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Research Article

**KALA PATHAR (PARAPHENYLENE DIAMINE) POISONING: AN ICU
BASED OBSERVATIONAL STUDY AT HYDERABAD, PAKISTAN.****Muhammad Akbar Kazi¹, Aisha Rasheed Shaikh², Abdul Samad³, Ishrat Bibi⁴, Mehrab Khan⁵**¹MBBS, DMJ, Professor and Chairperson, Department of Forensic Medicine & Toxicology, Liaquat University of Medical and Health Sciences Jamshoro.²MBBS, DGO, MD (Forensic Medicine), Lecturer, Department of Forensic Medicine & Toxicology, Liaquat University of Medical and Health Sciences Jamshoro.³MBBS, Dip in Diabetes, DMJ, Assistant Professor, Department of Forensic Medicine & Toxicology, Jinnah Medical College Peshawar⁴MBBS, MD(Forensic Medicine), Lecturer, Department of Forensic Medicine & Toxicology, Liaquat University of Medical and Health Sciences Jamshoro.⁵MBBS, Medical Officer Medical Unit LUMHS Jamshoro.**Abstract:**

Paraphenylenediamine (PPD) ingestion as a suicidal agent is becoming a more common toxicity in Pakistan and other Asian countries as reported in published literature. This coloring dye contains toxic chemicals responsible for hepatic necrosis, renal failure, rhabdomyolysis and severe laryngeal edema that leads to death if not timely managed. This chemical is quite cheap and easily available to a common man so the PPD poisoning is becoming in adults as a source of deliberate self-harm. Current study was conducted from Jan 2015 to June 2015 in the ICU(Intensive Care Unit) of the Liaquat University of Medical and Health Sciences Hospital Hyderabad, Sindh, Pakistan. This study was arranged because no such study was reported from this region of the country previously. There were 24 Patients were diagnosed as kala Pathar poisoning during the study time period with age range of 15-35 yrs. Most of them 17(70.83%) were females while 6(29.17%) were males. Majority of patients were married 18(75%) while 6(25%) were unmarried. Most of the patients belonged to low socio-economic background 22(91.66%) while 02(10.44%) were from middle group and no case was found to belong with high socio-economic group. Overall mortality was found 41.66% and Cure was 54.17% while 4.16% got referred to other facility. It is suggested that the easy availability of this chemical should be stopped and social life of community be improved.

Key Words: Paraphenylenediamine (PPD), Suicide, Rhabdomyolysis, Mortality,**Corresponding author:****Dr. Abdul Samad**

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INTRODUCTION:

