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RESEARCH ARTICLE

INCIDENCE PREVALENCE CLINICAL OVERVIEW AND COST ANALYSIS OF PEDIATRIC POISONING CASES IN A TERTIARY CARE SETTING OF BERHAMPUR, ODISHA, INDIA.

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Manuscript Info

Abstract

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Introduction:-

Poisoning in children is a major health problem and it is a frequent cause of admission in pediatric emergency units. The incidence of poisoning in children is 0.33% to 7.6% [1, 11] worldwide. Poisoning is most commonly observed in 1–5 years of age and they account for 80% of all poisoning cases [32, 30]. Medications taken by parents are the main causes of poisoning in the first year of life. At 2–3 years of age, house cleaning products cause most cases of poisoning and in children elder than three years medications kept at different sites are the main cause of poisoning either accidentally or in suicidal intent [30]. The suicidal tendency is seen in elder children. When Indian scenario is concerned, pediatric poisonings constituted (0.23-3.3%) of total poisoning incidences. The mortality from poisoning ranged from 0.64-11.6% with highest incidence being from Shimla [14].

The mortality rate in children due to poisoning is 3–5% worldwide [1, 11, 30]. The pattern and main risk of acute poisoning changes age wise with time to time, and they differ from country to country also. Hence, epidemiological surveillance specific for each country is essential to determine the extent and characteristics of associated problem, according to which related preventive measures can be taken. Out of all cases, majority of poisonings involving young children are seen to be unintentional (eg- exploratory ingestions, therapeutic errors) [26, 20]. In contrast, intentional poisoning is seen in teenagers in more than one-half of exposures (58 percent in 2014) [26].

More than 90 percent of poisoning exposures in children occur in homes [26, 8, 9, 27, 28]. But, the pattern of poisonings is different by age and sex. For preadolescent children, poisoning is more in males than females, but the trend reverses in teenagers, where more than one-half of all poisonings in the 13- to 19-year age group occurring in females (60% in 2014) [26]. In infants and younger children, it is mainly accidental but in older children, it is usually intentional [22, 4].

In our study we have included envenomation with pediatric snake bite and scorpion stings as there is significant mortality and morbidity in India due to these cases. This has been a neglected public health problem in developing countries like India.

Although it is difficult to be precise about the actual number of cases with snakebite, in India about 2 lakh persons suffer from snakebite every year with an estimated fatality rate of 35,000-50,000/year [16] Government of India's Central Bureau of Health Intelligence reported only 985 snake bite deaths in 2010 [42]

Scorpion sting is an acute life-threatening, time-limiting medical emergency of villagers [35]. But, reliable statistics for these events are not readily available in rural areas. Numerous envenomations are unreported and true incidence is not known. Case fatality rates of 3-22% were reported among children hospitalized for scorpion stings in India, Saudi Arabia and South Africa [35,25,6,17, 29].

Methodology:-

This is a cohort study. The present study describes the epidemiology of poisonings in a pediatric population admitted to the Pediatric Department of MKCG Medical college, Berhampur, Odisha, India during the month of October to December 2013. Pediatric patients of 67 numbers of either sex from less than 1 year to 14 years were studied during the study period of three months. The patients were divided into five groups as <1, 1-4, 5-8, 9-12 and more than 12 year age group. Weights of patients were divided into three categories according to the minimum and maximum values of weight of patients.

Results:-

Table 1:- Demographic Parameters Of Pediatric Poisoning Cases.

Sl.no		Number	Percentage
1	GENDER		
	MALE	40	59.7
	FEMALE	27	40.3
2	AGE(YEAR)		
	<1	4	5.97
	1 to 4	43	64.18
	5 to 8	6	8.96
	9 to 12	7	10.45
	>12	7	10.45
3	WEIGHT(KG)		
	<10	18	26.87
	10 to 20	29	43.28
	20 to 40	20	29.85
4	LOCALITY		
	RURAL	32	47.76
	URBAN	35	52.24

