Out of 105 children admitted with submersion injury, 5 children had epilepsy , 7 children had developmental delay and 1 child had cardiac disease. The antecedent medical problems were compared with outcome. On applying Pearson Chi-Square test, p-value came to be 0.420 which is not statistically significant.

DISCUSSION

Earlier studies on drowning in children had focused on death rates in drowning. There are very few population based studies regarding risk factors of submersion injury in children in India. So we have designed a descriptive study to study the risk factors and clinical profile of submersion injury in children less than 12 years of age. Study was carried out from 2011 - 2012 prospectively and case records of the period between 2008-2010 were included for final analysis. This study was conducted in a tertiary care Government hospital in Chennai which is the referral centre for the surrounding 4 districts. We aimed at analyzing the risk factors for submersion injury in children with an objective to guide health care providers in initiating preventive measures for prevention of submersion injury.

The findings of our study reveals that majority of children with submersion injury were aged less than 24 months (68.6%). The percentage of children with submersion injury increases to 94% if children less than 4 years were considered. The youngest child in our series is an infant who was 5 months old and the oldest child was 11 years of age. Boys outnumbered girls overall (63.8% vs 26.2%) which

suggests that gender is an important risk factor for submersion injury. However, among children more than 4 years of age, boys were less than girls (27.3% vs 72.7%). This may be attributed to the less number of children in that age group.

The number of submersion injury from 2008 – 2012 varied from 16 – 27 with maximum reported in 2010 (27 cases) and minimum reported in 2008 (16 cases). We also analyzed the location of submersion injury according to the locations and found that submersion occurred maximum in bathtubs (45.7%), followed by water tank (20%), septic tank (6.7%), dirty water collection (10.5%), well water (12.4%) and sea water (4.8%). Children less than 2 years submerged commonly in bathtubs(73.8%). Children in the age group of 2 – 4 years submerged in water tank, septic tank and dirty water collection commonly. Older children more than 4 years had submersion in well water and sea water (63.6%). This correlates with the increasing mobility and activity of children as age advances.

Garen J; Wintemute et al ., observed that drowning rates in both males and females were age related. Children less than 5 years contributed to 35 percent of submersion injury cases. Infants in the age group of zero to one year accounted for 67 percent of submersion

injury cases. **Emmanuvel onyekwelu et al.,** results showed that male children were likely to submerge more than female children.

All water-sources did not have any fencing facilities available or water storage vessels did not have any lids.

Majority of the submersion victims were unsupervised(89.5%) and this remained fairly constant ranging from 85% - 95% among different age groups. In our observation, we found 17.1% mothers of children were illiterate. Majority of the children were from poor socio economic group. We did not have any children in upper class.

This may be due to referral bias (their preference for private hospitals) or these children had more supervision and less exposure to open water bodies.

Around one 4th of our study population had antecedent medical problems epileptic disorder, developmental delay and cardiac disorder.

Among 105 children studies, 87.6% had one or many of the following clinical features like respiratory distress, febrile response, altered level of consciousness, cough, vomiting, tachypnea, abdominal distension, seizures and ENT bleeding. The most commonly seen

clinical feature was altered level of consciousness (78.1%), followed by respiratory distress seen in 65.7%. The chest radiography showed no abnormality in 64.8% of cases. The abnormal radiographic findings noted include cardiomegaly with pulmonary congestion (6.7%), bilateral hyperinflation (13.3%) and bronchopneumonia (15.2%). Mechanical ventilation was needed in 19% of these children. Pre-hospital CPR had been reported in 7.6% of these cases.

The mortality rate of submersion injury in children in our series was 5.7%. The mortality did not have any significance to age group (p 0.859). Previous co-morbid conditions analyzed also did not have any significance to mortality. Majority of the children at the time of submersion injury were unsupervised. The lack of supervision by mother just for a few minutes lead to submersion injury in children. In all our cases studied no water body had either fencing or lids. This is an important risk factor for submersion injury.

