

# Trends of Clinical Toxicology Cases in Nepal

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**Abstract**

Clinical analytical toxicology is one of the most essential parts in treatment of patients poisoned with drugs or toxic chemicals in hospitals. National Forensic Science Laboratory (NAFOL) has been providing clinical toxicology analytical services since its inception in 1999. NAFOL received over 182 cases in Fiscal Year 2011/2012 which is a far cry from two cases it started with in 1999. This study aims to analyze the data compiled from last 12 years (Fiscal Year 2000/2001 to 2011/2012) on different nature of poisons found in clinical toxicological cases. NAFOL analyzed total of 1699 toxicological cases it received from 22 different hospitals among which 1016 (60%) cases were of clinical toxicology. Out of 1016 clinical toxicological cases, 479 cases (47%) were negative and 537 cases (53%) were positive. Types of poisons used in the 537 positive cases are insecticide (34%), drugs (11%), rodenticide (4%) and other miscellaneous (4%). Nuvan is the most common insecticide used as poison.

The laboratory is facing the problems in providing clinical toxicology services due to inadequate information about the case history and lack of awareness in sample collections. It is expected that the study will help clinicians treat patients poisoned with drugs or toxic chemicals in the hospitals better.

**Keywords:** Clinical toxicology; Forensic toxicology**Introduction**

National Forensic Science Laboratory (NAFOL) was set up in 1986 for the purpose of providing forensic science services to analyze the physical evidence collected as part of investigation for justice administration. Clinical analytical toxicology is one of the most essential parts in treatment of patients poisoned with drugs or toxic chemicals in hospitals. Clinical analytical toxicology facilities are not yet available in most of the hospitals in Nepal.

In 1999, the laboratory received an urgent demand of toxicology test from one of the Government hospital for diagnosis of type of poison used to poison a patient. Laboratory did the analysis of clinical sample as part of its humanitarian service. During the Fiscal Year 1999/2000, the laboratory analyzed 2 clinical cases only. Clinical toxicological cases slowly increased year by year and in the Fiscal Year 2011/2012, Laboratory received a total of 182 cases from both Government and private hospitals.

This study aims to analyze the data compiled from last 12 years (Fiscal Year 2000/2001 to 2011/2012) on different nature of poisons found in clinical toxicological cases. It is expected that the study will help clinicians treat patients poisoned with drugs or toxic chemicals in the hospitals better.

**Methodology**

Total poisoning cases received at NAFOL during the last 12 years (Fiscal year 2000/01 to 2011/12) [1] were compiled and studied to find the nature of poison in clinical toxicology cases. The study was aimed to investigate the pattern of poisoning cases received from emergency department of different hospitals of Kathmandu valley. The pattern of poisoning data were compared with poisoning cases data of some other countries (India, Sri Lanka, Bangladesh and Pakistan). The collected data were analyzed for their appropriateness and then interpretation was made on the basis of nature of the analyzed result registered in Clinical Toxicology unit of NAFOL. The study was limited only within the NAFOL data.

**Result and Discussion**

1016 cases (60%) of the total 1699 cases received by NAFOL from 22 different hospitals (Table 1) in the past 12 years (Table 2) were of clinical toxicology. In comparison to forensic toxicology, number of clinical toxicology cases received is increasing year by year (Chart 1). Toxicology analysis started at the Central Police Forensic Science Laboratory (CPSL) in 2001. Number of police cases related to toxicology decreased from 255 to 59 from 2002 to 2007. With the introduction of GCMS technology in the laboratory in 2008 (Chart 2), the laboratory slowly started to receive toxicology cases again.

Out of 1016 clinical toxicology cases, 479 cases (47%) were negative and 537 cases (53%) positive for poisoning (Table 3). Common poisons found in the 537 cases are insecticide (34%), drugs (11%), rodenticide (4%) and other miscellaneous (4%) (Chart 3). The major groups of insecticide used were organophosphorus (71%), pyrethroid (13%), Mix insecticide (7%), carbamate (5%) and organochlorine (4%) (Chart 4). Nuvan is the most common insecticide and Phorate is the least common insecticide found in clinical toxicological cases (Chart 5). Benzodiazepines (28%), other basic drugs (29%) and Paracetamol drug (13%) were found as the most common drugs used (Chart 6). During F.Y. 2000/01 to 2006/07, NAFOL had technological limitation and could identify only basic drugs group and could not identify individual drug [1]. After the GCMS technology which became available on 2008, the laboratory was able to report the individual nature of the drug.

