RETROSPECTIVE AUTOPSY ANALYSIS ON PATTERN OF FATAL CASES OF POISOINING IN GOVERNMENT RAJAJI HOSPITAL, MADURAI

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CERTIFICATE

This is to certify that the dissertation entitled **"RETROSPECTIVE AUTOPSY ANALYSIS ON PATTERN OF FATAL CASES OF POISOINING IN GOVERNMENT RAJAJI HOSPITAL, MADURAI"** is the bonafide work of **Dr.R. KARTHICK** in partial fulfilment of the university regulations of the Tamilnadu Dr. M.G.R. Medical University, Chennai, for M.D., (Forensic Medicine) Branch–14 examination to be held in April 2015.

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This is to certify that this dissertation titled **"RETROSPECTIVE AUTOPSY ANALYSIS ON PATTERN OF FATAL CASES OF POISOINING IN GOVERNMENT RAJAJI HOSPITAL, MADURAI"** is a bonafide record work done by **DR.R. KARTHICK**, submitted to THE TAMILNADU DR.M.G.R. MEDICAL UNIVERSITY in partial fulfillment of university regulation for **MD,** (Forensic Medicine) Branch–14.

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DECLARATION

I, **Dr. R. KARTHICK**, hereby declare that, I carried out this work on **"RETROSPECTIVE AUTOPSY ANALYSIS ON PATTERN OF FATAL CASES OF POISOINING IN GOVERNMENT RAJAJI HOSPITAL, MADURAI"** at the Department of Forensic Medicine, Government Rajaji Hospital, Madurai, under the guidance of **Prof. Dr. G. Natarajan, M.D.,** Head of the Department of Forensic Medicine, during the period of one year from January 2012 to December 2012. I also declare that this bonafide work has not been submitted in part or full by me or any others for any award, degree or diploma to any other University or Board either in India or Abroad.

This is submitted to the Tamilnadu Dr.M.G.R.Medical University, Chennai in partial fulfillment of the rules and regulations for the M.D. Degree Examination in Forensic Medicine (Branch –14) to be held in April 2015.

(Dr.R. KARTHICK)

Place : Madurai

Date :

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ABSTRACT

RETROSPECTIVE AUTOPSY ANALYSIS ON PATTERN OF FATAL CASES OF POISOINING IN GOVERNMENT RAJAJI HOSPITAL, MADURAI

AIM AND OBJECTIVES :

To study the frequently used poisonous substance, to assess the distribution of a poisoning among individual of different age and sex, to observe the influence of literacy and socio-economic status on poisoning, to evaluate the occurrence of poisoning under marital status and various family patterns, to take an inventory of various reasons of consumption of poison.

MATERIALS AND METHODS : The subjects of the study were the 433 poisoning victims whose autopsy was done in the mortuary of the Government Rajaji Hospital for post mortem examination during the period of study.

The victims were subjected to autopsy. The various internal and external findings that were observed during the procedure were noted and the necessary specimen were sent for the chemical analysis to Regional Forensic Science Laboratory (RFSL), Madurai.

The detailed history regarding the poisoning cases that were brought dead was obtained from the inquest report from the relevant investigating police officer and also the relatives of the deceased.

INCLUSION CRITERIA : Those victims of poisoning whose body was autopsied in the mortuary of Government Rajaji hospital, Madurai. Inquest report and other relevant police documents, Optic lens for magnification, Metric tape for measurement, Equipment for photography, A workstation for autopsy, Autopsy certificate, Records of hospitalization and treatment, if any, Report of chemical analysis from Regional Forensic Science

Laboratory (RFSL), Madurai. The bodies of the deceased were examined post mortem using Otto Saphhir's technique for Autopsy.

RESULTS : The age of the deceased ranged from 4 to 97 yrs. The peak incidence of death from poisoning was observed in age group 21-30 yrs panning 119 cases which accounted for 27.48% all cases. On taking into account the literary qualification of the deceased under study, it was established that the illiterate victims were the most common to be exposed to poisoning. There were 271 cases (62.59%) who were illiterate while the literate accounted for 157 cases (36.26%) only. The marital status of the various victims were analyzed and the inference that the majority of the deceased were married. They numbered 281 which was 64.90% of the total study group. There were also 97 cases who were never married and they made up 22.40%.The family of the deceased when placed under scrutiny revealed that the individuals in Nuclear family, which numbered 413 (95.38%) were more prone to poisoning than those in the joint family. Only the remaining 20 (4.62%) belonged to joint family.The socio-economic status when taken as a criteria for classification lead to the observation that the people in low socio-economic status were 352 (81.29%) in number and was far more than people in medium (68 cases – 15.70%) and high (13 cases-3%) statuses. Of the people who consumed the poison, it was found that 237 (54.73%) people died within a day, 146 cases (33.72%) were prone to die within a week. Thus 88.45% of the victims died within a week of consuming poison. From a spectrum of poisons that the deceased were exposed to it was noted that organo phosphorous compounds were the most frequently ingested poison. 279 people (64.43%) were the victims of this poison. Aluminum and zinc phosphide were the next in line claiming 25

cases (5.77%) each. A look at the manner of death due to poison exposure revealed that a whopping majority of 409 cases (94.46%) were suicidal. Accidental cases were only 24 (5.54%) in number which constituted of mostly children and intoxicated individuals. The comparison between the positive and negative results of chemical analysis report came up with 215 (49.65%) positive cases and 218 (50.35%) of negative cases. A Compilation of various reasons for ingestion of poison has established that 178 individuals (41.11%) turned to poison out of a physical illness. 88 cases (20.32%) were people with marital dispute and 57 people (13.16%) turned towards poisoning during an economic crisis.

CONCLUSION : An overall look at the autopsies of the cases of poisoning led to the conclusion that the people were more prone to consume poison in the third and fourth decade of their life when they are at their maximum productivity and hence the most stressed. Among the study population males dominated in number thus reiterating the stress factor and hence seeing poison as a way out. The illiterate people were found to most frequently ingest poison than the literate population either ignorantly or knowingly for reasons that shall be discussed later. The observation of Marital status of the deceased helps conclude that married individuals consume poison more frequently than unmarried population. This phenomenon can also be attributed increased emotional or financial burden. A look at the families of the deceased conclusively tells that majority of death due to poisoning was found in the nuclear families. A further probing of socio economic status has established that the individuals in the low socio economic status often sought poison as a way out from their problems. The incidence of poisoning markedly decreased with increase in the status of the individual.

The majority of victims of poisoning did not survive the poison more than a day. Many others were dead within a week. The notoriety of poison was thus very clearly seen. Organo phosphorous compounds were the poison of choice for most individuals thus claiming a colossal number of lives among the subject population. Suicide was the dominant manner of death in almost all deceased. Very few accident cases were seen, although it was a pristine fact that most people intentionally consume poison as a way out of their worries and problems. A full enumeration of the various reasons claimed for the individual to consume poison, the collection of history revealed that most people poisoned themselves due to a physical illness. However people turning to poison due to marital dispute or an economic crisis was also a common occurrence.

INTRODUCTION

The word 'poison' has been evolved from the Latin word 'potion' i.e. 'to drink for health', but in the due course of time the definition of 'poison' has changed reversibly to its present form i.e. any substance which when administered, inhaled or ingested is capable of acting deleteriously on the human body. Thus, almost anything is a poison and there is really no boundary between a medicine and a poison, for a medicine in a toxic dose may be a poison and a poison in a small dose may be a medicine.

Poisoning is and likely to remain one of the commonest cause of unnatural death. Our history is full of such instances where famous personalities died as a result of poisoning like The Greek Philosopher Socrates who was executed through the use of Hemlock, a plant poison, examples of homicidal use of poison and as such persistent hunt for a ideal homicidal poison speaks of the age old interest of the man kind to poisoning, Ala-ud-din Khilji, Cleopatra, Julius Caesar and Napoleon Bonaparte are other few to be remembered in this context. We are surrounded by more than 9 million natural and synthetic chemicals, and this list keeps growing inexorably, and is

estimated that about one to two thousand new chemicals appear in the market every year and most of this chemicals, be it pesticides, cosmetics or food preservatives pose grave risks to our health if inhaled, ingested or otherwise administered in excess.

Poisoning being invariably medico legal in nature among fatal cases, post mortem examination is done to establish the exact cause and manner of death. Manner of death in these cases is predominately Suicidal because of the general belief that it terminates life with minimal sufferings or accidental but however homicidal cases are also reported and alleged which was more prevalent in the past as there were no well-established means of detecting poison from the viscera, etc. With the advent of modern techniques of sample analysis, this method of committing homicide has lost its grounds. The incidence of poisonings is increasing day by day because of its low cost, easily availability without any check on their sales and irregularity in distribution. Under the prevailing law of the country even though, The opium act 1857, Drug Control act 1950, Narcotic drugs and psychotropic substances act 1984 do regulate the import, manufacture and availability of poisonous substances, the poisoning has never decreased.

AIM AND OBJECTIVES

1. To study the frequently used poisonous substance.
2. To assess the distribution of a poisoning among individual of different age and sex
3. To observe the influence of literacy and socio-economic status on poisoning.
4. To evaluate the occurrence of poisoning under marital status and various family patterns.
5. To take an inventory of various reasons of consumption of poison.

REVIEW OF LITERATURE

By an approximate estimation, it can be said that around 10 million cases of poisoning is recorded every year. Of these people, about 10 thousand cases are fatal. A 6 year study in Government Medical College, Chandigarh has Revealed that males (68%) were the majority among poisoning cases. They Outnumber females with a ratio of 2.1:1. Age group 21-25years (27.2%) and rural residence (66.9%) were found to be the criteria for maximum incidence.

Aluminium oxide (38.2%) with no specific antidote claimed the highest number of fatalities and it was followed by Alcohol (8.4%) and Organophosophorous Compounds (6.9%) as a distant second and third respectively. However there are a number of cases that has kept pending due to the want of a chemical analysis report (28.3%) and in other cases (9.2%) the examiner could not detect any particular poison in the system inspite of one or more clinical features pointing towards its favour.

A Study in Guru Nanek Dev Hospital, 340 cases of poisoning were detected of which 248 male cases (72.94%) and 92 female cases (27.06%) with a ratio of 3:1 approximately. The majority of the cases

were Married and of young age and the manner of death being mostly suicidal (76.4%) and some accidental (20%) And very few homicidal cases (3.6%) caused by various aspects of married life and/or the stress of various social customs oppressing the unemployed and people of the low socioeconomic Group.

The commonest poison being Organophosphorous compounds followed by aluminium phosphide and alcohol.

However among the females, the numbers peaked among the unmarried outnumbered the married and the common age group was akin to males (21-30years)

A comparative study between the poisoning cases in LMCH, New Delhi and Jipmer, Pondicherry on being autopsied has revealed that the incidence of poisoning was abundant in Age group (21-30 years) (31.6%) with males more than females and the poison of choice was mostly Organophosphorous compounds (56.35%) followed by Aluminum phosphide (45.11%) and then yellow oleander (16.56%)

A study in PGIMS, Rohtak has showed that out if the 1191 cases of poisoning. As high as 1145 (96.2%) cases were suicidal in

nature followed by 29 (2.4%) accidents and 17 (1.4%) homicidal cases. The criteria for majority being Married status (36.2%), male gender(63.8%), below metric level of education(37%) and rural population(75.2%). Among all these cases majority of the victims belonged to the age group 21-30yrs (30%). The common poisons in the order of choice being Aluminum phosphide, Organophosphorous compounds and alcohol.

The Institute of Legal Medicine, Laussane in China autopsied about 248 cases and it was observed that most victims were male and belonging to the age group 21-39 and organophosphorous compounds being the most common poison ingested. However a look at the urban poisoning revealed a majority of Polyintoxication cases (e.g. Methadone+heroine) accounted due to narcotic over usage and the cases too were found to be mostly suicidal or accidental while about 6 cases was found homicidal. Rout of administration was intravenous (54.4%), oral (28.8%), nasal inhalation (5.7%)

A retrospective study done from 1993-97 at District Hospital and KLE Society hospital, Belgaum on 136 cases childhood poisoning noted the highest mortality among the age group 11-15 yrs

and boys outnumbering girls for reasons varying from mental trauma to playful intentions. Accidental poisoning was noted among younger age groups (0-5yrs) and deliberate self poisoning among older children. As many as 36(27.21%) children died from ingesting Organophosphorus compounds. Kerosene and other petroleum products were the cause in as many as 26(19.12%) while others consumed drugs like anti-convulsants and anti-hypertensives.

Retrospective studies have established that majority of poisoning was suicidal (66%) and was found to be more in Married individuals (56%) and Males (69%). Highest number of victims were of the age group 21-30 years belonging to the farming society. This was followed by accidental cases (33.75%). On considering the mortality among the total cases the victims were mostly from Rural area (38%) or student population (26%). They were exposed to the poisonous substance at Homes (52%) and Fields (28%), the most common poison being Organophosphorus and carbamate (62.2%) followed by ethanol (24.4%) ingested orally (78.75%). The parentral route (21.25%) accounted mostly due to snake bites and scorpion stings. Most of the victims (71.5%) were admitted within 6 hours of poisoning and around 50% - 88% of cases were detected by chemical

analysis. Nuvan (88.9%) was the highest detected poison succeeded by Roger (75%), Ethanol (71.5%) and malathion (50%).

About 117 cases of organophosphorus poisoning was brought to Gandhi Medical College, Bhopal between 1999-2001.Chemical analysis established Cypermethrine to be the commonest compound and in about 24 cases alcohol concentration was detected. The toxicology laboratory performed test such as Solvent Extraction test for insecticides, color test, paper chromatography, thin layer chromatography and High performance liquid chromatography. TIK-20 (Diazan), endosulphan and roger were common in other metropolitan cities. In Sri Lanka it was Dimethoate, malathion, fenthion and in England it was paraquat with males outnumbering the females by 2.4:1. Married females were found to turn to poisoning # times more than unmarried females due to the inability to deal with the emotional and cultural stresses. Other Common Factor found in most of the poison cases were Illiteracy, Rural Background. These victims were also mostly housewives followed by students.

A comprised study done from 1996-2000 on 348 cases of acute poisoning at Regional Medical Sciences Institute, Imphal However

revealed the poisoning was most common among females than males with a male female ratio of 0.99:1.01 among the age group 13-20 yrs. The males were most prone to poisoning in the 21-30 yrs of age with the highest age being 71yrs of age. The common poison being insecticides (53.73%), disinfectants/anti-septics (10.63%). Of the 348 cases,284 (81.61%) cases were suicidal and 64 (18.39%) cases were accidental and no homicidal cases were reported.

After the study of 285 cases of poisoning in the SRN hospital, Allahabad, it was established that 69.74% of victims were males as they were more exposed to stress, strain and occupational hazards. Rural population was mo0re affected and the majority deaths were among the Hindu(84.91%) population than in the Muslim(12.32%) population and among the age group of 15-30 yrs. Among the poison successfully identified in 86.32% of cases, the commonest poison was reported to be Aluminum Phosphide (42.1%) followed by Organophosphorous (17.17%) followed by diazepam among other common poisons. Most poisoning cases (87.02%) were suicidal and some were Accidental (7.31%) thus raising the issue of the need to establish more poison information bureaus and toxicology centres.

UCMS and GTBH, Delhi did a retrospective study on 433 cases of fatal unintentional poisoning from 1997-2001. It was found that 229 cases were suicidal and 58 cases were accidental poisoning with urban population being slightly more than rural people and the most common age group being 13-24, regardless of gender. In 29.4% of cases the poison could not be ascertained. Ethyl alcohol (20.7%) was found to be the most common poison in accidental cases while Aluminum phosphide was the poison of choice among suicide victims (15.7%) followed by Organophophorus (10.3%) and carbamates (3.4%). The poison was mostly consumed in the nights (8pm-6am) and rarely in the afternoon time. Males tended to consume in the nights (42.5%) while in females it was morning and evening (38.9%).

A comparative study on poisoning in India pinned the cause for more incidence of death on the changing pattern of poisoning in the nation's many states. Aluminum phosphide was the most common poison in North India, followed by Organo phosphorus, barbiturates and carbamates. Whereas in South India, Organo phosphorus compounds was the dominant poison. While in children, kerosene was the common cause for accidental poisoning. Rural areas and lower socio economic groups showed a increased incidence. These

facts clearly establishes the need for an intrinsic knowledge of the pattern of poisoning in a particular region as to help in reducing the mortality and morbidity of poisoning by appropriate and timely treatment.

WHO has a reported 2,20,000 deaths due to poisoning annually. Considering the fact that the majority of poisoning cases goes unreported in many regions especially the third world countries, this may well be a much larger number. Most of the poisoning occurs in developing countries. A rough estimate would reveal that about 5to 6 person per Lakh, more than 50,000 population dies in India due to poisoning. An exact figure being difficult to establish due to lack of availability of centralized data. Availability of poisons , socio economic status and cultural etiquettes are some influencing factors that make pesticides and insecticides the most common poison in India. Children were the most victims of accidental poisoning while in adults suicidal cases were more.

There are about 70,000 different chemicals and pharmaceutical substances that can be used as poisons. This makes it difficult for the centers to test the poison cases and thus creating differences between

opinions on different same cases or different cases due to subjectivity. The collection of adequate samples in light of the History, clinical features and autopsy findings can help to better interpret the toxicological laboratory reports.

Negative Autopsy may be due to inadequate history, inadequate internal and external finding and insufficient samples for the laboratory or improper techniques, improper training or inexperience of the doctor conducting the post mortem. It must be remembered that a negative screening does not rule out the presence of toxin but merely states that the toxin does not belong to the panel of tested toxins. A properly preserved negative screened sample when assessed at a later date showed false positive results thus revealing faulty tests. Care has to be taken when finalizing such reports.

Institute of Legal Medicine, Lisbon did a Retrospective study on 540 cases and observed that 274 (47.4%) cases showed positive findings taking into account the circumstances, factors and toxicological reports. Hospital information was the decisive factor in more than half the cases while autopsy findings helped establish poisoning in round 25% of the cases. While in the remaining 306

cases (52.6%) findings were negative. 45% of the negative cases were resolved on autopsy findings and hospital information. The information depending on "Psychological Autopsy" a series of interviews of the victim's relatives and friends using a standard questionnaire. This method led to the establishing of a case as Suicidal or accidental.

Organo phosphorus and other pesticides such as carbamates, chlorinated hydrocarbons and pyrethroids were the most common suicidal poison in India. While accidental poisoning found mostly in children were due Kerosene, other household chemicals and garden plants. The mortality of poisoning in India is as high as 15-35% as opposed to the 1-2% mortality found in developed nations. Accidental poisoning in children below age 15 yrs had a low mortality while the suicidal cases in adults had a high mortality rate.

The toxicity test helps evaluating the degree of toxicity and the harmful effects of a chemical substance, identifying its intrinsic properties and establishing the effective dose and lethal dose, asses the susceptible species and target organs of toxicity and other information for risk assessment. The studies have been designed in

such a way to obtain maximum data possible in order to help easily predict the toxic effects without much bias.

Poison information centers have been established with the primary prerequisite of recognition of the problem of poisoning and the need for specialized facilities to deal with it. The center's main function is to provide information and advice on diagnosis, prognosis, treatment and prevention of poisoning. This information must be made available to all those who would benefit from it. The team involved in such a center consists of physicians, toxicologists, nurses, analysts, pharmacists veterinarians and other experts. The conduction of workshops, seminars, periodical bulletins help in creating awareness among the General public.

Poisoning may result from :

1. The administration of a poison for criminal purposes. 2. Te swallowing of poison in mistake for harmless substance. 3. the inhalation through ignorance or accident of the vapours of a poison. 4. The incorrect preparation of medicines containing a poison. 5. The accidental taking of a large dose of medicine containing a poison. 6. Excessive self medication. 7. Addiction to drugs. 8. Bite by a poisonous animal. 9. Food infected with bacteria or their toxins.

Routes of Administration: In order of rapidity of action: (I) Inhaled in gaseous or vapourous form. It usually involves a volatile substance, gas, dust, smoke or aerosol. Volatile solvents, such as benzene, toluene, xylene, acetone, methylene chloride, methyl chloroform, and carbon tetrachloride poisoning in industrial exposures; solvent sniffing among adolescents, or accidents in the home; gases such as CO. hydrogen sulphide and methane in industries; smokes and dusts of industrial origin may involve lead, mercury, silicon, asbestos and beryllium. (2) Injection into blood vessels. (3) Intramuscular, subcutaneous and intradermal injection. (4)Application to a wound. (5) Application to a serous surface. (6) Application to a bronchotracheal mucous membrane. (7) Introduction

into stomach. (8)Introduction into the natural orifices, e.g. rectum, vagina, urethra, etc. Some drugs can be given by rectal route to produce a systemic effect, e.g., aspirin, barbiturates, chloral hydrate, chlorpromazine etc. (9) Application to unbroken skin. Organic phosphates, nicotine, some organic solvents and lewisite gas can penetrate the skin and produce intoxication and death. Other substances which are absorbed through the skin are: phenol and its derivatives. endrin, methyl salicylate, mercury, tetraethyl lead and alkylated compounds, cantharidin, hydrocyanic acid, hormones, such as oestrogen, progesterone, testosterone and desoxycorticosterone, vitamin D and K.

FATE OF POISONS IN THE BODY: The greater part of a poison is thrown out of the body as a result of vomiting and purging. The portion absorbed is mainly deposited in a less soluble form in the liver, 'I which either partially metabolises or completely destroys it. The unaltered portion enters into the general circulation and acts on the body as a whole, or on the `particular organs with which it has special affinity, provided the poison is not destroyed or made harmless by the kidneys and muscles. Some inorganic poisons like arsenic and antimony are retained in certain tissues, such as nails,

hair, bones, etc., for a considerable time. Certain poisons like chloroform, phosphorus, nitrates and acetic acid disappear by evaporation or oxidised or destroyed in the body and no trace of them can be detected in the viscera or tissues if postmortem is delayed.

