



CODEN [USA]: IAJ PBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**

<http://doi.org/10.5281/zenodo.2574429>

Available online at: <http://www.iajps.com>

Research Article

**PARAPHENYLENE DIAMINE (PPD) POISONING: PRESENTATION  
AND MANAGEMENT OUTCOMES AT LIAQUAT UNIVERSITY  
HOSPITAL HYDERABAD, PAKISTAN.**

**Dr. Abdul Samad<sup>1</sup>, Dr. Mushtaq Ahmed<sup>2</sup>, Dr. Jamshed ul Qadir<sup>3</sup>, Dr. Abdul Mannan Hashmi<sup>4</sup>,  
Dr. Pir Abdul Hayee<sup>5</sup>, Dr. Ball Chand<sup>6</sup>**

<sup>1</sup>MBBS, D. Diab, DMJ, Assistant Professor, Department of Forensic Medicine & Toxicology, Jinnah Medical College Peshawar, KPK., <sup>2</sup>MBBS, DMJ, Additional Medical Superintendent, Liaquat University Hospital Hyderabad., <sup>3</sup>MBBS, Lecturer, Department of Forensic Medicine & Toxicology, Liaquat University of Medical and Health Sciences Jamshoro., <sup>4</sup>MBBS, Demonstrator, Department of Forensic Medicine & Toxicology, Mohi u Din Islamic Medical College, Mirpur Azad Kashmir, <sup>5</sup>MBBS, MD ( General Medicine ), Assistant Professor, Department of Medicine, Muhammad Medical College, Mirpurkhas., <sup>6</sup>MBBS, DTCD, MCPS (Pulmonology ), FCPS ( Medicine ), Assistant Professor, Department of Medicine, Muhammad Medical College, Mirpurkhas.

**Abstract:**

*Paraphenylene-diamine is a coloring dye but a toxic chemical at the same time with its use as a tool for suicide being cheaper and easy availability as reported by many countries in recent past. This agent affects liver, kidney, heart, lungs and muscles and ultimately death if left unmanaged. Current research on 24 Patients presenting as poisoning cases at Liaquat University Hospital, Hyderabad, Pakistan found 70.83%(17) female and 29.17%(6) male gender involved in poisoning more in married subjects 75%(18) as compared to unmarried 25%(6) in low socio-economic people 91.66%(22). All cases were suicidal in nature presenting with Hemodynamic Shock (4.17%), Anuria 50%, Oliguria (54.17%), pain in throat (87%), Rhabdomyolysis (95%) and Dark urine (100%). Tcheostomy performed 29.17% (7) and 70.83 % (17) were provided ventilatory support despite of that only 58.33% (14) could be revived leaving a mortality rate to 41.66% (10). Hospital stay duration was from 1-8days depending on the severity of condition.*

***Conclusion:** This poisoning is becoming more common in younger age, married and poor females with high mortality so the easy availability of this toxic agent should be restriction.*

**Key Words:** *Poisoning, Paraphenylene-diamine (PPD), Tracheostomy, Suicide.*

**Corresponding author:****Dr. Abdul Samad,**

MBBS, D. Diab, DMJ, Assistant Professor,

Department of Forensic Medicine &amp; Toxicology,

Jinnah Medical College Peshawar, KPK

Address: H # 73, 4th Street Gulshan Masjid,

Near Habib General Store Mohalla Thomasabad

Mirpurkhas 69000 [Sindh.Email.drmemonmpk1970@hotmail.com](mailto:Sindh.Email.drmemonmpk1970@hotmail.com).

Cell No. 03142613782.

QR code



Please cite this article in press Abdul Samad et al., *Paraphenylene Diamine (Ppd) Poisoning: Presentation And Management Outcomes At Liaquat University Hospital Hyderabad, Pakistan., Indo Am. J. P. Sci,* 2019; 06(02).