While comparing the pattern of poison observed in this study with poison data publication of India, Sri Lanka, Bangladesh and Pakistan

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S. No	Name of Hospital
<b>Government</b>	
1	Bir Hospital
2	Birendra Military Hospital
3	Bhaktapur Hospital
4	Kanti Children Hospital
5	Teaching Hospital (TU)
6	Patan Hospital
<b>Private</b>	
1	Alka Hospital
2	B & B Hospital
3	Blue Cross Hospital
4	Jana Matri Hospital
5	Kathmandu Model Hospital
6	Kathmandu Medical College Hospital
7	Life Care Hospital
8	Laligurash Hospital
9	Man Mohan Merorial Hospital
10	Nepal Medical College Hospital
11	Nagarik Community Hospital
12	Nobel Hospital
13	Norvic Hospital
14	Ohm Hospital
15	Star Hospital
16	Venus International Hospital

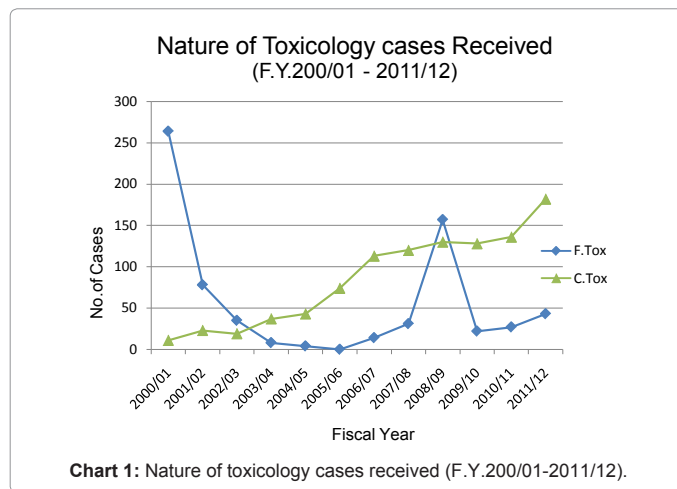
**Table 1:** List of Hospitals from which Cases received at NAFOL F.Y.2000/01-2011/12).

F.Y.	Case received	Forensic Tox		Clinical Tox Hospital
		Police	Other	
2000/01	275	255	9	11
2001/02	101	59	19	23
2002/03	54	0	35	19
2003/04	45	0	8	37
2004/05	47	0	4	43
2005/06	74	0	0	74
2006/07	127	0	14	113
2007/08	151	7	24	120
2008/09	287	137	20	130
2009/10	150	13	9	128
2010/11	163	14	13	136
2011/12	225	23	20	182
<b>Total</b>	<b>1699</b>	<b>508</b>	<b>175</b>	<b>1016</b>

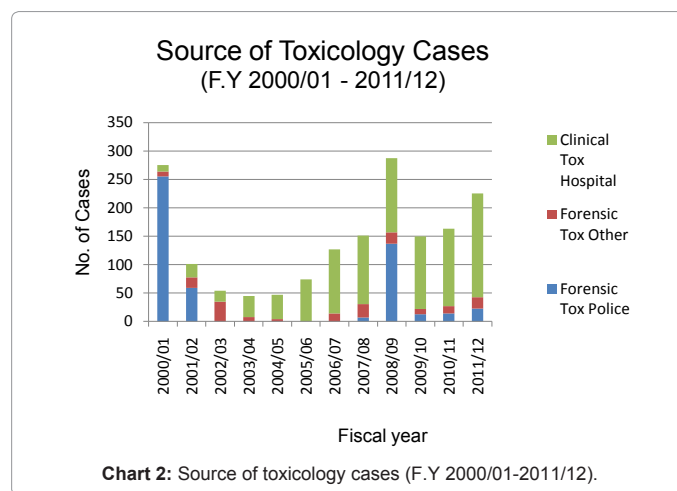
Note:  
 Total Clinical cases=1016 (60%)  
 Total Forensic cases=687 (40%)  
 Total Toxicology cases=1699 (100%)  
 Others=Court, Aviation Department, Natural Trust Animal Husbandary Department, Private