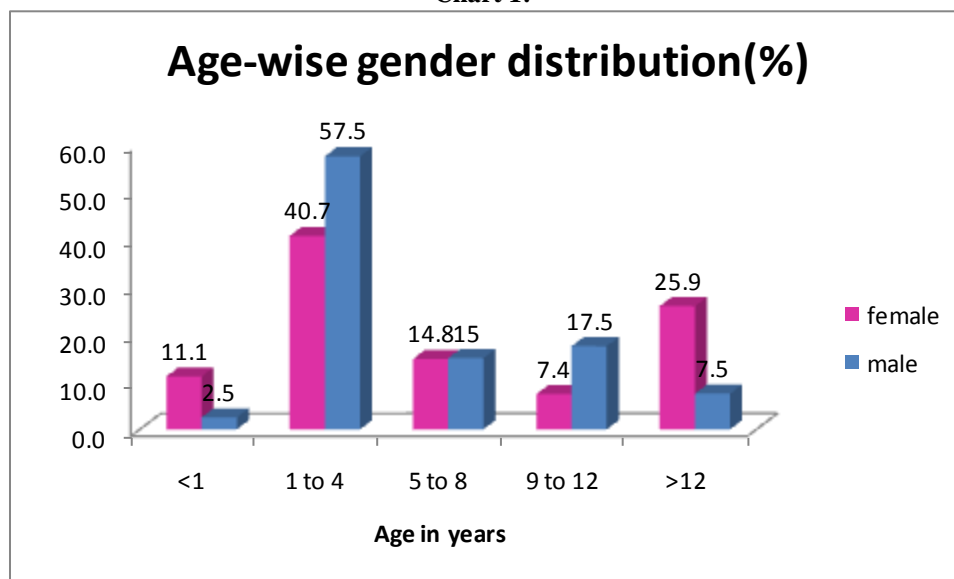
Table 2:- Poisoning Parameters.

SL.No.	Nature of poison	Number	Percentage (%)
1	Hydrocarbon	23	34.33
	Snake bite	15	22.39
	Scorpion sting	11	16.42
	Household	10	14.93
	Agricultural	4	5.97
	Industrial chemical	1	1.49
	Plant	1	1.49
	Drug	1	1.49
2	Route of exposure		
	Dermal	26	38.81
	Ingestion	41	61.19
3	Duration of stay(days)		
	1-3 DAY	51	76
	3-6 DAY	12	18
	> 6 DAY	4	6

4	Outcome	Number	Percentage (%)
	Dead	1	1.49
	Cured	66	98.51

Table 3:- Percentage Distribution of hydrocarbon poisoning.

Sl.no.			Number	Percentage(%)
1	Types	Kerosine	14	60.87
		Turpentine oil	9	39.13
2	Age	1-4yr	19	82.609
		5-8yr	3	13.043
		9-12yr	1	4.348

Chart 1:-**Table 4:-** Case distribution of snake bite and scorpion stings in percentage.

SL.NO.			Snake bite (%)	Scorpion sting (%)
1	AGE	<1	0	9.09
		1 to 4	6.67	45.45
		5 to 8	33.33	27.27
		9 to 12	26.67	9.09
		>12	33.33	9.09
2	GENDER	Male	54.5	66.7
		Female	45.5	33.3
3	LOCALITY	Urban	60	54.5
		Rural	40	45.5

Table 5:- Average cost as per poisoning and difference between direct and referred cases.

Sl.no.	Type of poison	Hospital transfer	peripheral hospital	hospital Bed	Investigation cost	Medicine cost	Cost on man hr	Other cost
1	Agricultural	950	650	0	300	1775	250	100
	Drug	1000	400	800	150	300	1000	0
	Household	567	411	444	211	572	1400	156
	Hydrocarbon	422	248	496	450	820	635	87
	Industrial chemical	400	350	900	200	350	750	0
	Other	0	0	300	250	150	0	0
	Plant	1000	500	1500	500	1000	2500	0
	Scorpion sting	409	114	282	200	205	318	36
	Snake bite	540	720	740	340	5043	1187	200
2	Direct	405	152.5	0	330	1445	605	205
	Referred	551.1	480.9	583.0	328.7	1750.0	902.1	66.0