Drugs Secreted into the Stomach: **(1) Acids**: Salicylic acid, barbital, probenecid, p - Hydroxypropiophenone, phenylbutazone, thiopental. **(2) Bases**: Theophylline, antipyrine, arninopyrine, quinine, levorphanol, acetanilid, aniline, phencyclidine. dextromorphan, tolazoline. Narcotics, cocaine and amphetamines can be found in high concentrations in stomach even when given parenterally.

Routes of Elimination: The absorbed portion of poison is mainly excreted by the kidneys and to some extent by the skin. Other routes are bile, milk, saliva, mucous and serous secretions. The unabsorbed portion

is excreted in the vomit and faeces.

Levels of consciousness:

Grade 0 : Fully conscious.

Grade 1 : Drowsy but responding to verbal command.

Grade 2 : Maximum response to minimal painful stimuli.

Grade 3 : Minimal response to maximum painful stimuli.

Grade 4 : No response to painful stimuli, loss of all reflexes including the pharyngeal, laryngeal and corneal.

The most painful stimulus is probably rubbing one's knuckles over the patients' sternum. This hurts more than pressing the eyeball and is potentially less dangerous

ACTION OF POISONS: (1) LOCAL: The local action by coming in direct contacts with the part (I) Chemical destruction by corrosives. (2) Congestion and inflammation by irritants. (3) Effects on motor and sensory nerves, e.g., tingling of skin and tongue by aconite, dilation of pupils by belladonna or datura.

(2) REMOTE: Remote action produced either by shock acting reflexly through severe pain caused by corrosives, or by poison being first absorbed into the system through the blood, and then exerting a specific action on certain organs and tissues, e.g., cantharides acting on kidneys produces nephritis, nux vomica acting on the spinal cord causes tetanic convulsions.

(3) COMBINED: Drugs like carbolic acid, oxalic acid, phosphorus, etc., have local and remote actions.

CAUSES MODIFYING ACTION OF POISONS

(1) QUANTITY: More the quantity, more severe are the toxic effects. A large quantity of poison taken orally may cause excessive vomiting, causing its rapid elimination and decreased toxicity, e.g., alcohol, copper sulphate, etc. The action of a poison varies with the dose, e.g., a very large dose of arsenic may produce death by shock without causing irritant symptoms, while moderate doses produce irritant symptoms and small doses produce therapeutic action.

(2) FORM: (a) PHYSICAL STATE: Poisons act most rapidly when gaseous and less when liquid. In and even articles of diet, e.g., shellfish, eggs and fruit case of solids, the action depends on their solubility.

(B) CHEMICAL COMBINATION : The action of a poison depends upon the solubility or insolubility resulting from a chemical combination, e.g., silver nitrate and hydrochloric acid are both strong poisons, hut when combined, form an insoluble salt of silver chloride which is harmless. A substance may be handless in metallic state but its salt may he toxic, e.g., arsenic is not poisonous but its salts are poisonous. Certain poisons which are not soluble in water may

become dissolved in the acid secretion of the stomach and absorbed into the blood, e.g., lead carbonate and copper arsenite.

(C) MECHANICAL COMBINATION: The action of a poison may be altered if combined mechanically with inert substances, e.g., small dose of concentrated mineral acid produces corrosive action, but the same dose largely diluted with water is harmless.

(3) MODE OF ADMINISTRATION: The rapidity of the action is in the order described under routes of administration. As a rough guide if the active dose by the month is considered as unit, the rectal dose is about one-and-half to two, and the hypodermic dose about one-fourth. A lethal dose is usually ten or more times the maximum medicinal dose.

The rate of absorption from the alimentary canal is variable. Absorption by the stomach occurs more rapidly when the stomach is empty than when it is full. Absorption may be hastened if nature of stomach contents is such as will dissolve the poison, e.g., action of phosphorus will he hastened if oil is taken immediately after it is swallowed. Gastroenterostomy hastens the entry of poisons into the

small bowel. Sleep, narcosis and trauma causing gastrointestinal stasis will retard it. Retardation during gastrointestinal absorption, dilution and alteration during digestion, or metabolism by the action of the liver render some poisons almost inactive and greatly reduce the potency of others. The skin is on the whole a bad absorptive organ.

(4) CONDITION OF THE BODY (a) AGE: Age has a considerable effect upon the dosage of drugs. Poisons have greater effect at the two extremes of age. A child under two years of ape has not yet fully developed the drug-metabolising enzymes of the liver, and does not have an effective blood-brain barrier, and as such is much more susceptible to the effect of most drugs. There are some drugs of which children can take more than their proportionate dose, e.g., mercury and belladonna. There are some of which they cannot take even a proportionate dose e.g., morphine.

(B) IDIOSYNCRACY: It may be defined as the inherent personal hypersensitivity to the agent in question. Certain people are sensitive for certain drugs and even articles of diet, e.g., shellfish, eggs and fruit, The symptoms usually occur in the skin as an urticaria, but may be of a more general nature with dyspnoea, rigors, fever, diarrhoea, haemorrhage from the bowel and albuminuria. Fatal cases

are comparatively rare, but symptoms may be alarming or dangerous. Iodine, bromine, opium, helladonna, cocaine, aspirin, penicillin, and mercury are common examples of drugs to which many people are allergic.

(C) HABIT: The effect of certain poisons decrease with habituation. Tolerance is the ability of an organism to show less response to a specific dose of a chemical than it showed on a previous occasion from the same dose. It results from a decreased reaction between the chemical and the biologic effect or substance. Opium preparations frequently taken, lose much of their effect after a time, and require to be administered in increased doses. Addicts can tolerate quantities of the drug which would endanger life if they had been initial doses. Tolerance is seldom a natural phenomenon. The same effect of habit occurs from the use of tobacco, alcohol, cocaine, morphine and other alkaloids. It is more usually a feature of natural substances, less of synthetic drugs, such as sulphonal, barbiturates, chloral, etc. Tolerance for mineral substances is limited, but it occurs in connection with arsenic to a certain extent.

(D) STATE OF HEALTH: A healthy person tolerates better than a diseased. General debility, senility, chronic or disabling disease

may cause death of a person to a dose that is ordinarily safe, e.g., CO may kill at a blood saturation of only 25 to 30%. In some diseases, larger doses of certain drugs may be given without harmful effects, e.g., opium in tetanus, delirium tremens and mania, and strychnine in paralysis, while in other diseases certain drugs cannot be given even in small doses, e.g., opium in granular kidney and bronchial asthma and mercury in chronic nephritis.

(E) SLEEP AND INTOXICATION: The action of a poison is delayed if a person goes to sleep soon after taking it. The action is also delayed if one takes a poison in an intoxicated condition**.**

(F) CUMULATIVE ACTION: Poisons which are eliminated slowly may accumulate in the body when given ha repeated doses for a long time and may ultimately produce symptoms of poisoning.

TYPES OF POISONING: **(I) Acute poisoning** is caused by an excessive single dose, or several smaller doses of a poison taken over a short interval of time. **(2) Chronic poisoning** is caused by smaller doses over a period of time, resulting in gradual worsening. The poisons which are commonly used for the purpose of chronic poisoning are arsenic, antimony, phosphorus and opium. **(3)**

Subacute poisoning shows features of both acute and chronic poisoning. **(4) Fulminant poisoning** is produced by a massive dose. In this death occurs rapidly, sometimes without preceding symptoms.

Parasuicide (attempted suicide or pseudocide) is a conscious, often impulsive, manipulative act, undertaken to get rid of an intolerable situation. Drug ingestion is the commonest form. Most persons are psychologically disturbed.

DIAGNOSIS OF POISONING: **(1) In the Living**: There is no single symptom, and no definite group of symptoms, which are absolutely characteristic of poisoning. The closest resemblance to disease may be produced by thallium poisoning. The symptoms of a disease may simulate acute poisoning, e.g., the sudden onset of intestinal obstruction may be mistaken for irritant metal poisoning. A detailed clinical history is of great importance.

The following conditions should arouse suspicion of poisoning. (1) The symptoms appear suddenly in a healthy person. (2) The symptoms appear immediately or within a short period after food or drink. (3) The symptoms are uniform in character, and rapidly increase in severity. (4) When several persons eat or drink from the

same source of poison in the food or drink at the same time, all suffer from similar symptoms at or about the same time. (5) The discovery of poison in food taken, in the vomit or in the excreta is strong proof of poisoning.

The following groups of symptoms are suggestive of poisoning. (I) The sudden onset of abdominal pain, nausea, vomiting, diarrhoea and collapse. (2) The sudden onset of coma with constriction of pupils. (3) The sudden onset of convulsions. (4) Delirium with dilated pupils. (5) Paralysis, especially of lower motor neurone type. (6) Jaundice and hepatocellular failure. (7) Oliguria with proteinuria and haematuria. (8) Persistent cyanosis. (9) Rapid onset of the neurological or gastrointestinal illness in persons known to be occupationally exposed to chemicals.

Collect: (1) Stomach wash (entire quantity). (2) Ten ml. blood. (3) Urine, as much as possible. 100 mg. of sodium fluoride for 10 ml. blood acts both as a preservative and as an anticoagulant.

Symptoms of Chronic Poisoning (1) The symptoms are exaggerated after the administration of suspected food, fluid or medicine. (2) Malaise, cachexia, depression and gradual deterioration

of general condition of the patient is seen. (3) Repeated attacks of diarrhoea, vomiting, etc., are seen. (4)When the patient is removed from his usual surroundings, the symptoms disappear. (5) Traces of poison may be found in the urine, stool or vomit.

A detailed history of the quality and quantity of the poison administered, the character of the symptoms with reference to their onset, and the time that passed between the taking of the poison and the development of symptoms, the duration of illness, the treatment given, and the time of death, should be obtained from the relatives of the deceased.

In the Dead: Collect all information from the inquest report and from the relatives of the deceased.

(I) Postmortem Appearances : External (1) The surface of the body and the clothes may show stains or marks of vomit, faeces or the poison itself. The colour changes in the corroded skin and mucous membrane are: (a) sulphuric and hydrochloric acid: grey, becoming black from blood; (b) nitric acid: brown; (c) hydrofluoric acid: reddish-brown; (d) carbolic acid: greyish-white; (e) oxalic acid: grey, blackened by blood; (0 cresols: brown, leathery; (g) caustic alkalis:

greyish-white; (h) mercuric chloride: bluish-white; (i) zinc chloride: whitish; (j) chromic acid and potassium chromate: orange, leathery. (2). Colour of **postmortem staining** : The skin may be dark-brown or yellow in phosphorus and acute copper poisoning; cherry-red in poisoning by carbon monoxide; chacolate-coloured in cases of death from poisoning by nitrites, aniline, nitrobenzene, acetanilide, bromates, chlorates, due to the formation of methaemoglobin. (3)**Smell about the mouth and nose**: Substances which may be recognised by their odour are: (a) **Garlic-like**: Phosphorus, arsine gas, arsenic (breath and perspiration), thallium, tellurium, seleni urn, dimethylsu parathion, malathion. (b) **Sweet or fruity**: Ethanol, chloroform, nitrites. (c) **Acrid**: Paraldehyde, chioral hydrate. (d) **Rotten eggs**: Hydrogen sulphide, mercaptans, disulfiram. (e) **Fishy or musty**: Zinc phosphide. (1) Other substances are: Cyanides, phenol, opium, ether, camphor, etc. (4) **The natural orifices**, e.g., mouth, nostrils, rectum and vagina may show the presence of poisonous material or the signs of its having been used. (5) **Injection marks** should be looked for with care. (6) **Skin** should be examined for lesions, e.g. have significant injury in the lower half to two hyperkeratosis and pigmentation may be found in chronic arsenical

poisoning. Jaundice may occur in poisoning from phosphorus, senecio, and in susceptible persons by potassium chlorate. (7) Any evidence of **marks of violence**, such as bruises, or wounds of any nature, may suggest some form of death other than poison.

The bodies of persons poisoned are not more rapidly decomposed than those of others. Some poisons may delay the action of the putrefactive bacteria to some extent.

Internal: There is no special routine peculiar to poisoning cases. All organs must be examined and all contents preserved.

(1) Smell : On opening the body, note any peculiar smell. The skull should be opened first to detect unusual odours in the brain tissues, because such odours are masked by the opening of the body cavities. This is useful in cyanide, alcohol, phenol, cresol, ether, chloroform and camphor poisoning.

(2) Mouth and Throat : Examine the tongue, mouth and throat for any evidence of inflammation, erosion or staining. Areas of necrosis of the pharynx may be secure in death associated with agranulocytosis caused by amidopyrine, thiouracil, dinitrophenol, su and barbiturates.

(3) Oesophagus : Corrosive alkalis produce marked softening and desquamation of the mucous membrane. In acute cantharidin poisoning, the mucous membrane is often swollen and engorged and may show patches of ulceration. Perforation of oesophagus may occur in poisoning from paraquat and fluorides.

(4) Upper Respiratory Tract: Examine the larynx, trachea and bronchi for evidence of volatile irritants or inhaled poisonous matter. Oedema of glottis, and congestion and desquamation of mucous membrane of the trachea and bronchi may be seen in corrosive acid or alkali poisoning when it enters the respiratory tract.

(5) Stomach:Toxic substances may be held in high concentrations in the rugae and crypts of the mucosa, or even in the blood in the actual stomach wall. The pathway of acids and alkalis in food-filled stomach starts along the lesser curvature of the stomach and leads to the pylorus which explains the location of greatest damage in food-filled stomach (Fig 24-2). Stomachs without food tend to thirds and may have sparing of the fundus (fig.24- 3).The colour and appearance may be normal, though poison is present.

(a) Hyperaemia: Hyperaemia of the mucous membrane caused by an irritant poison is usually patchy and of a deep crimson colour. The ridges are more involved in poisoning than in disease. The mucous membrane is often covered with a sticky secretion and shows small haemorrhagic foci. Redness of mucous membrane of the stomach is found after death, but is usually limited to the posterior wall. In this case, there is no thickening of mucous membrane, nor any thick mucus over its surface. Redness of the mucosa is also found during digestion, in asphyxial deaths due to general venous congestion, and when it is exposed to atmosphere. Hyperaemia caused by disease is uniformly spread over the whole surface and not in patches. Putrefactive changes will alter the colour of a healthy stomach, but the destructive changes of poisoning are usually present. Histological examination helps in cases of doubt.

Colours other than red: may be present due to various causes. Mercury usually causes a slate- coloured stain; arsenic may show white particles adherent; strong sulphuric, acetic or hydrochloric acids, and concentrated oxalic acid are likely to blacken or char the wall; nitric acid may cause yellow colour, carbolic acid may produce buff or white colour and shrivelling; cresols produce brown colour;

copper produces a blue or green colour. The colour may also be due to bile when there will be no signs of inflammation, or to fruit juice or food, when it is uniform and without signs of inflammation.

(b) Softening: Corrosives and irritants produce immediate contraction of the muscularis, due to which the superficial epithelium is damaged, while the depths of the glands are protected by compression of their necks by the spasm. Excess of mucus is secreted by the glands due to the neighbouring irritation. If life is prolonged, the poison passes deeper and deeper. Spasm of the pylorus holds a poison at this point, which is the site most often involved. Softening of mucous membrane of stomach is usually caused by corrosive poisons, chiefly alkaline corrosives. It is also seen in mouth, throat and oesophagus. In disease, it is limited to stomach and is usually found at its cardiac end. Softening due to putrefaction begins in most dependent parts and affects all the coats of the stomach without detachment of its mucosa and softened patch is not surrounded by an inflamed area.

(c) Ulcers: Ulceration due to corrosive or irritant poisons appears as an erosion with thin. friable margins. The surrounding mucosa is softened due to inflammation, and there is diffuse

hyperaemia. An ulcer from disease is usually seen on the lesser curvature and the margins are well- defined, thickened and indurated.

(d) Perforation: Perforation is occasionally observed, when the strong mineral acids have been taken, especially sulphuric acid; it is much less common with other acids. Ammonia can cause perforation of stomach. The stomach, in such cases is blackened and extensively destroyed the aperture is irregular, the edges sloughing, and the adjacent tissues easily torn. The acid escapes into the abdomen and causes peritonitis. Perforation by irritant poisons is rare. In chronic gastric ulcer, it is oval or rounded and has a punched-out appearance and may show chronic adhesion to neighbouring organs.

In autolysis from postmortem digestion, the change is confined to the stomach alone, and it is commonly found only at the cardiac end. The opening is large and irregular, with rough and pulpy edges. The surrounding mucous membrane is softened and gelatinous. Peritonitis is not seen.

The Contents of the Stomach: The ligatured stomach should never be sent for analysis without being opened, as putrefaction may obscure changes in the mucous membrane, and the gases produced

may result in the lid of the jar being forced off in transit. The stomach is opened along its greater curvature in a clean porcelain dish. The wall is examined for fragments of poison adhered to it, such as powdered poisons, fragments of capsules, starch from tablets, fragments of leaves or fruit, cantharides,

written notes made, regarding the volume, colour and contents, including food. The presence of seeds, leaves, capsules and foreign bodies such as nails. pins, glass, etc., must be noted.

The cells of plants in the alimentary canal retain their characteristic shape, dimensions, surface ornamentation and other characters, which can be identified in vomit or material from gastrointestinal tract, by microscopic examination.

(6) The Duodenum and Intestines: A strongly acid reaction is of greater significance here than in the stomach contents. Sodium hydroxide can rarely cause perforation of duodenum. Ulceration beyond the pylorus is usually due to natural disease. The only characteristic change which occurs in the intestine is seen in mercury poisoning. This change which usually involves the ascending and

transverse colons is a diphtheretic colitis, which may resemble the enteritis of acute bacillary dysentery.

A normal gastrointestinal tract rules out poisoning by corrosive acids and alkalis, phenols, mercury and arsenic.

(7) Liver: Substances, such as arsphenamine, phosphorus, chloroform, trinitrotoluene, carbon tetrachioride and senecio, may produce liver necrosis. Arsenic, carbon tetrachloride, amanita phalloides, yellow phosphorus and rarely ferrous sulphate produce a fatty liver. Jaundice may be produced by phosphorus. senecio and potassium chlorate, due to acute haemolytic anaemia.

(8) Respiratory System: Oedema of the glottis and congestion and desquaniation of the mucous membrane of the trachea and bronchi may be seen in corrosive poisoning when the acid or alkali has entered the respiratory tract. The lungs show non specific signs of congestion and oedema.

(9) Kidneys: Parenchymatous degenerative changes are commonly found in irritant metal poisoning, and in cantharidin poisoning. Extensive necrosis of proximal convoluted tubules may be

found in deaths from poisoning by mercuric chloride, phenol, lysol and carbon tetrachloride.

(10) Heart: Subendocardial haemorrhages in the left ventricle occur in most cases of acute arsenic poisoning.

(11) The bladder, and in females the **vagina and uterus** should be particularly examined, for poison is occasionally introduced into the body by these mutes. In criminal abortion, it may be necessary to send the vagina and uterus for analysis

Many poisons, such as alkaloids do not produce characteristic tissue changes. The presence of wounds or of a disease sufficient to cause death, does not rule out the use of poison. A poison can cause death without leaving any naked eye changes, and proof of poisoning must be obtained from other sources, or from chemical examination. No poison kills without producing some symptoms of illness, if no signs after death. Therefore, enquiry as to symptoms in life is very important. The conclusion that death was caused by poison depends on evaluation of clinical, toxicologic and anatomic evidence.

Chemical Analysis: If during autopsy any organ is removed from the body, it should never be placed on any surface, or in any

container which is not clean. If this is not done, a doubt may arise, whether the poison found might have been accidentally introduced in the vessel used. If a refrigerator is available, all organic substances, should be kept in it as soon as possible after removal from the body. Chemical compounds should not be added, as they may confuse the issue, Decomposition may produce substances not in the original stomach, but allowances can almost always be made for these without confusion.

The specimens of blood, urine, bile and vitreous should be placed in glass containers, but not in plastic containers, as these fluids can leach out plastic polymers from the wall of a plastic container, which may mask some compounds and interfere with analysis.

Blood is the specimen of choice for detection of poisons, as it gives the best indication of the quantity of drug exerting an effect on the person at the time of death. The urine concentrates the drug or poison in many cases. It is suitable for single direct spot test, because there is no protein-binding to prevent extraction. The concentration of poisons found in urine is not important in evaluating the quantity ingested or the toxicity. in delayed deaths, the poison may he found in urine, when none is found in viscera.

The muscle, especially of thigh is well preserved in advanced decomposition. Levels of drugs in the muscle more accurately reflect blood levels than the liver or kidney.

Postmortem diffusion of the drugs occur from the stomach into the liver, mainly the left lobe. Diffusion also occurs in the base of left lung, spleen and pericardial fluid and to a lesser degree into heart, aorta

In a living person, the concentration of a poison is lower in the venous blood as compared to arterial, because tissues may take up the compound from the arterial supply. Portal blood has higher concentration of a poison that is being absorbed from the intestine. After death, variation in concentration is caused by uneven destruction by enzymatic and microbiological activity and from diffusion from sites of higher concentration. Postmortem levels of many poisons are unreliable because the barriers formed by living cell membranes breakdown after death, and molecules can easily move through the tissues into blood vessels.

