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Prevalence of Aluminum Phosphide Intoxication amongst Victims of Poisoning – Lady Reading Hospital Peshawar

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Objectives: To study the prevalence of intoxicated aluminum phosphide patients, which depends on the manner of ingestion at Emergency Department, Lady Reading Hospital, Peshawar.

Materials and Methods: ThisRetrospective cross-sectional study was conducted at Emergency Department of Lady Reading Hospital Peshawar from January 2021 to December 2021. All the cases reported were enrolled in this study. The study data was analyzed using SPSS v.25.0.

Results:A total of 199 cases were received, gender based distribution was 140 were females and 59were males. The most commonly affected age group is 11-20 years among females and 21-30 years among males. More common is rural than in urban areas.

Conclusion: Aluminum phosphide (wheat pills) is the most commonly used substance for poisoning among young people. The reasons being Pakistan an agricultural country and due to easyaccessibility of wheat pills.

Keywords: Prevalence, Accidental, suicidal, poisoning.

Introduction:

Any substance which is taken in any amount by any route and produce harmful effects on the body is called poison. From 1980 to 2008 the main cause of death was road traffic accidents, however,in 2008 for the first time deaths due poisoning exceeds than deaths due to road traffic accidents. From the last 30 years, the death rates due to poisoning increased to almost three times.[1] Inthe year 1991 a study conducted which showed that about 592000 people killed

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themselves and almost 76% of deaths all over the world occurred due to self-harm.[2] According to World Health Organization, almost twenty lac people killed themselves and about 10 lac people were accidental cases of poisoning are reported every year, throughout the world.[3]

In majority of the Asian subcontinent countriespoisoning, hangingand jumping from buildings or jumping into river are common ways of suicide.Developing countries or third world countries and also agricultural countries shows high mortality rate of suicidal poisoning because of easy availability of poisons.[4] Poisons are classified into different types and among them one group is organophosphate poisons which are widely used as insecticide and pesticides. Pakistan is an agricultural country and organophosphate compounds are used as insecticides and pesticides and almost easily available in every home therefore these are used for suicidal purpose. Sri lanka is an agricultural country located in Asia subcontinent, most commonly used method for suicide are pesticides,[5] which is highlyfatal,[6] and stands fifth leading cause of death.[7] In Pakistan very little research is done regarding Aluminum phosphide poisoning. From the limited research which is done in Pakistan national health survey of Pakistanconcluded that among unintentional injuries it is the second commonest cause.[8-11]

Aluminum phosphide is available in solid tablets form which is fumigant pesticide. It is used for preservation of grains especially wheat& rice since long. It is cheaper & easily available in market with the brand name of Celphos, Alphos, Quickphos, Phostoxin, Phosphotex, etc. When water or any moisture or wet substance or liquid comes in contact with aluminum phosphide, it release a gas known as Phosphine gas which is highly toxic respiratory poison and lethal for all kinds of living organism specially for the insects, pests and rodents as well as human beings.

$$ALP + 3H_2O \longrightarrow AL(OH)_3 + PH_3$$

Phosphine is respiratory poison and affects oxygen transport to tissues and cells of the body and damage organs due to cellular hypoxia by binding to Cytochrome oxidase. It also disturb the electrolyte balance of the body as result it causes acute cardio toxicity and may lead to necrosis of myocardium.

There are many causes of suicidal poisoning in our country, in which one of the most important isinter-personal conflict with the opposite gender.Interpersonal conflict leads to stress in women. The police records do not reflect the true picture ofthe problem in our set up.[12] The main purpose of this study was to highlight factors such asage group,gender, mode, seasonal variationand the residential background of the victims which influence intoxication whether intentionally or accidently. This study will help the government to make legislation through parliament and then implement the law by administration to make sure of control sale to specific population of community.By taking such measures the government reduces the cases of poisoning in our setup and may save precious lives.

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Materials and Methods:

A Retrospective study was conducted at Emergency Department of Lady Reading Hospital Peshawar, Pakistan from1st January 2021 to 31st December 2021, included a total of 199 cases of aluminum phosphide poisoning, including both genders and covering all age groupsthat were brought to the department and the record is available. Intoxication due to other poisons is excluded. The exclusion criteria is determined on basis of history and toxicological analysis.