**INTRODUCTION:**

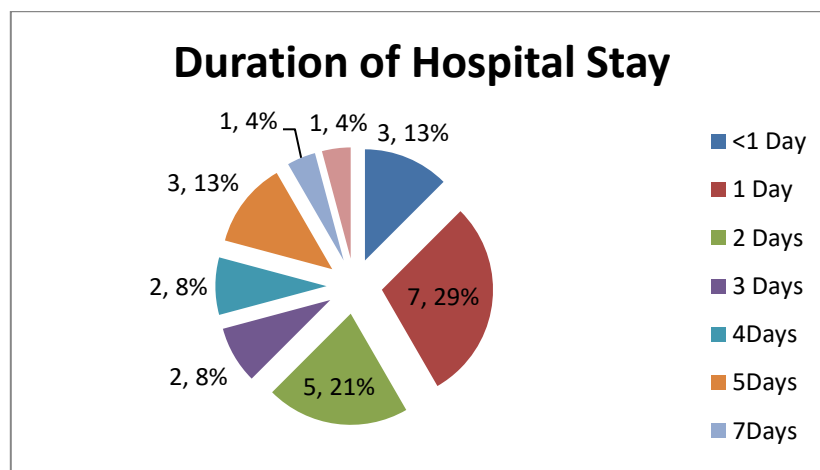
Paraphenylene-diamine (PPD) used in various chemical industries is actually a derivative of p-nitroaniline results in toxicity (local and systemic) it its different routes (oral, inhalational and topical) [1]. This agent is proved to be lethal at a dose of 7-10grams causing death in 6-24 hours following oral administration[2]. The metabolism takes place in liver by CYP450 system that convert it into benzoquinone diamine and Brandowaski's base and both these metabolites are toxic[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 Kaala 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 lifesaving 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 research was arranged on PPD poisoning patients admitted in ICU of LUH Hyderabad from 01/01/2015-30/06/2015 with consent from responsible family members. 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 in chart and tables.

**RESULTS:**

We could find a total of 24 Patients over a time period of 6 months 29.17%(7) out of them were males and 70.83%(17)were females, 75% (18) were married while 25%(6) were unmarried. . The age range was found to be 79.17% (19) patients were from age range of 15-35 years and 20.83% (5) patients were from 15-25 years. low Most patients 91.66%(22) were from poor background while 8.33%(2) were from middle group. 87% patients were presented with Pain in throat, Dysphagia, Difficulty in opening of mouth, Dysphonia , Cervico-facial edema, Muscle aches / tenderness /edema , Dark urine(100%), Rhabdomyolysis in 95% patients, Oliguria in 54.17%, Anuria in 50%, Acute Renal Failure in 45.83%, Hemodynamic Shock was observed in 4.17% patients. Tcheostomy was done in 29.17% (7) patients while ventilatory support was provided in 70.83%(17) patients but the survival rate achieved was 58.33% (14) and mortality rate remained 41.66% (10).



Figure#1: Pie chart showing period of hospital stay of study population

**Table #1. Showing demographic data of victims along with treatment options and outcomes**

|   |                                     |                                |
|---|-------------------------------------|--------------------------------|
| 1 | <b>Sex</b>                          |                                |
|   | <b>Male</b> 7(29.17%)               | <b>Female</b> 17(70.83%)       |
| 2 | <b>Socio-economic status</b>        |                                |
|   | <b>Middle Income</b> 02(8.33%)      | <b>Low income</b> 22(91.66%)   |
| 3 | <b>Marital Status</b>               |                                |
|   | <b>Married</b> 18(75%)              | <b>Unmarried</b> 06(25%)       |
| 4 | <b>Age ranges</b>                   |                                |
|   | <b>15 to 25 Yrs</b> 19(79.17%)      | <b>26 to 35 yrs</b> 05(20.83%) |
| 5 | <b>Nature of Poisoning</b>          |                                |
|   | <b>Accidental</b> 0(0%)             | <b>Suicidal</b> 24(100%)       |
| 6 | <b>Respiratory Support Provided</b> |                                |
|   | <b>Tcheostomy</b> 07(29.17%)        | <b>Ventilator</b> 17(70.83%)   |
| 7 | <b>Out Come</b>                     |                                |
|   | <b>Survived</b> 14(58.33%)          | <b>Died</b> (41.67%)           |

**Table#2 Showing frequency and percentage of sign and symptoms**

| 1  | Presentation Symptoms                   | Frequency | Percentage    |
|----|---|-----------|---------------|
| 2  | <b>Pain in throat</b>                   | <b>21</b> | <b>87.5%</b>  |
| 3  | <b>Dysphagia</b>                        | <b>21</b> | <b>87.5%</b>  |
| 4  | <b>Difficulty in opening of mouth</b>   | <b>21</b> | <b>87.5%</b>  |
| 5  | <b>Dysphonia</b>                        | <b>21</b> | <b>87.5%</b>  |
| 6  | <b>Cervico-facial edema</b>             | <b>21</b> | <b>87.5%</b>  |
| 7  | <b>Muscle aches / tenderness /edema</b> | <b>21</b> | <b>87.5%</b>  |
| 8  | <b>Dark urine</b>                       | <b>24</b> | <b>100%</b>   |
| 9  | <b>Rhabdomyolysis</b>                   | <b>23</b> | <b>95.83%</b> |
| 10 | <b>Oliguria</b>                         | <b>13</b> | <b>54.17%</b> |
| 11 | <b>Anuria</b>                           | <b>12</b> | <b>50%</b>    |
| 12 | <b>Acute Renal Failure</b>              | <b>11</b> | <b>45.83%</b> |
| 13 | <b>Hemodynamic Shock</b>                | <b>01</b> | <b>4.17%</b>  |

**DISCUSSION:**

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 100% of our patients were suicide cases. Similarly we found 24 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 41.66% [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 41.66% [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].