It is essential to prevent contamination of the solid viscera with the contents of the gastrointestinal tract, because an idea of the length

of time since ingestion may be had from the relative amounts of poison in the stomach, intestines and the solid organs. If the poison is only found in the contents of the stomach, and none in the solid viscera and is not an irritant, doubts may occur about the actual cause of death. Poison found in liver or kidney is proof of absorption. Therefore, it is important to keep the contents of the alimentary canal in separate bottles. Poison found in urine, unless added with evil intention is a proof of absorption and excretion. If the poison is also found in the food or medicine preserved, this would be very strong additional evidence. The stomach contents are of primary value for estimating the quantity ingested in acute overdoses, and qualitatively in identifying substances which have been recently ingested

INFORMATION SUPPLIED TO THE LABORATORY:

The pathologist should provide all available information to the toxicologist, i.e. (I) brief details of symptoms if any, and length of illness, (2) if poison taken is not known, drugs or poisons to which the deceased was known to have access, including medication being taken, (3) history obtained from family members and friends, (4) empty containers or medications found at the scene, (5) autopsy findings, and (6) any special risk with the samples, e.g. hepatitis B

virus, AIDS, etc It is very important recover and send the container in which the toxic substance had been kept, which narrows the toxicologist's search to one or more specific compounds. The pathologist should not ask the toxiccologist to look for a "general unknown poison" in the viscera preserved.

THE ANALYTIC PROCEDURE

For toxicologic analysis, poisons can be divided into five groups.

ANALYSIS: Toxicological analysis of biological tissues involves: (1) Separation of the drug from the biological tissue. For this, the contents of stomach are phenacetin, etc. (2) Compounds which may be extracted diluted in water, and the solid viscera are cut into small pieces and macerated in water. Then a solvent is used to extract the poison. (2) Purification of the drug. This is done by additional extraction procedures using alkaline and acid solutions. (3) Analytical detection and quantitation. This is done by thin-layer chromotography (TLC), gas chromatography (CC), gas chromatography- mass sepectrometry (GC-MS), and rarely UV spectrophotometry. Except for gas chromatography- mass

spectrometry, none of the methods is totally specific. If a method of analysis other than GC-MS is used for initial identification, then often it is easier to make positive identification and even quantitation using the GC-MS.

GROUP I. GASES: Gases are separated from blood or lungs by simple aeration procedures and P specific tests applied. Air samples collected at scene of exposure give better results.

GROUP II. Steam volatile poisons: They include both organic and inorganic substances, which are separated from biological materials by steam distillation from an acidic or basic medium, e.g. ethyl and methyl alcohol, phenol, chlorinated hydrocarbons, benzene, amphetamines, nicotine, yellow phosphorus, etc.

Steam distillation of a sample of finely minced tissue containing tartaric acid separates volatile acidic and neutral substances. The residue is made alkaline and redistilled, which separates volatile basic substances. Individual qualitative tests are carried out on suitable portions of the distillate, if some volatile compound is identified in distillate; a fresh weighed sample of tissue is used for quantitative analysis.

GROUP III. METALLIC POISONS: (I) In Dry Ashing Procedure the weighed and minced tissue is dried in an oven and then placed in muffled furnace at 450°C until all the organic matter is destroyed. The remaining ash is leached with mineral acids and resulting solutions subjected to qualitative and quantitative analysis for individual metals. Arsenic, antimony and mercury are volatile at 450°C and would he lost in such procedure.

(2) The Wet Ashing Procedure employs a mixture of nitric, sulphuric and perchloric acids to oxidise the organic matter. The remaining solution is the ash which is used for analysis of various metals.

GROUP IV. NONVOLATILE ORGANIC POISONS: This group includes all compounds that are alcohol and water soluble. (1) Compounds which may be extracted from an acidic aqueous medium by chloroform or ether include organic acids and organic slral compounds, such as barbiturates, acetanilid, from a basic aqueous medium by chloroform or ether include organic bases, such as cocaine, quinine, strychnine, phenothiazines. imipramine, nicotine, demerol, etc. (3) Compounds which may be extracted from aqueous solution, which is faintly alkaline with ammonia or sodium

bicarbonate, by chloroform with 10% ethanol include morphine, dionin, dilaudid, etc.

For the above substances 200 to 500 g. of tissue is finely ground, and treated with alcohol, filtered and alcohol evaporated, and process repeated and a final residue is obtained and tests, such as TLC, CC. CC- MS carried out to find out specific poison.

GROUP V. MISCELLANEOUS: This includes all substances which are not classified in any of the above four groups, such as non-metallic inorganic substances and water and alcohol insoluble organic compounds. For identification, special individual procedures for each substance must be employed

Cause of Death: The blood level of the drug or chemical is useful to determine the cause of not always be in the lethal range for it to reflect the cause of death, especially in a treated case. When the presence of a highly toxic material is established even in trace amounts, the inference that the poisoning is cause of death is justified.

Toxic and Lethal Drug Levels : Fatal concentrations of poisons vary depending upon: (I) analytical techniques which vary widely both in method and accuracy, (2) site of sampling, (3) fatal

level being attributed to one substance without considering the levels of other toxic substances that the deceased may have taken, and of which the pathologist or analyst may not be aware. Many victims who die due to poisoning, have lower blood concentrations of the responsible agent than those usually regarded as fatal. The causes for this may be : (I) Unusual susceptibility to the drug; (2) combinations of drugs can interact in an additive fashion; (3) some pre-existing natural disease may have contributed to death; (4) rapid but not complete absorption of drug; (5) metabolic degradation of the drug during a prolonged survival in which respiratory complications and hypoxic encephalopathy maintain coma and act as the immediate causes of death.

If low levels are found in viscera, consider: (a) Poly-pharmacy. (b) Time lapse after ingestion with death, in findings. the cause correlation with clinical and anatomic A lethal level does not by itself establish of death. The blood level of a drug need resulting metabolism of drug. (c) Positional asphyxia Failure to Detect Poison : In some cases, no (d) Intravascular sickling in certain trace of poison is found on analysis. although from haemoglobinopathies. (e) Post ictal respiratory failure. Death may occur one to two weeks after

ingestion of drugs from apparent unrelated causes, e.g.. (a) Bronchopneumonia. (b) Therapeutic from tracheostomy. (c) Hepatitis. (d) Fungal or bacterial endocarditis. (e) Encephalomalacia. (1) Haemotologic problems.

Toxicity: The **"therapeutic index"**, or the ratio of the toxic to the effective dose of a drug. indicates the relative toxicity of drugs. Toxicity of the chemicals have been devised depending on the amounts which produce harm.

The **lethal dose** is the dose that kills. "Minimal lethal dose' is the smallest dose that has been recorded as fatal to a healthy person. The usual lethal dose of a poison is ten times the therapeutic dose.

Young's rule: The dose of a drug for a child is obtained by multiplying the adult dose by the age in years and dividing the result by the sum of the child's age plus 12.

Interpretation of Toxicological Results: The following factors should be considered in the interpretation of the result of toxicological analysis. (I) Age and weight of the deceased, (2) Presence of a natural disease condition. (3) Presence of traumatic lesions. (4) Degree of tolerance of the individual. (5) Hypersensitivity reaction.

Putrefaction and Toxicologic Analysis: In postmortem decomposition many poisons present in the tissues undergo chemical changes, and cannot be detected. Putrefaction of normal tissue may produce substances which give chemical reaction similar to those obtained from toxic compounds. Most volatile compounds are lost due to putrefaction, but ethyl alcohol and cyanide may be produced from normal tissue. Neurin, muscarin, mydalein, etc., are produced due to putrefaction. the toxicity of which is equal to the well-known alkaloids. In an embalmed body, it i,4 very difficult to detect and identify most volatile poisons.

Table (24-2) Toxicity Rating (Gosselin, et. al).

<5 mg/kg	6 (super toxic)
5 to 50 mg/kg	5 (extremely toxic)
50 to 500 mg/kg	4 (very toxic)
0.5 to Sg/kg	3 (moderately toxic)
Stol5glkg	2(slightlytoxic)
> I kg	1 (non-toxic)

Failure to Detect Poison :

In some cases, no trace of poison is found on analysis, although from other circumstances, it is almost or quite certain that poison was the cause of illness or death. The possible explanations of negative findings are (I) The poison may have been eliminated by vomiting and diarrhoea, e.g. in irritant poisons. (2) The whole of the poison has disappeared from the lungs by evaporation or oxidation. (3) The poison after absorption may be detoxified, conjugated and eliminated from the system. (4) Some vegetable alkaloidal poisons cannot be definitely detected by chemical methods. (5) Some drugs are rapidly metabolised, making extraction difficult. (6) Some organic poisons especially alkaloids and glucosides may by oxidation during life, or due to faulty preservation, or a long interval of time, or from decomposition of the body, may deteriorate and cannot be detected chemically. (7)Biological toxins and venoms which may be protein in nature cannot be separated from body tissues. Immunoassay procedures can detect these compounds. (8) If the poison acts slowly and death is delayed following production of irreversible organic changes (e.g. hydrogen sulphide or cyanide), the poison may be completely excreted. (9) Sometimes, decomposition products makes

the detection difficult or impossible. (10) Treatment may alter the poisonous substance. (II) Many drugs may be present in very small amount and these may require considerable amount of viscera for their identification. (12) The wrong or insufficient material may have been sent for analysis.

False positive results: (Many poisons enter the body regularly in small amounts with food, water or air. (2) Due to decomposition: (a) Gases (methane, H2S, CO2, mercaptan). (b) Alcohol. (c) CO2 (d) Cyanide. (3) Cyanide (burns). (4) Anticoagulants used for blood (methanol, formalin, EDTA, heparin). (5) Regular intake of arsenic, mercury and lead by food and water. (6) Therapeutic use of arsenic, strychnine, sedatives and tranquilisers. (7) Nicotine in the blood of smokers. (8) Chemical bums due to gasoline (in automobile and aircrash accidents) (9) Faulty technique of sample collection. (10) Contamination of blood with stomach contents, pleural or pericardial fluids.

(Ill) Experiments on Animals : This is not an ideal test, for signs and symptoms may be due to other causes. Absence of signs and symptoms may be due to insusceptibility of the animal to the particular poison, e.g., rabbits are insusceptible to belladonna,

hyocyamus and stramonium; pigeons are not affected by opium. Cat and dog are affected by poisons almost in the same way as man. They may be fed with the suspected food or with the poison after it is separated from the viscera and the symptoms noted.

(IV) Moral and Circumstantial Evidence: Such evidence may consist of motive, the evidence of witness about the recent purchase of the poison, his behaviour before and after the commission of the offence, and the recovery of the poison from the possession of the accused.

TYPES OF DRUG FATALITIES: Drug-related deaths can be (1) Primary drug fatalities are those in which death is due to the toxic or adverse effect of the chemical agent, with or without the contributory influence of pre-existing, unrelated natural disease. (2) Secondary drug fatalities are those arising from medical complications of drug abuse, such as viral hepatitis and bacterial endocarditis. (3) Drug associated fatalities are those caused by homicidal, accidental and suicidal violence arising directly or indirectly from activities related to the obtaining and use of illicit drugs.

Drug Automatism: According to this hypothesis. the patient develops a state of toxic delirium after ingesting one or several doses of a drug (usually depressant drugs, alcohol, or a combination of these), and in the delirious or automatism slate, takes additional doses of the drug without realising it. It is difficult to prove or disprove this hypothesis.

TREATMENT OF POISONING

(I) Immediate resuscitative measures in comatose patients should be adopted to stabilise respiration, circulation and to correct CNS depression (ABCD of resuscitation). (A) **Airway**: Opening tip and cleaning up the airway (oral cavity, nostrils) of secretions, vomit or any other foreign body might be life saving, Protecting and securing the airway by means of endotracheal intubation may be necessary. (B) **Breathing**: If the arterial blood gas cannot be maintained inspite of establishing an effective airway, then graduated supplemental oxygen therapy either by a ventimask or through endotracheal tube should be administered. (C)

Circulation: I.V. fluid administration may be life sustaining line. (D) **Depression of CNS** should be corrected. An unconscious patient

should be turned to lie on one side to stop the tongue blocking the throat and to allow fluid to come out of the mouth (recovery position). Most of the poisoning cases, whether they are conscious or unconscious recover with supportive care alone.

(II Removal of Unabsorbed Poison from the Body. (I) Inhaled Poisons: If the poison is inhaled as a gas, the patient must be removed into fresh air, artificial respiration oxygen (six to eight litres per minute) should be given. The air-passages should be kept free from mucus by postural drainage or by aspiration. Nikethamide 2 ml. i.v. should be given if necessary. Give aminophyline 250 to 500 mg. if there is severe bronchospasm and diuretics if there is pulmonary oedema.

(2) Injected Poisons: If the poison has been injected subcutaneously from a bite or an injection, a tight ligature should be applied immediately above the wound, which must be loosened for one minute after every ten minutes, to prevent gangrene. The wound should be excised, the poison sucked out, and the poison neutralised by suitable chemical substance. Local vasoconstriction can be produced by injection of adrenaline. Immersion of the extremity in water at 10°C. slows capillary blood

(3) Contact Poisons: Patient's contaminated clothes, contact lenses and jewellery should be removed immediately. If poison is applied to the skin or wound, or is inserted into the vagina. rectum or urinary bladder, it should be removed by washing with water for 30 minutes or should be neutralised by specific chemical. Eyes should be irrigated with normal saline for at least 15 minutes.

(4) Ingested Poisons: GASTRIC LAVAGE: It is useful any time within 3 hours after ingestion of a poison. It is done using a stomach tube (Ewald or Boa's, tube) or ordinary soft, non-collapsible rubber tube of one cm. diameter and one-and-half metre length, with a glass funnel attached at one end, and a mark about 50 cm. from the other exit which should be rounded with lateral openings to avoid any injury when it is being passed. At about the mid-part of the tube there is a suction bulb, used to pump out the stomach contents. A wooden mouth gag has a hole at its mid-part to allow the passage of the tube through it. One end of the gag is pointed so that it can be forcefully inserted by the side of the mouth in non-cooperative patients. Dentures must be removed and a mouth gag is placed in right position in between the teeth of two jaws, so that the teeth do not bite the tube. Care should be taken in unconscious persons, who are likely to

regurgitate and then aspirate stomach contents into respiratory tract and die from asphyxia. Patient should be lying on his left side or prone with head hanging over the edge of the bed, and face down supported by an assistant, so that the mouth is at .a lower level than larynx, so that any fluid which may leak out through the sides of the tube will not trickle down inside the larynx and trachea. The end is lubricated with olive or sweet oil, liquid paraffin or glycerine, and is passed into the stomach by depressing the tongue with two fingers or tongue depressor, and slowly passing it downwards through the pharynx and oesophagus into the stomach, till the 50 cm. mark is reached. If there are no marks on the tube, the tube should be passed for a distance equal to that measured between the bridge of. the nose and the tip of the xiphoid process. Force must not be used to insert the tube. Absence of coughing and of breath sounds in the funnel will confirm that the tube has not entered into the trachea. Whenever in doubt, test by keeping the free end of the tube just below a water surface. Air from the stomach is usually expelled completely in 2 to. 3 expirations, whereas air from the lungs causes bubbling at each expiration. About one-fourth litre of warm water 5YC) should be passed through the funnel held up above the patient's head. When

funnel is empty, compress the tube below it between the finger and thumb and lower it below the level of the stomach, and its contents will be emptied by rubber tubing. If stomach pump is used, applying suction on the bulb will siphon the stomach contents. Stomach contents can he aspirated by a 20 ml. syringe. Preserve this for chemical analysis. If there is any bleeding, abandon the procedure. Gastric lavage may be done with water 1:5000 potassium permanganate; five per cent sodium bicarbonate four percent tannic acid: one percent sodium or potassium iodide; one to three percent calcium lactate: saturated lime water or starch solution, or 0.9% saline. Next, use about half litre of suitable solution and repeat till clear and odourless fluid comes out. This indicates that there is no further interaction between the antidote and poison. At this stage, the stomach is not completely emptied but a small quantity of the fluid containing the antidote or activated charcoal suspension (one gm/kg body weight. Or fand a cathartic) is left behind in the stomach, so that it may neutralise whatever small quantity of the poison is left behind. Ryle's tube or a number 10 to 12 French catheter can be used for infants and children, and about 25 cm. is necessary to reach the stomach. After a recent heavy meal, the bulky contents are first .

removed by emetics. Stomach wash is better than emesis because of the discomfort caused to the patient in vomiting. In poisoning with salicylates, phenothiazines, tricyclic antidepressants. antihistamines, lavage can be done up to 12 to 18 hours after ingestion of the poison.

Contraindications: The only absolute contraindication is corrosive poisoning (except carbolic acid), owing to the danger of perforation. In the following conditions stomach wash can be done by taking proper precautions. (1) Convulsant poisons, as it may lead o convulsions. Lavage should be done after controlling the convulsions. (2) Comatose patients, because of the risk of aspiration of fluid into the air-passages. The airway should be sealed by cuffed endotracheal tube (8 to 9 mm) and lavage done. (3) Volatile poisons, which may be inhaled. (4) Upper alimentary disease, e.g., oesophageal varices. (5) In patients with marked hypothermia, and haemorrhagic diathesis.

Complications: (I) Laryngeal spasm. (2) Aspiration pneumonitis. (3) Perforation of stomach. (4) Sinus bradycardia.

Emetics : Emetics should be used only if there is difficulty in obtaining or using a stomach tube. Vomiting can be produced only if the medullary centres are still responsive. Due to the danger of such

as steam, CO_2, etc., to increase its adsorptive inhaling gastric contents, vomiting should only be induced when a conscious patient is lying on his side with the head dependent Ipecacuanha powder one to 2 g. or 30 ml. of ipecac syrup for adults, 15 ml (I to 12 years), 10 ml (9 to 12 months), 5 ml (6 to 9 months) followed by several glasses of water induces vomiting in 90 to 95% of patients within 20 to 30 minutes. Syrup of ipecac contains cephaeline and emetine. It induces vomiting by local activation of peripheral sensory receptors in the CIT and stimulation of vomiting centre. The dose is repeated. if vomiting does not occur in half hour. This is the only and best method of producing vomiting. Ingestion of excessive amount of salt water may cause fatal hypernatraemia. Household emetics, i.e. mustard powder (one teaspoon) and common salt are not effective and can lead to complications. Apomorphine, copper sulphate, tartar emetic and zinc sulphate are absolete.

Contraindications: Same as for stomach wash and (1) severe heart and lung diseases, (2) advanced pregnancy, and (3) after ingestion of a CNS stimulant, because further stimulation associated with vomiting may produce convulsions.

(III) Administration of Antidotes: Antidotes are substances which counteract or neutralise the effects of poisons. Common modes of action of antidotes are (1) Inert complex formation, e.g. chelating agents for heavy metals, dicobalt edetate for cyanide. (2) Accelerated detoxification, e.g. thiosu for cyanide. (3) Reduced toxic conversion, e.g. ethanol for methanol. (4) Receptor site blockade, e.g. naloxone for opiates; atropine for organophosphates at muscarinic receptor sites. (5) Toxic effect bypass, e.g. 100% oxygen in cyanide poisoning.

Tickling throat: Make patient lie face down or sit well forward with the head lower than the chest, and ask the patient to touch the back of the throat with his fingers or with your own finger or a blunt object, such as a spoon handle or a wooden tongue depressor. This is usually ineffective.

(I) Mechanical or Physical Antidotes: They neutralise poisons by mechanical action or prevent their absorption. (1) Activated charcoal is a fine, black, odourless powder. It is produced by the destructive distillation of various organic materials, usually from wood pulp, and then treating at high temperatures with a variety of activating agents, capacity. The particles are small, hut the surface area is very large. It can he used by mixing with water to form a soup-

like slurry (! inl.of water per gram of charcoal). it acts mechanically by adsorbing and retaining within its pores organic, and also to a less degree mineral poisons, and thus delays the absorption from the stomach. Barbiturates, atropine, benzodiazipincs, opiates, quinine, strychnine, phenothiazines. digitalis, amphetamines, antidepressants, ntiepileptics, antihistamines, chioroquine, cimetidine, tetracycline, theophylline, pyrethrins, aluminium phosphide are well adsorbed. hi multipe doses it significantly increases the total body clearance of opium, cyanide and phenobarbital. Phenol, salicylates, kerosene, paracetamol are moderately adsorbed. It is not useful in poisoning with corrosives, heavy metals, cyanide, hydrocarbons and alcohol. The initial dose is 60 to 100 g. in adults and 15 to 30 g. in children using 8 ml.of diluent per gram of charcoal. Adsorption may lead to release of the offending chemical as the pH of the environment changes during the passage of the material through the gastrointestinal tract. Repeat doses of 50 g. every four hours can be given in poisoning by aspirin. phenobarbital, theophylline, phenothiazines, antihistamines, tricyclic antidepressants, and carbamazepine, up to 2 days.

(2) **Demulcents** are substances which form a protective coating on the gastric mucous membrane and thus do not permit the poisons to cause any damage, e.g. milk, starch, egg-white, mineral oil, milk of magnesia, aluminium hydroxide gel, etc. Fats and oils should not be used for oil-soluble poisons, such as kerosene, phosphorus, organophosphorus compounds, DDT, phenol, turpentine, aniline, acetone, carbontetrachioride, etc.

(3) **Bulky food** acts as a mechanical antidote to glass powder by imprisoning its particles within its meshes, and thus prevent damage being effected by the sharp glass particles.

Multidose activated charcoal: It facilitates the passage of substances from plasma into the intestinal lumen (by creating a concentration gradient between the blood and bowel fluid), where the concentration of toxin has been significantly lowered by intraluminal charcoal adsorption, and significantly decreases the half-life of several drugs. Initial loading dose is 1 to 2 g/kg. Repeat doses of 0.5 to 1 g/ kg are given at 4 to 6 hours intervals. It can also be administered by continuous infusion of 0.25 to interfering with another's action upon the enzymes, 0.5 g/kg/hour through a nasogastric tube.