In this study, 67 pediatric patients were enrolled. Among them majority (64.18%) were in the age of 1-4 years. Mean age of patients was (5.78 ± 4.45). 59.7% were male children. But, the gender difference was not statistically significant in less than four year children. Of the total population majority of patients were having weight of 10-20kg (29%). Around 47.76% patients were from rural area. Out of all poisoning cases, nature of poisoning was maximum for Hydrocarbons (34.33%) followed by snake bite (22.39%), scorpion sting (16.42%) and household (14.93%) poisons. Among all the patients poisoned with hydrocarbons, majority (82.61%) were in the age group of 1-4 years. Of the hydrocarbon poisonings, majority (60.87%) were from kerosene ingestion followed by turpentine oil (39.13%). In majority of cases ingestion (61.19%) was route of exposure followed by dermal route (38.81%). Out of all snake bite cases, (6.67%) cases were less than equal to four years and majority were more than five years. Out of all scorpion stings 45.45% were of 1-4 years followed by 27.27% in 5-8 year age group. (66.7%) of snake bite cases were of male gender, similarly majority (54.5%) of scorpion stings were of male gender. All the cases registered were of accidental poisonings. Majority (92.54%) of patients were in serious condition while admissions in pediatric indoor ward. 83.58% patients were conscious, while few (13.43%) were disoriented. (76%) of patients were hospitalised for less than equal to three day and most of them (98.51%) were cured of the poisoning and its outcomes.

Discussion:-

In our study majority of children were less than four years and were of male gender. But, when contingency is seen by chi-square test, there was no statistically significant difference gender-wise in this 1-4 year age group, unlike a study done by Sabiha Sahin et al on year 2011, where male to female ratio was significantly higher in less than four year age group when compared with the other age groups ($\chi^2=21.6$, $P<0.001$) in the poisoned patients under 4 years of age [36].

Majority of poisoning in our study was from hydrocarbon ingestion. Of the hydrocarbon poisonings, majority (60.87%) were from kerosene ingestion, similar to study done by [24]. The reason could be attributed to kerosene being mistaken for water [16, 23,40,31].

All patients documented were of accidental poisoning cases with no suicidal poisoning cases, the reason may be most of our cases (91%) included for the study were below 12 year age group. This is supported by a study done by Dutta AK et al [14] where suicidal poisoning cases are more commonly seen in patient elder than 13 year age group.

Medications are the most common poisonous agent in children [1,11,32,30,5]. But in our study we found least number (1.49%) of cases with drug/medication intake.

Out of all poisoning cases, 61.19% cases were from ingestion or oral poisoning followed by dermal route similar to study [18].

Of the snake bite cases, (66.7%) were of male gender, similar to studies [42, 33, 19, 39] which can be attributed to their behaviour and nature to play more of outdoor games. In our study, out of all snakes bite cases, (6.67%) cases

were of less than equal to four years and majority (93.33%) were more than five years. Children over 5 years are at risk of snakebite because they are involved more exploring new things as well as playing outdoor games. Older children in rural areas are given responsibility of carrying out outdoor activities like grass cutting, working in crop farms, cattle grazing and collecting firewood etc. thus making them an exposed age group for snake bite as seen in our study. Snake bites are more common in rural area [42], but in our study we found 60% cases in urban areas, the reason may be seasonal variations of snake bite cases. We can make a conclusion that boys more than 5 years of age are more prone to snake bites. Outcome can be fatal in patients presenting late so awareness amongst people regarding the seriousness and early treatment is important.

Out of all scorpion stings 45.45% were of 1-4 years followed by 27.27% in 5-8 year age group. In our study majority (54.5%) of scorpion sting were males similar to studies [3]. Most of the patients evaluated in the present study had mild symptoms, and there was no case of death by scorpion sting. These results are in accordance with those of Al Asmari et al. [2] in Saudi Arabia, and Sagheb et al. [37] in Shiraz, Iran; but Bouree et al. [7] determined a fatality frequency of more than 1000 individuals, while Shahbazzadeh et al. [38] reported three deaths in Khuzestan, Iran.

Children at ages of 1 and 2 years old are more mobile and exploring—and getting into things. Most of these children take medications in their own home that parents or other family members haven't secured properly. But, most of the poison exposures are not life-threatening, and many are managed properly at home without hospitalisation.

Because most of the poisoning incidents occur at home [43], it is essential to teach parents how to minimize the risks of poisoning. For this purpose, poison-prevention counselling, recommended by Academy of Pediatrics and Academy of Family Practitioners results in greater safety efforts at home [15]

Worldwide, more than 5 million persons per year get snake bites, out of which approximately 100,000 develop severe sequelae [41, 13]. Snake bite cases are most common in school age children, adolescent and young adults and causes 3% of all deaths in children of ages 5–14 years. Similarly, scorpion stings are a major public health problem in underdeveloped tropical and subtropical countries, especially Sahelian Africa, South India, the Middle East, Mexico, and South Latin America. [21,34] Annually 1.2 million scorpion stings occur worldwide, leading to 3250 deaths (0.27%) [12]. For every person killed by poisonous snake, ten are killed by a poisonous scorpion.

