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STUDY OF ORGANOPHOSPHURUS POISONING IN HOSPITALIZED SUBJECTS

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ABSTRACT

To determine survival rate & incidence of organophosphorus poisoning in hospitalized subject. To find out causes, complications & ventilator requirement among the client admitted with OPP. The incidence rate of OPP is 7.22/10,000 population (hospitalized subjects). Survival rate of the patients in the year 2010 = 82.69%. In the year 2011= 90.90%. In the year 2012 =100% .82 acute poisoning patients were got admitted in the emergency department. Of these 64.63% were males and 35.36% females. The majority (43.90%) cases were from age group of 21 to 30 years. Most (87.80%) poisoning are intentional and only 12.19% were unintentional. The mortality was organophosphate poisoning 86.58%. Majority of the patients 40 (48.78%) were required ventilator support. Majority 65 (79.26%) patients had good prognosis; 4 (%) patients were DAMA and 13 (15.85%) patients had poor prognosis. Maximum no 18 (21.95%) of patients were hospitalized for 7-9 days and minimum no 1 (1.21%) of patients were hospitalized for 31-33 days and 52-55 days. This study concluded that mortality rate was high in patient with organophosphorus poisoning due to respiratory complications. The reasons for good prognosis in year 2012 could be due to comprehensive management and good nursing care in the hospital by dedicated staff.

KEYWORDS : Organophosphorous Poisoning (OPP), Incidence, Nursing, Retrospective Study, Survival Rate

A poison is any substance that can cause harm if it gets into the body. The word poison derived from a Latin word 'Potare' which means to drink. Organo phosphorus (OP) compound are a diverse group of chemicals used in both domestic and industrial settings. OP compounds are divided into two groups carbonate group and phosphate group. The examples of organ phosphorus compounds include insecticides and pesticides namely Malathion, parathion, diazinon etc. (Polwattage ,2009).

The primary mechanism of action of Organophosphorus poisoning is inhibition of carboxyl ester hydrolases, particularly acetyl cholinesterase (AchE). AchE is an enzyme that degrades the neurotransmitter acetylcholine (Ach) into choline and acetic acid. Ach is found in the central and peripheral nervous system, neuromuscular junctions and RBCs. (Clark, 2006).

Organophosphorus inactivates AchE by phosphorylating the serine hydroxyl group located at the active site of AchE. Once acetyl cholinesterase has been inactivated, acetylcholine accumulates throughout the nervous system, resulting in over-stimulation of muscarinic and nicotinic receptors. The clinical effects are increases tracheobronchial and salivary secretions, bronchoconstriction, bradycardia.

Occupational, accidental, suicidal or homicidal poisoning is one of the common causes of morbidity and mortality in India. The mortality rates as much lower if early treatment is started in organophosphorous poisoning cases (Barthold ,2005).

STUDY

In worldwide the organ phosphorus poisoning appears to the most important cause of death. The number of intoxication cases with organ phosphorous poisoning is estimated to be 3 million each year and according to the WHO around 3,00,000 people die each year from organ phosphorous poisoning. (Siwatch ,2004.).

The pattern of poisoning varies from country to country, place to place and changes over a period of time due to various reasons .Organ phosphorus poisoning is the commonest cause of poisoning accounting for over 60% in Northern and Southern Indian states like Maharashtra among farmer, Chandigarh, Haryana, Delhi and Karnataka due to its easy availability and mostly from financial constrain. (Krupesh and Sunaina,2006).

The mortality rate of organ phosphorous poisoning depend on the type of compound used, amount ingested, general health of the patient, delay in discovery and transport. The most common cause for death is respiratory failure.

A study stated about “Management of Organ phosphorus poisoning in ICU, Jodhpur, India”. The males 21-30 years predominated, 58.54% cases had consumed poison accidentally, 46-34% cases brought to hospital within six hours of poisoning, 4.46% within 6-12 hours,

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65.88% were categorized as severe, 26.83% as moderate and 7.32% as mild cases, 53 patients were put on ventilator support. The drug therapy included atropine or glycopyrolate and pralidoxin (PAM) and non specific drugs, antimicrobial, sedatives. The overall mortality was 12% (Murat ,2003.)

A study regarding ICU management of OP poison in Manipal ,Karnataka stated that there were 25 females and 22 males out of that 68% were suicidal attempt, 32% were accidental exposure. The gastrointestinal route was main route (93.6%). The mortality rate was 18.7%. The complications observed in 35 patients.

