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Research Article

KALA PATHAR (PARAPHENYLENE DIAMINE): A FORENSIC PERSPECTIVE FROM LIAQUAT UNIVERSITY HOSPITAL HYDERABAD, SINDH, PAKISTAN

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Abstract:

*Kala Pathar a local name of Paraphenylene-diamine which is an agent used in coloring dyes but also known for its toxicity that promotes its use as a tool for suicide as it is cheaper as well as easily and frequently available. This chemical agent affects all body organs including liver, heart, kidney, lungs, muscles and ultimately leads to death if left untreated. This research was conducted on 20 poisoning cases presenting to LUH (Liaquat University Hospital) Hyderabad, Sindh, Pakistan. We observed 16 females and 4 males out of which married were 15 and unmarried were 5. Mostly subjects were from low socio-economic status 18 and the presentation was suicidal 19(95%) and accidental in 1(5%) cases. Different presentations were seen like Hemodynamically unstable patients (Shock), Oliguria, Anuria, throat pain, Dark urine and Rhabdomyolysis. Tracheostomy and ventilatory support could only save 12 patients while 8 patients died in a span of one week. **Conclusion:** The kala Pathar poisoning is most common in poor, young, females specially married ones with high mortality rate.*

Key Words: Forensic, Poisoning, Kala Pathar, Suicidal, Tracheostomy,

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INTRODUCTION:

Kala Pathar (Paraphenylene-diamine) is being used since very long in chemical industries specifically in colour and dye industry. It was so commonly available due to common use in homes but its derivative p-nitroaniline caused the local as well as toxicity by various routes of administration like oral, topical and inhalational [1]. The chemical is proved to produce the lethal effects at around a dosage of 7-10grams while death is reported within 6 hours to a day after oral route [2]. The metabolism of kala Pathar is based on hepatic CYP450 system which is responsible for its conversion into 1) benzoquinone diamine, 2) Brandowaski's base which are toxic in nature [3]. Literature shows much higher rate of suicide around the world 60% of which takes place in Asian countries alone with depression being the most common cause [4,5]. The PPD Poisoning is also prevalent Middle east, Sudan, Morocco apart from the Indo-Pak region in recent past [6]. It is also termed as Kala Pathar in indo-Pak region and its toxicity affects multiple body organs resulting into renal failure and MI, Hepatic necrosis and rhabdomyolysis. Reported presentation for PPD poisoning is laryngo-pharyngeal edema along with the swelling of the tongue, and face followed by cardiac arrhythmias and shock. Tracheostomy is a life saving technique in this situation along with other supportive management [7-11]. The literature regarding presentation and management success in this region (Hyderabad, Pakistan) was lacking sufficient data in the relevant poisoning so the current work was arranged and hopefully this work will add in the available knowledge and facilitate the physician community and the patients ultimately.

METHODOLOGY:

This PDD poisoning based study was arranged at Liaquat University Hospital ICU at Hyderabad with informed and written consent from patient's attendant without any compulsion. Patients of both genders presenting with PPD poisoning were included while other sort of intoxications were excluded. Required information was collected using self-designed study questionnaire containing columns for name, gender (male, female, other) age, residence (rural or urban) and income based status (Low, middle, poor), analyzing this information on SPSS version 22 results were calculated and presented as frequencies and percentages in tables as well as in bar charts and pie charts.

RESULTS:

We saw 20 Patients in a short time of 6 months 5(25%) were males and 15(75%) were females (fig-1), 16 (80%) were married while 04(20%) were still unmarried. The age range was found to be 16(80%) patients were from age range of 25 to 35 years while 2(20%) patients were in range of 15-25 years. No victim was from upper or rich socio-economic class, whereas subjects from middle class were only 2(10%) while most of the patients were 18(90%) from poor socio-economic group. Most cases 17(85%) had throat Pain and Dysphagia and severe dyspnea in 14(70%) patients were provided ventilatory support while 6 were having mouth opening issues along with Cervico - facial edema so provided tracheostomy. All subjects were having dark urine 9(45%) out of which were seen in ARF (Acute Renal Failure), 19(95%) had Rhabdomyolysis and 1(5%) patient had hemodynamic instability. The survival rate was 60% while mortality rate observed was 40% (table-1). Duration of hospital stay was from 1day to 1week (fig-2).

