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### **RESEARCH ARTICLE**

# Pattern of Pediatric poisoning in Kashmir (Incidence, Clinical profile and outcome): A hospital based study.

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#### Manuscript Info

#### Abstract

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**Backround:**Poisoning is a common preventable cause of morbidity and mortality in children. Most of the poisoning in children less than 5 years is accidental. Objective of study was to study the incidence, clinical profile and outcome of childhood poisoning.

**Methods:** This was a retrospective study done in patients, who were admitted in pediatric wards, pediatric intensive care unit of GB Pant Children Hospital with history of Ingestion of poison from May 2011 to May 2015.

**Results:** There were total 1272 children enrolled in study. Male: Female Ratio was 1.52:1. Mean Age of presentation was 3.18 years. Among 1272 patients, 57.23 patients received pre-referral treatment in the form of gastric lavage, atropine etc. OrganoPhosphorous was the commonest poisoning seen in 332 patients (26%) followed by kerosene (hydrocarbon) poisoning 240 patients (18.83%), Drugs 232 patients (18.23%). During treatment 30.2% received Antidotes, 55.7% received antibiotics, Gastric lavage and anticonvulsants in 47.7% and 2.5% respectively. Overall survival was 95.2%. The time interval between Intoxication and presentation to hospital, mean Glasgow comma scale (GCS) and presence of Coma (GCS<8) were significantly different between survivors and expired cases.

**Conclusion:** Organophosphorus is the commonest agent involved in childhood poisoning. Overall outcome is good 95.2% Survival in our hospital. The time gap between the poisoning, presentation to hospital and presence of coma predict mortality. There is a definitive statistical significance of mortality with development of Respiratory failure, seizures and development of coma as the mortality was higher in patients who developed the above clinical manifestations than those who did not developed the above features

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# **INTRODUCTION**

Children are curious and explore their world with all their senses, including taste. As a result, the home and its surroundings can be a dangerous place when poisonous substances are inadvertently ingested – every year millions of calls are made to poison control centers when this happens and thousands of children are admitted to emergency departments. Poisoning patterns change according to age group, type of exposure and the nature and dose of the poison.<sup>1</sup>Acute poisoning in children is an important public health problem and represents a frequent cause of admission in pediatric clinic. The incidence of childhood poisoning in various studies ranges from .33-7.6%. Poisoning is most common observed at 1-5 years of age and these children constitute 80% of all poisoning cases.<sup>2</sup> When exposed to poison, children are more likely to suffer serious consequences because they are smaller, have faster metabolic rates and their bodies are less capable of neutralizing toxic chemicals<sup>3</sup>.Pattern of poisoning in a given area depends upon the availability of poisonous substance, occupation prevalent in the society, religious and

cultural influences. Rapid industrialization and massive use of pesticides in agriculture has increased the incidence of poisoning. India's backbone being agriculture, insecticides are used to a greater extent and the poisoning with such agents is more common<sup>4</sup>. Ingestion is the most common route of poisoning accounting for 70% cases; with dermal, ophthalmic and inhalational routes each occurring in about 6% cases<sup>5</sup>.

The exact data of poisoning in Kashmir is not available. Accidental poisoning is the twelfth leading cause of admission in the pediatric wards in India and accounts for about 1.0% of the hospitalized patients.<sup>6</sup> Significant progress in public health has been made towards the protection of young children from the harms presented by exploratory ingestion of medications in the past decades by the advent of child resistant packaging on most medications and poisonous substances, still poisoning remains as an important cause of mortality and morbidity among children globally<sup>7, 8</sup>. As the global burden of diseases, injuries and risk factors study 2010 reported, the global burden of the disease attributed to poisoning has decreased substantially between 1990 and 2010. Nevertheless poisoning still contributes for over 17000 deaths and around 1.5 million of disability adjusted life year (DALY) lost (i.e. the number of years lost due to ill health, disability, and early death) among children aged 1-14 years worldwide in 2010. <sup>9</sup>

The objective of study was to study the clinic- epidemiological profile and outcome of childhood poisoning at GB Pant Hospital Srinagar Kashmir, only tertiary care pediatric hospital.

# **Materials and Methods:**

It was a retrospective study from May 2011 to May 2015. All children admitted to pediatric ward and pediatric intensive care unit, with history of ingestion of poison was identified and their medical records analyzed. All cases upto 18 years of age with history of poisoning were included in the study, analyzed using SPSS 12.0 software. Appropriate tests of significance were applied to find out the significance of results.

# Results:-

There were 76543 children admitted above 1 month of Age in pediatric wards and PICU during the study period. Among them, 1316 cases were admitted with history of ingestion of poison or with envenomation. Among those 44 cases of envenomation (snake bite, scorpion bite etc.) were excluded from study. Final analysis was done in 1272 cases. Mean age of cases was 3.18 years; with age range of one to 18 years.