The conclusion of the study was organ phosphorous poisoning is a serious condition that needs rapid diagnosis and treatment. Since the respiratory failure is the major reason for mortality, careful monitoring, appropriate management and nursing care, early recognition of complication may decrease the mortality rate among organ phosphorus poisoning patient. (Goghwani S.).

The Knowledge of nurses towards organ phosphorous poisoning patients is important to those involved in the planning and delivery of care towards this client groups. Patients may develop the complications like respiratory failure, neuropathy, seizures, muscle weakness, aspiration pneumonia. The nurses need knowledge on management and complications of organ phosphorous poisoning.

METHODOLOGY

Research Approach

A retrospective study research design- non-experimental survey design. Research setting- The study was conducted in Krishna Hospital, Karad. OPP registries monitor the rate and incidence of OPP cases from 1st Jan.2010- 31st Dec.2012 in Krishna Hospital, Karad. Population- The study population was the previous records of OPP cases admitted in Krishna hospital, Karad, from Jan.2010-Dec. 2012. Sample- The samples for the present study were the case file and records about OPP from Jan.2010- Dec.2012 which were available at the time of data collection in medical record office of Krishna hospital, Karad. Sample size- 82 Sampling technique-Purposive sampling technique Sample criteria- Inclusion criteria: The study includes the case files of patient and records from register available at the time of data collection. The patient's are- Who had consumed the OPP, who was admitted for the treatment of OPP. Exclusion criteria: Data which are not available at the time of data collection. Tool- The tool will be consisting of, Demographic data. Information related to poisoning. Data collection method- Step 1: Take the consent from the concerned authorities of the hospital. Step 2: Introduce himself to the medical record room staff. Step 3: Collecting data from the records. Step 4: Avoid being biased in the data collection.Step 5: Maintain confidentiality, plan for data analysis- Inferential statistic and by using the spread sheet of excel and it's various tools and Instat software.

Analysis And Interpretation of Data

The data presented under the following heading, Demographic data, Information related to poisoning.

Incidence Rate

Incidence rate is defined as the number of new cases during in a defined population during a specified period of time.

$$= \frac{\text{No. of new cases of specific disease during a given time period}}{\text{Population at risk during that period}} \times 1000$$

$$= 82/113547 \times 1000$$

$$= 0.722$$

$$= 7.22/10000 \text{ population}$$

The incidence rate of OPP is 7.22/10,000 population (hospitalized subjects)

Year wise distribution is 2010= 14.0/10000 population, 2011=.5.9/10000 population, 2012=1.9/10000 population.

Survival Rate

It is the proportion of survivors in a group.

$$= \frac{\text{Total no. of patients alive after 3 years}}{\text{Total no. of patients diagnosed or treated}} \times 100$$

Survival rate of the patients in the year 2010 = 82.69%

Survival rate of the patients in the year 2011= 90.90%

Survival rate of the patients in the year 2012 =100%

The patients admitted with OPP have higher (100%) survival rate during the year 2012.