Permission was taken from the emergency department of Lady Reading Hospital Peshawar. A predesigned proforma was made, which contains demographic data such as age, gender, districtand season. The data was entered in the pro-forma. Percentages and frequency were applied for categorical variables.

Results:

Out of the total 199 cases of aluminum phosphide poisoning 59 (29.64%) were males and 140 (70.35%) were females. Age group wise distribution shown in table: 1, wherein most commonly affected age group is between 11-20 years among females and 21-30 years among males. Majority of the cases were brought in the month of December followed by October.

TABLE NO 1:AGE GROUP CROSS TABULATEDWITH GENDER DISTRIBUTION

Gender	Age Group (years)			
	11-20	21-30	31-40	Above 40
Male	16	24	14	5
Female	72	60	8	0

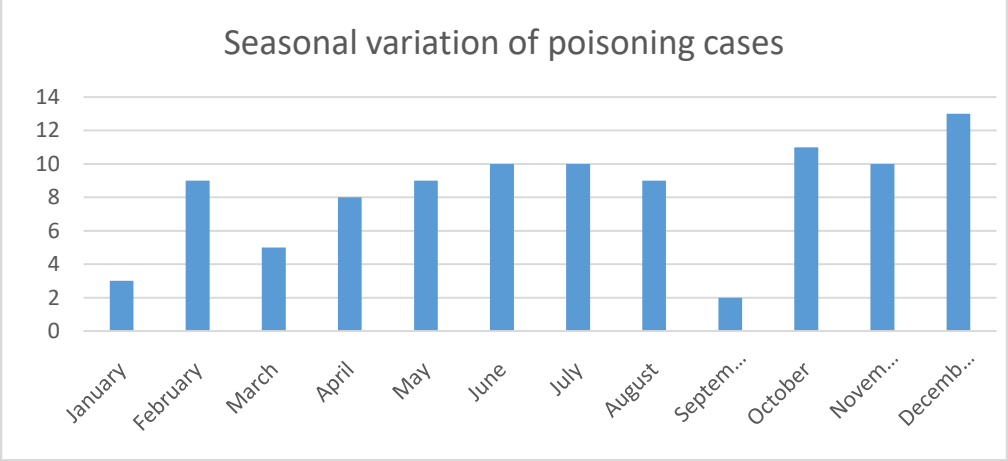

FIGURE NO: 1 SEASONAL VARIATION

Discussion:

Intoxication of poisons either intentionally, unintentionally or accidently is one of the important public health problem all over the world which affect all countries as well as all age groups of both males and females irrespective of their income status. Epidemiological studies showed that

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about 700 people die from poisoning in every 24 hours worldwide.[7,13] In third world and developing countries incidence of poisoning is 14 times more as compared to the developed countries.[14] Aluminum phosphide poisoning is known worldwide, especially in the developing countries. The fatal dose of aluminum phosphide for a 70 kg adult is 500mg---1500mg. Aluminum phosphide when ingested, phosphine gas is released which like cyanide inhibit cytochrome oxidase and hence decrease oxygen utilization by the cells of body.

This study included 199 victims of poisoning with 140 female and 59male cases. In female gender intoxicated deaths were more common than males because of psychological stress, lack of education and awareness, which coincides with the studies conducted at China,[15] Japan[16] and Austria.[17] Main bulk of the poisonous victims comprised of younger age groups 21-30 years in males and 11-20 years in femaleswhichis in accordance with research conducted in six cities of Pakistan.[18] Loss and personal conflictsbeing thecommon identifiablelife events precipitating suicidal nature.In this study majority of poisonous cases reported in the December, however in another study conducted in Faisalabad many cases were reported during summer season.[18]

The outcome of ALP poisoning depends on multiple factors among them one is the time interval between poisoning and hospital presentation. It also depends on number of pills taken, amount of pills taken and condition of pill whether old or fresh but we did not find such association.

Conclusion:

Aluminum Phosphide (wheat pill) is a dangerous and lethal poison and rapidly causes death. There is no specific substance which is used to antagonize its harmful effects. Among teen agers intentional poisoning was common. This study consist of sample size and limited only to one tertiary care hospital therefore we need to cover large population so that its results can be generalized. Therefore large-scale studies are required to improve survival from exposure to this dangerous poison. Proper legislation is required for strict control on the purchase of this lethal drug.

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