(2) Chemical Antidotes: They counteract the action of poison by forming harmless or insoluble compounds or by oxidising poison when brought into contact with them. (I) Common salt decomposes silver nitrate by direct chemical action, forming the insoluble silver chloride. (2) Albumen precipitates mercuric chloride. (3) Dialysed iron is used to neutralise arsenic. (4) Copper sulphate is used to precipitate phosphorus. (5) Potassium permanganate has oxidising properties. 1:5000 solution is used in poisoning for opium its derivatives, strychnine, phosphorus, hydrocyanic acid, cyanides, barbituric acid and its derivatives, atropine and other alkalis. When it reacts with the poison in the stomach, it loses its pink colour. The wash must be continued till the solution coming out of the stomach is of the same pink colour as the solution put in. (6) A solution of tincture iodine or Lugol's iodine 15 drops to half a glass of warm water precipitates most alkaloids, lead, mercury, silver, quinine and strychnine. (7) Tannic acid 4%, or tannin in the form of a strong tea or one teaspoonful of tannic acid in water tends to precipitate apomorphine. cinchona, strychnine, nicotine, cocaine, aconite, pilocarpine, lead, silver, aluminium, cobalt, copper, mercury, nickel and zinc. (8) Alkalis neutralise acids by direct chemical action. It is

safer to give little weak solution of an alkaline hydroxide, magnesia or ammonia. Bicarbonates should not be given, because of the possible risk of rupturing the stomach due to liberated CO_2. (9) Acids neutralise alkalis by direct chemical action. Only those substances which are by themselves harmless should be given, e.g. vinegar, lemon juice, canned fruit juice. Neutralisation of acids with alkali and vice versa should be avoided because exothermic reaction of neutralisation can cause additional injury.

Socalled **universal antidote** consisting of activated charcoal, or burnt toast 2 pñrts, magnesium oxide one part and tannic acid or strong tea one part is not recommended.

(3) Physiological or Pharmacological Antidotes: They act on the tissues of the body and produce symptoms exactly opposite to those caused by the poison. They are used after some of the poison is absorbed into the circulation. Their use is somewhat limited and not without danger. These agents act on the principle of antagonism by tissue cells or opposing nerve systems. Most of the known antidotes are only partial in their action. Atropine and physostigmine are two real physiological antidotes, as both of them affect nerve endings and produce opposite effects on the heart rate, state of the pupils, and

glandular secretory activity. Other examples are: cyanides and amyl nitrite; barbiturates and picrotoxin or amphetamine; strychnine and barbiturates.

Chelating Agents: Chelating agents (metal complexing agents) are used in the treatment of poisoning by heavy metals. They have a greater affinity for the metals as compared to the endogenous enzymes. The complex of the agent and metal is more water-soluble than the metal itself, resulting in higher renal excretion of the complex. They can form stable, soluble complexes with calcium and certain heavy metals.

(A) B.A.L. (British anti-lewisite; dimercaprol; dimercaptopropanol): It is used as a physiological antidote in arsenic, lead, bismuth, copper, mercury, gold, thallium and antimony. Many heavy metals have great affinity for suiphydryl (SH) radicles and combine with them in tissues and deprive the body of the use of respiratory enzymes of tissue cells. Dimercaprol has two unsaturated sulphydiyl groups which combine with the metal, and thus prevent union of arsenic with the SR group of the respiratory enzyme system. The compound formed by the heavy metal and dimercaprol is relatively stable, which is carried into the tissue fluids, particularly

plasma, and is excreted in the urine. In severe poisoning a dose of 3 to 4 mg/kg. is given. Each ml. contains 50 mg. Three ml of 10% SAL and 20% benzyl benzoate in arachis oil is injected deep i.m. fourth hourly for the first two days, and then twice daily for ten days or till recovery. It should not be used when liver is damaged. BAL may induce haemolysis in the 6-PGD deficient individuals.

(B) E.D.T.A. (ethylenediaminetetraacetic acid; calcium disodium versenate; edathemil; edetic acid; versene): It is a chelating agent and is effective in lead, mercury, copper, cobalt, cadmium, iron and nickle poisoning. The usual dose is 25 to 35 mgI kg. body weight in 250 to 500 ml. of 5% glucose or normal saline i.v. over a one to 2 hour period twice daily for five days, and may be repeated after two to three days. It forms chelates with lead which are water-soluble, non-toxic, non-ionised, non-metabolised and excreted intact in the urine. It is oedema. Urinary acidification is not recommended superior to B.A.L. for the treatment of poisoning by arsenic and mercury. It is the treatment of choice in lead poisoning.

(C) Penicillamine (cuprimine; dimethyl cystine):

It is a hydrolysis product of penicillin. It has a stable SH group. It is given in a dose of 30 mg/kg. body weight up to a total of 2 g. per day in 4 divided doses orally for about 7 days. One to 3 g. can be given in slow normal saline drip daily for 2 to 4 days. It is the chelating agent of maximum efficiency for the heavy metals.

(D) DMSA, succimer (Meso-2, 3-dimercapto- succinic acid): It is used in lead, mercury and arsenic poisoning. It is superior to EDTA in the treatment of lead poisoning, as it does not lead to redistribution of lead to the brain. It is less toxic to the kidneys. It can be given in patients with 6- POD deficiency. It is given in a dose of 10 mg/kg orally every 8 hours for 5 days, followed by the same dose every 12 hours for 14 days. A combination of succimer and EDTA is said to be more effective.

DMSA and DMPS possess the same dithiol (sulphydryl) chelating grouping as dimercaprol and the molecules are more hydrophilic. They have a better therapeutic index.

(E) DMPS: (2, 3-dimercaptopropane I -sulfonate) is effective in the treatment of mercury, lead and arsenic poisoning. It is given in a

dose of 5 mg/ kg. i.v. in 6 divided doses, followed by 100 mg. orally twice a day for 24 days.

(F) Desferrjoxamjne: It contains trivalent iron as a chelate and is very useful in acute iron poisoning. 8 to 12 g- is given orally daily to absorb iron in the stomach. Two g. in five percent of laevulose solution is given iv. to bind absorbed iron, repeated twelve hourly if necessary. It is also used to promote removal of radioactive heavy metals.

(IV) Elimination of Poison by Excretion: Indications: (Severe poisoning. (2) Progressive deterioration inspite of full supportive care. (3) When there is high risk of serious morbidity or mortality. (4) When normal route of excretion of the toxic compound is impaired. (5) When the poison produces delayed but serious toxic effects. (6) When the patient is having cardiovascular, respiratory or other diseases that increase the hazards.

(1) RENAL EXCRETION: It may be improved by giving large amounts of fluid, tea or lemonade orally. Forced diuresis may cause pulmonary or cerebral

(2) PURGING: Thirty g. sodium sulphate with large amounts of water, hastens the elimination of poison in the stool. Magnesium sulphate should be avoided, since sufficient may be absorbed to produce central nervous system depression in cases of renal failure. To remove unabsorbed material from the intestinal tract, poor(v absorbable material, such as liquid petroleum which is a solvent for fat-soluble agents is effective. Sorbitol 50 ml of 70% solution is a better purgative, but in young children it may cause fluid and electrolyte imbalance.

(3) WHOLE-BOWEL IRRIGATION: Whole bowel irrigation involves the use of a polythylene glycol with electrolyte lavage solution which is a non-absorbable, osmotically active compound. This is administered usually by nasogastric tube (05 litres/ hour to children less than 5 years of age and 2 litres/ hour to adults) continuously until the rectal effluent Is clear. It takes about 2 to 4 hours. It is useful in patients who have ingested large quantities of substances that are difficult to remove, eg. iron and lithium overdose, sustained release preparations, cocaine, heroin, etc.

(4) DIAPHORETICS: In most cases, it is doubtful whether this speeds up the excretion of toxic agents. In most cases application

of heat (blankets, hot water bottles), and administration of hot beverages (hot tea, hot milk, hot lemonade) will cause increased perspiration. Profuse perspiration will be produced by five mg. of piocarpine nitrate, s.c. and a less marked effect may be produced by cutaneous irritation and cutaneous vasodilation produced by alcohol, salicylates and antipyretics.

(5) FORCED ALKALINE DIURESIS, achieving a urinary pH of 7.5 to 9 promotes, excretion of drugs that are weak acids, such as salicylates, phenobarbital, chlorpropamide, methotrexate, etc. A solution of sodium bicarbonate 50 to 100 met!, added to one litre of 0.45% saline may be administered at the rate of 250 to 500 mI/hr for the first 1 to 2 hours. Alkaline solution and diuretics should be administered to maintain a urinary output of 2 to 3 mI/kg/hr.

(6) PERITONEAL DIALYSIS: Alcohols, long-acting barbiturates, chloral hydrate, lithium, salicylates, bromides, inorganic mercury, quinidine, theophyffine, and sodium chlorate are effectively removed by peritoneal dialysis. For adults, the exchange is usually 2 litres; for children under 5 years, 200 ml. It is only 10 to 25% as effective as haemodialysis. Exchange transfusion especially in

children is useful in barbiturate, pentobarbital, carbamozepine, theophylline and Co and salicylate poisoning.

(7) HAEMODIALYSIS: It is very useful for removing ethanol, methanol, ethylene glycol, ch hydrate, lithium, trivalent arsenic, acetaminophen, bromides, phenobarbital, bromides, salicylates, fluoride, sodium chlorate, digitalis, methaqualone, boric add and thiocyanates.

(8) CHARCOAL HAEMOPERFUSION : This is useful even with highly protein-bound substances that have a large volume of distribution and are lipid- soluble. They include barbiturates, salicylates, paraquat, phenytoin, theophylline, choral hydrate, digitalis, glutethimide, metbaqualone, methotrexate, paracetamol. Blood is circulated extracorporeally from an arterial source through a filter filled with adsorptive materials, i.e. charcoal coated with various polymers (acrylic hydrogel is commonly used), or resins and then back to the patients venous side. The circuit is heparinised and primed with saline.

(V) SYMPTOMATIC TREATMENT: It refers to the adoption of general measures to support the life of the patient and to lessen suffering. The symptoms should he treated on general lines.

(VI) FOLLOW-UP: Adequate follow-up is necessary to treat the complications if any. In suicidal cases, psychiatric treatment is necessary.

MATERIALS AND METHODS

This retrospective study was conducted for a period of 1 year from July, 2012 to June 2013 at Madurai medical college affiliated to Government Rajaji Hospital, Madurai.

The subjects of the study were the 433 poisoning victims whose autopsy was done in the mortuary of the Government Rajaji Hospital for post mortem examination during the period of study.

The victims were subjected to autopsy. The various internal and external findings that were observed during the procedure were noted and the necessary specimen were sent for the chemical analysis to Regional Forensic Science Laboratory (RFSL), Madurai.

The detailed history regarding the poisoning cases that were brought dead was obtained from the inquest report from the relevant investigating police officer and also the relatives of the deceased.

For those who died of poisoning in the GRH, Madurai, the history was obtained from the hospital records. The resulting observation thus made were entered into a master chart and the proforma and it was subjected to comparison with studies done along similar lines.

CRITERIA FOR SELECTION OF CASES

INCLUSION CRITERAIA :

Those victims of poisoning whose body was autopsied in the mortuary of Government Rajaji hospital, Madurai.

EXCLUSION CRITERIA :

Among the bodies of the deceased examined post mortem, the study did not include bodies pertaining to homicidal cases, unknown and decomposed bodies.

MATERIALS USED :

1) Inquest report and other relevant police documents
2) Optic lens for magnification
3) Metric tape for measurement
4) Equipment for photography
5) A workstation for autopsy
6) Autopsy certificate
7) Records of hospitalization and treatment, if any

8) Report of chemical analysis from Regional Forensic Science Laboratory (RFSL), Madurai.

AUTOPSY TECHNIQUE :

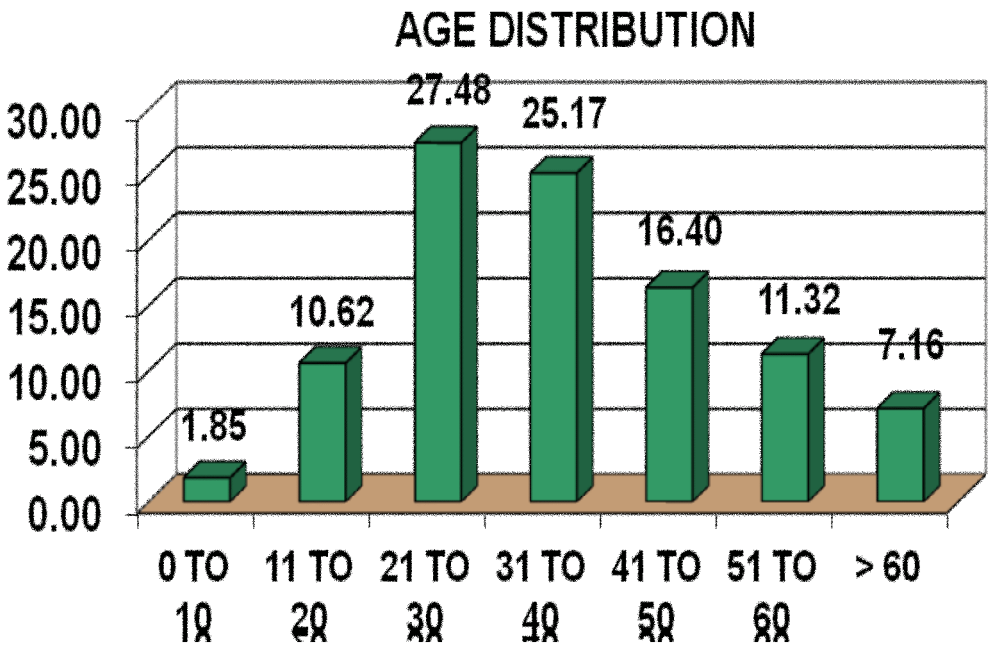
The bodies of the deceased were examined post mortem using Otto Saphhir's technique for Autopsy.

RESULTS

1) AGE WISE DISTRIBUTION

The age of the victims spanned age groups such as 0-10 to >70. Majority of the people who died of poisoning belonged to the age group 21-30 (27.48%) the least number of victims were found to belong to the age group >70 yrs (1.15%). The second most number was observed in the age group 31=40. Children from age of 0-10 yrs accounted for 1.85% of the population while 11 to 20 yrs were 10.62%. This trend was noted to decline as the age increased 41-50 were 16.40% 51-60 was 11.3% and 61-70 were 6% of the total subjects studied.

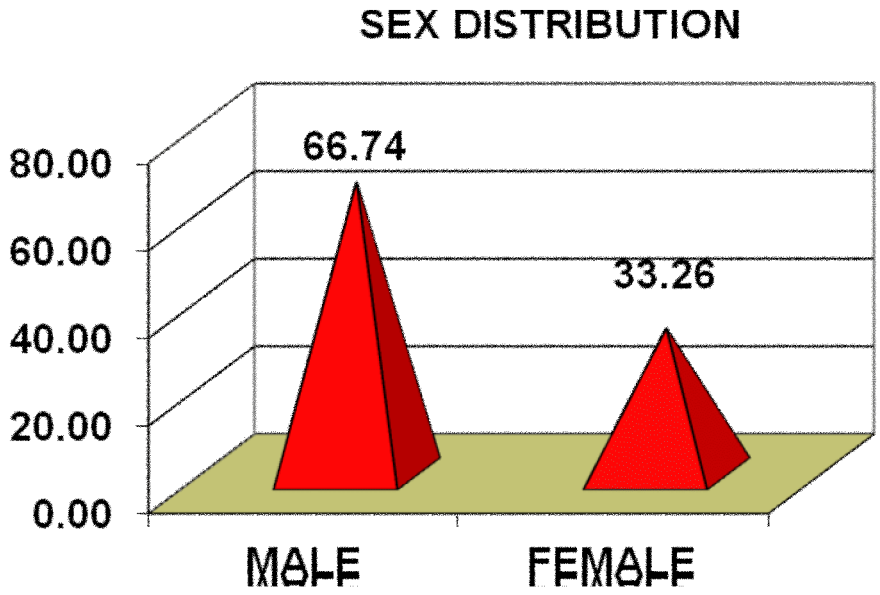
AGE	COUNT	%
0 TO 10	8	1.85
11 TO 20	46	10.62
21 TO 30	119	27.48
31 TO 40	109	25.17
41 TO 50	71	16.40
51 TO 60	49	11.32
61 TO 70	26	6.00
>70	5	1.15
TOTAL	433	100


AGE DISTRIBUTION
30.00
25.00
20.00
15.00
10.00
5.00
0.00
1.85
10.62
27.48
25.17
16.40
11.32
7.16
0 TO 10
11 TO 20
21 TO 30
31 TO 40
41 TO 50
51 TO 60
> 60

2) SEX WISE DISTRIBUTION

When classified according to sex, the population was found to consist mostly of males (66.74%). The females made up the remaining 33.26% of the study population.

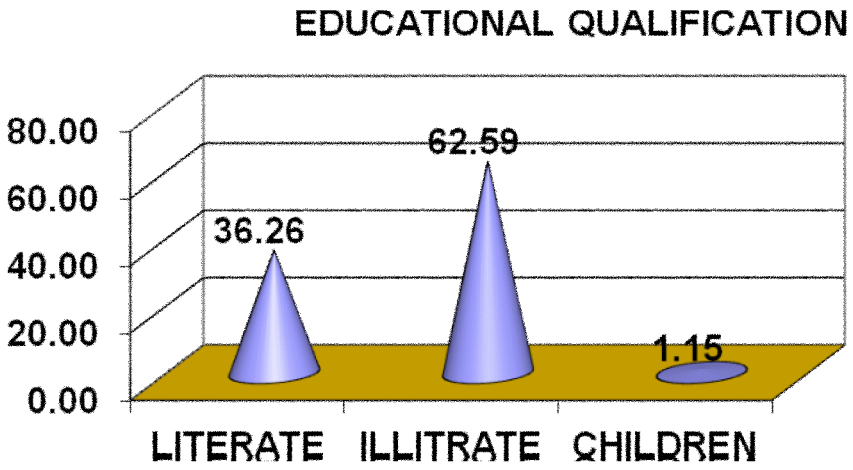
SEX	COUNT	%
MALE	289	66.74
FEMALE	144	33.26
TOTAL	433	100



3) EDUCATION WISE DISTRIBUTION

On taking into account the educational qualification of the victim to the poison the illiterates (62.59%) more often turned to poison than the Literate people (36.26%). A 1.15% of the population were the children who never went to school

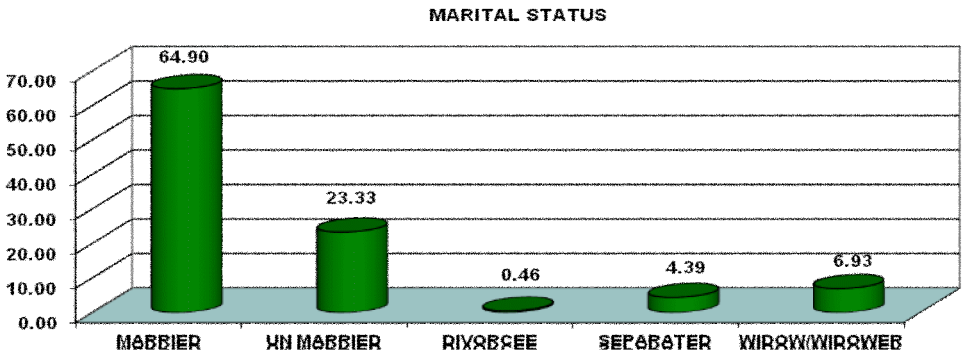
EDUCATIONAL QALIFICATION	COUNT	%
LITERATE	157	36.26
ILLITRATE	271	62.59
CHILDREN	5	1.15
TOTAL	433	100



4) MARITAL STATUS DISTRIBUTION

The population studied was also classified according the marital status. It was noted that poisoning was more rampant among the married individuals (64.90%). The unmarried persons (23.32%) were next most prone to poisoning. The widow/widower (6.93%), married but separated individuals (4.39%) and Divorcees (0.46%) were also among the population studied.

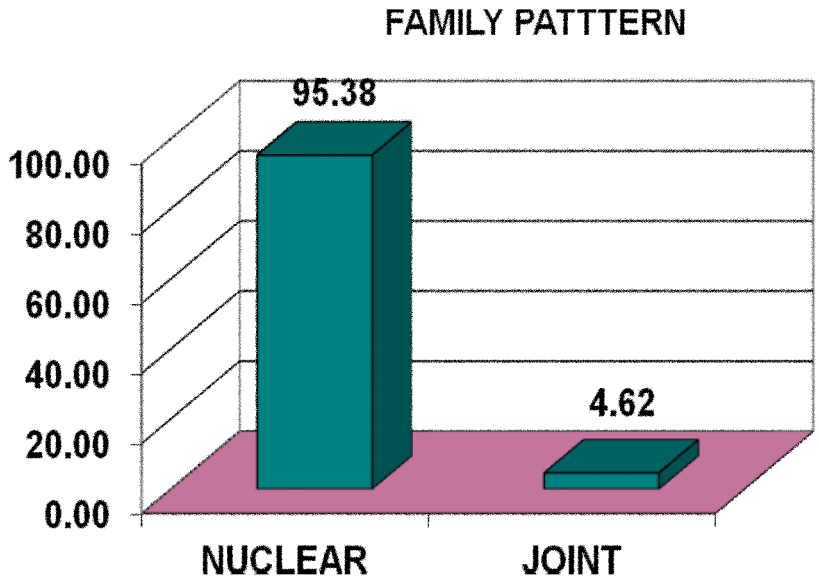
MARITAL STATUS	COUNT	%
MARRIED	281	64.90
UN MARRIED	101	23.32
DIVORCEE	2	0.46
SEPARATED	19	4.39
WIDOW/WIDOWER	30	6.93
TOTAL	433	



5) FAMILY PATTERN WISE DISTRIBUTION

The family pattern of the individuals when observed as a whole revealed that the incidence of poisoning was more common among people living in a Nuclear family (95.38%). The number of poison cases in people living in a joint family (4.62%) was far less in number.