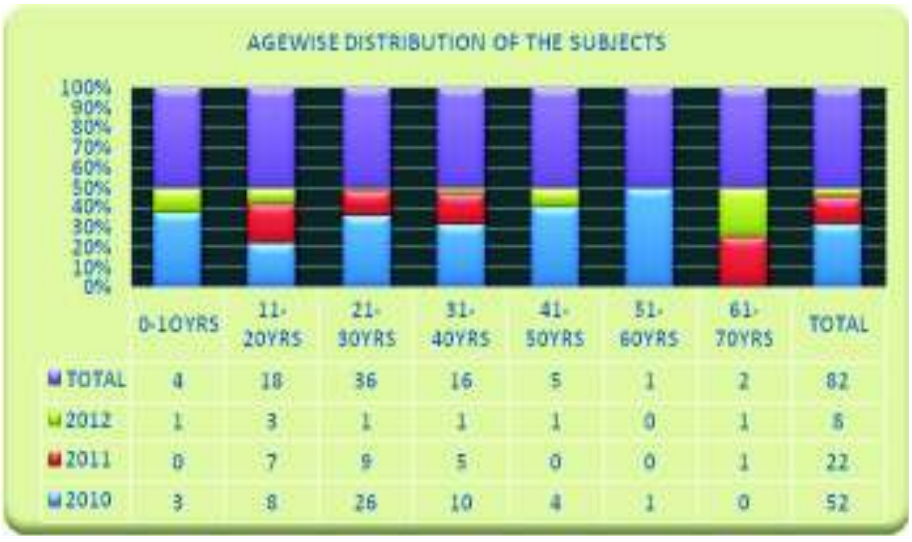
Table 1 : Ventilator Requirement

YEAR	YES	NO	TOTAL
2010	24	28	52
2011	13	9	22
2012	3	5	8
TOTAL	40	42	82

Ventilator requirement in the year 2010 = 24(29.26%), year 2011 = 13(15.85%) , year 2012 = 03(3.6%) In Table ,1.

Majority of the patients 40 (48.78%) were required ventilator support while 42 (51.21%) were not required the ventilator support.

Graph 1 : Agewise Distribution of The Subjects



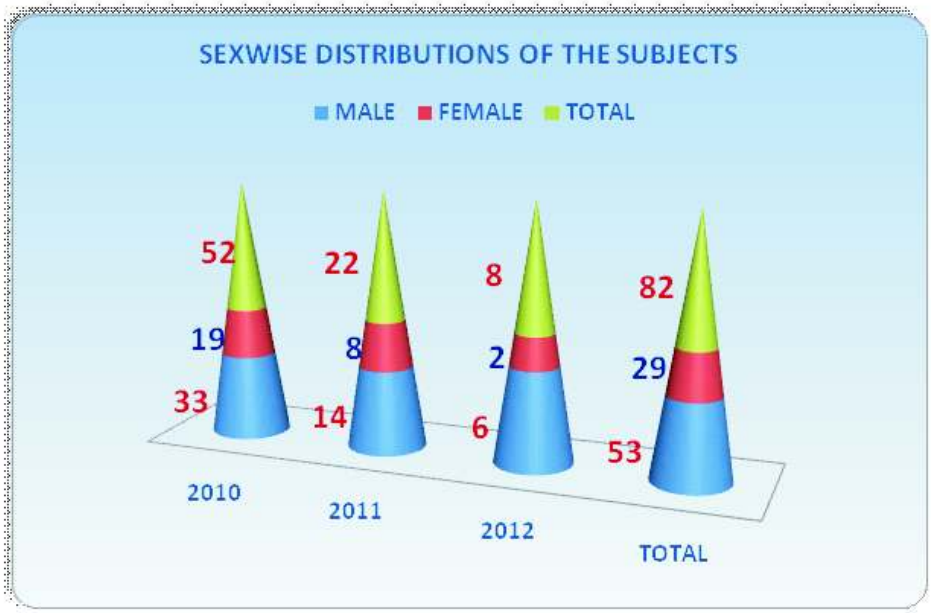
The data presented in Graph 1 indicates that maximum no 36(43.90%) of patients belongs to age group 21-30 yrs and minimum no 1(1.21%) of patients belongs to age group 51-60 yrs.

Table 2 : Total Hospital Stay

YEAR	0-3 DAY	4-6 DAY	7-9 DAY	10-12 DAY	13-15 DAY	16-18 DAY	19-21 DAY	22-24 DAY	25-27 DAY	28-30 DAY	31-33 DAY	52-55 DAY	TOTAL
2010	10	7	14	7	6	4	2	1	0	0	0	1	52
2011	1	2	4	6	6	2	1	0	0	0	0	0	22
2012	2	0	0	1	1	0	2	1	0	0	1	0	8
TOTAL	13	9	18	14	13	6	5	2	0	0	1	1	82