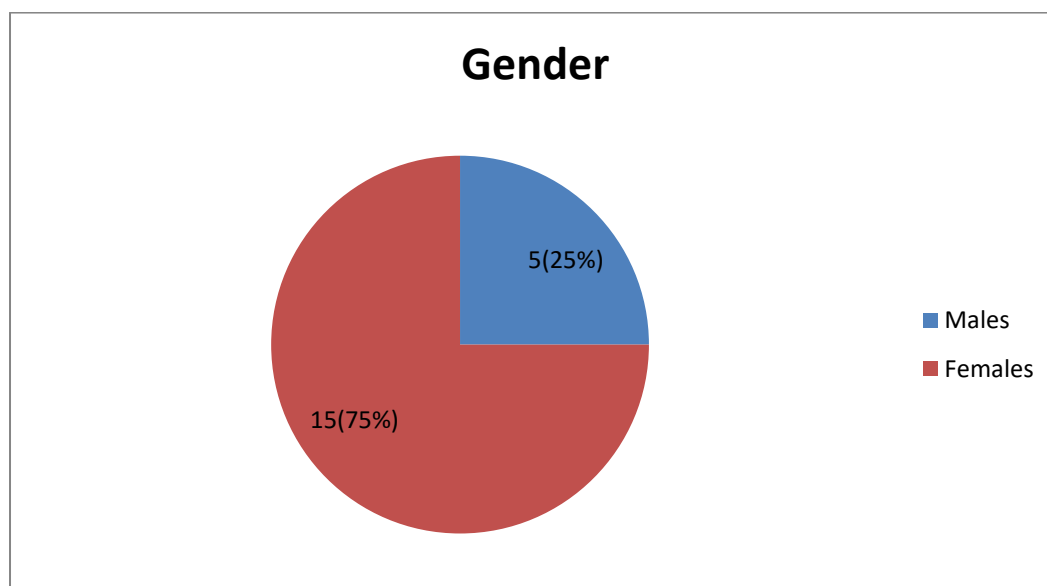


Fig-1: Pie Chart Representation of Gender Distribution

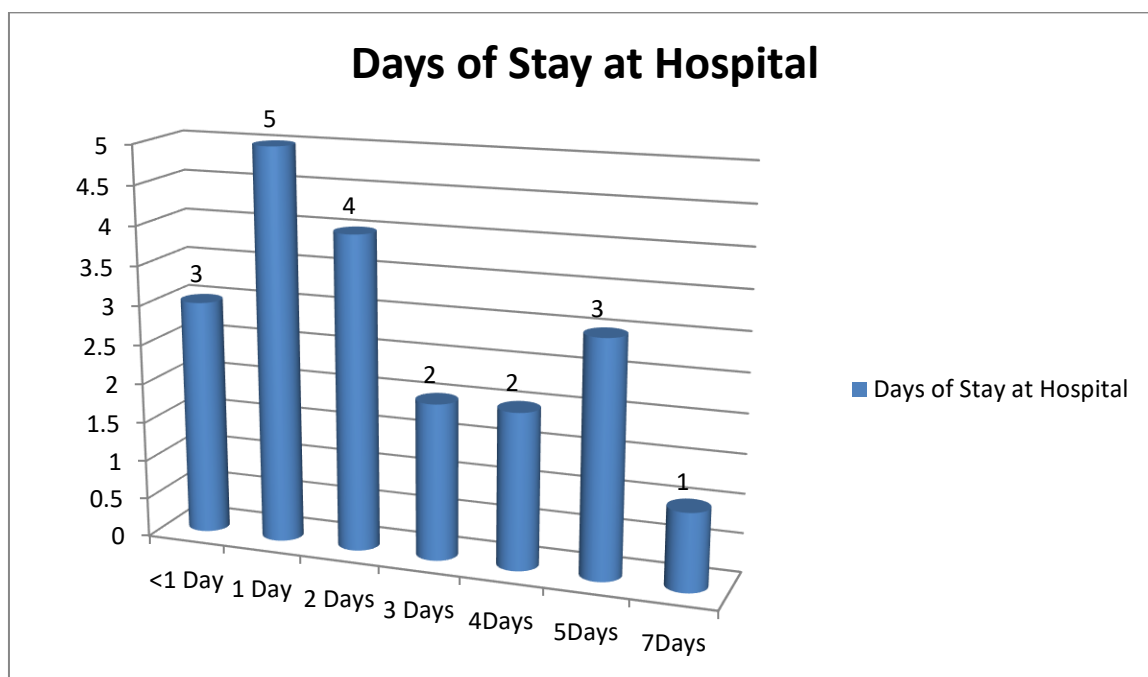


Fig-2: Bar Chart Distribution For Days of Stay at Hospitals

Table -1: Showing frequency and percentage of various study parameters.

S. No	Parameters	Frequency	Percentage
1.	Age Ranges of 15-25 Years	04	20%
2.	Age Ranges of 25-35 Years	16	80%
3.	Males	05	25%
4.	Females	15	75%
5.	Married	16	80%
6.	Unmarried	04	20%
7.	Rich	00	0%
8.	Middle Class	02	10%
9.	Poor	18	90%
10.	Accidental Cases	01	5%
11.	Suicidal Cases	19	95%
12.	Tracheostomy	06	30%
13.	Ventilatory Support	14	70%
14.	Survived	12	60%
15.	Died	08	40%

DISCUSSION:

1. Our results are not in agreement with results from Khuhro BA et (2012) reporting 87.5% males and 12.5% females majority (68.8%) belonging to 21-30 yrs age group in comparison to 15-25 yrs. He found 75% cases as suicidal while 25% were of accidental nature and 95% of our patients were suicidal and 5% of cases were accidental. Similarly we found 20 cases in 6 months while he could found 16 cases over 3 years, the mortality he reported was 37.5% that was near to our reported 40% [12]. Results of study done by Qasim AP et al (2016) showed 109 poisoning cases over 3 months that was much above what

we found in 6 months. He reported 89% and 11% for females and males respectively with 11-30 yrs of age range, 83.48% suicidal, 95.41% belonging to low socioeconomic class lying in consistency with our study results [13]. Research work by Khan MA et al (2018) was on 1258 patients of poisoning presented over 1.3 years his results show 64.7% females and 35.3% males age ranging from 5 to 63 years falling in contrast to results. 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 along with low mortality rate of 24.08% as compared our 40%