**Table 2:** Nature of toxicology cases received (F.Y.2000/01-2011/12).

[2-6], it was found consistent nature of increasing trends of Pesticide poisoning in all those countries. A mixture of insecticide (Chlopyrifos and Cypermethrin) is found as a new emerging uses in this study while in those countries it was not found reported. In this study it was found that the first commonly used poison is organophosphorus (OP) insecticide followed by second Drugs (Benzodiazepines) and third rat poison (Al/Zn phosphide). The first commonly used poison was found similar in those countries also but second and third commonly used poison is found different. Indian publication [2] reported that the second and third commonly used poisons are rat poison (Aluminium phosphide) and Benzodiazepam drugs. The Shri Lankan publication [3]



**Chart 1:** Nature of toxicology cases received (F.Y.2000/01-2011/12).



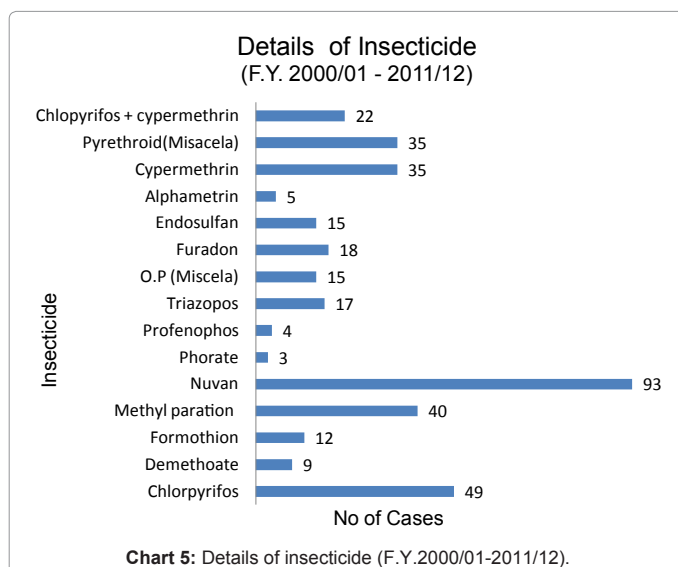
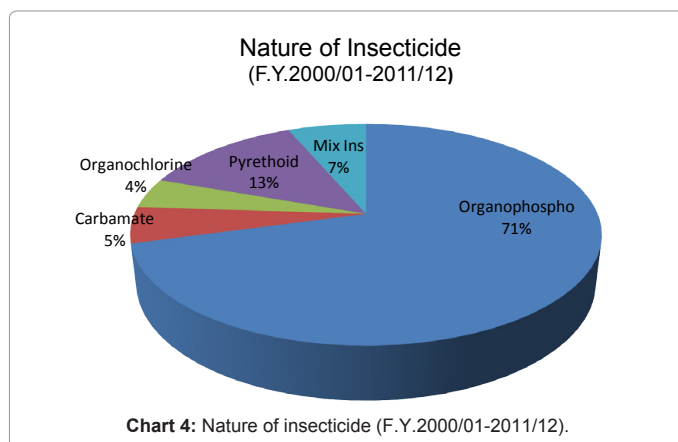
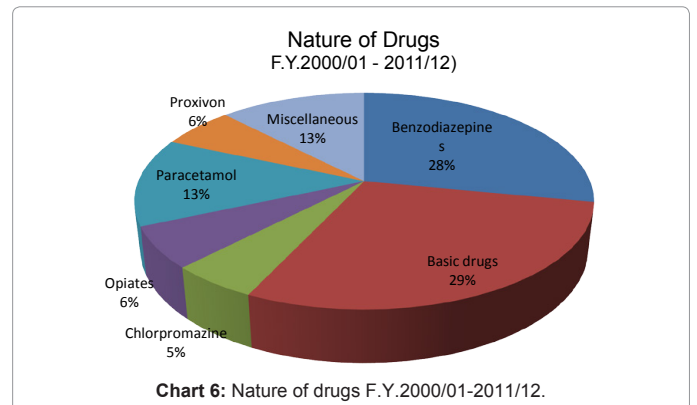
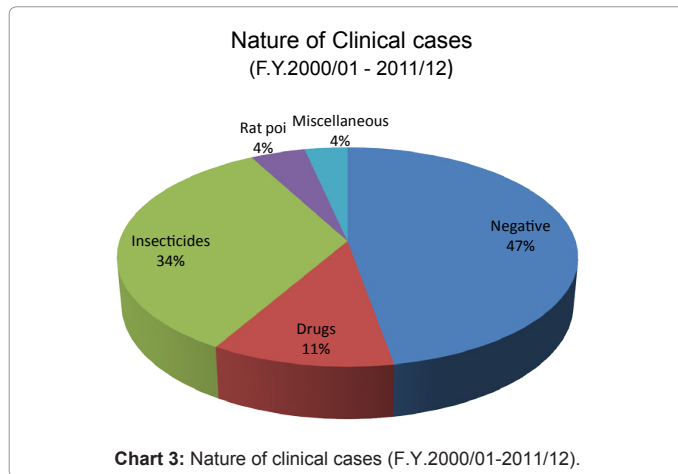
**Chart 2:** Source of toxicology cases (F.Y.2000/01-2011/12).

