

## Intentional Self Poisoning Cases Autopsied in a Teaching Hospital in Central Kerala: A Descriptive Study

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### Original Research Article

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**Abstract:** Intentional self-poisoning is a common method of committing suicide globally as well as in India. The present study attempts to analyse successful cases of suicidal intake of poisons. By a retrospective study, all the data recorded during autopsy examination associated with completed intentional self-poisoning from 2016 January to 2017 June in a teaching hospital in central Kerala was collected. The demographic variables and the suicides' outcomes were analyzed using the Chi-Square test, and Fisher Exact Test. Totally, 28 cases of completed suicide by poisoning were evaluated. The youngest individual in the sample was aged 28 years and oldest 82 years. There was a male preponderance in our sample with 86.2% of the victims being male. In 17 (3 females and 14 males) of the 28 cases, the state Chemical Examiner's Laboratory had provided a positive report. These cases were used to analyse the association between the type of poison on one hand and the gender and age of the suicide victim on the other hand. The predisposing factors were alcoholism, psychiatric issues and household issues. The study indicated that the commonly used poisons are accessible to individuals of all ages and both genders. The consumption of none of the poisons encountered in the study was associated with any specific age or sex. Alcoholism was the most commonly encountered predisposing factor and it was seen only in males, but the statistical association between gender and alcoholism as a predisposing factor was not significant.

**Keywords:** Acid, Alcohol, Chlorpyrifos, Cyanide, Insecticide, Organophosphate, Phorate, Poisoning, Quinalphos, Suicide.

### INTRODUCTION

The World Health Organization (WHO) estimates that of the nearly 900,000 people who commit suicide every year all over the world, 170,000 are from India. Self-poisoning is the second most common method employed in suicides in India as found in a systematic review of Indian studies on suicide patterns[1].

Female gender, age group 15–24, low educational status and being unmarried were found to be factors which predisposed to suicidal poisoning as per a study which analysed pattern of suicides between 1993-2013 periods in the Ilam province in Iran [2]. In a study conducted in India in the age group 10-18, in Delhi, 37.4% girls and 49.5% boys chose poisoning as the method to commit suicide. It was the second commonest method overall [3].

A study conducted in Kozhikkode District in Kerala, showed that poisoning was the second

commonest method employed by the males (34.3%) and the third commonest method employed by females (20.1%) to commit suicide [4]. Another study conducted in Thiruvananthapuram district in Kerala revealed that poisoning was the second commonest method used to commit suicide [5].

Poisoning is clearly an important method employed in taking one's own life. Some studies have shown that females are more likely to choose a poison to commit suicide [2] while some others have shown that males are likely to use this method more than females[3,4].

### MATERIALS & METHODS

Those deaths identified as intentional self-poisoning cases or the cases where poisoning or overdose was identified to be associated with death at inquest were selected from the cases autopsied between 2016 January and 2017 June (both months inclusive). The information provided by the police was recorded

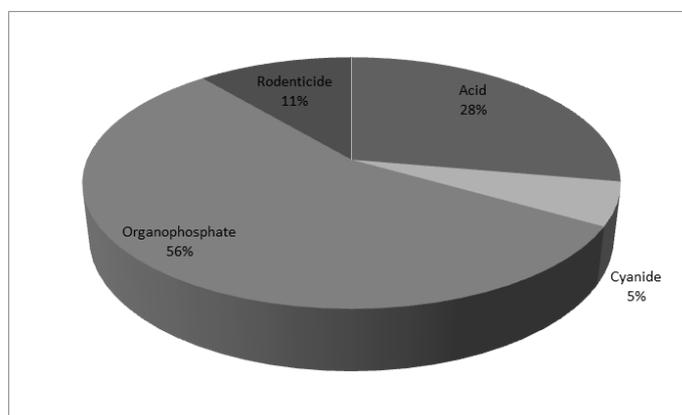
for each case. In those cases where the individuals were treated and the treatment records are available, that information was also used in the analysis. In those cases where the chemical analysis report was available, it was incorporated into the study.