Bose A; George K; Joseph A et al ., found death in less than 5 years of age constituted 46 percent of submersion injury in his study.

Very few percentage (7.6%) received pre-hospital CPR. Even after receiving effective resuscitative and treatment measures, the

outcome varies from normal state to neurologically impaired state. Sometimes even death. So, prevention of occurrence of submersion injury is a better way. People and adolescents should be taught of basics of CPR and what should not be done while saving a submersion injury victim from water. Fencing of water bodies is a must. The bath-tubs should not be kept open without lids. Mothers of children in age group of less than 2 years should never leave their children unsupervised even for a few minutes.

Anwarul Iqbal et al., proposed intervention programme to prevent submersion injury-associated deaths. It was based on building of awareness about the risk of submersion injury, and measures like door-fencing and also filling-up of ditches and holes which are man-made.

SUMMARY

1. Children less than 2 years age group are at increased risk of submersion injury when compared to older children.

2. Boys come across more submersion injury than girls.

3. Unsupervised children are at risk for submersion injury, especially in less than 2 years age group.

4. Water bodies without any fencing and uncovered bath-tubs and tanks are posing increased risk for submersion of children.

5. Most of the children who suffered submersion injury have any one of the clinical features. No child should be sent home immediately. Even if asymptomatic should be kept under observation.

CONCLUSION

This study found that children less than 2 years were at increased risk of submersion injury. Lack of supervision and lack of fencing facilities were major risk factors for submersion injury. The results suggest that enhancement in supervision among children less than 2 years and providing fencing facilities and covering of bath-tubs and tanks might decrease the risk of submersion injury.

RECOMMENDATIONS

The results suggest that enhancement in supervision among children less than 2 years and providing fencing facilities and covering of bath tubs and tanks might decrease the risk of submersion injury.

BIBLIOGRAPHY

1. Nelson's textbook of paediatrics 19th edition

2. Van Beeck.E.F, Branche.C.M, Spilma.D et al.A new definition of drowning. towards documentation and prevention of a global public health problem, Bulletin of the World Health Organization, 2005, 83(11):853-856

3. Wintemute, GJ.Childhood drowning and near drowning in the United States. American Journal of Disease in Childhood, 1990, 144(663-9).

4. Wintemute GJ, Kraus JF, Teret SP. Drowning in childhood and adolescence. Am J Pub Health 1987; 77: 830-832.

5. Pearn J, Nixon J, Wilkey I. Freshwater drowning and near-drowning: A five-year total population study. Med J Aust 1976; 2: 942-946.

6. Celis A. Home drowning among preschool age Mexican children. Inj Prev 1997; 3: 252-256.

7. O' Flaherty-JE, Pirie PL. Prevention of pediatric drowning and near drowning: A survey of AAP. Pediatrics 1997; 99: 169-174.

8. The Indian Journal of Pediatrics March 2012, Volume 79, Issue 3, pp 395-396.

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CERTIFICATE OF APPROVAL

To
Dr. V. Gnanasekaran
PG in MD Paediatrics
Madras Medical College, Chennai -3

Dear Dr. V. Gnanasekaran

The Institutional Ethics committee of Madras Medical College, reviewed and discussed your application for approval of the proposal entitled "Clinical profile of submersion injury and risk factors for submersion injury in children less than 12 years of age" No.10062012.
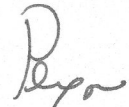
The following members of Ethics Committee were present in the meeting held on 19.06.2012 conducted at Madras Medical College, Chennai -3.

1. Dr. S.K. Rajan. M.D.,FRCP.,DSc   -- Chairperson
2. Prof. K. Ramadevi MD   -- Member
   Prof of Biochemistry, MMC, Ch-3
3. Prof. R. Nandhini MD   -- Member
   Director, Inst. of Pharmacology ,MMC, Ch-3
4. Prof. C. Rajendiran, MD   -- Member
   Director , Inst. of Internal Medicine, MMC, Ch-3
5. Prof. S. Deivanayagam MS   -- Member
   Prof of Surgery, MMC, Ch-3
6. Prof. A. Radhakrishnan MD   -- Member
   Prof of Internal Medicine, MMC, Ch-3

We approve the proposal to be conducted in its presented form.