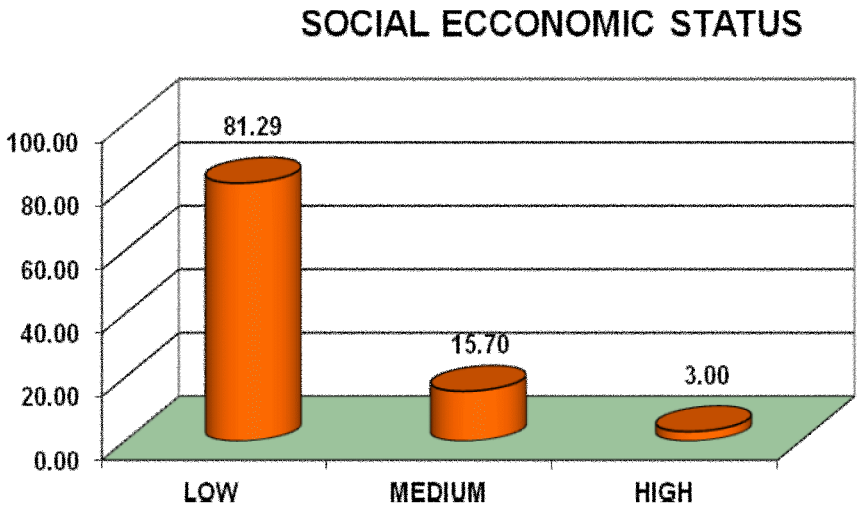
FAMILY PATTERN	COUNT	%
NUCLEAR	413	95.38
JOINT	20	4.62
TOTAL	433	100



6) SOCIO ECONOMIC STATUS DISTRIBUTION

When classifying the cases of poisoning according to their Socio-economic status, it was observed that a vast majority of cases belonged to the Low (81.29%) socio-economic status. There was also a declining trend observed when the socio-economic status of the people increased. The number of poison cases among people of medium cadre (15.70%) and higher cadre (3.00%) were considerably lower.

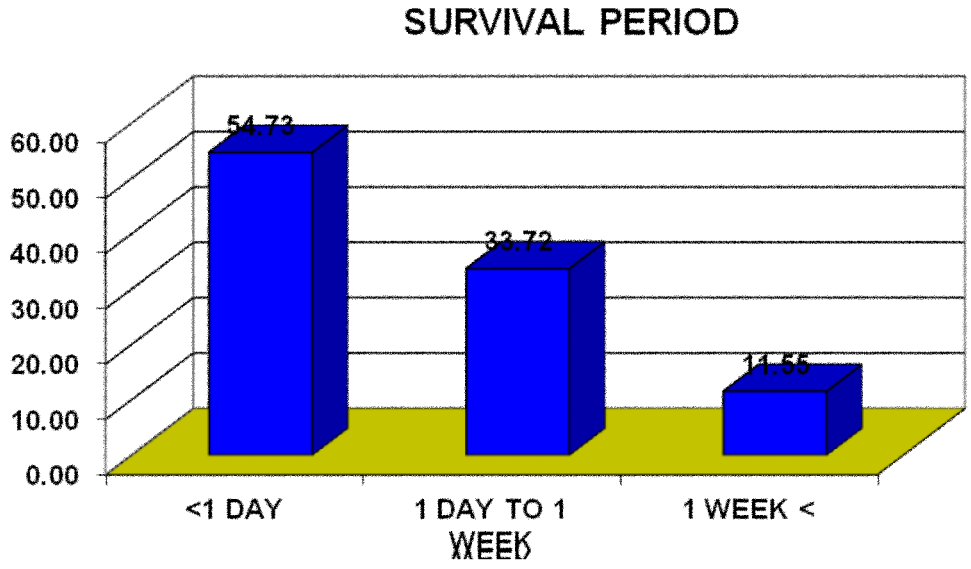
SOCIAL ECONOMIC STATUS	COUNT	%
LOW	352	81.30
MEDIUM	68	15.70
HIGH	13	3.00
TOTAL	433	100



7) SURVIVAL PERIOD WISE DISTRIBUTION

The period of survival – the time upto which the individuals who ingested poison was alive was gauged. It was seen that more than half the population did not survive more than a day (54.73%). Some cases survived for a full week (33.72%). The people who survived more than a week (11.55%) was the least among all.

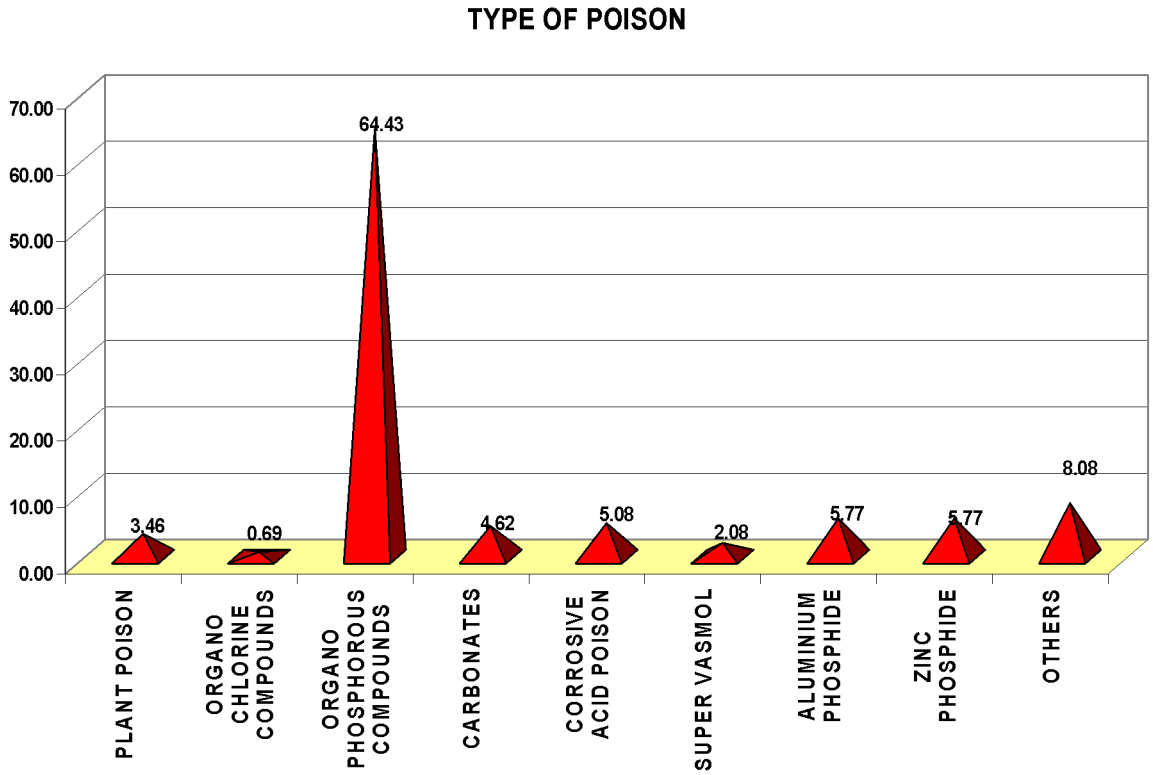
SURVIVAL PERIOD	COUNT	%
<1 DAY	237	54.73
1 DAY TO 1 WEEK	146	33.72
> 1 WEEK	50	11.55
TOTAL	433	100



8) POISON WISE DISTRIBUTION

A comparison between type of poison of poison ingested by various individuals revealed the following. Organo-phosphorous (64.43%) compounds were the most common poison consumed. The least chosen poison were Organo-chlorine compounds (0.69%). Other poisons seen were plant poison (3.46%), carbonates (4.62%), corrosive acids (5.08%), aluminium phosphide (5.77%), zinc phosphide (5.77%). An 8.08% of individuals were found to have consumed other types of poison also.

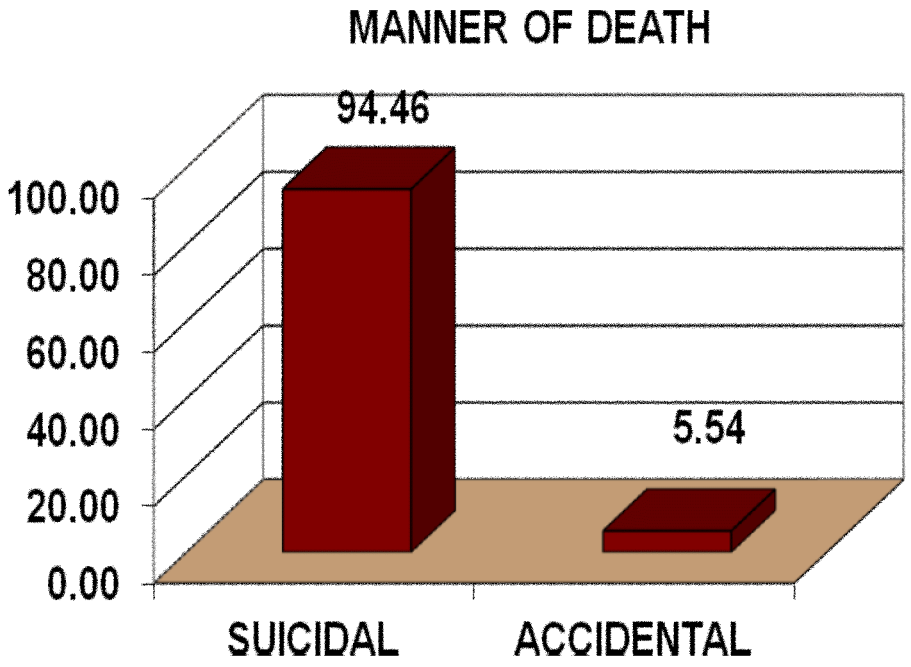
TYPE OF POISON	COUNT	%
PLANT POISON	15	3.46
ORGANO CHLORINE COMPOUNDS	3	0.69
ORGANO PHOSPHOROUS COMPOUNDS	279	64.43
CARBONATES	20	4.62
CORROSIVE ACID POISON	22	5.08
SUPER VASMOL	9	2.08
ALUMINIUM PHOSPHIDE	25	5.77
ZINC PHOSPHIDE	25	5.77
OTHERS	35	8.08
TOTAL	433	100


TYPE OF POISON
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
3.46
0.69
64.43
4.62
5.08
2.08
5.77
5.77
8.08
PLANT POISON
ORGANO CHLORINE COMPOUNDS
ORGANO PHOSPHOROUS COMPOUNDS
CARBONATES
CORROSIVE ACID POISON
SUPER VASMOL
ALUMINIUM PHOSPHIDE
ZINC PHOSPHIDE
OTHERS

MANNER WISE DISTRIBUTION

When the manner of death of the individuals were assessed, it was noted that most of the cases were suicidal (94.46%). A minor 5.56% of the cases were deaths due to accidental poisoning.

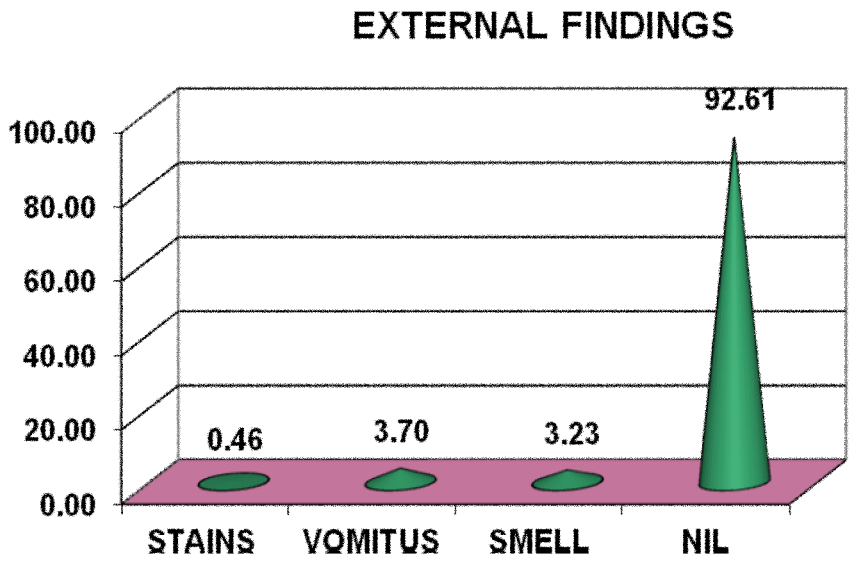
MANNER OF DEATH	COUNT	%
SUICIDAL	409	94.46
ACCIDENTAL	24	5.56
TOTAL	433	100



9) EXTERNAL FEATURES

The external findings such as Stains (0.46%), Vomitus (3.70%), Smell (3.23%) were observed on the bodies of some of the victims of the poisons. However most of the cases did not present any external findings (92.61%).

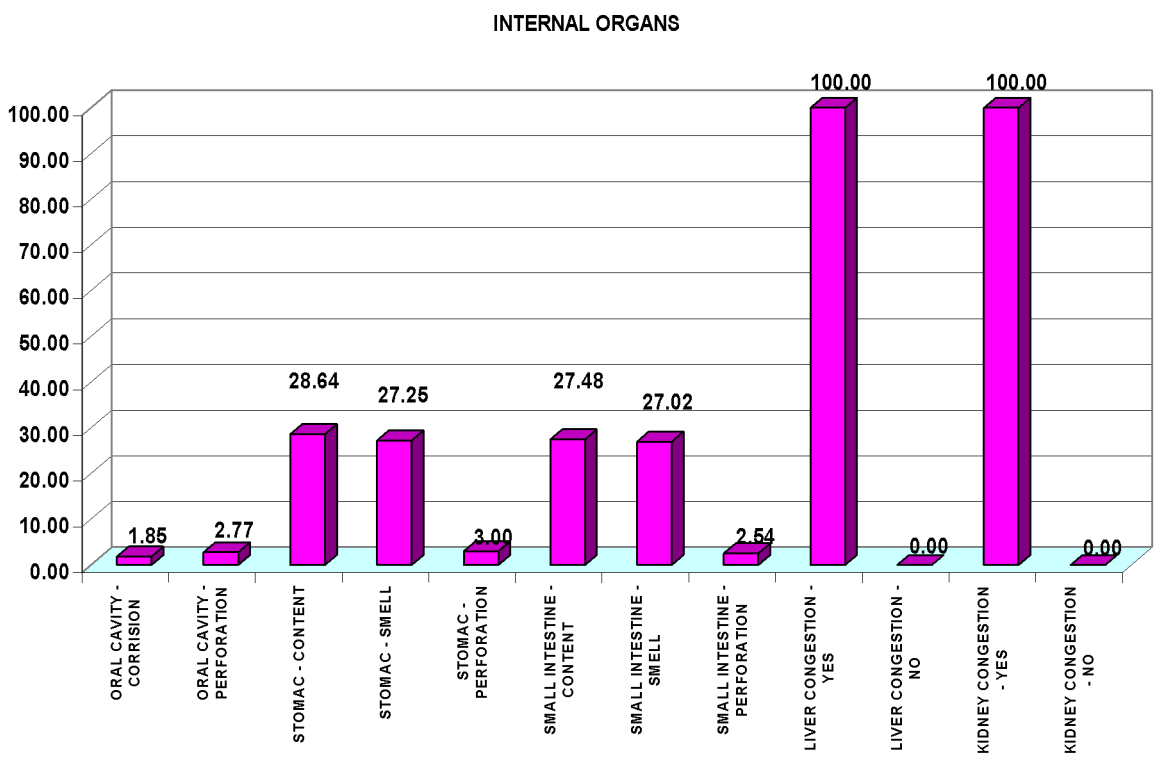
EXTERNAL FINDINGS	COUNT	%
STAINS	2	0.46
VOMITUS	16	3.70
SMELL	14	3.23
NIL	401	92.61
TOTAL	433	100



10) INTERNAL FINDINGS

A comparison between the internal findings revealed that content of the stomach (28.64%) was the most common internal finding. Other common findings were Smell in the stomach (27.25%), contents of the small intestine (27.48%), smell of the same (27.02%). Other rare findings were corrosion (1.85%) and perforation (2.77%) of oral cavity, perforation of the stomach (3.00%) and small intestine (2.54%)

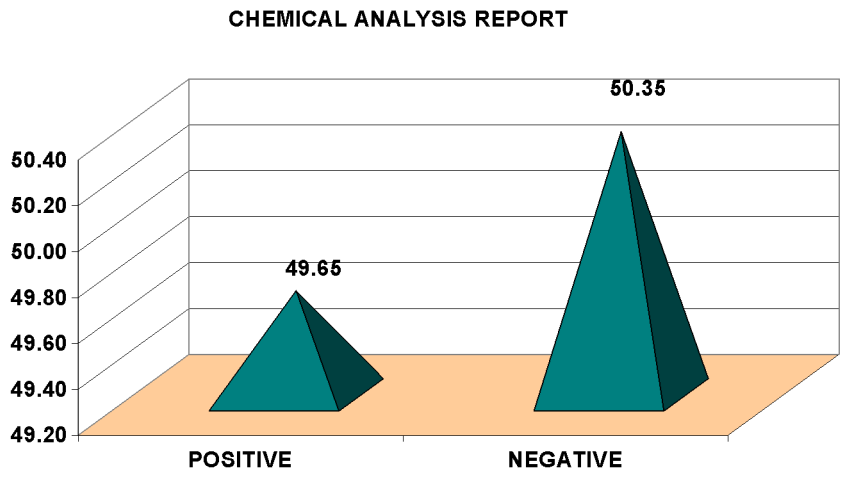
INTERNAL ORGANS	COUNT	%
ORAL CAVITY - CORROSION	8	1.85
ORAL CAVITY - PERFORATION	12	2.77
STOMACH - CONTENT	124	28.64
STOMACH - SMELL	118	27.25
STOMACH - PERFORATION	13	3.00
SMALL INTESTINE - CONTENT	119	27.48
SMALL INTESTINE - SMELL	117	27.02
SMALL INTESTINE - PERFORATION	11	2.54
TOTAL	433	


INTERNAL ORGANS
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
1.85
2.77
28.64
27.25
3.00
27.48
27.02
2.54
100.00
0.00
100.00
0.00
ORAL CAVITY - CORRISION
ORAL CAVITY - PERFORATION
STOMAC - CONTENT
STOMAC - SMELL
STOMAC - PERFORATION
SMALL INTESTINE - CONTENT
SMALL INTESTINE - SMELL
SMALL INTESTINE - PERFORATION
LIVER CONGESTION - YES
LIVER CONGESTION - NO
KIDNEY CONGESTION - YES
KIDNEY CONGESTION - NO

11) CHEMICAL ANALYSIS

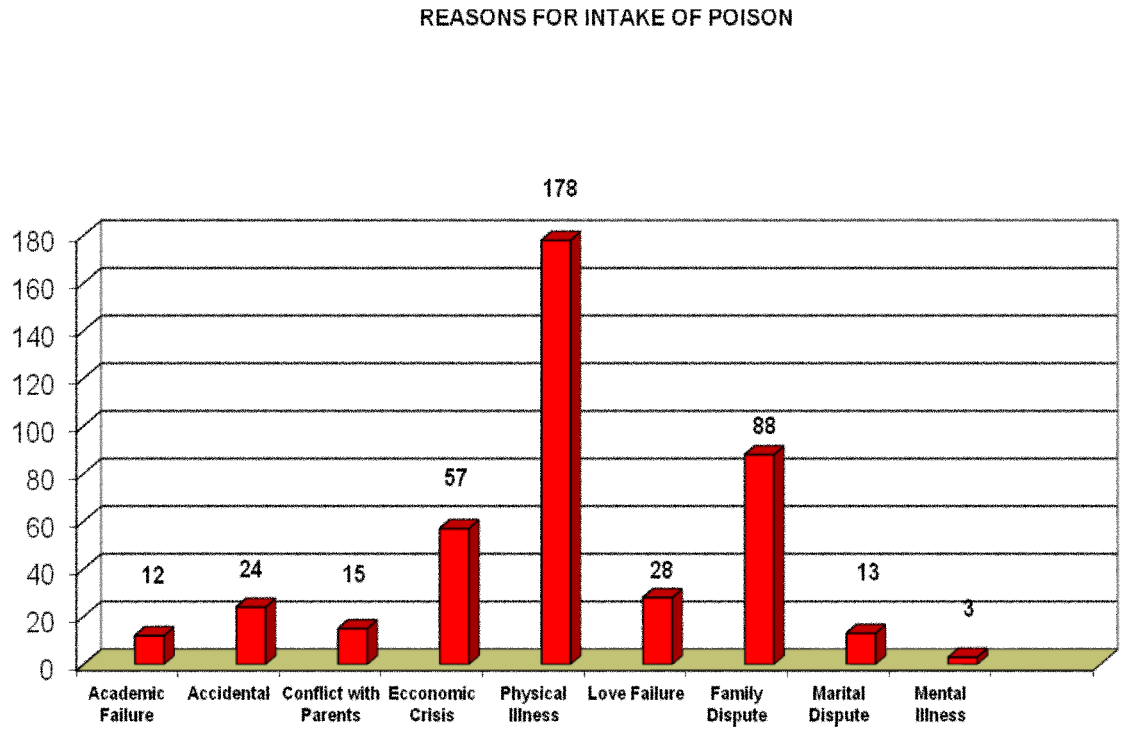
The study on the chemical analysis report revealed that most of the cases were Negative (50.35%) and remaining 49.65% were of positive results.

CHEMICAL ANALYSIS REPORT	COUNT	%
POSITIVE	215	49.65
NEGATIVE	218	50.35
TOTAL	433	100



12) **Reasons for Intake of Poison**

When the reason for consumption of poison was taken as a criteria, it was noted that the majority of the victims were those who have succumbed to a physical illness (41.11%) and ironically those turning towards suicide due to Academic failure (2.77%) were found to be the minimum in number. The other reasons were Accidental (5.54%), Family dispute (3.54%), economic crisis (13.16%), love failure (6.47%), a problematic marriage (20.32%), mental illness (3.0%) and miscellaneous causes (0.69%).