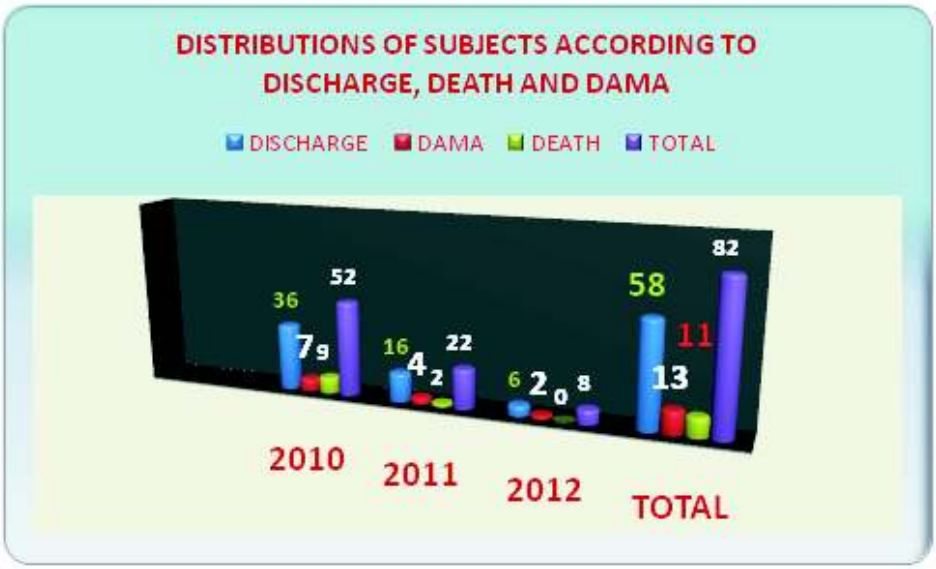
The data presented in table indicates that maximum no 18 (21.95%) of patients were hospitalized for 7-9 days and minimum no 1 (1.21%) of patients were hospitalized for 31-33 days and 52-55 days.

Graph 2 : Sexwise Distributions of The Subjects



The data presented in Graph 2 indicates that maximum no 53 (64.63%) of patients belongs to male sex and minimum no 29 (35.36%) of patients belongs to female sex.

Graph 3 : Distributions Of Subjects According To Discharge, Death And Dama

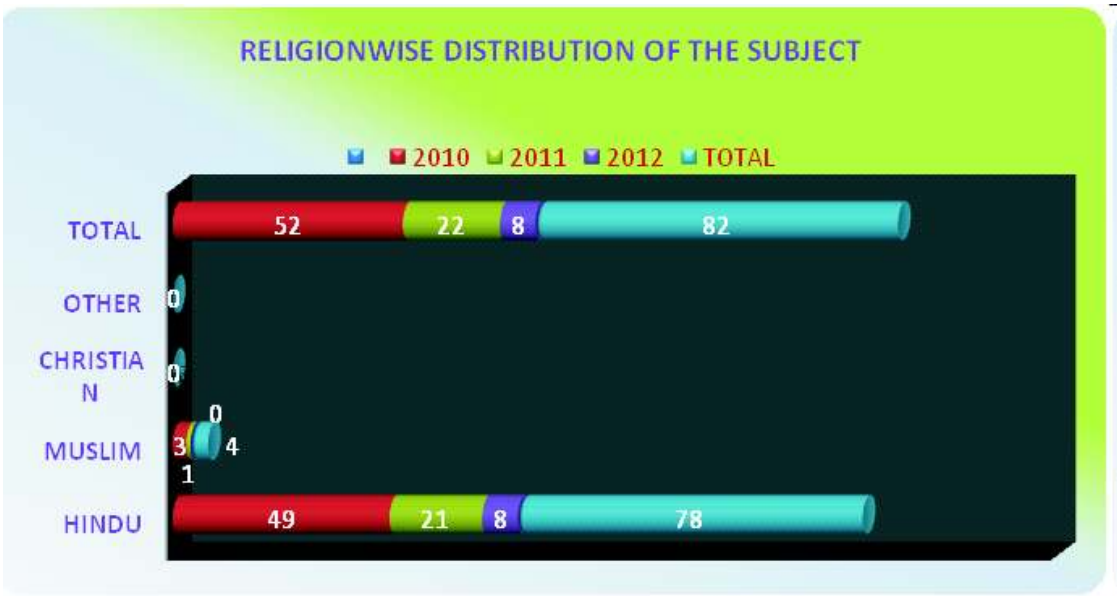


The data presented in Graph 3 indicates that maximum number of patients58 (70.73%) were discharged, 13(15.85%) were taken DAMA and 11(13.41%) were death