Male: female ratio was 1.52:1. Other baseline Characteristics of children with poisoning are presented in Table-1. **Table 1** 

Base line Characteristics		Ν	%
Age (years)	<1	80	6.28
	1-5	928	72.95
	6-10	176	13.83
	11-15	88	6.91
Sex			
	Male	768	60.37
	Female	504	39.62
Regional urban/ rural	Urban	444	34.90
	Rural	828	65.09
Pre-referral treatment		728	57.23
Median duration between poising and presentation	5 hours		

Various agents responsible for poisoning are presented in Table-2.

#### Table 2: Agents causing poisoning in children

Insecticides	and	Type of poison	Total	Percentage
Rodenticides				
		OrganoPhosphorous	332	26.1
		Pyrethrum	16	1.2
		Zinc phosphide	92	7.23
		Organochlorine	28	2.2
		Naphthalene	28	2.2

Plant		92	7.23
	Mushroom	25	1.96
	Dhatura	62	4.87
	Wild fruit {coriahia	5	0.39
	Napeloniss}		
Hydrocarbons		240	18.86
	Kerosene/Diesel	240	18.86

Drugs	N	%
	232	18.23
Antibiotics	9	.70
Anticholnergics	7	.55
Anticonvulsants	15	1.17
Antiemetcs	7	.55
Antifungals	3	.23
Antihistamines	6	.47
Antihypertensives	4	.31
Antipsychotics	5	.39
B-Blockers	7	.55
Benzodiazipines	20	1.5
Bronchodilators	12	.94
Calmix Lotion	2	.15
Carbanide Peroxide [wax	4	.31
softener]		
Decongestant	25	1.96
Dextrometorphan	10	.78
Diuretics	17	1 33
Iron overdose	16	1.55
NSAIDS	24	1.25
Parasticides		31
TCA	15	1 17
Thyroxine	17	1 33
Sunscreen lotion	3	23
		.23
Household Chemicals	N	
	96	7.54%
Acid	36	2.83
Antiseptics	28	2.2
Copper sulphate	4	.31
Mercury	16	1.2
Silica gel	12	.94
Miscellaneous	88	6.91
Soaps/detergents	20	1.57
Food poisoning	36	2.82
Unknown	32	2.51
Total	1272	100%

Insecticides were the most common agents responsible for poisoning in 38.99% cases. Among insecticides, Organophosphorus was the most common agent, which accounted for 26.1% of total cases. Other agents were kerosene, drugs, plants, chemicals. In 2.51% cases, actual agent could not be identified by history and clinical findings.

Common clinical features of poisoning are presented in table 3.

Clinical features	N	%
Vomiting	640	50.3
Drowsiness	300	23.5
Salivation	268	21.0
Tachypnea	236	18.5
Miosis	232	18.2
Crepitation in chest	208	16.3
Abdominal pain	164	12.8
Mydriasis	148	11.6
Fever	136	10.6
Diarrhea	87	6.83
Seizures	65	5.11
Coma	30	2.35
Respiratory failure	19	1.49

Table 3:Common clinical features of poisoning:

Vomiting was the most common clinical feature followed by drowsiness, increased salivation and increased respiratory Rate. Coma was present in 6.2% of cases and 1.49% had respiratory failure. Average duration of presentation was 5 hours after ingestion. 65% cases belonged to rural and 35% to urban. Pre referral treatment was received 57.23% cases before presentation to our centre. Antidotes were received by 44.3 of cases. Atropine was the most common antidote used in 20.4% of total cases. Other antidotes used were pralidoxime, Vitamin K, Neostigmine, and N-acetylcystine. During treatment 57.7% cases were treated with antibiotics, 5.3% cases received anticonvulsants and 2.5% cases required vasopressor support for hypotension. Respiratory support in the form of mechanical ventilation was required in 1% cases for respiratory failure.

Various clinico epidemiological parameters were analyzed to test the association with survival. These are presented in table 4.

Table 4:Clinical parameters and outcome of poisoning patients

Clinical parameters	Survivors (n=1252) Number (%)	Expired cases (n=20) Number (%)	Р
Male sex	759 (60.6)	9 (45)	>0.05
Seizures	60 (4.79)	5 (25)	<0.05
Vomiting	633 (50.5)	7 (35)	>0.05
Respiratory failure	16 (1.27)	3 (15)	<0.05
Abnormal pupil size	370 (29.55)	10 (50)	>0.05

Coma (GCS<8)	17 (1.25)	13 (65)	<0.05
Pre referral treatment	720 (57.5)	8 (40)	>0.05
Treatment with antidote	555 (44.3)	8 (40)	<0.05

Among various parameters, time interval between poisoning and presentation to our hospital, mean GCS and presence of Coma, seizures and development of respiratory failure were significantly different between survivors and expired cases.

Other parameters like sex, presence of vomiting, , abnormal pupil size, pre referral treatment with antidote were not significantly different between survivors and expired cases.

Overall survival was 98.42% among the remaining cases 20 cases died in hospital and 40 cases left against medical advice. Mean duration of stay in hospital was 1.6 days. Among all deaths 80% deaths occurred within 24 hours of presentation.