REASONS FOR INTAKE OF POISON	COUNT	%
Academic Failure	12	2.77
Accidental	24	5.54
Conflict with Parents	15	3.46
Economic Crisis	57	13.16
Family Dispute	15	3.46
Love Failure	28	6.47
Marital Dispute	88	20.32
Mental Illness	13	3.00
OTHERS	3	0.69
Physical Illness	178	41.11
TOTAL	433	100

DISCUSSION

Of the total 3275 cases of postmortem, poisoning constituted 433 cases amounting to 13.22% during this study period. This count however excludes unknown, homicidal and decomposed bodies.

Incidence of Poisoning among various age groups

LEAST INCIDENCE OF POISONING – 71- 80 Yrs (1.15%)

MOST INCIDENCE OF POISONING – 21-30 yrs (27.48%)

Similar findings were observed in the studies conducted by Adharsh Kumar, Dhalbir Singh, Karamjit Singh, B.R.Sharma, Maurari Atul, S.K.Dhattarwal, Manish Nigam, Sinha.U.S

This above observation went against the studies done by Tharuni Ng.

The reason for the most people consuming poison in the age of 21-30yrs can be cited varying from academic pressure, differences of opinion between a couple, unemployment, love failure, conflict with parents, improper judgment. The individual is in the pressure and increasing demand to establish themselves and hence they are prone to take a brazen route to most problems and thus eventually commit

suicide when failure of motives are imminent. The most trivial reasons however have been observed in the age group 11-20(10%). Poisoning is rampant on account of Academic failure or Harsh words from parents.

Incidence of Poisoning between the two Gender

LEAST INCIDENCE OF POISONING – MALES (66.74%)

MOST INCIDENCE OF POISONING – FEMALES (33.26%)

Similar findings were observed by Dalbir Singh, J Gargi, B.R.Sharma, Murari Atul, S.K.Dhattarwal, Rahul Jain, Manish Nigam.

The Observation was in disagreement of the studies done by Tharuni Ng and Karamjit Singh.

The reason for this can inferred that male, being the sole breadwinner in majority of the families are under more duress both emotionally and economically, thus being more prone to searching a means end it all.

Incidence of poisoning according to Literacy

LEAST INCIDENCE OF POISONING – LITERATES (36.26%)

MOST INCIDENCE OF POISONING – ILLITERATES (62.59%)

This Study goes along with that of Karamjit Singh and is Contrary to that of S.K.Dhattarwal.

The reason for illiterate people turning towards poisoning can be attributed to unemployment or underemployment, getting daily wages presumably leaves them financially constrained after holidays or bouts of sickness, the lack of proper judgemental skills in a tough situation thus leaving them in a state of helplessness.

Incidence of poisoning according to Marital status.

LEAST INCIDENCE OF POISONING : DIVORCEE (0.46%)

MOST INCIDENCE OF POISONING : MARRIED (64.90%)

The study done by Dalbir Singh, Karamjit, SK Dhattarwal, J Gargi shows similar findings, however BR Sharma Observes the other way round.

The reason for the married people consuming poison more commonly than single individuals can be enumerated from trivial to

serious. The married males usually consume poison due to marital disharmony, financial problems unemployment.

The married females though turn to poison due to cruelty of In-laws, dowry tortures, quarrel with husbands, excessive dependency on their spouses.

The unmarried males usually take poison out of frustration, unemployment while unmarried females opt poison out when they hit puberty, dysmennorhoea, pre menstrual tension being unable to handle the psychological stress.

Incidence of poisoning among different types of Family

LEAST INCIDENCE OF POISONING : JOINT FAMILY (95.38%)

MOST INCIDENCE OF POISONING:NUCLEAR FAMILY (4.62%)

BR Sharma has also come to a similar conclusion from his study of poisoning patterns.

The reason cited is that the individuals in a nuclear family do not have any support from family elders or lack thereof to share their family problems and thus lacking in proper guidance.

Incidence poisoning under various socio-economic states

LEAST INCIDENCE OF POISONING : HIGH STATUS (3.00%)

MOST INCIDENCE OF POISONING : LOW STATUS (81.29%)

The same observation has been made by SK Dhattarwal. The opposing results have been obtained in the studies of Rahul Jain.

The reason mainly being a deficit in finances both long term and short term. The deprivation of even basic amenities drive them to extreme conditions of stress. Lack of proper education also is a driving factor towards poison consumption.

Survival period of individuals consuming various poisons

LEAST INCIDENCE OF POISONING : >1WEEK (11.55%)

MOST INCEIDENCE OF POISONING : <1DAY (54.73%)

This finding is deviant from that of the study done by Anil Kohli.

The reason for maximum deaths within 24 hours can be attributed to the Delay in detection, toxic nature of poison consumed, the individual's body response to the poison, any pre-existing illness in the victim.

Incidence of Types of Poison consumed

LEAST INCIDENCE : ORGANO-CHLORINE COMPOUNDS (0.09%)

MOST INCIDENCE : ORGANO-PHOSPHOROUS COMPOUNDS (64.4%)

A Similar Result was obtained by B. Maharani and N. Vijayakumari and SANJEEVKUMAR, AKIHILESHPATHAK,H. M.MANGAL

The reason for Organo-Phosphorous being the preferred poison is due to the high exposure of individuals to the chemical which is very easily available and accessible owing to the extensive agricultural background of our region. On autoB. Maharani1 and N. Vijayakumari2 psy, Organo-phosphorous compounds give off a Kerosene like smell. Aluminum phosphide has been observed to be a poison consumed on the rise. Plant poison such as oleander, etc. (3.46%) is also easily available in Villages. Corrosive acid poisoning (5.08%) is also an easily available poison among households. Supervasmol (2.08%) is another commonly found poison in this region yet rare in other areas.

The Manner of Death Pertaining to Different Poisons Cases

LEAST INCIDENCE OF POISONING : SUICIDAL (94.46%)

MOST INCEDENCE OF POISONING : ACCIDENTAL (5.56%)

Dalbir Singh, Karamjit Singh, SK Dhattarwal, Taruni Ng and Anil Kohli have made studies along the similar subjects and have come up with similar information regarding the manner of deaths of the victims.

A death from poisoning has been ruled Suicidal due to the history, suicide note and other such circumstantial evidences. Adults have been found to be most number of cases in suicidal poisoning and children have been found mostly to be the victims of accidental poisoning. The accidental poisoning is mainly due to the ignorance of the parents keeping the poison within the reach of children, misinterpretation of the chemical by children and sometimes even by adults under intoxication.

Incidence of Poison detection by chemical analysis

LEAST INCIDENCE OF DETECTION : POSITIVE (49.65%)

MOST INCIDENCE OF DETECTION : NEGATIVE (50.35%)

This study was akin to that conducted by L Reys, SK Dhattarwal, OP Moorthy, Adharsh Kumar, SK Sharma.

The Near balanced margin of chemical analysis reports is usually due to the extensive awareness for the need of emetics in a case of acute poisoning even among illiterates. The near all time availability of medical practitioners warrants a quick stomach wash or even the administration of activated charcoal. Since Organo-phosphorous compounds are the most common poison in this region, the fatalities result not usually from the immediate effects of poisoning but from sequelae such as respiratory depression and infection, days later after the poisoning is treated.

REASON FOR INTAKE OF POISON

LEAST INCIDENCE OF POISONING : PHYSICAL ILLNESS (41.11%)

MOST INCIDENCE OF POISONING : ACADEMIC FAILURE (2.77%)

The reason for physical illness to be touted as the main reason as obtained from the police reports for poisoning can be assumed that it is because of the relatives of the deceased reporting that they would have alledgedly consumed poison due to their unfounded fear of police enquiry or the tainting of family honor. Marital dispute and

economic dispute is more a rampant reason for suicides. The situation nowadays is as such couples in a marriage or individuals in a financial crisis fail to resolve the issues on their long term disputes and are rather prone to look for a short term solution and thus they turn towards suicide. Deaths due to academic failure and conflict with parents are mostly committed by youngsters in a moment of frustration and close to the occurrence of these incidents are the accidental poisoning in children due to their ignorance.

SUMMARY

1. A study of 433 cases of the victims of poisoning was undertaken in the mortuary of Government Rajaji Hospital through Autopsy.

2. The age of the deceased ranged from 4 to 97 yrs.

    a. The peak incidence of death from poisoning was observed in age group 21-30 yrs panning 119 cases which accounted for 27.48% all cases.

    b. The age group 31 -40 yrs was found to be the next most in number mounting to 109 cases which is 25.17% of all cases.

    c. Thus it can be said that 52.65% of the total population were among the independent population.

3. When the statistics were broken down considering the gender of the victims, the males were found to far outnumber the females. There were 289 cases (66.74%) of male victims while the female victims numbered only 144 (33.26%). The male

population died of poisoning almost twice frequently than the females.

4. On taking into account the literary qualification of the deceased under study, it was established that the illiterate victims were the most common to be exposed to poisoning. There were 271 cases (62.59%) who were illiterate while the literate accounted for 157 cases (36.26%) only.

5. The marital status of the various victims were analyzed and the inference that the majority of the deceased were married. They numbered 281 which was 64.90% of the total study group. There were also 97 cases who were never married and they made up 22.40%.

6. The family of the deceased when placed under scrutiny revealed that the individuals in Nuclear family, which numbered 413 (95.38%) were more prone to poisoning than those in the joint family. Only the remaining 20 (4.62%) belonged to joint family.

7. The socio-economic status when taken as a criteria for classification lead to the observation that the people in low socio-economic status were 352 (81.29%) in number and was

far more than people in medium (68 cases – 15.70%) and high (13 cases-3%) statuses.

8. Of the people who consumed the poison, it was found that 237 (54.73%) people died within a day, 146 cases (33.72%) were prone to die within a week. Thus 88.45% of the victims died within a week of consuming poison.

9. From a spectrum of poisons that the deceased were exposed to it was noted that organo phosphorous compounds were the most frequently ingested poison. 279 people (64.43%) were the victims of this poison. Aluminum and zinc phosphide were the next in line claiming 25 cases (5.77%) each.

10. A look at the manner of death due to poison exposure revealed that a whopping majority of 409 cases (94.46%) were suicidal. Accidental cases were only 24 (5.54%) in number which constituted of mostly children and intoxicated individuals.

11. The comparison between the positive and negative results of chemical analysis report came up with 215 (49.65%) positive cases and 218 (50.35%) of negative cases.

12. A Compilation of various reasons for ingestion of poison has established that 178 individuals (41.11%) turned to poison out of a physical illness. 88 cases (20.32%) were people with marital dispute and 57 people (13.16%) turned towards poisoning during an economic crisis.

CONCLUSION

An overall look at the autopsies of the cases of poisoning led to the conclusion that the people were more prone to consume poison in the third and fourth decade of their life when they are at their maximum productivity and hence the most stressed. Among the study population males dominated in number thus reiterating the stress factor and hence seeing poison as a way out.

The illiterate people were found to most frequently ingest poison than the literate population either ignorantly or knowingly for reasons that shall be discussed later. The observation of Marital status of the deceased helps conclude that married individuals consume poison more frequently than unmarried population. This phenomenon can also be attributed increased emotional or financial burden.

A look at the families of the deceased conclusively tells that majority of death due to poisoning was found in the nuclear families. A further probing of socio economic status has established that the individuals in the low socio economic status often sought poison as a way out from their problems. The incidence of poisoning markedly decreased with increase in the status of the individual.

The majority of victims of poisoning did not survive the poison more than a day. Many others were dead within a week. The notoriety of poison was thus very clearly seen. Organo phosphorous compounds were the poison of choice for most individuals thus claiming a colossal number of lives among the subject population.

Suicide was the dominant manner of death in almost all deceased. Very few accident cases were seen, although it was a pristine fact that most people intentionally consume poison as a way out of their worries and problems. A full enumeration of the various reasons claimed for the individual to consume poison, the collection of history revealed that most people poisoned themselves due to a physical illness. However people turning to poison due to marital dispute or an economic crisis was also a common occurrence.

RECOMMENDATION

- In lieu of organo phosphorous compounds being the most rampant poison among the population, the availability of these compounds should be curtailed by stringent legal means by the government.

- The poisoning in children happens accidentally and hence is easily preventable. The hazardous chemicals must be made sure that they are kept out of the reach of the children.

- The young adults can be dissuaded from turning to poison when their times are tough by proper parental guidance. A sympathetic ear is rather the need of the hour than a vial of poison.

- The married couples among whom the poisoning is most frequent are also a case that considers their marriage a lost cause. Times of economic or emotional burden can be dealt with easily when there is proper understanding and support of the spouse.

- There must be a congenial working relationship between the forensic department and the toxicology department in a hospital. Any case of poisoning went unprevented must at least be cured. This can be achieved by a ready arsenal of drugs and other facilities at the institution.

- There must be adequate poison information centers in a region to provide an insight on the changing trends in poisoning and the information about any poison and its management. Awareness among the public is also a necessary factor to prevent this high incidence of poisoning.

- The Samples and specimen collected post mortem must done so under necessary precaution with the proper technique guidance in mind. The sample must be properly preserved and strived to reach the laboratory as quick as possible.

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PROFORMA

1. **Name :**
2. **P.M. No**
3. **Age :**

Age	No. of. cases	Percentage
0 – 10		
11 – 20		
21 – 30		
31 – 40		
41 – 50		
51 – 60		
61 - 70		
>70		
Total		

4. **Sex:**

Sex	No. of. cases	Percentage
Male		
Female		
Total		

5. **Educational status :**

Educational status	No. of. cases	Percentage
Literate		
Illiterate		
Children		
Total		

6. **Marital status :**

Marital status	No. of. cases	Percentage
Unmarried		
Married		
Widow / widower		
Separated		
Divorcee		
Total		

7. **Family Pattern :**

Family Pattern	No. of. cases	Percentage
Nuclear		
Joint		
Total		

8. **Socio-economic status:**

Socio-economic status	No. of. cases	Percentage
High (> 5 lakhs / annum)		
Medium (1 – 5 lakhs / annum)		
Low (< 1 lakh / annum)		
Total		

9. **Survival period :**

Survival period	No. of. Cases	Percentage
< 1 DAY		
1 DAY – 1 week		
> 1 week		
Total		

10. **Type of poison consumed :**

Type of poison	No. of. Cases	Percentage
Organo-phosphorous compounds		
Organo-chorine compounds		
Carbamates		
Zinc phosphide		
Aluminum phosphide		
Plant poisons		
Super Vasmol		
Corrosive poisons		
Others		
Total		

11. **Manner of death :**

Manner of death	No. of. Cases	Percentage
Suicidal		
Accidental		
Total		

12. Pm findings:

A) EXTERNAL FEATURES:

EXTERNAL FEATURES	YES	NO	PERCENTAGE
STAINS			
VOMITUS			
SMELL			
NIL			
TOTAL			

B) **INTERNAL FEATURES**

Internal Organs	Count	%
Oral Cavity - Corrosion		
Oral Cavity - Perforation		
Stomach - Content		
Stomach - Smell		
Stomach - Perforation		
Small Intestine - Content		
Small Intestine - Smell		
Small Intestine - Perforation		
Total		

13. Chemical analysis report :

Chemical analysis report	No. of. Cases	Percentage
Positive		
Negative		
Total		

14. Reason for poison intake :

Reasons For Intake Of Poison	No. of. Cases	Percentage
Academic Failure		
Accidental		
Conflict With Parents		
Ecconomic Crisis		
Family Dispute		
Love Failure		
Marital Dispute		
Mental Illness		
Others		
Physical Illness		
Total		

Sl No:	P.M.No	Age	Sex	Educational Status		Marital Status	Family Pattern		Socio Economic Status	Survival Period			Type of Poison	Manner of Death		P.M.FINDINGS														CHEMICAL ANALYSIS REPORT	
																EXTERNAL FINDINGS			INTERNAL ORGANS													
																			ORAL CAVITY		STOMACH			SMALL INTESTINE			LIVER CONGESTION		KIDNEY CONGESTION			
				Litrate	Illitrate		Nuclear	Joint		< 1 Day	1 Day - 1Week	> 1 Week		Suicidal	Accidental	Stains	Vomitus	Smell	Corrosion	Perforation	Content	Smell	Perforation	Content	Smell	Perforation	Yes	No	Yes	No	Positive	
1	1644	32.0	F		Y	M	Y		LOW			Y	C	Y			Y	Y			Y	Y		Y	Y		Y		Y		Y	
2	1649	27.0	M		Y	M	Y		LOW			Y	OPC	Y			Y	Y			Y	Y		Y	Y		Y		Y		Y	
3	1660	50.0	M		Y	S	Y		LOW			Y	OPC	Y			Y	Y			Y	Y		Y	Y		Y		Y		Y	
4	1681	19.0	M	Y		UM	Y		MED			Y	OPC	Y			Y	Y			Y	Y		Y	Y		Y		Y		Y	
5	1682	23.0	F	Y		UM	Y		MED			Y	OPC	Y			Y	Y			Y	Y		Y	Y		Y		Y		Y	
6	1685	28.0	M		Y	M	Y		LOW			Y	AP	Y													Y		Y			
7	1699	28.0	F		Y	S	Y		LOW			Y	AP	Y			Y	Y			Y	Y		Y	Y		Y		Y		Y	
8	1704	45.0	M		Y	M	Y		LOW		Y		AP	Y													Y		Y			
9	1705	24.0	M		Y	UM	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
10	1708	26.0	F		Y	M	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
11	1709	22.0	M	Y		UM	Y		MED		Y		ZP	Y													Y		Y			
12	1710	18.0	M	Y		UM	Y		LOW			Y	OPC	Y													Y		Y			
13	1711	23.0	M	Y		M	Y		MED		Y		AP	Y													Y		Y			
14	1723	27.0	F		Y	M	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
15	1726	22.0	M		Y	UM	Y		LOW	Y			PP	Y			Y	Y									Y		Y			
16	1738	26.0	F		Y	M		Y	LOW	Y			C	Y													Y		Y		Y	
17	1744	50.0	M		Y	M	Y		LOW	Y			O	Y													Y		Y			
18	1749	65.0	M		Y	W	Y		LOW	Y			OPC	Y			Y	Y			Y	Y		Y	Y		Y		Y		Y	
19	1755	38.0	F		Y	M	Y		MED	Y			OPC	Y			Y	Y			Y	Y		Y	Y		Y		Y		Y	
20	1759	55.0	F		Y	M	Y		LOW		Y		OPC	Y													Y		Y			

21	1772	40.0	M		Y	M	Y		LOW	Y			OPC	Y			Y	Y									Y		Y		Y	
22	1778	26.0	F	Y		M	Y		MED	Y			ZP	Y													Y		Y		Y	
23	1803	47.0	M		Y	W	Y		LOW	Y			OPC	Y													Y		Y		Y	
24	1831	30.0	M		Y	M	Y		LOW			Y	OPC	Y													Y		Y			
25	1840	75.0	M		Y	W	Y		LOW	Y			OPC	Y				Y			Y	Y		Y	Y		Y		Y		Y	
26	1850	29.0	F		Y	M	Y		LOW			Y	SV	Y													Y		Y			
27	1860	27.0	M		Y	UM	Y		LOW	Y			O	Y							Y			Y			Y		Y			
28	1871	30.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y			
29	1881	36.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y			
30	1882	40.0	M	Y		M	Y		LOW	Y			AP	Y			Y										Y		Y			
31	1884	18.0	F	Y		UM	Y		MED	Y			C	Y							Y	Y		Y	Y		Y		Y		Y	
32	1893	16.0	M	Y		UM	Y		MED		Y		ZP	Y													Y		Y			
33	1897	37.0	M	Y		UM	Y		MED	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
34	1898	50.0	M		Y	M	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
35	1915	47.0	M		Y	M	Y		LOW		Y		CAP	Y		Y			Y				Y				Y		Y			
36	1918	23.0	F		Y	M		Y	LOW	Y			C	Y							Y	Y		Y	Y		Y		Y		Y	
37	1917	55.0	M		Y	M	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y			
38	1924	21.0	M		Y	UM	Y		LOW		Y		SV		Y												Y		Y		Y	
39	1927	43.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y			
40	1934	27.0	M		Y	M	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
41	1942	25.0	F	Y		M	Y		MED		Y		OPC	Y													Y		Y		Y	
42	1951	30.0	F		Y	M	Y		LOW		Y		AP	Y													Y		Y			
43	1958	54.0	M	Y		M	Y		HIGH	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
44	1964	22.0	M	Y		UM	Y		MED		Y		OPC	Y													Y		Y			
45	1967	52.0	M	Y		M	Y		MED	Y			OPC	Y			Y	Y			Y	Y		Y	Y		Y		Y		Y	
46	1973	38.0	M		Y	M	Y		MED		Y		C	Y													Y		Y			
47	1983	23.0	M	Y		UM	Y		MED		Y		O	Y													Y		Y			
48	1984	17.0	F	Y		UM		Y	LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
49	1986	30.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y			
50	2006	58.0	M		Y	M	Y		LOW	Y			OPC	Y			Y	Y			Y	Y		Y	Y		Y		Y			
51	2009	37.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y			
52	2019	29.0	F		Y	M	Y		LOW			Y	OPC	Y													Y		Y			
53	2026	29.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y			
54	2027	40.0	M		Y	M	Y		LOW	Y			O	Y													Y		Y			