[14]. Similarly research work by Akbar K et al (2017) reported 65 cases/Year 72.31% (47) being female and 27.69% (18) females and males with 24.35±9.8years as mean age. Nature of poisoning he reported was 89.23% (58) suicidal and the accidental was 10.77 % (7)[15]. Khan N et al (2015) reported 38 in 2 years with 22.08±6.42 years mean age, reporting unmarried as majority of cases 71.1%(27) belonging to low socioeconomic group and 94.74% (36) he reported as Suicidal accidental cases were 5.26% (2) in his study with 47.4% mortality consistent to our findings [16]. Suliman et al (1983) reported 15.8% tracheostomy in his study and Rhabdomyolysis as 80.9% of patients [17]. Kallel et al showed 47.4% rhabdomyolysis in his study [18]. What amount of the dye was consumed by the dying victims was not clear as the lethal dose for PPD is still controversial [19]. There is no available antidote specific against the PPD so far with hope the future development may provide this targeted approach [20]. We reached to opinions that this chemical as well as other related chemicals should be banned for sale and programs for social life improvement should be arranged in targeted communities. Health management guideline need to be established along with the special training of the staff to improve the health to reduce the mortality rate.

Development of some anti-dote is also recommended

CONCLUSION:

PPD poisoning is increasing in a suicidal style, married and poor females are more prone to commit this leading to a mortality rate of 40%.

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