Graph 4 : Marital Status

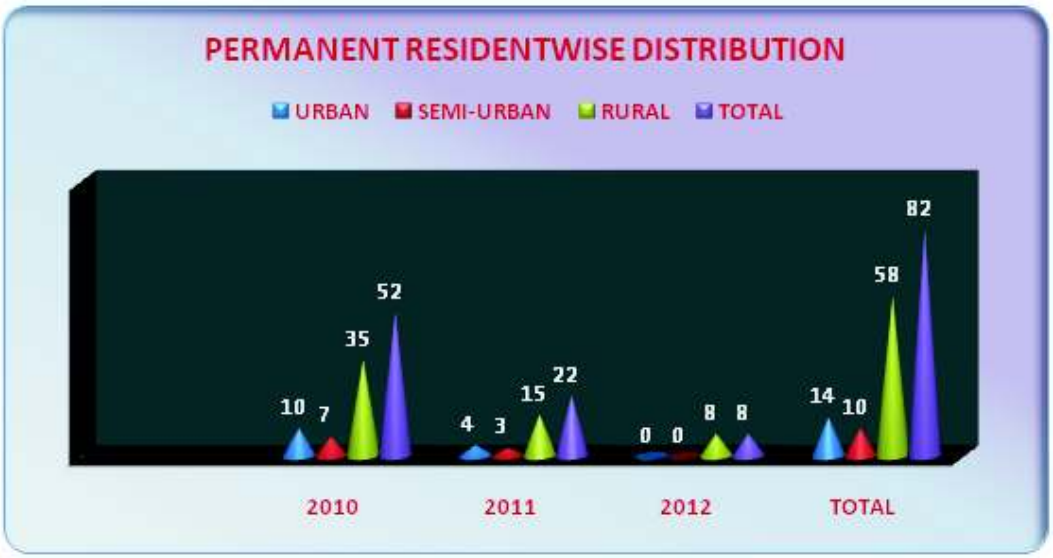
The data presented in Graph 4 indicates that maximum no 42 (51.21 %) of patients were single and minimum no 40 (48.78 %) of patients were married.

Graph 5 : Religionwise Distribution of the Subject



The data presented in Graph 5 indicates that majority of patients 78 (95.12%) belongs to Hindu religion and 4 (4.87%) patients belongs to Muslim religion.

Graph 6 : Permanent Residentwise Distribution



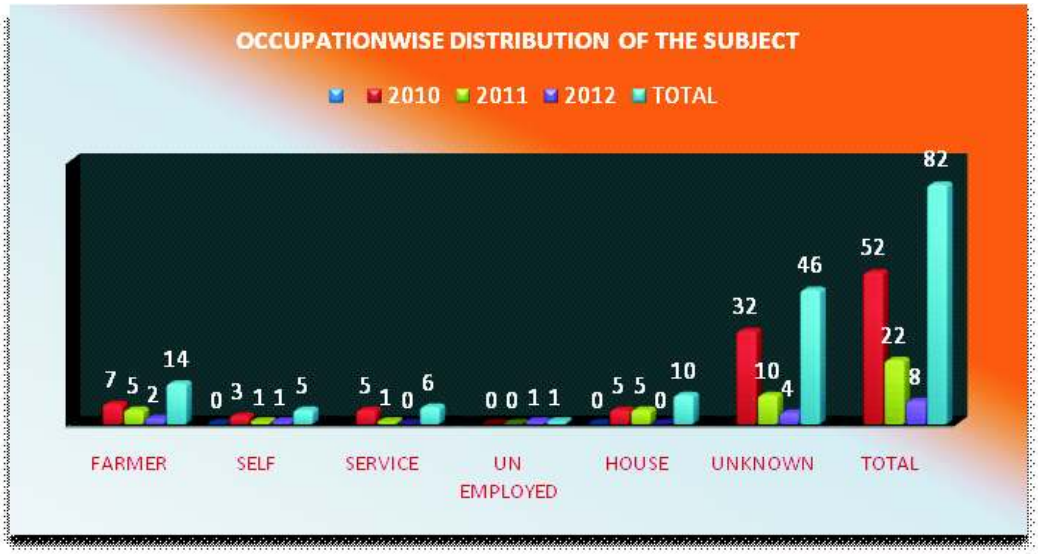
The data presented data Graph 6 indicates that 14 (17.07%) patients belong to urban residence, 10 (12.19%) patients belong to semi urban residence, 58 (%) patients belong to rural residence.