55	2033	23.0	F		Y	M	Y		LOW	Y			SV	Y													Y		Y		Y	
56	2044	55.0	M		Y	M	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
57	2047	37.0	M		Y	UM	Y		LOW			Y	OPC	Y													Y		Y			
58	2064	28.0	F		Y	M	Y		LOW	Y			OPC	Y													Y		Y			
59	2083	41.0	M	Y		S	Y		MED	Y			CAP	Y													Y		Y			
60	2098	46.0	F		Y	M	Y		LOW		Y		SV	Y													Y		Y			
61	2103	58.0	M	Y		M	Y		MED		Y		OPC	Y													Y		Y		Y	
62	2113	29.0	M	Y		UM		Y	LOW	Y			CAP	Y													Y		Y			
63	2128	35.0	F		Y	M	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
64	2138	60.0	F		Y	W	Y		LOW	Y			OPC	Y			Y	Y			Y	Y		Y	Y		Y		Y		Y	
65	2139	45.0	M		Y	M	Y		LOW			Y	OPC	Y													Y		Y			
66	2143	42.0	M	Y		S	Y		MED		Y		OPC	Y													Y		Y			
67	2159	22.0	M		Y	UM	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
68	2166	4.0	M		Y	UM	Y		LOW		Y		O		Y												Y		Y			
69	2181	50.0	M		Y	M	Y		LOW		Y		O	Y													Y		Y			
70	2190	28.0	M		Y	UM	Y		LOW		Y		OPC	Y													Y		Y			
71	2209	70.0	M	Y		W	Y		MED	Y			O		Y												Y		Y			
72	2217	19.0	F	Y		M	Y		MED		Y		OPC	Y													Y		Y			
73	2222	55.0	M		Y	M		Y	LOW		Y		OPC	Y													Y		Y			
74	2228	58.0	M		Y	M		Y	LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
75	2231	62.0	M		Y	M	Y		LOW	Y			OPC	Y													Y		Y		Y	
76	2264	45.0	M		Y	S	Y		LOW	Y			OPC	Y			Y				Y						Y		Y		Y	
77	2276	40.0	M		Y	M	Y		LOW	Y			OPC	Y			Y				Y						Y		Y		Y	
78	2277	50.0	F		Y	M	Y		LOW			Y	OPC	Y													Y		Y			
79	2280	35.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y			
80	2286	30.0	M		Y	M	Y		LOW		Y		ZP	Y													Y		Y			
81	2289	25.0	M	Y		UM	Y		LOW	Y			OPC	Y							Y						Y		Y		Y	
82	2311	18.0	F	Y		M	Y		LOW	Y			C	Y							Y						Y		Y		Y	
83	2313	47.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y			
84	2319	50.0	M		Y	M	Y		LOW	Y			OPC	Y													Y		Y		Y	
85	2320	40.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y		Y	
86	2323	20.0	M	Y		M	Y		LOW			Y	OPC	Y													Y		Y			
87	2330	32.0	M		Y	UM	Y		LOW	Y			OPC	Y													Y		Y		Y	
88	2332	45.0	M		Y	M	Y		LOW	Y			OPC	Y													Y		Y		Y	

89	2341	35.0	M	Y		M	Y		MED	Y			O	Y													Y		Y		
90	2347	31.0	F		Y	M	Y		LOW	Y			OPC	Y													Y		Y		Y
91	2350	18.0	M	Y		UM	Y		MED	Y			AP	Y													Y		Y		Y
92	2362	42.0	M	Y		M	Y		MED	Y			OPC	Y													Y		Y		Y
93	2363	35.0	M		Y	M	Y		LOW		Y		PP	Y													Y		Y		Y
94	2364	30.0	F		Y	M	Y		LOW	Y			OPC	Y													Y		Y		Y
95	2370	21.0	F	Y		UM	Y		MED	Y			OPC	Y													Y		Y		Y
96	2382	50.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y		
97	2402	75.0	M		Y	W	Y		LOW	Y			OPC	Y													Y		Y		Y
98	2419	32.0	M		Y	M	Y		LOW		Y		CAP		Y				Y	Y			Y			Y	Y		Y		
99	2422	47.0	F		Y	M	Y		LOW	Y			PP	Y													Y		Y		Y
100	2423	35.0	F		Y	M	Y		LOW		Y		PP	Y																	
101	2429	30.0	F		Y	M	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y
102	2463	45.0	M		Y	M	Y		LOW	Y			OPC	Y													Y		Y		
103	2489	17.0	F	Y		UM	Y		MED	Y			OPC	Y													Y		Y		
104	2491	40.0	M	Y		M	Y		MED		Y		OPC	Y													Y		Y		
105	2507	50.0	F		Y	M	Y		LOW		Y		ZP	Y													Y		Y		
106	2533	26.0	M	Y		M	Y		MED			Y	ZP		Y												Y		Y		
107	2541	24.0	F		Y	M	Y		LOW	Y			OPC	Y													Y		Y		
108	2545	61.0	M		Y	W	Y		LOW		Y		OPC	Y													Y		Y		
109	2546	36.0	F		Y	W	Y		LOW		Y		ZP	Y													Y		Y		
110	2556	66.0	M		Y	UM	Y		LOW		Y		ZP		Y												Y		Y		
111	2557	37.0	M	Y		M	Y		LOW			Y	OPC	Y													Y		Y		
112	2564	22.0	F	Y		UM	Y		MED	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y
113	2581	32.0	F	Y		M	Y		MED	Y			AP	Y													Y		Y		Y
114	2592	40.0	M		Y	M	Y		LOW	Y			AP	Y													Y		Y		
115	2602	20.0	F	Y		UM	Y		MED		Y		OPC	Y													Y		Y		
116	2640	27.0	M	Y		M	Y		LOW		Y		OPC	Y													Y		Y		
117	2641	40.0	M		Y	S	Y		LOW	Y			OPC	Y													Y		Y		
118	2645	55.0	M		Y	M	Y		LOW	Y			OPC	Y													Y		Y		Y
119	2657	20.0	M	Y		UM	Y		LOW			Y	OPC	Y													Y		Y		
120	2665	36.0	M		Y	M	Y		LOW	Y			O		Y												Y		Y		Y
121	2669	58.0	M	Y		M	Y		MED			Y	OPC	Y													Y		Y		
122	2696	24.0	M	Y		UM	Y		LOW		Y		OPC	Y													Y		Y		
123	2700	62.0	M		Y	S	Y		LOW	Y			OPC	Y													Y		Y		Y

124	2712	40.0	M		Y	M	Y		LOW	Y			OPC	Y													Y		Y		Y
125	2713	35.0	M		Y	M	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y
126	2715	31.0	M		Y	M	Y		LOW		Y		OPC		Y												Y		Y		
127	2726	37.0	M		Y	S	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y
128	2738	22.0	F	Y		UM	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y
129	2760	32.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y		
130	2771	16.0	F	Y		UM	Y		LOW		Y		ZP	Y													Y		Y		
131	2793	37.0	M		Y	M	Y		LOW		Y		OPC	Y							Y	Y		Y	Y		Y		Y		Y
132	2816	30.0	F		Y	M	Y		LOW		Y		OPC	Y													Y		Y		
133	2820	30.0	M	Y		UM	Y		LOW		Y		O	Y													Y		Y		
134	2822	35.0	M	Y		M	Y		LOW		Y		O	Y													Y		Y		
135	2826	45.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y		
136	2833	32.0	M	Y		M	Y		LOW		Y		OPC	Y							Y	Y		Y	Y		Y		Y		Y
137	2846	45.0	M	Y		M	Y		LOW		Y		OPC	Y													Y		Y		
138	2860	21.0	M	Y		UM	Y		LOW		Y		OPC	Y							Y	Y		Y	Y		Y		Y		Y
139	2880	20.0	F	Y		UM	Y		LOW			Y	O	Y													Y		Y		
140	2889	50.0	M		Y	M	Y		LOW			Y	OPC	Y													Y		Y		
141	2894	50.0	F		Y	W		Y	LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y
142	2907	33.0	F	Y		M	Y		MED	Y			O	Y													Y		Y		
143	2911	35.0	M		Y	M	Y		LOW	Y			OPC	Y							Y	Y		Y	Y						Y
144	2913	2.0	M			UM	Y		LOW		Y		O		Y												Y		Y		
145	2922	40.0	M		Y	M	Y		LOW			Y	OPC	Y													Y		Y		
146	2928	24.0	M		Y	UM	Y		LOW		Y		OPC	Y													Y		Y		Y
147	2947	55.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y		
148	2949	22.0	M		Y	UM	Y		LOW		Y		OPC	Y							Y	Y		Y	Y		Y		Y		Y
149	2971	22.0	M	Y		UM	Y		MED		Y		ZP	Y													Y		Y		
150	2985	40.0	M		Y	UM	Y		LOW	Y			OPC	Y													Y		Y		
151	2991	35.0	M		Y	M	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y
152	3008	42.0	M		Y	M	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y
153	3023	45.0	M		Y	M	Y		LOW	Y			OPC	Y													Y		Y		Y
154	3035	63.0	M		Y	M	Y		LOW			Y	OPC	Y													Y		Y		
155	3038	66.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y		Y
156	3048	31.0	M		Y	UM	Y		LOW		Y		OPC	Y													Y		Y		
157	3051	50.0	F		Y	W	Y		MED	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y

158	3052	55.0	F		Y	M	Y		MED	Y			O		Y												Y		Y		Y
159	3056	45.0	M		Y	M	Y		LOW	Y			OPC	Y													Y		Y		Y
160	3061	20.0	F	Y		S	Y		MED	Y			OPC	Y													Y		Y		Y
161	3071	35.0	M			M	Y		LOW	Y			OPC	Y													Y		Y		Y
162	3073	60.0	F		Y	M	Y		LOW		Y		OPC	Y													Y		Y		
163	3076	38.0	F		Y	M		Y	LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y
164	3087	21.0	M	Y		UM	Y		LOW		Y		O	Y													Y		Y		
165	3096	30.0	M		Y	S	Y		LOW			Y	OPC	Y													Y		Y		
166	3097	30.0	M	Y		M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y
167	3099	15.0	F	Y		UM	Y		LOW	Y			ZP	Y													Y		Y		
168	3110	40.0	F		Y	M	Y		LOW		Y		OPC	Y													Y		Y		Y
169	3121	29.0	M		Y	S	Y		LOW	Y			AP	Y													Y		Y		Y
170	3127	1.5	F			UM		Y	HIGH	Y			OPC		Y												Y		Y		
171	3156	58.0	M	Y		M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y
172	3157	29.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y		Y
173	3159	30.0	M	Y		M	Y		LOW		Y		OPC	Y													Y		Y		
174	3179	30.0	M	Y		M	Y		MED		Y		OPC	Y													Y		Y		Y
175	3180	52.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y		Y
176	3199	17.0	M	Y		UM	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y
177	3200	25.0	F		Y	M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y
178	3202	70.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y		
179	3210	30.0	M	Y		UM	Y		LOW	Y			OPC	Y													Y		Y		
180	3221	28.0	F		Y	S	Y		LOW		Y		CAP	Y						Y	Y			Y			Y	Y		Y		
181	3222	30.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y		
182	3227	32.0	M	Y		D	Y		MED			Y	OPC	Y													Y		Y		
183	3228	17.0	F	Y		UM	Y		MED	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y
184	3233	32.0	F	Y		M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y
185	3239	39.0	F		Y	M	Y		LOW	Y			OPC		Y							Y	Y		Y	Y		Y		Y		Y
186	3241	35.0	M		Y	M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y
187	3242	65.0	M	Y		M	Y		MED			Y	OPC	Y								Y	Y		Y	Y		Y		Y		Y
188	3246	22.0	F			UM	Y		MED	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y
189	13-Jul	32.0	M		Y	M		Y	LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y
190	17	55.0	F		Y	M	Y		LOW		Y		OPC	Y													Y		Y		
191	34	45.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y		

192	37	23.0	F	Y		UM	Y		LOW		Y		OPC	Y												Y		Y			
193	39	35.0	F		Y	M	Y		LOW			Y	OPC	Y												Y		Y			
194	56	50.0	F		Y	W	Y		MED			Y	OPC	Y												Y		Y			
195	57	32.0	M	Y		M	Y		LOW			Y	OCL	Y												Y		Y			
196	58	22.0	M	Y		UM	Y		LOW			Y	OPC	Y												Y		Y			
197	75	63.0	M		Y	M		Y	LOW	Y			OPC	Y												Y		Y		Y	
198	79	36.0	F		Y	M	Y		LOW	Y			CAP	Y		Y			Y	Y			Y			Y		Y		Y	
199	92	45.0	F		Y	M	Y		LOW		Y		OPC	Y												Y		Y		Y	
200	100	40.0	M		Y	M	Y		LOW			Y	OPC	Y												Y		Y			
201	105	38.0	M		Y	M	Y		LOW	Y			AP	Y												Y		Y		Y	
202	110	68.0	M		Y	W	Y		LOW	Y			OPC	Y												Y		Y		Y	
203	127	17.0	M	Y		UM	Y		LOW		Y		ZP	Y												Y		Y			
204	147	65.0	F		Y	W	Y		LOW	Y			C	Y												Y		Y		Y	
205	150	37.0	M		Y	S		Y	LOW	Y			CAP	Y												Y		Y			
206	155	18.0	F	Y		UM	Y		LOW	Y			SV	Y												Y		Y			
207	159	37.0	M	Y		M	Y		LOW		Y		OPC	Y												Y		Y			
208	164	40.0	F		Y	S	Y		LOW	Y			SV	Y												Y		Y			
209	173	27.0	M	Y		M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y	
210	185	40.0	M	Y		M	Y		LOW	Y			OPC	Y												Y		Y		Y	
211	187	35.0	M		Y	M	Y		LOW		Y		AP	Y												Y		Y			
212	188	33.0	F		Y	W	Y		LOW		Y		CAP	Y					Y	Y			Y			Y		Y			
213	202	48.0	M		Y	M	Y		LOW		Y		OPC	Y												Y		Y			
214	207	47.0	M		Y	M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y	
215	218	26.0	F		Y	M	Y		LOW		Y		ZP	Y												Y		Y			
216	225	32.0	M		Y	M	Y		LOW			Y	OPC	Y												Y		Y			
217	244	33.0	M		Y	M	Y		LOW			Y	OPC	Y												Y		Y		Y	
218	245	38.0	F		Y	M	Y		LOW		Y		CAP	Y												Y		Y			
219	250	19.0	M	Y		UM		Y	MED			Y	OCL	Y												Y		Y			
220	271	40.0	M		Y	M	Y		LOW	Y			OPC	Y												Y		Y			
221	273	19.0	F	Y		UM	Y		MED	Y			OPC	Y												Y		Y			
222	313	23.0	M	Y		UM		Y	HIGH	Y			OPC	Y												Y		Y		Y	
223	316	30.0	F		Y	M	Y		LOW	Y			ZP	Y								Y	Y		Y	Y		Y		Y	
224	324	50.0	M		Y	M	Y		LOW	Y			C	Y								Y	Y		Y	Y		Y		Y	
225	327	20.0	F	Y		UM	Y		MED	Y			AP	Y								Y	Y		Y	Y		Y		Y	
226	329	17.0	F	Y		UM	Y		MED	Y			OPC	Y												Y		Y		Y	

227	335	55.0	M	Y		M	Y		LOW		Y		OPC	Y													Y		Y		
228	339	55.0	F		Y	M	Y		LOW	Y			CAP	Y							Y	Y	Y				Y		Y		Y
229	351	47.0	M		Y	M		Y	LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y
230	357	37.0	F		Y	M	Y		LOW	Y			SV	Y													Y		Y		
231	359	22.0	M		Y	UM	Y		MED		Y		OPC	Y													Y		Y		
232	361	26.0	F		Y	M	Y		LOW		Y		AP	Y													Y		Y		Y
233	374	32.0	M		Y	M	Y		LOW	Y			OPC	Y													Y		Y		Y
234	379	38.0	M	Y		M	Y		LOW	Y			OPC	Y													Y		Y		Y
235	389	58.0	F		Y	M	Y		LOW		Y		CAP	Y													Y		Y		
236	398	29.0	F	Y		M	Y		LOW		Y		ZP	Y													Y		Y		
237	401	47.0	M		Y	M	Y		LOW			Y	OPC	Y													Y		Y		
238	408	36.0	M		Y	M	Y		LOW	Y			C	Y							Y	Y		Y	Y		Y		Y		Y
239	409	23.0	M	Y		UM	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y
240	414	45.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y		
241	418	65.0	F		Y	M	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y
242	426	80.0	F		Y	W	Y		LOW	Y			CAP	Y													Y		Y		
243	434	21.0	M		Y	UM	Y		LOW	Y			C	Y							Y	Y		Y	Y		Y		Y		Y
244	437	25.0	F	Y		UM	Y		MED	Y			CAP	Y							Y	Y		Y	Y		Y		Y		Y
245	439	70.0	F		Y	W		Y	LOW		Y		OPC	Y													Y		Y		Y
246	446	24.0	F		Y	M	Y		LOW	Y			ZP	Y													Y		Y		
247	459	29.0	M		Y	M	Y		LOW	Y			C	Y							Y	Y		Y	Y		Y		Y		Y
248	474	20.0	M	Y		UM	Y		MED	Y			AP	Y													Y		Y		
249	488	46.0	M		Y	M	Y		LOW		Y		ZP	Y													Y		Y		
250	494	45.0	M		Y	M	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y
251	496	43.0	M		Y	M	Y		LOW		Y		OPC	Y							Y	Y		Y	Y		Y		Y		Y
252	502	23.0	M		Y	UM	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y
253	514	27.0	M	Y		UM	Y		MED		Y		OPC	Y													Y		Y		
254	523	29.0	F	Y		M	Y		MED			Y	OPC	Y													Y		Y		
255	538	45.0	M		Y	M	Y		LOW			Y	OPC	Y													Y		Y		
256	549	43.0	M		Y	M	Y		LOW		Y		ZP	Y													Y		Y		
257	550	3.0	M		Y	UM	Y		LOW		Y		O		Y												Y		Y		
258	556	32.0	M	Y		M	Y		LOW		Y		ZP	Y													Y		Y		
259	566	24.0	F	Y		M	Y		LOW		Y		OPC	Y													Y		Y		Y
260	569	35.0	F		Y	M	Y		LOW	Y			PP	Y													Y		Y		Y
261	571	42.0	F		Y	M	Y		LOW	Y			OPC	Y													Y		Y		

262	573	15.0	F	Y		UM	Y		LOW	Y			C	Y													Y		Y		Y	
263	588	45.0	M		Y	M	Y		LOW	Y			OPC	Y													Y		Y		Y	
264	589	70.0	F		Y	W		Y	LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
265	599	32.0	M		Y	M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
266	604	22.0	F	Y		M		Y	LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
267	621	45.0	M	Y		M	Y		MED	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
268	642	29.0	F	Y		M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
269	645	29.0	M		Y	M	Y		LOW		Y		OPC	Y														Y		Y			
270	647	52.0	M		Y	M	Y		LOW	Y			OPC	Y														Y		Y		Y	
271	649	19.0	M	Y		UM	Y		LOW	Y			OPC	Y														Y		Y		Y	
272	653	65.0	M	Y		M	Y		LOW	Y			CAP	Y							Y			Y			Y	Y		Y		Y	
273	659	65.0	F	Y		W	Y		LOW	Y			C	Y														Y		Y		Y	
274	667	55.0	M	Y		M	Y		LOW			Y	C	Y														Y		Y		Y	
275	671	33.0	M		Y	M	Y		MED	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
276	673	20.0	F	Y		UM	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
277	684	38.0	M	Y		M	Y		LOW		Y		OPC	Y								Y	Y		Y	Y		Y		Y		Y	
278	698	30.0	M	Y		M	Y		LOW	Y			OPC	Y														Y		Y			
279	703	42.0	F		Y	M	Y		LOW			Y	OPC	Y														Y		Y		Y	
280	704	52.0	M		Y	M	Y		LOW	Y			CAP	Y														Y		Y		Y	
281	707	52.0	F		Y	M	Y		LOW		Y		OPC	Y								Y	Y		Y	Y		Y		Y		Y	
282	709	23.0	M		Y	UM	Y		MED		Y		OPC	Y								Y	Y		Y	Y		Y		Y		Y	
283	714	22.0	F		Y	W	Y		LOW	Y			O	Y														Y		Y			
284	717	9.0	M		Y	UM	Y		LOW	Y			PP		Y													Y		Y		Y	
285	721	42.0	M		Y	M	Y		LOW	Y			OPC	Y														Y		Y			
286	723	12.0	M		Y	UM	Y		LOW	Y			PP		Y													Y		Y		Y	
287	731	35.0	F		Y	M	Y		LOW		Y		OCL	Y														Y		Y			
288	734	50.0	M	Y		M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
289	739	65.0	M		Y	W	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
290	744	20.0	M		Y	UM	Y		MED	Y			OPC	Y														Y		Y		Y	
291	745	55.0	M		Y	M	Y		LOW	Y			AP	Y														Y		Y		Y	
292	746	45.0	M		Y	M	Y		LOW	Y			OPC	Y														Y		Y		Y	
293	749	35.0	M		Y	M	Y		LOW			Y	CAP	Y							Y			Y			Y	Y		Y			
294	753	25.0	M	Y		M	Y		LOW			Y	OPC	Y														Y		Y			
295	755	63.0	M		Y	M	Y		LOW		Y		AP	Y														Y		Y			
296	756	24.0	M		Y	M	Y		LOW		Y		OPC	Y														Y		Y			