### CONCLUSION:

PPD poisoning involves young, married, poor, female community with 41.66% mortality compromising all body systems.

### Recommendations:

1. The chemical should be banned from the market or the sale should be controlled.
2. Social life improvement strategies for the poor people low should be improved.
3. Management guideline should be established and staff should be trained to improve the survival rate.
4. Development of some anti-dote is also recommended.

### REFERENCES:

1. Ahmad E (2018) Paraphenylenediamine (PPD) Poisoning - A Case Report Do We Really Know Kala Pathar? *J Anesth Crit Care Open Access* 10(1): 00353. DOI: 10.15406/jaccoa.2018.10.00353
2. Bowen DAL. A case of Paraphenylene diamine poisoning. *Med Sci Law*. 1963;3:216-9.
3. Ram R et al (2007;53:181–2.), Swarnalatha G, Prasad N, Dakshinamurty KV. Paraphenylenediamine ingestion. An uncommon cause of acute renal failure. *Postgrad J Med*.
4. Varnik P. Suicide in the World. *International Journal of Environmental Research and Public Health*. 2012;9(3):760–71.
5. Ashique A A, Abdul R M, Humayon K, Barkat A M. Reduction of Serum Lipid Profile by Escitalopram in Depressive Patients: A Cardio Protective Aspect of SSRI Use. *J Cardiol & Cardiovasc Ther* 2017; 4(4): 555642. DOI: 10.19080/JOCCT.2017.04.555642.
6. Ishaque S, Haq A, Jurair H, Siyal H (2016) Kaala Pathar (Paraphenylene Diamine) Poisoning and Angioedema in a Child: An Unusual Encounter. *J Clin Toxicol* 6: 294. doi:10.4172/2161-0495.1000294
7. Ram R, Swarnalatha G, Prasad N, Dakshinamurty KV (2007) Paraphenylene diamine ingestion: an uncommon cause of acute renal failure. *J Postgrad Med* 53: 181-182.
8. Akbar MA (2010) Kala pathar (paraphenylene diamine) intoxication; a study at Nishtar Hospital Multan.
9. Nemeth J, Maghraby N, Kazim S. Emergency airway management: the difficult airway. *Emerg Med Clin North Am* 2012;30:401-20.
10. Shaik NA, Jayasundaram E. Gastric lavage in hair dye (Super-Vasmaol 33) poisoning: A friend or foe. *J Emerg Trauma Shock* 2012;5:276.
11. Singh N, Jatav OP, Gupta RK, Tailor MK. Myocardial damage in hair dye poisoning – An uncommon presentation. *J Assoc Physicians India* 2008;56:463-4.
12. Khuhro BA, Khaskheli MS, Shaikh AA. Paraphenylene diamine poisoning: Our experience at PMC Hospital Nawabshah. *Anaesth Pain & Intensive Care* 2012;16(3):243-246.
13. Qasim AP, Ali MA, Baig A, Moazzam MS. Emerging Trend of Self Harm by ‘Kala Pathar’ Hair Dye (Paraphenylene diamine) : An Epidemiological Study. *APMC* 2016;10(1):26-30.
14. Khan MA, Akram S, Shah HBU, Hamdani SAM, Khan M. Epidemic of Kala Pathar(Paraphenylene Diamine) Poisoning: an Emerging Threat in Southern Punjab. *J Coll Physicians Surg Pak*. 2018 Jan;28(1):44-47. doi: 10.29271/jcpsp.2018.01.44.
15. Akbar K, Iqbal J, Rehman H, Iqbal R. Acute renal failure among kala pathar poisoning. *JSZMC* 2017;8(2): 1153-1156
16. Khan N, Khan H, Khan N, Ahmad I, Shah F, Rahman AU, Mahsud I. Clinical presentation and outcome of patients with paraphenylenediamine (kala-pathar) poisoning. *Gomal J Med Sci* 2015; 14: 3-6.
17. Suliman SM(1983); Homeida M, Aboval OI. Paraphenylene Diamine Induced Acute Tubular Necrosis Following Hair Dye Ingestion. *Human Toxicol*2:633-635.
18. Kallel H, et al ,(2005) Clinical Manifestations of Systemic ParaphenyleneDiamine Intoxication. *J Nephrol*;18:308
19. Chaudhary SC, Salwani KK, Singh K(2013). Paraphenylamine poisoning. *Niger J Clin Pract*.16:258-9
20. Srikanth A, Babu C(2011). Treatment modalities of hair dye poisoning. *Indian Med Updates*. 34(6):1-4