SPSS version 16.0 and the online statistics tool available at <http://www.socscistatistics.com> were used for statistical analysis. The Chi-Squared test and Fischer Exact Test were applied to test if the detected poison was dependent on the age of the individual or the gender. In all cases,  $p < 0.05$  was considered as significant.

## FINDINGS

There were 28 cases which met the inclusion criteria. Of these, there were 24 males (85.7%) and 4 females (14.3%). The youngest individual in our sample was aged 28 years and oldest 82 years.

In 19 of the 28 cases, the state Chemical Examiner's Laboratory had provided the report, however, in two known poisoning cases which were treated in hospital (one for 15 hours and the other for 2 days), no poison was detected. The 17 cases where the poison was identified were considered (see Fig 1) in statistically analysing whether there was a significant association between the types of poison used and the gender or age of the individual. Of the 17 cases, 14 (82.4%) were males and 3 (17.6%) were females.



**Fig-1: Distribution of detected poisons**

In 5 cases, the poison detected was Chlorpyrifos. In another case, Chlorpyrifos and acid were detected together. Quinalphos was detected in two other cases. In one case, Phorate was identified. In one case, the laboratory gave the report that an organophosphate insecticide was detected, without specifying the type. In total, 10 cases (58.8%) of the 17 cases where the chemical analysis report came had detectable presence of organophosphate compounds in

the viscera. Acid was detected in 4 (23.5%) cases (in addition to one in which Chlorpyrifos was also detected). Rat poison was detected in two (11.8%) cases. Cyanide was detected in a single case (5.9%). The delay in getting the chemical analysis report makes it difficult to analyse the usage pattern of poisons for committing suicides. See Table 1 for the profile of detected poisons.

**Table-1: The profile of the detected poisons**

		First Rank Poison	n	%	Second Rank Poison	n	%	Third Rank Poison	n	%						
Entire Sample (n 17)		Chlorpyrifos*	6	35.3%	Acid*	4	23.5%	Quinalphos	2	11.8%						
								Rodenticide	2	11.8%						
Gender	♂ (n 13)	Chlorpyrifos	5	29.4%	Acid*	3	17.7%	Quinalphos	2	11.8%						
	♀ (n 3)	Acid	1	5.9%												
		Chlorpyrifos	1	5.9%												
Rodenticide		1	5.9%													
Age groups	21- 30 (n 1)	Quinalphos	1	5.9%												
	31- 40 (n 3)	Organophosphate**	2	11.8%							Acid	1	5.9%			
		Rodenticide	1	5.9%												
	41- 50 (n 4)	Chlorpyrifos	4	23.5%												
	51- 60 (n 1)	Acid & Chlorpyrifos	1	5.9%												
	61- 70 (n 2)	Acid	1	5.9%												
		Chlorpyrifos	1	5.9%												
	71- 80 (n 5)	Acid	1	5.9%												
		Cyanide	1	5.9%												
		Rodenticide	1	5.9%												
81- 90 (n 3)	Acid	1	5.9%													
	Phorate	1	5.9%													

\* A case in which acid and Chlorpyrifos was detected was counted twice.

\*\* One of the cases was detected to be Quinalphos; the other case was only identified as organophosphate.

Out of the 17 cases where the type of poison was identified, only one female had consumed organophosphate poison whereas 9 males had used it to end their lives. 2 females and 5 males had consumed a poison other than organophosphate. Fisher Exact Test statistic value was 0.536765 and the result was not significant at  $p < 0.05$ . 1 female and 4 male individual had consumed acid. The Fisher Exact Test statistic value was 1 in this case and the result was not significant at  $p < 0.05$ . 1 male and 1 female in the sample had consumed Rodenticide poisons to commit suicide. The Fisher Exact Test statistic value was 0.330882 and the result was not significant at  $p < 0.05$  level. A male had consumed cyanide to commit suicide. The Fisher Exact Test statistic value was 1 in that case and the result was not statistically significant at  $p < 0.05$ .