When cost on poisoning cases is concerned, there was extra cost burden for referred cases for the purpose of hospital transfer, cost on peripheral hospital for medication and laboratory diagnostic procedures. For all poisoning cases there was an extra cost burden in the form of cost on man hour, for the patient as well as the attendants of patient accompanying them. Medication cost was higher for referred cases, reason being extra cost in peripheral hospital. But, the difference is not statistically significant. Cost on hospital bed was nil for direct cases as this is a tertiary care government hospital, but there was a cost burden on referred cases.

Reference:-

1. Agarwal V, Gupta A. Accidental poisoning in children. Indian Padiatr. 1984;11(9):617–21. [PubMed]
2. Al Asmari AK, Al Zahrani AG, Al Jowhary S, Arshaduddin M. Clinical aspects and frequency of scorpion stings in the Riyadh Region of Saudi Arabia. Saudi Med J. 2012;33(8):852–8.
3. Alireza Khatony1, Alireza Abdi, Tahereh Fatahpour. Farhad Towhidi. The epidemiology of scorpion stings in tropical areas of Kermanshah province, Iran, 2008-09]
4. Andiran N, Sarikayalar F. Pattern of acute poisonings in childhood in Ankara: what has changed in twenty years? Turk J Padiatr. 2004; 46: 147-152.
5. Bicer S, Sezer S, Cetindag F, et al. Evaluation of acute intoxications in pediatric emergency clinic in 2005. Marmara Medical J. 2007;20(1):12–20.
6. Biswal N, Charan MV, Betsy M, Nalini P, Srinivasan S, Mahadevan S. Management of scorpion envenomation. Pediatrics Today 1999; 2: 420-426.
7. Bouree P, Frinot JP, Fernot JP, Gil RE, Fils-Aimé F, Barrera RR, et al. Scorpion stings: a public health problem in Morelos (Mexico). Sante. 2005;15(4):217–23.
8. Bronstein AC, Spyker DA, Cantilena LR Jr, et al. 2010 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 28th Annual Report. Clin Toxicol (Phila) 2011; 49:910.
9. Bronstein AC, Spyker DA, Cantilena LR Jr, et al. 2011 Annual report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 29th Annual Report. Clin Toxicol (Phila) 2012; 50:911.

