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ORGANOPHOSPHATE POISONING (OPP) PRALIDOXIME & ATROPINE INTOXICATION RAMPANCY IN FEMALE PATIENTS AND MORTALITY RATE

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Abstract:

Objective*: We aimed at the identification of organophosphate poisoning impact in tertiary healthcare subjects.*

Methods:

This research was carried out at Allied Hospital, Faisalabad (Sept, 16 to October, 17) on the ICU hospitalised cases.

Results:

Mortality rate was (17.39%) from 483 subjects; eighty-four deaths excluding referred cases. From these eighty-four causalities, sixty-five (13.46 percent) passed away owing to cardio respiratory failure. Mechanical ventilation complications & infections acquires in the stay of ICU caused deaths of seventeen subjects (3.52 %). Renal failure was responsible for 2 deaths (0.41 %). Deliberate self-harm /suicidal intention was the major cause of poisoning (93.02 %; female: 57.07 %; male: 35.95 %). Deaths on account of unintentional/accidental exposure were seen in males with the percentage of 6.98. The salient ingredients to avoid the Organophosphate poisoning deaths are sufficient amount of pralidoxime and atropine doses, intensive supportive treatment and accurate and proper respiratory care.

Conclusion:

Intoxication of Organophosphate Poisoning (OPP) is widespread in the women. Effortless access to such dangerous compounds is the main cause of deaths by either deliberate suicidal attempt or by accidental exposure.

Keywords: *Pralidoxime, Atropine, Organophosphate poisoning, Suicidal intention.*

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INTRODUCTION:

There are many compounds used for the purpose of agricultural insecticide, Organophosphate compounds (OPCs) are a case in point. In the developing countries, the excessive uses of these compounds have caused morbidity and mortality owing to its OP poisoning [1]. Almost three million OPCs poisoning cases are reported across the world, which are responsible for about 200,000 deaths annually. In developing nations, World Health Organization has indicated that the mortality rate because of OPCs poisoning has increased in last decade [1, 2]. Deliberate suicidal attempt or an accidental exposure to OPCs may result into Organophosphate poisoning [2 – 4]. Lethal cardiac complications can be arisen due to such compounds. Since there is dearth of studies in connection with cardiac toxicity, numerous doctors may not be fully conversant with the extent, frequency and pathogenesis of such dangerous compounds [5, 6].

Respiratory, transdermal and oral routes may be adopted to take OPCs. The action of OPCs can be initiated by inhibiting acetylcholine esterase activity that may result into acetylcholine build-up at neuromuscular junctions and nerve synapses. Acetylcholine receptors overstimulation may follow it. Cholinergic synaptic transmission paralysis in autonomic ganglia at parasympathetic, somatic nerves, central nervous system and few sympathetic nerve endings, are followed by overstimulation of acetylcholine receptors [7 – 9]. The OPP manifestations can be categorised into the impacts inferior to muscarinic, nicotinic and central nervous system receptor overstimulation [10 – 12]. By complying with intensive management, the rate of deaths has been marginally decreased in comparison with the past occurrences where inappropriate treatment and delayed diagnosis paved the way to increasing number of deaths [1, 11]. OPP treatment is based on the therapy of pralidoxime and atropine [1, 8, 9, 13]. Extracorporeal elimination is potentially helpful strategy too. In terms of the management of severe OPP, the use of hemoperfusion is ambiguous. In human self poisoning, there has been a reported disparity amongst OPCs insecticides. Such results have revealed that all OPCs differ from one another in respect of toxicity. However, there is uniformity amongst all OPCs in accordance with literature [14, 15]. In the rationale of this study it was clear that OPP is being considered a significant health issue in Pakistan. The OPP related incidents can be prevented by adopting proper sale regulations, awareness among the masses and by proper management and control system.

METHODS:

This research was carried out at Allied Hospital, Faisalabad (Sept, 16 to October, 17) on the ICU hospitalised cases. OPP affected cases (573) were included in the research. OPP diagnosis was dependent on; the subjects' exposure to OPCs in the last 24 hours; typical OPP symptoms like excessive salivation, meiosis and fasciculations; betterment of OPP symptoms and signs after high doses intakes of pralidoxime or atropine; the presence of OPCs odour in the gastric contents. All subjects were required to meet this aforementioned criterion to be the part of this study. There was unavailability of resources to guess the blood cholinesterase activity.

