



FREQUENCY OF PESTICIDE POISONS AND AUTOPSY FINDING.

Prof. Prasanta Kr. Baruah

Prof. of Pathology, Jorhat Medical College & Hospital.

Prof. Netromoni Kakoti*

Professor of Forensic Medicine, JMCH, Jorhat *Corresponding Author

Dr. Nandini Pegu

Assist. Prof, Deptt. of Forensic Medicine, JMCH

ABSTRACT **Background:** The increasing numbers of suicide by using pesticide, herbicide, insecticide and other household cleaning agents are common findings in our institute. Malnutrition, population overcrowding, mental illness and uses of various forms of narcotic drugs, alcohol (various local brand and Govt. permitted) are said to be initiating and exciting causes that commonly encountered that requests for an autopsy. **Aim and Objective:** To study the mode of dying by uses of organophosphorus compound as an agent to commit suicide and to detect, describe and to measure the extent of (external-internal) tissue damage thereof. **Material and Methods:** The study was carried out Jorhat Medical College and Hospital, Jorhat from Jan2020 to Dec 2021 and, Out of total 612 nos. of medico-legal cases, 59 cases of poisoning were examined. Putting into Medico legal (ML) register, written consent was taken for further investigation and treatment. **Observation & Results:** In present study, major number of poisoning with insecticide was 51, out of which, 35 Nos Male and 24 no. of Female (cases of 15-30 yrs age groups, was the highest) and male to female ratio was, M:F: 3.3:2.3. **Conclusion:** Public awareness, counseling from school level is very important in backward places especially person resides in remote hills and mountain, tea garden areas through teaching, training and education with publicity by different printing, electric, electronic and other social networking to reduce the morbidity and mortality of suicide.

KEYWORDS : Autopsy, pesticide, poison.

INTRODUCTION:

Taceant colloquia. Effugiat risus. Hic locus est ubi mors gaudet succurrere vitae. (Let conversation cease. Let laughter flee.) (This is the place where death delights to help the living.)

Latin proverb: Knight's Text Book of Forensic Medicine, 4th Edi).

Usual indication of (PME) Post Mortem Examination:

Examination of suspected death, un natural death, unwanted death, un timely death, bought dead, found dead, cutting, stabbing, hanging, strangulation, suffocation, drowning, injured by bullets, fire arms, burning and electrocution are some very common etiologies where medico-legal, post mortem examination and autopsy are warranted.

Many of such other causes can be enumerated and has been channelized by Indian Penal Code, Criminal code and other Juries those are active in different corners of the country today. Many of the road traffic injury, railway injury, child abuse, homicide, infanticide and injury caused by wild animal are much more increasing day by day where the importance medico-legal examination is mandatory.

History of Medical autopsy:

The probable and the oldest known official instructions about the external investigation of corpses have been dated to the Ching-dynasty (~2000 BC) in ancient China. A decree enacted during the Song-dynasty (960–1279 AD), in 995 AD, provided that a government official had to investigate a violent or suspicious death within 4 hours and failure to do so was punishable.

The earliest known forensic dissections took place in Italy, probably in the middle of the thirteenth century, at the University of Bologna.

Possibly the first reliable record of a medico-legal autopsy in those days has been attributed to Bartolomeo da Varignana, a professor of medicine, who served the municipality of Bologna in a medico-legal capacity. The public prosecutor had ordered an autopsy in the suspected poisoning of a nobleman, Azzolino, in February 1302.

The most scientific way of autopsy started at the beginning of the nineteenth century. When Virchow started in 1844 as assistant to the Prosecutor at the Charite in Berlin, he found a rather disorganized autopsy facility where most of the autopsies were performed by the youngest, not yet fully qualified physicians without any basic training in autopsy technique. This was the starting point for the publication of his book on autopsy technique. (Knight's Text Book of Forensic

Medicine 4th edi). Suicidal acts (suicide, attempted suicide and suicidal gestures), the intention to killing self and causes death usually necessary to undertake a post mortem examination using appropriate protocol as per concerned Institutional guide line.

The most common uses of insecticide, pesticide and organo-phosphorus compounds, organo chlorine etc are used to commit suicide very often. Many forms of such common names like Malathion, Parathion, DDT, Gamaxine, Braygon, Phenol, Lysol, TIC-20 etc are different poisons used by victims and mal practices that we encountered.