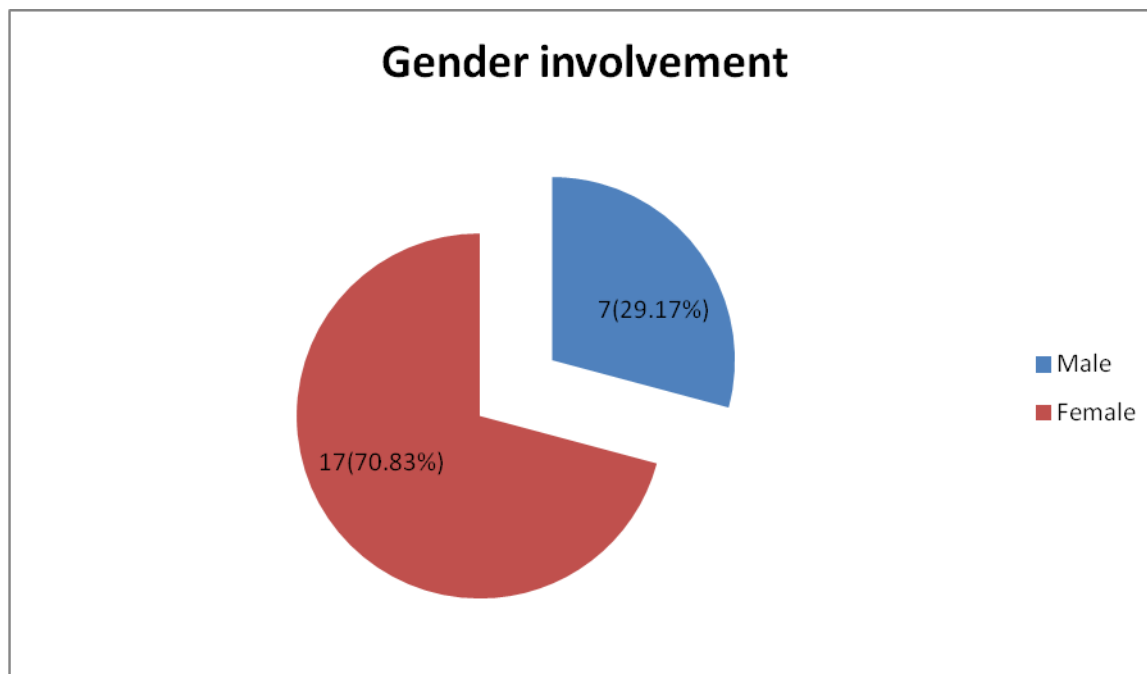
Asian countries has high rate of suicidal attacks which is 60% of the total [1]. Suicide is also a complication of the depression where patient tries to end the life after uncontrolled pessimistic thoughts [2]. There are various methods adopted by different patients for suicidal purpose but Paraphenylene diamine is becoming a more common cause of poisoning since few years. Kaala Pathar is the name in local Urdu language spoken in sub-continent. It is quite cheaper and frequently available to add in the coloring dyes(Hair dye). PPD is derived from an aromatic amine (p-nitroaniline), used in various industrial chemicals and it causes local as well as systemic toxicity following oral, inhalational and topical use [3].The lethal dose of PPD is reported as 7-10grams and death may occur within 6-24 hours after oral ingestion[4]. PPD is metabolized into benzoquinone diamine by cytochrome P450 peroxidase and further oxidation results into the formation of Brandowaski's base (Both are responsible for DPP toxicity[5].Multiple organs get affected due to PPD toxicity like kidneys(Renal failure), heart(MI, Myocarditis) ,liver(Hepatitis, Hepatic necrosis) and muscles (rhabdomyolysis) and the victims usually present with edema of tongue, pharynx, larynx ,neck and face along with hemodynamic instability and cardiac arrhythmias requiring early tracheotomy to manage the airway obstruction along with other therapeutic measures [6-10].Poisoning from Paraphenylene diamine is also reported from Morocco, Sudan, Middle east, India and Pakistan [11].The current study was conducted in intensive care unit of liquat University of medical and health sciences Jamshoro /Hyderabad as literature was deficient about this region's figures in terms of PPD (Kalapathar)poisoning and hopefully it will be beneficial for physicians as well as patients.

METHODOLOGY:

This observational study was conducted on the 24 ICU admitted patients diagnosed as PPD poisoning from January 2015 to June 2015. The inclusion criteria was known cases of PPD poisoning of both genders and any age group while patients admitted for other types of poisoning were excluded from the study. Informed written consent was acquired from relatives and attendants of patients. Biodata was registered on a designed performa for name , age ,gender, area of residence (rural/urban) and socio-economic status. SPSS version 22 was used for data analysis purpose, mean, SD and frequency was calculated.

RESULTS:

There were 24 Patients diagnosed as kala Pathar poisoning that we could find in 6 month duration. The age range was found to be 15-35 years 19(79.17%) patients were from 15-25 years and 5(20.83%) patients were from 26-35 years .Majority of the cases were females 17(70.83%) while males were only 7(29.17%). Most of the study subjects were married 18(75%) while the ratio of unmarried patients was small 6(25%). Patients of low socio-economic background were mostly involved in DPP poisoning 22(91.66%) and only 02(8.33 %) of patients were from middle socio-economic background group and there was no case from high socio-economic background group. Thirteen patients were treated and discharged around 1week stay in ICU while one patient got referred other health facility and 10 patients could not survive despite of all possible available sources putting the mortality as 41.66% in this condition.