Sd/ Chairman & Other Members

The Institutional Ethics Committee expects to be informed about the progress of the study, and SAE occurring in the course of the study, any changes in the protocol and patients information / informed consent and asks to be provided a copy of the final report.

Member Secretary, Ethics Committee

year	age	sex	amp	fencing	sup	lit of moth	ses	wb	cli.Featu	radio.fea	treat	outcom	respdis	feb	imp.cons	cough	vomit	tachy	abd,dis	sei	entble	oxy	suctio	antib	crys	ino	anipy	m.v	cpr
2008	12m	1	0	2	2	1	1	1	13	2		1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	10m	1	0	2	1	2	1	1	13	3	1234	1	1	0	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0
2008	18m	1	0	2	1	3	2	1	135	1	1	1	1	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
2008	18m	1	0	2	1	3	1	1	1345678	4	12345678	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1
2008	12m	1	0	2	1	3	1	1	135	3	1234	1	1	0	1	0	1	0	0	0	0	1	1	1	1	0	0	0	0
2008	9m	2	0	2	1	4	2	1	12356	2	1234567	1	1	1	1	0	1	1	0	0	0	1	1	1	1	1	1	1	0
2008	10m	2	0	2	2	2	1	1	1345678	4	1234567	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0
2008	15m	2	0	2	1	4	2	1	1	2		1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	12m	2	0	2	1	3	1	1	13	1	12345678	1	1	0	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1
2008	36m	1	1	2	1	4	2	2		3		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	48m	1	0	2	1	1	1	2	1	3		1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	36m	1	0	2	1	2	1	3	1235	4	123456	1	1	1	1	0	1	0	0	0	0	1	1	1	1	1	1	0	0
2008	60m	2	0	2	1	3	1	4	4	2	13	1	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0
2008	108m	1	0	2	1	3	1	5		3		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	120m	2	0	2	1	3	2	5	4	3		1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0

2008	72m	2	0	2	1	2	1	6	1	3		1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	10m	1	0	2	1	1	1	1	136	2	1234	1	1	0	1	0	0	1	0	0	0	1	1	1	1	0	0	0	0
2009	15m	1	0	2	1	2	1	4	136	3	123	1	1	0	1	0	0	1	0	0	0	1	1	1	0	0	0	0	0
2009	12m	1	0	2	1	3	2	1	1236	3	12345	1	1	1	1	0	0	1	0	0	0	1	1	1	1	1	0	0	0
2009	9m	1	0	2	2	2	1	1		3		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	6m	1	0	2	1	3	1	1	1234567	4	1234567	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	0
2009	18m	1	1	2	1	4	2	3	13456	3	1234567	1	1	0	1	1	1	1	0	0	0	1	1	1	1	1	1	1	0
2009	14m	1	0	2	1	1	1	4	12345678	1	1234567	2	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0
2009	12m	1	0	2	1	2	1	2	13456	3	1234	1	1	0	1	1	1	1	0	0	0	1	1	1	1	0	0	0	0
2009	12m	1	0	2	1	3	1	2	13456	3	1234	1	1	0	1	1	1	1	0	0	0	1	1	1	1	0	0	0	0
2009	5m	1	0	2	1	2	1	1	3	3		1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	10m	1	0	2	1	2	1	1	3	3		1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2009	18m	1	0	2	1	3	1	5	123456	4	1234567	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	0
2009	12m	1	0	2	1	4	2	1	13	3	123	1	1	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0
2009	12m	2	0	2	1	1	1	1	13	3	123	1	1	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0
2009	17m	2	0	2	1	3	1	2	123456	3	1234567	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	0
2009	14m	2	0	2	1	3	1	2	13	3		1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