Through the ED, the admission of the patients of OPP was ensured. Decontamination procedures were adopted for all subjects of OPP in ED. It encompasses decontamination of skin by washing hair and skin with water & soap and clothes removal which follows gastric lavage and cathartics respectively. To achieve xerostomia, flushing, tachycardia, mydriasis, and anhidrosis; after every ten to fifteen minutes, the repetitive intravenous bolus doses (2 mg) atropine were administered to all OPP cases. Uninterrupted infusion of atropine 1mg/h was maintained in all the subjects in accordance with the characteristics of satisfactory atropinisation i.e. dry tongue, dry mouth, rapid heart rate (one hundred and twenty to one hundred and forty per minute), dry flushed skin and visible pupil's dilation. For 24 to 48 hours, one to two-gram intravenous pralidoxime was injected into every case of OPP with the interval of six hours. During sickness period, none of the patients received any neuromuscular blocking agent with the exception of few subjects who were fidgety cases on Mechanical Ventilation. To acquire sedation, they were in need of intravenous midazolam. SPSS was used for data analysis (P-value under 0.05).

RESULTS:

Mortality rate was (17.39%) from 483 subjects; eighty-four deaths excluding referred cases. From these eighty-four causalities, sixty-five (13.46 percent) passed away owing to cardio respiratory failure. Mechanical ventilation complications & infections acquires in the stay of ICU caused deaths of seventeen subjects (3.52 %). Renal failure was responsible for 2 deaths (0.41 %). Deliberate self-harm /suicidal intention was the major cause of poisoning (93.02 %; female: 57.07 %; male: 35.95 %). Deaths on account of unintentional/accidental exposure were seen in males with the percentage of 6.98. The salient ingredients to avoid the Organophosphate poisoning deaths are sufficient

amount of pralidoxime and atropine doses, intensive supportive treatment and accurate and proper respiratory care. OPP therapy encompasses acetylcholinesterase's regeneration using compounds of oxime i.e. muscarinic symptoms reversal using atropine, pralidoxime, decontamination and supportive pulmonary care. In the study at hand, the combination of pralidoxime and atropine was administered in both ICU and medical ward in association with every supportive care. Detailed outcomes analysis has been made in the tables given below:

Table – I: Characteristics of patients with acute organophosphate poisoning (573)

Characteristics	Value (Male)	Value (Female)
Age year	40±5	26±4
Duration of hospital stay	2 wks.	03 wks.
Time interval between ingestion and hospital arrival hours	3.9±2.5	4.5±2.6
Death	32	52
Deliberate self-harm (suicidal)	206	327
Unintentional (accidental)	40	--
Ventilation required	150	200
Referred Cases	10	80