Table 3 : Education wise Distribution of The Subject

YEAR	BELOW SSC	SSC	HSC	DIPLOMA	GRADUATE	POST GRADUATE	PHD	UNKNOWN	TOTAL
2010	5	O	6	0	1	1	0	39	52
2011	1	O	3	0	1	0	0	17	22
2012	2	1	0	0	0	0	0	5	8
TOTAL	8	1	9	0	2	1	0	61	82

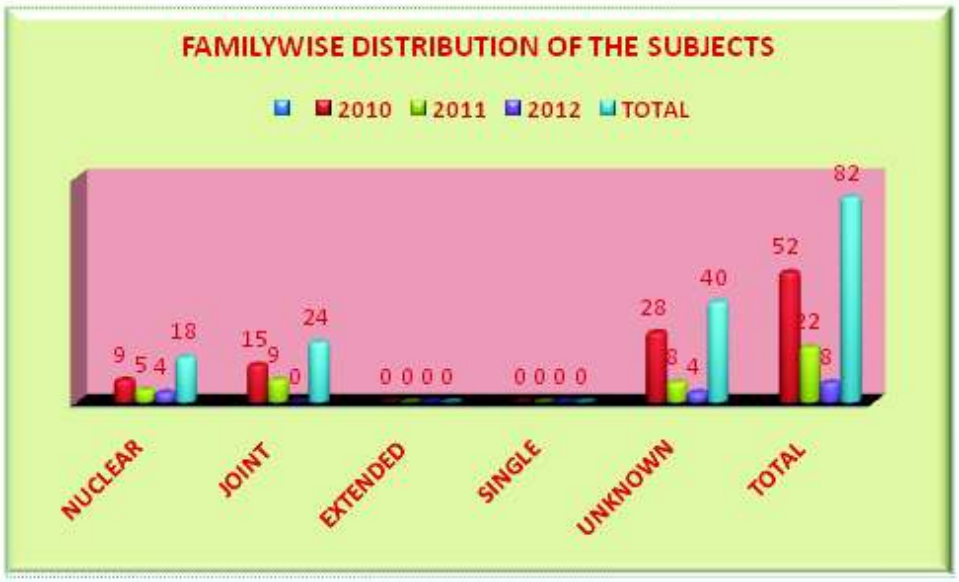
The data presented in Table, 3 indicates that maximum no 61 (74.39%) of patients education is unknown and minimum no 1 (1.21%) of patients education is S.S.C and post graduate.

Graph 7 : Occupation Wise Distribution of The Subject



The data presented in Graph 7 indicates that maximum no 46 (56.09%) of patients occupation is unknown and minimum no 1 (1.21%) of patients were unemployed

Graph 8 : Family wise Distribution of The Subjects



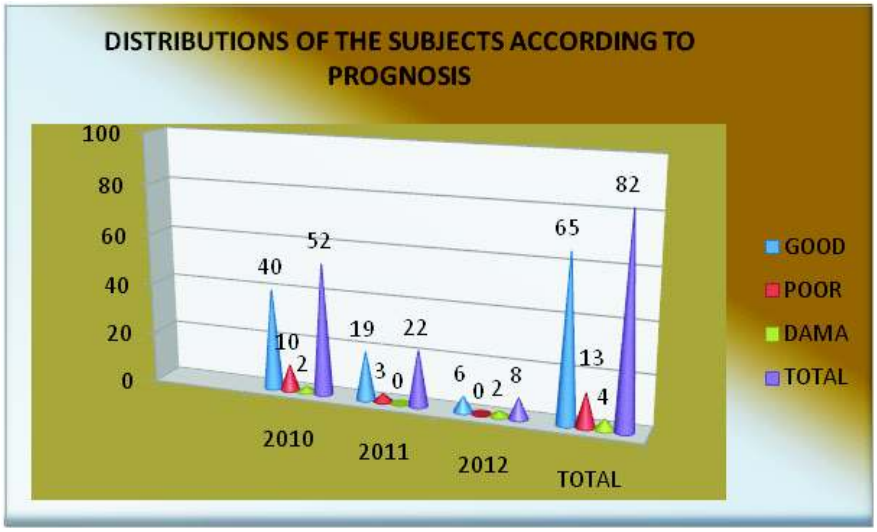
The data presented in Ggraph 8 indicates that maximum no 40 (48.78%) of patients type of family is unknown and minimum no.18 (21.95%) of patients were nuclear family.