20 09	8 m																													
20 09	8 m	2	0	2	1	3	1	1	3	3		1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 09	10 m	2	0	2	1	3	1	1	123456	3	1234567	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	0
20 09	36 m	2	0	2	1	3	1	3	13	3	13	1	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
20 09	48 m	2	0	2	1	4	2	2	13	3	1234	1	1	0	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0
20 09	96 m	2	0	2	1	4	2	5	1236	3	1234	1	1	1	1	0	0	1	0	0	0	1	1	1	1	0	0	0	0
20 10	10 m	1	0	2	1	1	1	1	1356	2	123	1	1	0	1	0	1	1	0	0	0	1	1	1	0	0	0	0	0
20 10	14 m	1	0	2	1	1	1	1	1356	2	123	1	1	0	1	0	1	1	0	0	0	1	1	1	0	0	0	0	0
20 10	12 m	1	0	2	1	1	1	1	1356	2	123	1	1	0	1	0	1	1	0	0	0	1	1	1	0	0	0	0	0
20 10	8 m	1	0	2	1	1	1	1	3	3		1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 10	17 m	1	0	2	2	1	1	1	3	3	123	1	0	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0
20 10	11 m	1	2	2	1	1	1	1	3	3	13	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
20 10	10 m	1	2	2	1	2	1	1		3	13	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
20 10	16 m	1	0	2	2	2	1	1		3	13	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
20 10	20 m	1	0	2	2	2	1	1		3		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 10	12 m	1	0	2	2	2	1	1		3		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 10	12 m	1	0	2	1	3	1	1	3	3		1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 10	11 m	2	0	2	1	3	1	3	3	3		1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

20 10	14 m	2	0	2	1	3	1	5	3	3		1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
20 10	12 m	2	2	2	1	3	1	2	123456	4	12346	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	0	0	0		
20 10	12 m	2	0	2	1	3	1	2	12345678	1	12345678	2	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1		
20 10	12 m	2	0	2	1	3	1	1	1234568	4	1234567	1	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	0		
20 10	12 m	2	2	2	1	3	1	1	123456	3	1234567	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	0		
20 10	30 m	1	0	2	1	3	1	2	3	3	13	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0		
20 10	36 m	1	0	2	1	3	2	2	3	3	3	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		
20 10	42 m	1	0	2	1	3	2	4	3	3	3	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		
20 10	36 m	1	0	2	1	4	2	4	3	3		1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
20 10	36 m	1	3	2	1	4	2	5	1234569	4	12346	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	1	0	0		
20 10	48 m	2	0	2	1	4	2	5	3	3		1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
20 10	60 m	2	1	2	1	4	2	5	1234568	3	12345678	2	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1		
20 10	96 m	2	0	2	1	4	2	6	1235	3	1234	1	1	1	1	0	1	0	0	0	0	1	1	1	1	0	0	0	0		
20 10	84 m	1	0	2	1	4	2	5	3	3		1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
20 10	96 m	1	0	2	1	4	2	6	135	3	1234	1	1	0	1	0	1	0	0	0	0	1	1	1	1	0	0	0	0		
20 11	18 m	1	0	2	1	3	1	1	13456	4	1234567	1	1	0	1	1	1	1	0	0	0	1	1	1	1	1	1	1	0		
20 11	16 m	1	0	2	1	3	2	1		3		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