Acids, alkalis, phenols, arsenic, antimony and strychnine, are some example, became easy to detect, these compounds that leave little or no gross, or even histological changes in the body. Most are pharmaceutical or agrochemical substances, active in low dose compared to the old 'blockbuster' poisons

Sampling collection Time:

Shorter the delay between death and the removal of poison is always the better. Though some toxic substances, such as carbon monoxide, form stable compounds in the body, many others (especially volatile substances and some pharmaceutical products) will be broken down by post-mortem autolysis and decomposition. So it would be very better if samples should be collected as per protocol without delay.

Samples and preservation method:

Many samples for analysis are best sent in their original state, others require additives are necessary to keep the sample in an optimum condition until they reach the laboratory. We used anticoagulants to keep the blood fluid.

The usual preservative is sodium or potassium fluoride that is essential if the sample is not to be analyzed within a few hours of withdrawal from the body.

Collection of Blood, Serum etc:

There are special way collection of blood and serum. Blood should never be obtained from body cavities after evisceration, as it is certain to be contaminated with other body substances. The collection of scooping 'Blood' - or more accurately, bloody fluid - from the paravertebral gutters or the pelvis is always unacceptable, for many other inference objects like urine, intestinal contents, gastric contents, lymph, pleural and ascitic fluid etc.

General Examination of the body:

By general examination the usual features we encountered sweating,

cold, calmy extremities, meiosis, many times associated with salivation and frothing from the mouth and nostrils.

Various respiratory problems like slow and slurred breathings associated with wheeze, compromised with consciousness or orientation, Occasionally added breath sounds like rhonchi and crepitating, feeble pulse, weak heartbeat, paresis or paralysis and many times changes of motor, sensory and autonomic functions.

Autopsy finding of deceased:

Most of the cases of acute poisoning we cannot see any gross physical changes.

In some cases the face is dark and cyanosed, dribbling of saliva, various types of frothing from mouth, nose and eyes. the body of the victims smelling which is directly related with type consumed poison like phenol, dettol etc.

Patho-physiological findings:

The stomach contents are mostly blood stained, usual histopathological findings are mucosal congestion and grossly hyperemic changes of the sub mucosal associated with patecheal haemorrhages.

Another post mortem findings are, capillary dilation, haemorrhages of parenchymal lung tissue and hyperaemia plus congestion and even pulmonary oedematous changes with diffuse alveolar damage of lungs.

Common changes in the brain are loss of neurons and coagulative necrosis of the neural tissue.

In most cases paralysis of extremities induced by parathion, malathion and other compounds plays major role of demylenation of ascending and descending spinal tracts with loss, degeneration of motor horn cell.

Most of such insecticide and heavy metallic compounds are very much resistant to decompose and they have been detected some highly decomposed bodies even after 5-7 days before post-mortem examination.

Material and Methods:

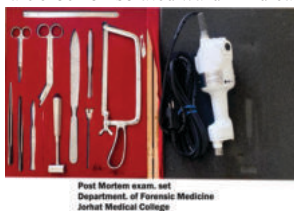
Remembering the great words, “Seldom say never - seldom say always! (-Forensic proverb)

The study was carried out Jorhat Medical College and Hospital, Jorhat from Jan2020 to Dec 2021 and 612 no cases was registered out which 59 cases of poisoning were examined. Putting into Medico legal (ML) register, written consent was taken for further investigation and treatment.

Equipment and instruments sets in our team of Investigators: Waterproof apron, rubber gloves and disposable overalls and mask.

1. Thermometer, syringes and needles, sterile swabs.
2. Autopsy dissection set, including handsaw.
3. Cutting needles and different suture for body closure.
4. Swabs and containers for blood and body fluids.
5. Formalin jars for histological samples.
6. Plastic bags, envelopes, paper, spare pen and pencil.
7. Printed body charts for recording external injuries.
8. Hand lens, electric torch, mini-tape recorder.
9. Digital or 35 mm single-lens reflex camera with electronic flash or digital video camera.

The proforma for special ML cases was included detailed history of present illness, personnel history, past history was taken either from the patient or from near relative who witnessed the ML case. The remaining of the ingested material if found was noted with expansion way for examination of sample to carry out chemical and toxicological nature of the poison and the results were noted down. Collections of vomit out material, blood, urine, saliva, tear etc were taken out for pathological, biochemical and other toxicological examination. Than, the patient was monitored as per patient need in ICU, semi ICU, general Male/Female block or isolated ward if indicated thereof.



Observation & Results:

In present study, 59 cases were studied out of 612 cases major group of poisoning with pesticide was 15-30 yrs age groups and male female ratio was 3.3:2.3.