Figure#1: Pie chart of gender distribution of study subjects

Table#1. Demographic parameters of the study subjects

| Parameters | Married | Unmarried |
|-----------------------|-------------|-------------|
| Marital Status | 18(75%) | 06(25%) |
| Socio-economic status | Low | Middle |
| | 22(91.66%) | 02(8.33 %) |
| Age ranges | 15-25 Years | 26-35 years |
| | 19(79.17%) | 05(20.83%) |

Table #2. Study outcomes

| | | |
|---|-------------------|------------|
| 1 | Patients Cured | 13(54.17%) |
| 2 | Patients referred | 01(4.16%) |
| 3 | Patients died | 10(41.66%) |
| 4 | Total | 24(100%) |

DISCUSSION:

Many researchers added their valuable observations on kala-pather poisoning our results also resemble with majority of them Khuhro BA et al (2012) reported female involvement as 87.5% (14) and males as 12.5%(2) which is consistent to our 70.83%(70) for female 29.17%(7)for males. Majority of the subjects (68.8%) were reported to belong with 21-30 yrs age range while we found majority in 15-25 yrs age group they reported 75%(12) as suicidal and 25%(4) as accidental while we found 100% subjects to commit suicide. Oral route was reported by them in majority of subjects 81.3%(13) and other route was found in 18.8%(3) cases which was inconsistent to our study where oral route was reported in all subjects. Similarly the duration of shorter and more cases were observed (24 cases in 6

months) while they could find 16 patients in 3 years was too inconsistent which may possibly be due to population and area differences however the mortality reported by them (37.5%) was parallel to what we observed 41.66%[12].Qasim AP et al (2016) reported 109 cases in 3 months which was much higher as compared to our observation reflecting the social life of that rural region. He reported 89% (97) females and 11%(12) males with age range 11-30 yrs noted in most of cases 83.48%(91) and all were suicidal cases following oral route which was consistent to our results. Majority of cases (95.41%) were from lower socioeconomic group that consistent to our observation [13].Khan MA et al (2018) reported a much large number of PPD poisoning (1258) in 15 months with 64.7% (814) females patients while 35.3% (444) males subjects with an age

range of 5 - 63 years which was inconsistent to our findings. He also reported 5.2% (66) children in his study along with 1125 (94.37%) adults as suicidal cases while 62 (5.20%) as accidental poisoning that falls inconsistent to our results. They reported mortality of 24.08% in adults which was inconsistent to our 41.66% [14]. Akbar K et al (2017) found 65 cases of PDD poisoning in 1 year with 47 (72.31%), 18 (27.69%) females and males respectively which is in accordance to our findings. Mean age reported by him is 24.35±9.8 years and the route of poisoning in 89.23% (58) was oral that was suicidal and in 10.77% (7) it was reported trans-dermal that was accidental [15] Khan N et al (2015) in their 2 years study observed 38 patients of PPD poisoning with a mean age of 22.08±6.42 years, 71.1%(27) of which unmarried from a low socioeconomic class which is consistent with our results. He reported 94.74% (36) as Suicidal while 5.26% (2) as accidental with a mortality rate of 47.4% that is compare able with 41.66% of our results [16]. The current and previous studies show that the problem under discussion is of serious nature with high mortality in quite a young age so this chemical should be banned in the market and social life of the public especially the low socioeconomic group should be improved. Early management can improve the treatment outcomes so referral system needs improvement as the majority of the victims are reported to be from the rural areas by various studies.

CONCLUSION:

PPD poisoning is becoming more common among the young age, low socioeconomic group of people and females are more affected with an overall mortality in 41.66%.

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