2011	24 m	1	0	2	1	3	2	2	13	3	136	1	1	0	1	0	0	0	0	0	0	1	0	1	0	0	1	0	0
2011	19 m	1	0	2	2	3	2	1		3		1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	11 m	1	0	2	1	3	1	1	136	3	12346	1	1	0	1	0	0	1	0	0	0	1	1	1	1	0	1	0	0
2011	12 m	1	0	2	1	1	1	1	1236	3	12346	1	1	1	1	0	0	1	0	0	0	1	1	1	1	0	1	0	0
2011	12 m	1	0	2	1	2	1	1	1234568	4	1234567	2	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	0
2011	16 m	1	0	2	2	2	1	1	12345678	4	1234567	2	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0
2011	6 m	1	0	2	1	3	1	2	123	3	1234	1	1	1	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0
2011	17 m	2	0	2	1	1	1	2	123568	4	1234567	1	1	1	1	0	1	1	0	1	0	1	1	1	1	1	1	1	0
2011	18 m	2	2	2	2	2	1	3	13	2	136	1	1	0	1	0	0	0	0	0	0	1	0	1	0	0	1	0	0
2011	8 m	2	0	2	1	3	1	4	13	2	13	1	1	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
2011	10 m	2	0	2	1	1	1	4		3	3	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
2011	12 m	2	0	2	1	3	1	4		3	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
2011	36 m	1	2	2	1	4	2	1	134569	4	12345	1	1	0	1	1	1	1	0	0	1	1	1	1	1	1	0	0	0
2011	48 m	1	0	2	1	2	1	1	13	3	13468	1	1	0	1	0	0	0	0	0	0	1	0	1	1	0	1	0	1
2011	36 m	1	0	2	1	1	1	2	13	3	134	1	1	0	1	0	0	0	0	0	0	1	0	1	1	0	0	0	0
2011	32 m	1	0	2	1	4	2	2	139	1	1234	1	1	0	1	0	0	0	0	0	1	1	1	1	1	0	0	0	0
2011	40 m	1	0	2	1	4	2	2		3	1348	1	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1

Year	Measure																												
2011	48 m	2	0	2	1	4	2	3	3	2	3	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0
2011	30 m	2	0	2	1	2	1	5	13	2	1234	1	1	0	1	0	0	0	0	0	0	1	1	1	1	0	0	0	0
2011	36 m	2	0	2	1	4	2	5	3	3	6	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
2011	72 m	2	0	2	1	4	2	6	13	1	12348	1	1	0	1	0	0	0	0	0	0	1	1	1	1	0	0	0	1
2011	132 m	2	0	2	1	2	1	6	3	3		1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	24 m	1	0	2	1	2	1	1	13	2	16	1	1	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0
2012	9 m	1	0	2	1	2	1	1	136	2	1236	1	1	0	1	0	0	1	0	0	0	1	1	1	0	0	1	0	0
2012	18 m	1	0	2	1	2	1	1	13	3	1	1	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
2012	18 m	1	0	2	1	1	1	1	1346	3	12346	1	1	0	1	1	0	1	0	0	0	1	1	1	1	0	1	0	0
2012	24 m	1	0	2	2	2	1	1	1346	4	12	1	1	0	1	1	0	1	0	0	0	1	1	0	0	0	0	0	0
2012	12 m	1	0	2	1	4	2	1	13468	4	1234567	1	1	0	1	1	0	1	0	1	0	1	1	1	1	1	1	1	0
2012	15 m	1	0	2	1	4	2	1		3	123	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0
2012	18 m	1	0	2	1	4	2	2	4	3	123	1	0	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0
2012	17 m	1	0	2	1	1	1	2	4	3	123	1	0	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0
2012	10 m	1	0	2	1	4	2	2	1	3	123	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0
2012	14 m	1	0	2	1	4	2	2	1	3	123	1	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0
2012	20 m	1	0	2	1	3	1	3	13	3	123	1	1	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0

20	20 m	2	0	2	1		3	1	4	1234 5678	4	1234 5678	2	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1
20 12	36 m	1	2	2	1		3	1	4	123	3	123	1	1	1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0
20 12	48 m	2	1	2	1		2	1	4	1234 56	1	1235 6	1	1	1	1	1	1	1	0	0	0	1	1	1	0	1	1	0	0
20 12	72 m	2	0	2	1		2	1	5	13	3	123	1	1	0	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0
20 12	96 m	2	1	2	1		1	1	5	4	3	123	1	0	0	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0