Table 4 : Distribution of The Subjects According To Nature of Poisoning

YEAR	INSECTICIDE	PESTICIDE	CHEMICAL	DRUG	OTHER	UNKNOWN	TOTAL
2010	9	10	5	1	26	1	52
2011	1	4	2	0	15	0	22
2012	1	2	2	0	3	0	8
TOTAL	11	16	9	1	44	1	82

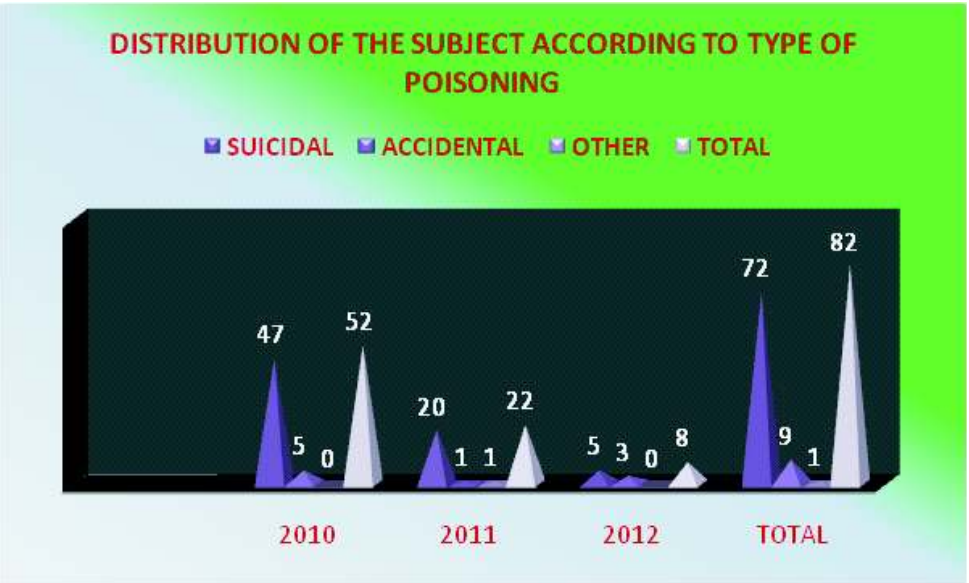
The data presented in Table, 4 indicate that majority of the patients 44(53.66%) were taken other compound, 11(13.41%) were taken insecticide, 16(19.51) were taken pesticide, 9(10.98) were taken chemical, 1(1.22%) were taken drug and 1(1.22%) were taken unknown compound.

Graph 9: Distributions of The Subjects According To Prognosis



The data presented in Graph 9 shows that 65 (79.26%) patients had good prognosis: 4 (%) patients were DAMA and 13 (15.85%) patients had poor prognosis.

Graph 10 : Distribution of The Subject According To Type of Poisoning



The data presented in Graph 10 that 72 (87.80%) patients were suicidal cases; 9 (23.17%) were accidental cases and 1(1.21%) patient were other cause

Graph 11 : Admission Wise Distributions of The Sujects

The data presented in this Graph 11 shows that incidence rate of OPP is 7.22/10,000 population (hospitalized subject).

DISCUSSION

The study revealed that 82 acute poisoning patients were got admitted in the emergency department. (Graph,11) Of these 64.63% were males and 35.36% females. (Graph, 2) The majority (43.90%) cases were from age group of 21 to 30 years. (Graph, 1) maximum no 40 (48.78%) of patients type of family is unknown and minimum no18 (21.95%) of patients were nuclear family. (Graph, 8) Table, 3 indicates that maximum no 61 (74.39%) of patients education is unknown and minimum no 1 (1.21%) of patients education is S.S.C and post graduate. Graph no-6 indicates that 14 (17.07%) patients belong to urban residence, 10 (12.19%) patients belong to semi urban residence, 58 (%) patients belong to rural residence.

Most (87.80%) poisoning are intentional and only 12.19% were unintentional. (Graph,10)The poison responsible for most of the mortality was organophosphate poisoning 86.58 %.(Table, 4) Majority of the patients 44(53.66%) were taken other compound, 11(13.41%) were taken insecticide, 16(19.51) were taken pesticide, 9(10.98) were taken chemical, 1(1.22%) were taken drug and 1(1.22%) were taken unknown compound. (Table-3) Majority of the patients 40 (48.78%) were required ventilator support. %.(Table, 1) Majority 65 (79.26%) patients had good prognosis; (Graph, 9) 4 (%) patients were DAMA and 13 (15.85%) patients had poor prognosis. (Graph, 3) Maximum no 18 (21.95%) of patients were hospitalized for 7-9 days and minimum no 1 (1.21%) of patients were hospitalized for 31-33 days and 52-55 days. %.(Table, 2) The incidence rate of OPP is 7.22/10,000 population (hospitalized subjects). Survival rate of the patients in the year 2010 = 82.69%, in the year 2011= 90.90% & in the year 2012 =100%.The patients admitted with OPP have higher (100%) survival rate during the year 2012.

