

## Suicidal Death due to Organophosphorus Compound Poisoning — an Experience of 67 Cases

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### Abstract

**Background:** Bangladesh is an agro-based country. Suicide by agrochemical compounds are increasing day by day in this country. Organophosphorus compounds (OPC) are commonly used for suicide. Mostly these are used for suicidal purpose in rural areas in our country due to low cost, toxicity and availability. **Objective:** To find out the relationship of age and sex variation along with the causes that influenced different income group people to ingest OPC for committing suicide. **Materials and Methods:** This study was conducted in the Department of Forensic Medicine, Dhaka Medical College during January to December 2010. Data were collected at the time of autopsy and from postmortem examination report of viscera. Viscera were preserved and sent to the Chief Chemical Examiner's Office, Dhaka for toxicological analysis. **Results:** In this study, middle aged subjects (20–30 years) were found to commit suicide using OPC in comparison to other age groups. Among the cases male were 57% and female 43%. Poverty was found as the most common cause (20%) of OPC poisoning. **Conclusion:** Poverty is the leading cause of death of OPC poisoning followed by failure in love and adultery. Business failure, unhappiness in conjugal life, demand for dowry and violence against women are other causes to commit suicide by OPC.

**Key words:** Cyanosis; Pesticide; Asphyxia; Suicide

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### Introduction

Bangladesh is a developing country in South Asia. Rural population of this country is mostly dependent on agricultural cultivation.<sup>1</sup> With the advance of time, pesticides are now-a-days routinely used for modern cultivation.<sup>2</sup> These are readily available as over the counter (OTC) in rural areas and act as a common agent for suicidal purpose after trivial family problems.<sup>3</sup> Organophosphorus compounds (OPC) are the most common suicidal poisons in developing countries.<sup>4</sup> Currently pesticide self-poisoning has become a major problem in the developing countries killing around 3,00,000 people each year.<sup>1</sup> Industrialized countries are also affected by it, where a significant proportion of

suicidal deaths are caused by pesticide ingestion.<sup>5</sup> Of course, such poisoning is seldom included as a priority for health in developing country.<sup>6</sup> The basic mechanism of toxic effects of organophosphates results from inhibition of cholinesterase action at the nerve ending resulting in accumulation of excess acetylcholine.<sup>7</sup> So rational use of atropine and oximes play a major role in management by combating the action of excess acetylcholine.<sup>2</sup> However, the most suitable oxime for reactivation of cholinesterases has still not been established with certainty, although pralidoxime is widely recommended.<sup>3</sup> In this study we aimed to find out the causes of OPC poisoning in Bangladesh.

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### Materials and Methods

This retrospective study was carried out at Dhaka Medical College in the Department of Forensic Medicine during period of January to December, 2010. After performing postmortem examination, viscera were preserved and sent to the Chief Chemical Examiner's office, Dhaka for toxicological analysis.

After receiving chemical examiner's report of viscera and analyzing the postmortem findings, the autopsy surgeon came to the conclusion that deaths were due to ingestion of OPC. In this way total 67 cases were selected as study population.

During the time of autopsy, family members, roommates and friends were asked about the probable causes of ingestion of OPC by the victims and also about their gross monthly income. Then all these information were analysed to find the study outcome.

### Results

In this study out of 67 cases, 38 (57%) were male and 29 (43%) female. Table I shows that persons ranging from 20–30 years of age (40%) are more vulnerable to suicidal death by taking OPC poison in comparison with other age groups.

Table I: Distribution of study subjects according to age (n=67)

Age range (years)	Number	Percentage
10–20	18	27
20–30	27	40
30–40	12	18
40–60	10	15

Table II shows the distribution as per causes of OPC poisoning. Poverty was found as the leading cause (30%) of death followed by love affairs (21%), adultery (18%) and dowry (13%). Multiple marriages by husband (9%), violence against women (4%), failure in business (3%) and family problem (2%) were other causes of suicidal death by OPC poisoning.