Fiscal Year	Total	Negative	Positive	Drugs	Ins	Rat poi	Miscel
2000/01	11	7	4	3	1	0	0
2001/02	23	14	9	4	4	1	0
2002/03	19	9	10	7	2	1	0
2003/04	37	10	27	15	10	1	0
2004/05	43	15	28	6	20	2	0
2005/06	74	30	44	13	18	4	9
2006/07	113	56	57	21	23	7	6
2007/08	120	62	58	15	31	11	1
2008/09	130	60	70	3	48	8	11
2009/10	128	62	66	6	56	2	2
2010/11	136	65	71	7	57	5	2
2011/12	182	89	93	14	72	3	4
<b>Total</b>	<b>1016</b>	<b>479</b>	<b>537</b>	<b>114</b>	<b>342</b>	<b>45</b>	<b>35</b>

Note:  
 Rat Poi=Aluminum/Zinc phosphide.  
 Others=Acid, Alcohol, Carbon monoxide gas, Formaldehyde, Phenol, Plant poi, Potassium permanganate.

**Table 3:** Nature of Clinical cases (F.Y.2000/01-2011/12).

reported oleander plant poison as well as washing detergent (oxalic acid and potassium permanganate) and paracetamol overdose as second and third commonly used poisons. The Bangladeshi publication [4,5] reported poisoning with unknown substance and copper sulphate as well as sedative drugs are second and third leading cause of poisoning. Recently, in Bangladesh the trends of poisoning used have been



changed pesticides to transport related poisoning (food with mixed Benzodiazepines preparations). The Pakistani publication [6] reported Alcohol and Benzodiazepines are the second and third frequent cause of acute poisoning.

The laboratory is facing the problems in providing clinical toxicology services due to inadequate information about the case history and lack

of awareness about sample collections. So it is necessary to prepare proper guidelines for sample collection as well as national policy to set up good clinical toxicology laboratory within the hospitals to achieve betterment in current treatment of patients who were poisoned.

### Conclusion

The Clinical toxicological cases data compilation of the last 12 years (F.Y.2000/01-2011/12) shows insecticides (Nuvan, Chlorpyrifos, Methylparathion, Cypermethrin, Mix (Chlopyrifos+Cypermethrin), Furadon, Endosulfan, etc.) are the most frequently used poison by patients in Nepal. The second commonly used poisons are drugs (Benzodiazepines, Paracetamol, Proxivon and Opiates, Chlorpramazine, etc.). Rat poisons (Aluminum/Zinc phosphide) are used only by 4% of patients who were poisoned.

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