A retrospective study was conducted by (Singh B.and Unnikrishnan, 2006), to characterize the poisoning cases admitted to the Government Wenlock Hospital, Mangalore, India. All the poisoning cases admitted to the emergency department of the hospital between January 2001 to May 2003 were included in this study. The study revealed that 325 acute poisoning patients were got admitted in the emergency department. Of these 70% were males and 30% females. The majority (36%) cases were from age group of 21 to 30 years. Most (72%) poisoning are intentional and only 27% were unintentional. The poison responsible for most of the mortality were organophosphate pesticides 65%.The study concluded that the prevention, treatment and proper management of poisoning due to organophosphate should merit high priority in the health care of the indigenous population of South India.

A retrospective study was conducted by (Noushad et al., 2007) to evaluate the respiratory failure in organophosphorus insecticide poisoning among 80 patients admitted in ICU at Sina Hospital, Iran. The study revealed that the mortality rate was 18% and 21% in patients who were treated with or without pralidoxime respectively. Mortality rate was 50% in patients with mechanical ventilator and 11.7% in patients without mechanical ventilator. The duration of ICU stay was 7.1+/- 2 days. The study concluded that organophosphorus poisoning is a serious and lethal condition and needs early diagnosis and appropriate management. Hence knowledge regarding appropriate management, complications and its prevention is an essential element to reduce mortality rate.12

The study results revealed that the incidence rate of OPP is 7.22/10,000 population (hospitalized subjects). Survival rate of the patients in the year 2010 = 82.69%, in the year 2011= 90.90% & in the year 2012 =100%.The patients admitted with OPP have higher (100%) survival rate during the year 2012. Most (87.80%) poisoning are intentional. The poison responsible for most of the mortality was organophosphate poisoning 86.58. 40 (48.78%) were required ventilator support in addition to gastric lavage and standard therapy with atropine and oximes and adequate hydration. Of these 40 patients, 11 (4 male) had died (13.41%). 65 (79.26%) patients had good prognosis; 4 (%) patients were DAMA. 18 (21.95%) of patients were hospitalized for 7-9 days and 1 (1.21%) patient was hospitalized for 31-33 days and 52-55 days.

The study results revealed that records of 10 patients was lost and those of 37 were incomplete and hence were excluded.

Nursing Implication

The findings of the study have varied implication in different areas of nursing practice, nursing education and research.

Nursing Practice

Since the present study showed that there is higher incidence of organophosphorus poisoning nurses should be aware about the emergency management, evaluation, administration of antidote and supportive therapy for the better management of patient. They should have knowledge regarding the prevention of organophosphorus poisoning. She should work with client and their families to assess the needs and draw up care plan for the client. She works with other nurse and health and social welfare professionals to help the clients with basic living skill and social activity to ensure that they lead a normal life as possible.

Nursing education

The nursing curriculum can be modified with more emphasis on management of OPP. Nursing personnel should give an opportunity to update their knowledge periodically. The nursing educator when equipped with proper knowledge will prepare nursing students and nursing school teacher aware about general knowledge regarding prevention of nosocomial infection.

Nursing Administration

The nursing administrator should give more emphasis on training of nurses in hospital regarding the management of OPP. They can arrange workshop, seminar, hand on training for operating various gadgets like ventilator, monitors etc in ICU's. special lectures etc. for nurses on management of OPP so that they can be more knowledgeable competent and skillful in nursing care of patient and this knowledge they can be apply in their day to day nursing practice.

Nursing research

Study can conducted in different setting with more extensive coverage.

CONCLUSION

The study concluded that mortality rate was high in patient with organophosphorus poisoning due to respiratory complications. So management of respiratory complications, intensive care, and specific therapy with atropine and oximes were required to reduce the mortality rate and complications due to organophosphorus poisoning. The reasons for good prognosis in year 2012 could be due to comprehensive management and good nursing care in the hospital by dedicated staff. There is need to work with client and their families to assess the needs and draw up individualized care plan for the client and should get social welfare professionals help to improve with basic living skill including meditation life style management skills and social activity to ensure that they lead a normal life as possible.

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