Table II: Distribution of study subjects according to causes of organophosphorus poisoning (n=67)

Causes	Number	Percentage
Poverty	20	30
Love affairs	15	21
Adultery	12	18
Dowry	9	13
Multiple marriage by husband	5	9
Violence against women	3	4
Failure in business	2	3
Family problem	1	2

Table III shows that there is a relation between average income of victim per month and suicidal ingestion of OPC. The study shows that the lower is the income the more is the chance of committing suicide by taking OPC. In this study we found that OPC poisoning cases were mainly from lower income group people.

Table III: Distribution of study subjects according to per month average income (n=67)

Income (in BDT)	Number	Percentage
1000–5000	48	72
5001–10000	12	18
10001–15000	5	8
>15000	2	2

### Discussion

Bangladesh is a developing country. The society here is agriculture-based. Pesticides are very easily available here. OPC are widely used as insecticides in agricultural sector by farmers for control of insect vectors.

In China and South-East Asia pesticides account for about 300000 suicides each year.<sup>8</sup> Another study suggested that each year worldwide there is 3 million acute poisoning with 220000 deaths.<sup>9</sup> Much of this burden is borne by developing countries where more

than 80% of cases are fatal pesticide poisoning related hospitalization.<sup>10</sup> Throughout the world acute poisoning is a very common medico-social problem. The agents vary from country to country depending on easy availability of poison, socio-economic condition and educational background of the people. In tropical countries OPC are the commonly used agent.<sup>11</sup>

In Bangladesh poisoning is an important health problem causing around 2000 deaths per year.<sup>12</sup> Self-poisoning constitutes more than half of the total poisoning cases admitted in hospital.<sup>13</sup> Most of the poisoning cases may have some reasons for taking poison. Our study shows that poverty is the leading cause of suicidal death by taking OPC in Bangladesh. Love affairs, adultery, dowry, family disharmony and finally all those leading to frustration are the causes of ingestion of OPC. Mental illness is sometimes proposed for background of poisoning. Although reducing accessibility to pesticides will decrease poisoning and deaths, socio-economic and cultural factors must also be addressed to make a real difference. OPC poisoning in a country like Bangladesh is not only a public health problem but also related to economics and culture. There is great need to enhance stress on prevention of poisoning. A coordinated and comprehensive response is needed to make any impact.

Another study from Rohtak, India in 1993–1994 analyzed 559 cases of poisoning<sup>14</sup> and aluminium phosphide was found to be the most common poison. The scenario was not different from these reports and agrochemicals continue to be the most common agents responsible for suicidal and/or accidental poisoning.<sup>15</sup> According to National Crime Records Bureau India, every 5 minutes one person commits suicide and 7 attempts to kill themselves, forming about 100000 deaths per year.<sup>16</sup> In a study, suicide rate was found highest in the state of Kerala.<sup>17</sup> Majority of the victims belonged to the group 14–34 years<sup>18</sup> and OPC was the most common agent used for suicidal purpose.<sup>19</sup> In Sri Lanka, many of hospital admissions each year are for agrochemical poisoning (16649 in 1983) with over a thousand death annually (1521 in 1983). Of these, about three-quarters are self-administered, and the rest are occupational and accidental.<sup>4,20</sup> In Sri Lanka another study showed that incidence of suicide due to poisoning was more than 80%, followed by hanging which constituted 10.7%.<sup>21</sup> However, changing use from the most toxic pesticides to less toxic pesticides has had a

remarkable effect in Sri Lanka and the suicide rate has fallen by 50% over ten years since such legislation was passed.<sup>22,23</sup> In USA, during 1980, out of total fatalities 49.7% were suicides and 39.5% were accidental by agrochemical poisoning. The overall suicide rate changed little between 1970 and 1980 as the rate among young persons increased and women preferred firearms than poisoning to commit suicide.<sup>24</sup>

Proper emphasis should be given for safe use of pesticides to avoid poisoning. Detailed study regarding death due to OPC poisoning is required to be carried out in this country to prevent suicidal death by ingestion of OPC.

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