# **Discussion**:

Poisoning among children is one of the common medical emergencies encountered in pediatric practice. Poisoning has become more important probably because of easy availability of poisonous substance. Rapid industrialization and exposure to hazardous chemical products, introduction of range of drugs for treatment, massive use of pesticides in agriculture, unhealthy dietary habits has widened the spectrum of toxic products to which people are exposed. Children are particularly at risk because of their curious and exploratory behavior and hand to mouth activities. Playing close to the ground magnifies exposure of children to toxins. By 2 to 3 years of age the child's motility and ingenuity allows him to access any drawer or cupboard at home.

Most studies from India and Abroad show a male preponderance in childhood poisoning.<sup>10, 11, 12</sup> In our study among all the age groups there was overall male preponderance with ratio of 1.5:1.

Most of the poisoning patients, 207 cases (65%) belonged to rural areas owing to high use of agricultural pesticides and kerosene for cooking purposes.

Majority of poisoning cases in the present study were due to Organophosphorus compounds used as pesticides in farming. However, most other India studies implicate kerosene followed by drugs as the most frequently encountered poisons in pediatric cases. Singh et al studied pattern of pediatric poisoning in a large north Indian tertiary case hospital and observed as significant decline in kerosene poisoning in the decade 1980-89, compared to 1970-79.<sup>13</sup> In a previous study from our centre from 1997 to 2000, kerosene was the commonest and accounted for 39.25% of cases while OrganoPhosphorous constituted 20.5% of cases.<sup>14</sup> Kerosene is used as cooking fuel in our country by low income families and is stored in bottles usually within easy reach of children. Its incidence has probably declined in the recent past because of wider availability of LPG and electricity for cooking purposes. Moreover Kashmir is a predominantly agriculture and horticulture State with easy availability of insecticides in most rural households. In our study vomiting was the most common clinical manifestation observed in more than half of the patients. Other common manifestations were drowsiness, increased salivation, tachypnea, miosis, seizures, mydriasis, coma, abdominal pain, diarrhea, and respiratory failure. Since O.P compounds were the major agents responsible for poisoning in our study, most of the clinical features were those of O.P Poisoning as were reported by Adebayo et al in their case reports<sup>15</sup>. Vomiting diarrhea, abdominal pain were the major clinical features of Mushroom Poisoning in studies done in Pakistan and California, USA<sup>16, 17</sup>. Mushroom poisoning was observed 1.2% of cases and clinical features matched their studies. 1.57% of patients from rural area consumed a wild fruit followed by seizures. Similar 5 cases were reported by I. Dar et al in 2007. The wild fruit belongs to bushy plant Coriaria napelensis exotic angiosperms grown as ornamental in Kashmir. It contains neurotoxin, Tannin causing nausea, vomiting, seizures and giddiness<sup>18</sup>. The median time between poisoning and presentation to hospital in our study was 5 hours. The median interval was 6.8 hours in a study done in India<sup>13</sup>. On admission 6.2% of children were comatose, among them one-third required mechanical ventilation. In a similar

study done in Oslo, 5% of children with poisoning were comatose on admission among them one third children required respiratory support in the form of Mechanical Ventilation<sup>19</sup>.

In our study, children received various form of treatment in the hospital. Among our cases 34.5% received gastric lavage, almost one fourth of the children with poisoning received atropine, as antidote. Next to atropine 12.8 of patient received pralidoxime as another antidote. A similar type of treatment like gastrointestinal decontamination and specific antidote were received in a substantial number of patients in a study done in Ethiopia<sup>20</sup>.

In our study 95.2% of the patients with poisoning improved, 1.57% of patient died and 3.1% of patients left against medical advice. The mortality due to poisoning reported in previous Indian studies varies from 0.64-11.6% with highest being from Shimla<sup>21</sup>. The lesser percentage of mortality in our study can be attributed to availability and easier accessibility of health facilities in the state and to improvements in critical care facilities.

Our study showed GCS, time lapse between ingestion of poison, presentation to hospital, duration of hospital stay were significantly different between survivor and exposed cases. Low GCS at presentation significantly predicted mortality. Mean duration of hospital stay in survivors was 1.6 days, while it was 9.6 hours in expired cases. It shows that there was less hospital stay in expired children. Their might be due to poor general condition at presentation of cases that expired. Time lapse from intoxication or ingestion of poison to presentation at hospital was significantly less in survivors 6.7 hours as compared to expired children. 15 hours. This suggests that supportive measures and antidotes are less effective if there is much delay in presentation to hospital after poisoning.

# **Conclusion:**

Organophosphorus is the commonest agent involved in childhood poisoning. Overall outcome is good 95.2% Survival in our hospital. The time gap between the poisoning, presentation to hospital and presence of coma predict mortality. There is a definitive statistical significance of development of Respiratory failure, seizures and development of coma with the mortality as the mortality was higher in patients who developed the above clinical manifestations.

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