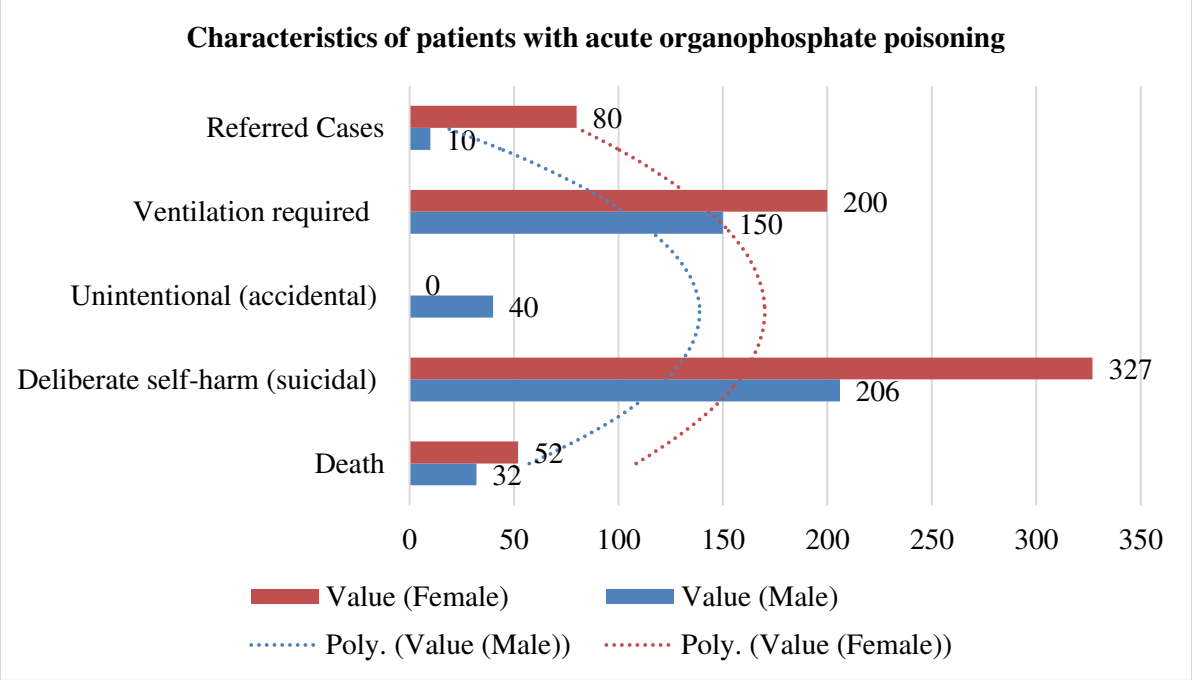


Table – II: Cause of mortality among patients (483)

Cause of mortality	Male		Female		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Cardiorespiratory failure	25	5.18	40	8.28	65	13.46
Complication of mechanical ventilation & ICU acquired infection	7	1.45	10	2.07	17	3.52
Renal failure	0	0	2	0.41	2	0.41
Total	32	6.63	52	10.76	84	17.39