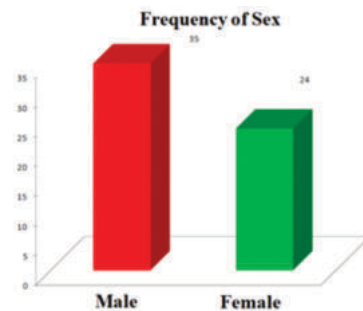
Table No: 1, Frequency of Age distribution:

Sl.No	Age in years	No.of Cases	Percentage of cases
1	5-14 yrs	09	15.25 %
2	15-30 yrs	25	42.37%
3	31-45 yrs	15	25.42%
4	>46 yrs	10	16.94%
	Yrs	59	100

From the above table it can be seen that early teenage suicidal (5-14 yrs) tendency high among school going child. The highest cases was recorded in the 15-30 yrs among the late teenage and maturity those among the college going students, engaged in different daily ways earners, early marriage and child birth, familial disharmony etc. Among them personnel history, most of the male candidates had habits of chewing gutka, smoking along with H/O of regular as well as casual drinkers of alcohol /abusers, those with very strong liquor (without any known percentage of alcohol) locally available . We had also encountered few special cases of pipe smoker, users of marijuana (Ganja) in various fashions either with or without alcohol.

Table No: 2, Frequency of Sex:

Frequency of Cases	Gender	Percentage of cases
Male	35	59.32%
Female	24	40.68%

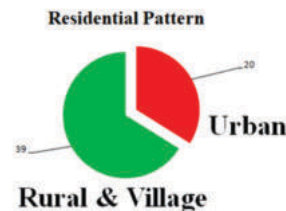


From the Table No.2 it has clearly been shown that there is preponderance of male in comparison to female. Most of the rural male and from the semi urban area there was association of H/O of drugs abusers, alcoholism especially having daily travelers like inter district bus drivers, auto drivers, tempo drivers, food and fish sellers etc.

Among the female population, most of them were daily ways earner, labor worked in building construction, high way drain worker, fish seller, fruit and vegetable seller, working in bidi factory, tea garden labors, chewing industries, cookery, pottery, chimney cleaner, breaks manufacturing industries.

Table No: 3, Residential pattern:

Frequency of Cases	Urban & Town	Remote area, tea garden etc
Male	20	33.89%
Female	39	66.11%



From the above table it is seen that the number of urban population was less than the persons living in the rural and village area.

As the more and more Central Govt. and State Govt. initiating highly active programme like “Education for All”, Girl Child protection like “Beti Bhachou, Beti Pohao” etc along with free school facility, mid day school meal etc are vastly popularized in the cities and urban areas. Although the there is increasing number of school going children and number educated people has greatly increased in last decades, but still

there is lack of knowledge to reduce prejudice, malice, witch hunting, mob attack, social taboo, common beliefs and to educate the moral and spiritual values where people doesn't hesitate kill by themselves with small negligible sentiments that causes great harm to the poor economic families as well as to the societies by large.



Clinical Sign and symptoms:

Total number cases that we evaluated 59 out of which 8 cases brought dead so the signed and symptoms could not be recorded.

Other remaining 51 cases where the hospital, patients history were collected either from guardian or relatives of police and all medical records were available including general physical examination upto toxicological and Forensic laboratory report.

Table: 4

Clinical Findings	Number of cases	Percentage
Frothing from mouth, nostrils	10	19.60
Associated with tremor & convulsion	15	29.41
Semi consciousness, stupor etc	20	39.21
Totally unconscious/ coma	06	11.76
	51	100

Table: 5 Clinical evaluation and systemic findings:

Clinical Findings	Number of cases	Percentage
Respiratory system		
Peripheral cyanosis	21	41.17
Respiratory wheeze on examination	09	17.64
Consolidation	0	0
Pulmonary edema	01	1.96
Cardiac & circulatory system		
Pulse rate(Bradycardia/Tachycardia)	(0/2/0)	3.92
Hypotension	04	7.84
Hypertension	03	5.88
Signs circulatory collapse	2	3.92
Central Nervous System		
Response to vocal command	06	11.76
Pupil reaction(Normal/Sluggish/No response)	(0/1/0)	1.96
Tremors, fasciculation etc	01	1.96
Sensory and motor function	01	1.96
Autonomic function, urinate/passage of stool	0	0
Total	51	100

Table: 6 Cases attending hospital after ingestion and period of seriousness:

Hospital attending time	Number of cases	Percentage
In the very first hour of ingestion	0	0
2-3 hrs	01	1.96
4-6 hrs	20	39.21
7-10 hrs	15	29.41
11-24 hrs	14	27.45
Referred cases from other hospital (2-4 day) and beyond	01	1.96
Total	51	100

It is very clear that most the cases were died within 6-8 hrs after attending the hospital. Next category cases were died within 2-3 days after proper treatment in hospital. Many survivors treated and remain discharged from hospital.