8 individuals aged less than 60 years and 2 individuals aged 61 or above had consumed organophosphate poison in our sample. The Fisher exact test statistic value was 0.058412 in this case and the result is not significant at  $p < .05$  level. Two individuals aged less than 60 years had consumed acid to commit suicide, whereas 3 individuals aged 61 or above had done so. The Fisher exact test statistic value is 0.59276 in this case and result is not significant at  $p < .05$ . One individual aged 61 years or above had consumed cyanide. The Fisher exact test statistic value

was 0.411765 in that case and the result was not significant at  $p < .05$  level.

In 8 cases, the reason why the deceased committed suicide was revealed in the inquest. Alcoholism and associated issues were the cause in 5 cases. All those who were associated with alcohol in the sample were males, however the Fisher Exact Test value was 1 and there was no association between gender and alcoholism as a predisposing factor at level  $p < 0.05$ . In two cases, family discord was the reason. In one case, the deceased was a psychiatric patient.

15 of the deceased were brought alive to a hospital. Three individuals had died in the first day. One had consumed rat poison, while the nature of poison was not detected in two cases. In one case where the poison was not identified by the treating doctors, the chemical examiner's lab was also unable to identify the poison. Four who were brought alive to a hospital had died on the second day. Chemical analysis revealed that two of them had consumed Chlorpyrifos. In one case, no poison was detected in chemical analysis. In the fourth case, the report was not yet available.

Three individuals had died on the third day. One of them had consumed acid, while the others had consumed insecticides (one was identified only as organophosphate while the other was Chlorpyrifos).

Two individuals had survived into the fourth day. One was identified to have had consumed Chlorpyrifos, while the report was not yet available in the case of the other. Three in our sample had survived for more than 4 days. A female who had consumed Chlorpyrifos had survived for 11 days, another female who consumed rodenticide had died after 7 years and a male who consumed Phorate had lived for 6 days.

## DISCUSSION

A systematic review of the global burden of self-poisoning with pesticides estimated that of the 853,300 people who commit suicide globally in 2012, 167,800 (19.7%) result from pesticide self-poisoning[6]. Pesticide intake was one of the leading causes in our study as well. A study conducted in Tamil Nadu state found that of the 46 who died from self-poisoning, 78.3% had taken pesticides and 19.7% had eaten poisonous plants[7]. This contrasted with our study where there were no cases of ingestion of toxic plants. However, 58.8% of our sample (where the toxicology report was available) had consumed organophosphate compounds. Two individuals (11.8%) had consumed rodenticides as well.

Even though an Iranian study had found that female gender and 15-24 age groups were associated with suicidal poisoning, our observations contrasted with this. The youngest individual in our sample was aged 28 years. There was a clear male preponderance with suicidal poisoning in our sample [2].

Eighty per cent of the self-poisoning cases obtained the poisonous substance in or in close proximity to the home, highlighting the importance of safe storage in the domestic environment [7]. This aspect was not specifically studied in our design, but at the first glance, it seems likely that the individuals in our sample had also used substances in close proximity to home.

No statistically association was found in the present sample between the types of poison used on one hand and the age or gender of the individual on the other hand. This suggests that, irrespective of the age or sex, for those who have made up their minds to commit suicide, all common poisons such as organophosphates, acids and rodenticides are equally accessible.

Alcohol as a predisposing factor was also not significantly associated with the gender of the individual.

## CONCLUSION

The poisons detected in chemical analysis showed a clear preference for the organophosphate

insecticides. Acids were the second commonest poison employed. The commonest predisposing factor detected in the inquest examination was alcoholism and all the individuals where this was revealed were males.

In the current sample, the lowest age was 28 years. With that limitation in mind, it is possible to assume that the poisons encountered in the study are accessible to individuals of all ages and both sexes since there was no statistically significant association between the type of poison used and the age and gender of the deceased.

## Conflict of interest

The authors declare no conflict of interest.

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## Ethical clearance

Ethical clearance was obtained from the institutional ethics committee, Government Medical College, Ernakulam.

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