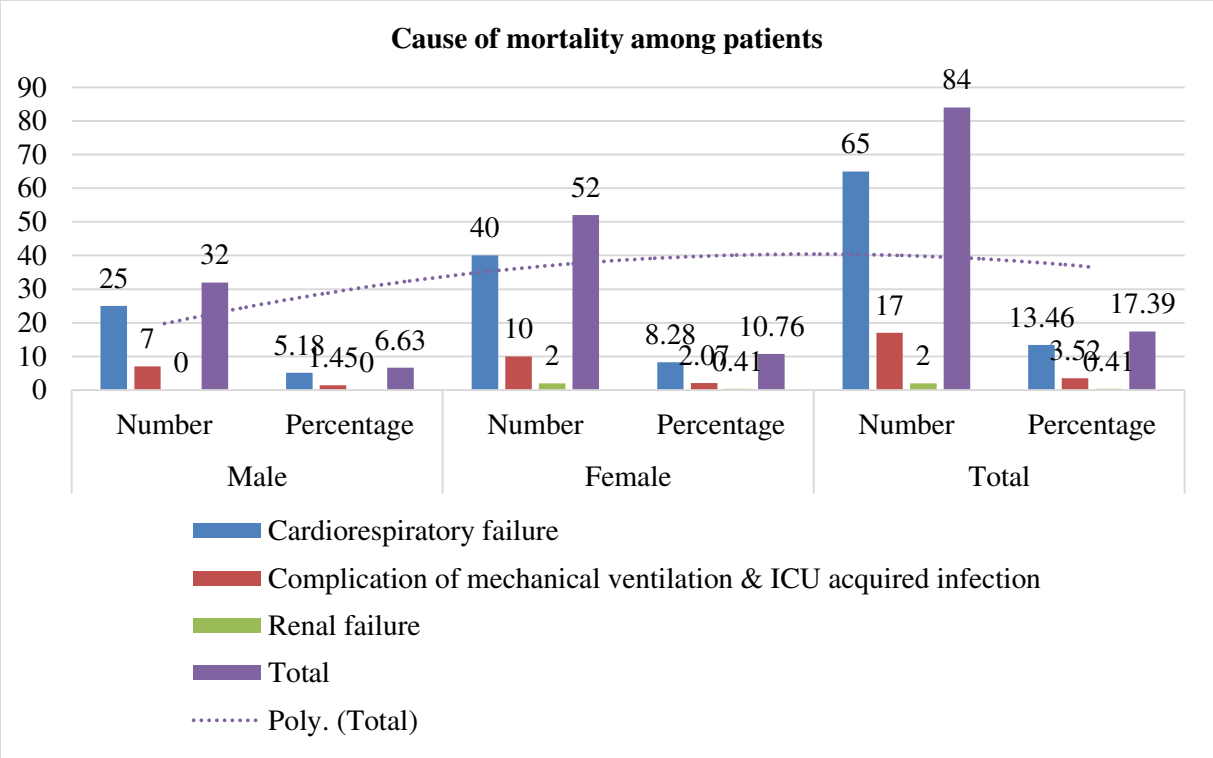
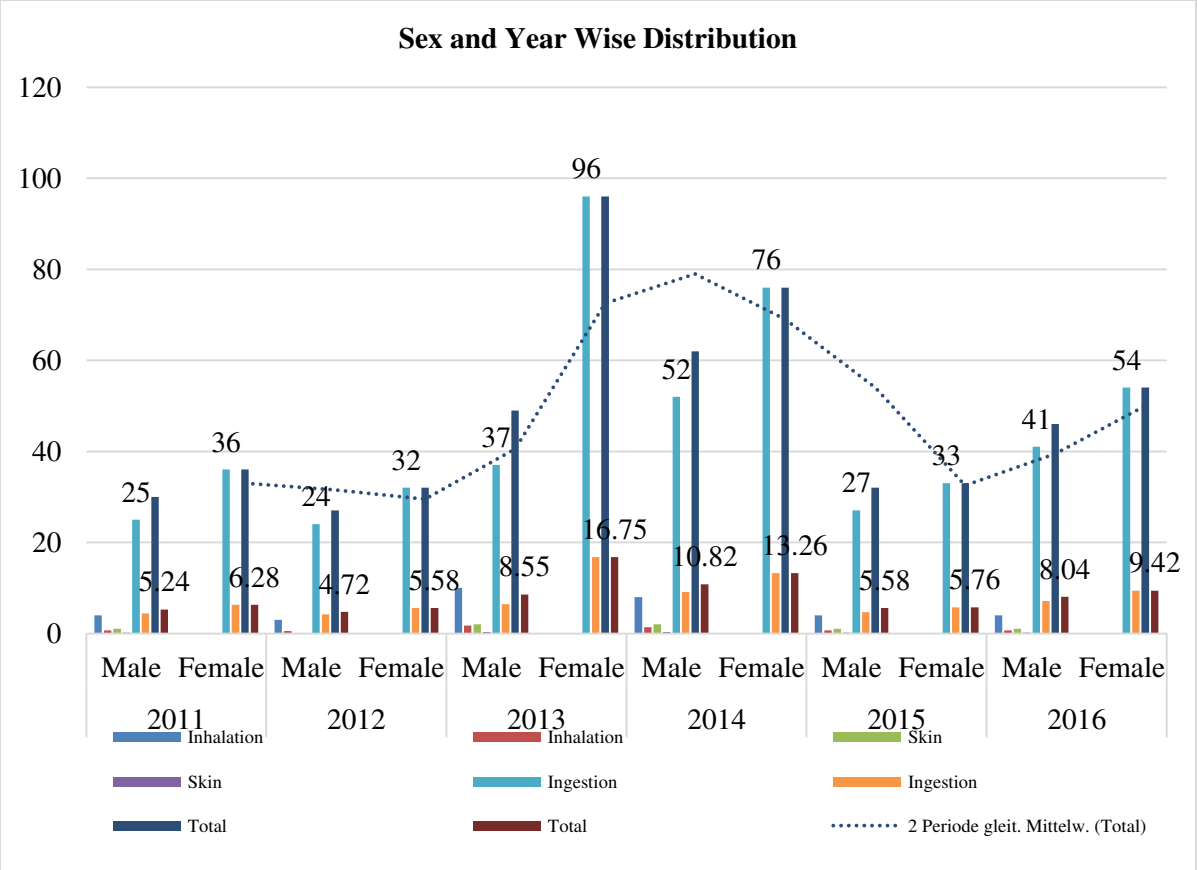


Table – III: OPP affected patient's distribution according to year, sex and route of poisoning

Year	Sex	Inhalation		Skin		Ingestion		Total	
		n	%	n	%	n	%	n	%
2011	Male	4	0.7	1	0.17	25	4.36	30	5.24
	Female	0	0	0	0	36	6.28	36	6.28
2012	Male	3	0.52	0	0	24	4.19	27	4.72
	Female	0	0	0	0	32	5.58	32	5.58
2013	Male	10	1.74	2	0.35	37	6.46	49	8.55
	Female	0	0	0	0	96	16.75	96	16.75
2014	Male	8	1.4	2	0.35	52	9.08	62	10.82
	Female	0	0	0	0	76	13.26	76	13.26
2015	Male	4	0.7	1	0.17	27	4.71	32	5.58
	Female	0	0	0	0	33	5.76	33	5.76
2016	Male	4	0.7	1	0.17	41	7.15	46	8.04
	Female	0	0	0	0	54	9.42	54	9.42
Total		33	5.76	7	1.21	533	93.02	573	100