297	763	25.0	F	Y		M	Y		LOW		Y		OPC	Y							Y			Y			Y	Y		Y			
298	766	40.0	M	Y		M	Y		LOW		Y		CAP	Y														Y		Y			
299	768	21.0	F	Y		UM	Y		LOW	Y			O		Y													Y		Y		Y	
300	780	2.0	M		Y	UM	Y		MED	Y			O	Y								Y	Y		Y	Y		Y		Y		Y	
301	782	31.0	M		Y	M	Y		LOW	Y			O	Y														Y		Y			
302	785	18.0	M	Y		UM	Y		LOW		Y		ZP	Y														Y		Y			
303	788	65.0	M		Y	S	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
304	794	21.0	M		Y	UM	Y		LOW		Y		OPC	Y														Y		Y			
305	798	38.0	F		Y	M	Y		LOW	Y			PP	Y														Y		Y			
306	799	24.0	M		Y	M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
307	814	33.0	M		Y	M	Y		LOW	Y			AP	Y														Y		Y			
308	821	73.0	M		Y	W	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
309	824	33.0	M		Y	M	Y		MED		Y		OPC	Y								Y	Y		Y	Y		Y		Y		Y	
310	860	59.0	M	Y		M	Y		HIGH		Y		AP	Y														Y		Y		Y	
311	871	11.0	M	Y		UM	Y		HIGH		Y		OPC		Y													Y		Y		Y	
312	872	1.5	F			UM	Y		HIGH	Y			O		Y													Y		Y			
313	884	18.0	F	Y		UM	Y		LOW	Y			C	Y														Y		Y			
314	893	15.0	F	Y		UM	Y		LOW	Y			OPC		Y													Y		Y			
315	894	47.0	F	Y		UM	Y		LOW	Y			PP	Y														Y		Y		Y	
316	896	65.0	F	Y		M	Y		LOW		Y		CAP	Y														Y		Y			
317	912	27.0	F	Y		M	Y		LOW	Y			ZP	Y														Y		Y			
318	916	39.0	M		Y	M	Y		LOW		Y		OPC	Y														Y		Y			
319	935	42.0	M		Y	M	Y		LOW	Y			SV	Y								Y	Y		Y	Y		Y		Y		Y	
320	944	22.0	F	Y		UM	Y		LOW	Y			OPC		Y							Y	Y		Y	Y		Y		Y		Y	
321	945	55.0	M		Y	M	Y		LOW		Y		OPC	Y														Y		Y			
322	953	37.0	M	Y		S	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
323	957	50.0	F		Y	M	Y		LOW	Y			O	Y														Y		Y			
324	963	41.0	M	Y		M	Y		MED	Y			O	Y														Y		Y			
325	967	80.0	F		Y	W	Y		LOW		Y		PP	Y														Y		Y			
326	975	32.0	M	Y		M	Y		LOW			Y	OPC	Y														Y		Y			
327	978	17.0	F	Y		UM	Y		HIGH		Y		ZP	Y														Y		Y			
328	983	18.0	F	Y		UM	Y		HIGH	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
329	990	28.0	M		Y	M	Y		LOW		Y		O	Y														Y		Y			
330	991	30.0	M	Y		M		Y	LOW		Y		OPC	Y														Y		Y		Y	
331	992	25.0	M	Y		M	Y		LOW		Y		OPC	Y														Y		Y			

332	996	32.0	M	Y		M	Y		LOW		Y		OPC	Y														Y		Y		Y	
333	1001	33.0	M	Y		M	Y		LOW	Y			OPC		Y													Y		Y			
334	1003	28.0	M	Y		M	Y		LOW	Y			O	Y														Y		Y			
335	1008	33.0	F	Y		M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
336	1014	30.0	M	Y		M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
337	1017	22.0	F	Y		UM	Y		LOW		Y		PP	Y														Y		Y			
338	1018	34.0	F	Y		M	Y		LOW		Y		OPC	Y														Y		Y			
339	1020	25.0	M	Y		M	Y		LOW			Y	OPC	Y														Y		Y			
340	1029	50.0	M		Y	M	Y		LOW		Y		OPC	Y														Y		Y			
341	1032	58.0	F		Y	M	Y		LOW	Y			O	Y														Y		Y			
342	1056	25.0	F	Y		M	Y		LOW		Y		PP	Y														Y		Y			
343	1057	26.0	F	Y		S	Y		LOW		Y		OPC	Y														Y		Y			
344	1059	35.0	M		Y	M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
345	1064	40.0	F	Y		M	Y		LOW	Y			AP	Y														Y		Y			
346	1068	52.0	M		Y	M	Y		LOW		Y		OPC	Y														Y		Y			
347	1079	27.0	M	Y		M	Y		LOW		Y		OPC	Y														Y		Y			
348	1080	44.0	M		Y	M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
349	1112	35.0	M		Y	M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
350	1121	35.0	M		Y	M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
351	1131	33.0	M	Y		M	Y		HIGH	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
352	1144	35.0	M		Y	M	Y		LOW		Y		OPC	Y								Y	Y		Y	Y		Y		Y		Y	
353	1145	28.0	M		Y	M	Y		LOW	Y			PP	Y														Y		Y			
354	1148	22.0	F	Y		M	Y		LOW	Y			ZP	Y														Y		Y			
355	1152	62.0	M		Y	W	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
356	1153	50.0	M		Y	UM	Y		LOW	Y			O	Y														Y		Y			
357	1156	30.0	M		Y	M	Y		LOW		Y		PP	Y														Y		Y			
358	1158	28.0	M		Y	M	Y		LOW		Y		OPC	Y														Y		Y			
359	1172	45.0	M		Y	M	Y		LOW		Y		OPC	Y								Y	Y		Y	Y		Y		Y		Y	
360	1178	29.0	F	Y		M	Y		LOW	Y			CAP	Y					Y	Y				Y			Y	Y		Y			
361	1180	40.0	M		Y	M	Y		LOW	Y			AP	Y														Y		Y			
362	1181	60.0	M		Y	W	Y		LOW	Y			OPC	Y														Y		Y		Y	
363	1189	42.0	M		Y	M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y	
364	1198	17.0	M	Y		M	Y		LOW		Y		OPC	Y														Y		Y			
365	1200	37.0	F		Y	M	Y		LOW		Y		OPC	Y								Y	Y		Y	Y		Y		Y		Y	
366	1209	24.0	F	Y		UM	Y		LOW		Y		OPC	Y														Y		Y			

367	1213	32.0	M		Y	UM	Y		LOW	Y			C	Y													Y		Y		Y
368	1216	35.0	F		Y	M	Y		LOW		Y		OPC	Y								Y	Y		Y	Y		Y		Y		Y
369	1224	2.0	F		Y	UM	Y		LOW	Y			O		Y													Y		Y		
370	1226	47.0	M		Y	M	Y		MED	Y			C	Y														Y		Y		Y
371	1227	60.0	M		Y	W	Y		LOW	Y			OPC	Y														Y		Y		
372	1228	58.0	M	Y		M	Y		MED	Y			AP	Y														Y		Y		Y
373	1229	35.0	F		Y	M	Y		LOW	Y			OPC	Y														Y		Y		
374	1238	27.0	F		Y	M	Y		LOW	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y
375	1243	52.0	M		Y	W	Y		MED	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y
376	1246	65.0	M		Y	W	Y		LOW			Y	OPC	Y														Y		Y		
377	1253	60.0	M		Y	W	Y		LOW	Y			OPC	Y														Y		Y		Y
378	1254	35.0	M		Y	S	Y		LOW			Y	OPC	Y								Y	Y		Y	Y		Y		Y		Y
379	1256	43.0	M		Y	M	Y		LOW			Y	OPC	Y														Y		Y		
380	1258	18.0	F	Y		UM	Y		MED	Y			OPC	Y														Y		Y		
381	1267	40.0	F		Y	M	Y		LOW	Y			OPC	Y														Y		Y		
382	1268	19.0	M	Y		UM	Y		LOW	Y			OPC	Y														Y		Y		
383	1275	21.0	F		Y	UM	Y		LOW	Y			OPC	Y														Y		Y		Y
384	1287	58.0	M	Y		M	Y		MED		Y		OPC		Y													Y		Y		
385	1289	21.0	M	Y		M	Y		LOW	Y			OPC	Y														Y		Y		
386	1293	21.0	M		Y	UM	Y		MED	Y			OPC	Y								Y	Y		Y	Y		Y		Y		Y
387	1295	60.0	M		Y	M	Y		LOW	Y			OPC	Y														Y		Y		Y
388	1299	42.0	M		Y	M	Y		LOW		Y		C	Y														Y		Y		Y
389	1303	44.0	M		Y	M	Y		LOW	Y			O	Y														Y		Y		
390	1310	27.0	M		Y	M	Y		LOW	Y			OPC	Y														Y		Y		Y
391	1311	45.0	M		Y	M	Y		LOW	Y			OPC	Y														Y		Y		
392	1315	55.0	M		Y	M	Y		LOW	Y			O	Y														Y		Y		
393	1318	55.0	M		Y	M	Y		LOW	Y			PP	Y														Y		Y		Y
394	1365	43.0	M		Y	M	Y		LOW	Y			O	Y														Y		Y		
395	1374	32.0	M		Y	M	Y		LOW		Y		ZP	Y														Y		Y		
396	1376	50.0	F		Y	M	Y		LOW	Y			O	Y														Y		Y		Y
397	1377	53.0	M		Y	M	Y		LOW	Y			O	Y														Y		Y		Y
398	1378	58.0	F		Y	M	Y		LOW	Y			CAP		Y					Y			Y			Y		Y		Y		
399	1379	34.0	F		Y	M	Y		LOW	Y			C	Y														Y		Y		Y
400	1383	43.0	M		Y	M	Y		LOW	Y			O	Y														Y		Y		
401	1387	22.0	F	Y		M	Y		LOW			Y	OPC	Y														Y		Y		

402	1388	65.0	M		Y	M	Y		LOW	Y			OPC	Y												Y		Y		Y	
403	1393	60.0	F		Y	W	Y		LOW		Y		CAP	Y					Y	Y			Y			Y		Y			
404	1411	33.0	F	Y		M	Y		MED	Y			ZP	Y							Y	Y		Y	Y		Y		Y		Y	
405	1417	18.0	F	Y		UM	Y		HIGH	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
406	1420	58.0	M		Y	W	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
407	1430	24.0	M		Y	UM	Y		LOW			Y	OPC	Y													Y		Y		Y	
408	1438	35.0	F	Y		D	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
409	1439	28.0	F	Y		M	Y		LOW		Y		OPC	Y													Y		Y		Y	
410	1443	55.0	M		Y	M	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
411	1444	27.0	M		Y	M	Y		LOW	Y			OPC	Y													Y		Y		Y	
412	1445	18.0	F	Y		UM	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
413	1446	52.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y		Y	
414	1450	37.0	M	Y		M	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
415	1454	50.0	M		Y	M	Y		MED		Y		OPC	Y													Y		Y			
416	1457	26.0	M	Y		UM	Y		MED	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
417	1462	38.0	M	Y		M	Y		LOW	Y			AP	Y													Y		Y			
418	1494	19.0	M	Y		UM	Y		LOW	Y			AP	Y													Y		Y			
419	1498	13.0	M	Y		UM	Y		HIGH	Y			AP	Y													Y		Y			
420	1502	25.0	M	Y		UM	Y		MED	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
421	1512	45.0	M		Y	M	Y		LOW	Y			OPC	Y													Y		Y		Y	
422	1514	57.0	F		Y	M		Y	LOW	Y			CAP	Y					Y	Y							Y		Y		Y	
423	1519	60.0	M		Y	M	Y		HIGH		Y		OPC	Y													Y		Y		Y	
424	1524	15.0	F	Y		UM	Y		HIGH		Y		C	Y													Y		Y		Y	
425	1533	35.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y			
426	1551	63.0	M		Y	M	Y		LOW			Y	OPC	Y													Y		Y			
427	1599	46.0	M	Y		M	Y		LOW		Y		OPC	Y													Y		Y			
428	1613	60.0	M		Y	M	Y		LOW	Y			OPC	Y													Y		Y			
429	1615	35.0	M		Y	M	Y		LOW		Y		OPC	Y													Y		Y			
430	1630	58.0	M		Y	S	Y		LOW	Y			OPC	Y							Y	Y		Y	Y		Y		Y		Y	
431	1634	18.0	F	Y		M	Y		LOW	Y			SV	Y													Y		Y			
432	1647	35.0	F	Y		M	Y		LOW		Y		OPC	Y													Y		Y			
433	1649	17.0	F	Y		UM	Y		MED			Y	OPC	Y													Y		Y			

Ref.No.6506/E1/5/2014

Madurai Medical College,
Maduai -20. Dated: 31-07 .2014.

Institutional Review Board/Independent Ethics Committee
Capt.Dr.B.Santhakumar,MD (FM). deanmdu@gmail.com
Dean, Madurai Medical College &
Government Rajaji Hospital, Madurai 625 020 . Convenor

Sub: Establishment – Madurai Medical College, Madurai-20 –
Ethics Committee Meeting – Meeting Minutes - for July 2014 –
Approved list – reg.

The Ethics Committee meeting of the Madurai Medical College, Madurai was held on 22nd July 2014 at 10.00 Am to 12.00 Noon at Anaesthesia Seminar Hall at Govt. Rajaji Hospital, Madurai . The following members of the Ethics Committee have attended the meeting.

1.Dr.V.Nagarajan,M.D.,D.M(Neuro) Ph: 0452-2629629 Cell No.9843052029 nag9999@gmail.com.	Professor of Neurology (Retired) D.No.72, Vakkil New Street, Simmakkal, Madurai -1	Chairman
2.Dr.Mohan Prasad, MS.M.Ch. Cell.No.9843050822 (Oncology) drbkcmp@gmail.com	Professor & H.O.D of Surgical Oncology (Retired) D.No.32, West Avani Moola Street, Madurai.-1	Member Secretary
3. Dr.L.Santhanalakshmi, MD (Physiology) Cell No.9842593412 dr.l.santhanalakshmi@gmail.com.	Vice Principal, Prof. & H.O.D. Institute of Physiology Madurai Medical College	Member
4.Dr.K.Parameswari, MD(Pharmacology) Cell No.9994026056 drparameswari@yahoo.com.	Director of Pharmacology Madurai Medical College.	Member
5.Dr.S.Vadivel Murugan, MD., (Gen.Medicine) Cell No.9566543048 svadivelmurugan_2007@rediffmail.com.	Professor & H.O.D of Medicine Madurai Medical College	Member
6.Dr.A.Sankaramahalingam, MS., (Gen. Surgery) Cell.No.9443367312 chandrahospitalmdu@gmail.com	Professor & H.O.D. Surgery Madurai Medical College.	Member
7.Mrs.Mercy Immaculate Rubalatha, M.A., Med., Cell.No.9367792650 lathadevadoss86@gmail.com	50/5, Corporation Officer's Quarters, Gandhi Museum Road, Thamukam, Madurai-20.	Member
8.Thiru.Pala.Ramasamy, B.A.,B.L., Cell.No.9842165127 palaramasamy2011@gmail.com	Advocate, D.No.72,Palam Station Road, Sellur, Madurai-20.	Member
9.Thiru.P.K.M.Chelliah, B.A., Cell No.9894349599 pkmandco@gmail.com	Businessman, 21 Jawahar Street, Gandhi Nagar, Madurai-20.	Member

The following project was approved by the committee

Name of the PG Student	Course	Name of the Project	Remarks
Dr.R.Karthick	PG in MD (Forensic Medicine), Madurai Medical College, Madurai	Retrospective autopsy analysis on pattern of fatal cases of poisoning in Government Rajaji Hospital, Madurai	Approved

Please note that the investigator should adhere the following: She/He should get a detailed informed consent from the patients/participants and maintain it confidentially.

1. She/He should carry out the work without detrimental to regular activities as well as without extra expenditure to the institution or to Government.
2. She/He should inform the institution Ethical Committee, in case of any change of study procedure, site and investigation or guide.
3. She/He should not deviate the area of the work for which applied for Ethical clearance.
   She/He should inform the IEC immediately, in case of any adverse events or serious adverse reactions.
4. She/He should abide to the rules and regulations of the institution.
5. She/He should complete the work within the specific period and if any extension of time is required He/She should apply for permission again and do the work.
6. She/He should submit the summary of the work to the Ethical Committee on completion of the work.
7. She/He should not claim any funds from the institution while doing the work or on completion.
8. She/He should understand that the members of IEC have the right to monitor the work with prior intimation.

Member Secretary
Ethical Committee

Chairman
Ethical committee

31.7.14

DEAN/Convenor
Madurai Medical College & Govt.
Rajaji Hospital, Madurai.

To
The above Applicant
-thro. Head of the Department concerned

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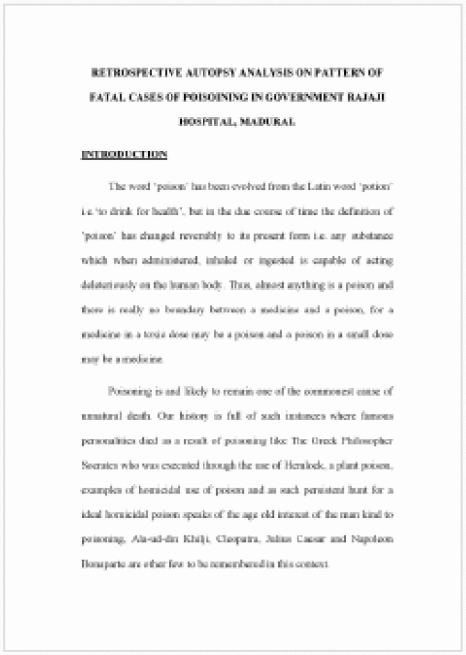
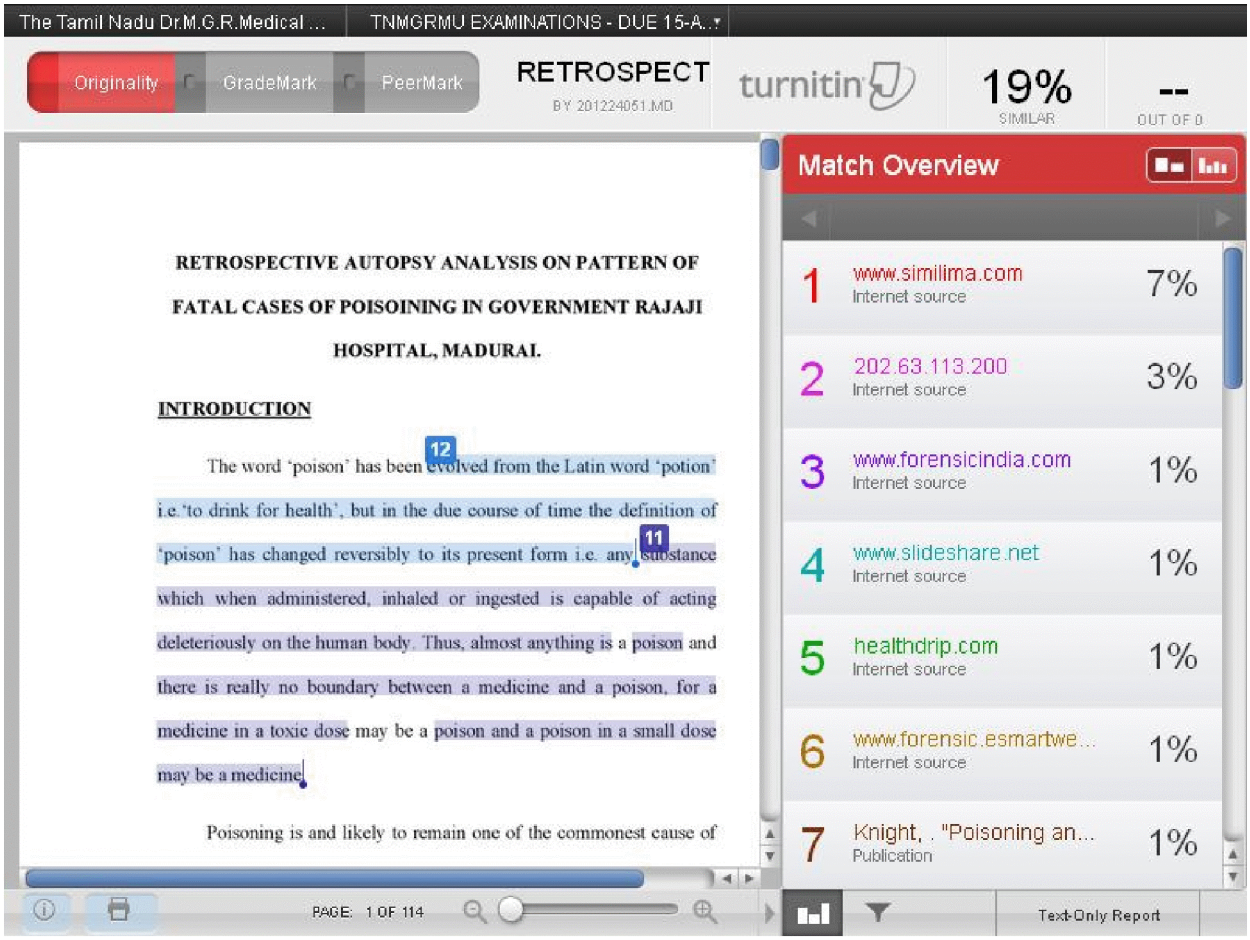


RETROSPECTIVE AUTOPSY ANALYSIS ON PATTERN OF FATAL CASES OF POISOINING IN GOVERNMENT RAJAJI HOSPITAL, MADURAI

INTRODUCTION

The word 'poison' has been evolved from the Latin word 'potion' i.e. 'to drink for health', but in the due course of time the definition of 'poison' has changed reversibly to its present form i.e. any substance which when administered, inhaled or ingested is capable of acting deleteriously on the human body. Thus, almost anything is a poison and there is really no boundary between a medicine and a poison, for a medicine in a toxic dose may be a poison and a poison in a small dose may be a medicine.

Poisoning is and likely to remain one of the commonest cause of unnatural death. Our history is full of such instances where famous personalities died as a result of poisoning like The Greek Philosopher Socrates who was executed through the use of Hemlock, a plant poison, examples of homicidal use of poison and as such persistent hunt for a ideal homicidal poison speaks of the age old interest of the man kind to poisoning. Ala-ud-din Khilji, Cleopatra, Julius Caesar and Napoleon Bonaparte are other few to be remembered in this context.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Poisoning is and likely to remain one of the commonest cause of
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