DISCUSSION:

Jorhat is a beautiful district in midst of State of Assam. The district is situated by bank of mighty river Brahmaputra and covered with world

famous National Park, Kaziranga (Famous for one horn Rhino) and surround by hills and mountains and 60-70% covering with tea garden area. It is also known as Tea Capital India. Another very import organization, Assam Agricultural University (AAU) which top ten in India and abroad is in our vicinity.

By virtue of living and socio-cultural standard majority of the local villagers is based on agricultural activities during different seasons of the year. Uses of insecticide, herbicide, pesticide is very common almost all household for many purposes including cultivation and domestic use.

Many forms of organophosphorus compound (OP) such common names like Malathion, Parathion, DDT, Gamaxine, Braygon, Phenol, Lysol, TIC-20 etc are different poisons used by victims and recovered from either from the victim or from site of area.

The present study revealed that most of cases were from villages and from person below poverty line and poor socio-economic conditions. A majority of victims were found to be in the age group of 15-30 yrs of age in comparison to older age groups.

Other significance variable of our study:

- cases were more in the afternoon after 3-8 PM than in the early morning.
- Cases were more in the poor socio-economic condition where literacy rate low rather than qualified person.
- Some of the most common factors like poverty, urbanization, industrialization, familial disharmony, overcrowding, an employment etc.
- It has seen that cases were common among housewives who had two or more children especially in the families belonging to cultivators/farmers where the availability of the insecticide were common. Our study variables were very similar to study of Siwach SB, Gupta et al.
- Among time of suicide it was seen that the winter season was the most common in our locality which may have significant relationship with intake of various warm stimulants like alcohol, ganja etc associated direct conflict of various types of assaults either physical or mental from the early evening and end with very tragic outcome. Our study co-relates with studies of Sinha US, Kapoor AK et al and, Emerson GM, Gray NM et al and their associates.
- Reporting to hospital was significant finding within, which the consumption of poison and seek medical treatment. Most of the victims were carried out by local police man. What is important to examine here that the ingestion, absorption of the poison has already in progress, till the formalities are done with due protocol. Average time was reported in our hospital was 5-6 hrs or later, with is compatible with studies done by Sahin HA, Sahin I et al.

Banerjee Indranil, Tripathi S K, Sinha Roy described total of 968 patients presented during the study period. Poisoning with suicidal intent (82.02%) was more common than the accidental one (17.98%). Majority of the patients were housewives (42%) followed by farmers, shopkeepers, laborers, students. Methyl parathion was the most common poison consumed by the patients (35.74%) followed by diazinon, chlorpyrifos, dimicon. The above study co-relates with our study.

Banday H.T, Tathineni B, Mehul Surendra Desai M.S., Naik V, in their study 133 patients were enrolled, out of which 98.5% were suicidal cases and only 1.5% had accidental exposure. Majority of cases were young male, with F/M ratio 1:3.2. Mortality rates were higher in younger people and in patients who required prolonged ventilator support. The mortality rate was directly proportional to amount of poison consumed, lag time, organ failure etc. are compatible with our study.

Taruni N, Bijoy A et al studied 348 cases of acute poisoning admitted in the Department of Medicine, Regional Institute of Medical Sciences Hospital, Imphal during 1996 to 2000 were studied. 76.72% of the cases were in the age group of 13 to 30 years. Insecticides were the commonest agent (53.73%) followed by disinfectants/antiseptics (10.63%). The maximum cases (81.61%) were of suicide that co-relate with our study.

Kora S.A., Doddamani G.B., Halangali G.R et al and his associates studied 232 cases of poisoning, in Karnataka State, 148 cases (63.8%)

were of OP poisoning, 65 (43.92%) were males and 83 (52.08%) were females, with a male to female ratio of 1:1.27 and the highest number of cases (46.62%) was from the age group of 21 to 30 years and housewives topped the list was reported incidence of 55 cases (37.16%).both the gender ratio and category of poisoning of our study.

CONCLUSION:

Public awareness, counseling from school level is very important in backward places especially person resides in remote hills and mountain, tea garden areas through teaching, training and education with publicity by different printing, electric, electronic and other social networking to reduce the morbidity and mortality of suicide.

The availability of big social media should be restricted to the minors to prevent various unwanted noise and chaos.

Conflict of Interest: None

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Authors Contribution: This is a departmental work-up among the authors of the same Institute

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