DISCUSSION:

OPCs as pesticides are frequently used in the whole world. Since no proper rules and regulations are put into practice to control the sale of such poisonous compounds, the large numbers of suicidal deaths are attributable to its easy accessibility [1 – 4]. The OPP victims suffer from polyneuropathy that is naturally irreversible. Mortality rate after OPCs ingestion varies from fifteen to fifty percent [1, 11 & 12]. Mortality rate in our study was 14.66 percent. Acute OPP mortality rate ranges from ten to twenty percent which is considered owing to respiratory failure [11]. The death causes and rates of mortality of the current cases (9.1 percent) were according to the literature [1, 16, 17]. It was observed that the leading factors responsible for mortality at hospital were severity of poisoning, type of poisonous agent, absence or availability of ICU facilities and treatment commencement on a particular phase. Other researchers have also found the same findings [1, 5, 18 & 19].

Genera affected cases had mean age (40 ± 5 & 26 ± 4 years) respectively in males & females. Our outcomes are analogous to the findings of other researches [11, 12, 14]. Some of the researchers are of the view that all ages are susceptible to OPCs poisoning [7, 8]. In developing nations, deliberate suicidal attempt or an accidental exposure to OPCs may result into Organophosphate poisoning [2 – 4]. During accidental exposure, there is a chance of mild poisoning [4, 11]. Forty to sixty percent of the cases related to attempt of suicide were reported from African countries [4]. The findings of excessive suicidal poisoning and oral intakes sources are akin to many other researches [2, 4]. Uncontrolled sales and widespread use of such agents may be a reason of such excessively high rates. The OPP manifestations can be categorised into the impacts inferior to muscarinic, nicotinic and central nervous system receptor overstimulation. The typical diagnosis is based on the type of exposure, the amount of quantity absorption and particular agent involvement [5]. 99.65 percent of the subjects were having the signs of Miosis. The very results are akin to the results found in the other studies [2, 15]. Numerous other signs included convulsion, loss of consciousness, tachycardia, bradycardia, urinary incontinence, emesis, hypertension, fever, orhypotension, hyperhydrosis, fasciculation and diarrhoea. 87.26 percent of the cases were observed with impaired consciousness. According to reports,

this is 25.27 percent [17]. 91.27 percent of the subjects were possessing bradycardia. This finding is different from other findings [16, 19]. Muscarinic effects are responsible for Bradycardia occurrence [13]. OPP treatment is based on the therapy of pralidoxime and atropine [1, 8, 9, 13]. Extracorporeal elimination is potentially helpful strategy too. Available OPP therapy encompasses muscarinic symptoms reversal using atropine, decontamination, supportive pulmonary care and acetylcholinesterase's regeneration using compounds of oxime like pralidoxime [4, 7, 20]. By complying with the treatment guidelines recommendations, regular atropine boluses or infusion therapy is suggested till the pulmonary secretions are decreased, in association with endotracheal intubation as per requirement [8, 17]. Insufficient atropinisation is the commonest cause of treatment failure. It can likely pave the ways to either death or pneumonia [2, 4 & 16]. The common OPP biochemical antidote is Pralidoxime. It has many advantages such as an endogenous anticholinergic effect, direct detoxification and reaction of unbounded OPCs and cholinesterase reactivation through phosphorylated active site cleavage [3 – 5]. Sarin is a destructive chemical drug can apply the similar OPP therapy in order to neutralise its dangerous effects [7, 14].

CONCLUSION:

To conclude, intoxication of Organophosphate Poisoning (OPP) is rampant in females. It is an issue which is still lurking in the developing countries such as Pakistan. Effortless access to such dangerous compounds is the main cause of deaths by either deliberate suicidal attempt or by accidental exposure. We can tackle such issues by complying with intensive management, accurate and proper respiratory care and satisfactory doses of pralidoxime or atropine.

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