10. Brunda G, Sashidhar RB. Epidemiological profile of snake bite cases from Andhra Pradesh using immune-analytical approach. *Indian J Med Res* 2007; 125:661-68].
11. Buch NA, Ahmed K, Sethi AS. Poisoning in children. *Indian Padiatr*. 1991;28(5):521-4. [PubMed]
12. Chippaux JP, Goyffon M. Epidemiology of scorpionism: a global appraisal. *Acta Trop*. 2008 Aug. 107 (2):71-9. [Medline].
13. Chippaux JP. Snake bites: Appraisal of the global situation. *Bull WHO*. 1998;76:515-24. [PMC free article] [PubMed]
14. Dutta AK, Seth A, Goyal PK, Aggarwal V, Mittal SK, Sharma R, Poisoning in children: Indian scenario *Indian J Pediatr*.1998 May-Jun;65(3):365-70
15. Gielen, A. C., McDonald, E. M., et al. (2002). Effects of improved access to safety counseling, products, and home visits on parents' safety practices. *Arch Pediatr Adolesc Med*, 156(1), 33.
16. Gupta P, Singh RP, Murali MV, Bhargava SK, Sharma P. Kerosene oil poisoning: A childhood menace. *Indian Padiatr* 1992; 29: 979-984.
17. Ismail M. The scorpion envenoming syndrome. *Toxicon* 1995; 33: 825-828.
18. J. JESSLIN, R. ADEPU* AND S. CHURI Assessment of Prevalence and Mortality Incidences Due to Poisoning in a South Indian Tertiary Care TeachingHospital]
19. Jamieson R, Pearn J. An epidemiological and clinical study of snake-bites in childhood. *Med J Aust*. 1989;150(12):698-702. [PubMed]
20. Kang AM, Brooks DE. US Poison Control Center Calls for Infants 6 Months of Age and Younger. *Pediatrics* 2016.
21. Khatony A, Abdi A, Fatahpour T, Towhidi F. The epidemiology of scorpion stings in tropical areas of Kermanshah province, Iran, during 2008 and 2009. *J Venom Anim Toxins Incl Trop Dis*. 2015. 21:45.[Medline].
22. Lamireau T, Llanas B, Kennedy A, Fayon M, Penouil F, Favarell- Garrigues JC, et al. Epidemiology of poisoning in children: a 7-year survey in a paediatric emergency care unit. *Eur J Emerg Med*. 2002; 9: 9-14.
23. Lucas GN. Kerosene oil poisoning in children: A hospital-based prospective study in Sri Lanka. *Indian J Pediatr* 1994; 61: 683-687.
24. M. Jayashree, S. Singhi and A.Gupta. Predictors of Outcome in Children with Hydrocarbon Poisoning Receiving Intensive Care *Indian Pediatrics* 2006;43:715-719
25. Mahadevan S, Choudhury P, Puri RK, Srinivasan S. Scorpion envenomation and the role of lytic cocktail in its management. *Indian J Pediatr* 1981; 48: 757-761.
26. Mowry JB, Spyker DA, Brooks DE, et al. 2014 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 32nd Annual Report. *Clin Toxicol (Phila)* 2015; 53:962.
27. Mowry JB, Spyker DA, Cantilena LR Jr, et al. 2012 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 30th Annual Report. *Clin Toxicol (Phila)* 2013; 51:949.
28. Mowry JB, Spyker DA, Cantilena LR Jr, et al. 2013 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 31st Annual Report. *Clin Toxicol (Phila)* 2014; 52:1032.
29. Muller GJ. Scorpionism in South Africa. A report of 42 serious envenomations. *South Afr Med J* 1993; 83: 405-411.
30. Mutlu M, Cansu A, Karakas T, et al. Pattern of pediatric poisoning in the east Karadeniz region between 2002–2006: increased suicide poisoning. *Hum Exp Toxicol*. 2010;29(2):131. [PubMed]
31. Nagi NA, Abdullah ZA. Kerosene poisoning in children in Iraq. *Postgrad Med J* 1995; 71: 419-422.
32. Petridou E, Kouri N, Ploychronopoulou A, et al. Risk factors for childhood poisoning: a case control study in Greece. *Inj prv*. 1996;2(3):208–11. [PMC free article] [PubMed]
33. Punde DP. Management of snake-bite in rural Maharashtra: A 10-year experience. *Natl Med J India*. 2005;18(2):71–5. [PubMed]
34. Queiroz AM, Sampaio VS, Mendonça I, Fé NF, Sachett J, Ferreira LC, et al. Severity of Scorpion Stings in the Western Brazilian Amazon: A Case-Control Study. *PLoS One*. 2015. 10 (6):e0128819. [Medline].
35. Rajarajeswari G, Sivaprakasam S, Viswanathan J. Morbidity and mortality pattern in scorpion sting—a review of 68 cases. *J Indian Med Assoc* 1979; 73: 123-126.
36. Sabiha Sahin, Kursat Bora Carman, Ener Cagrı Dinleyici, Acute Poisoning in Children; Data of a Pediatric Emergency Unit *Iran J Pediatr*. 2011 Dec; 21(4): 479–484.
37. Sagheb MM, Sharifian M, Moini M, Sharifian AH. Scorpion bite prevalence and complications: report from a referral centre in southern Iran. *Trop Doct*.2012;42(2):90–1.
38. Shahbazadeh D, Amirkhani A, Djadid ND, Bigdeli S, Akbari A, Ahari H, et al. Epidemiological and clinical survey of scorpionism in Khuzestan province, Iran (2003). *Toxicon*. 2009;53(4):454–9

39. Shrestha BM. Outcomes of snakebite envenomation in children. J Nepal Paediatr Soc. 2011;31(3):192–7.]
40. Singh S, Singhi S, Sood NK, Kumar L, Walia BNS. Changing pattern of childhood poisonings (1970-1989): Experience of a large North Indian Hospital. Indian Pediatr 1995; 32: 331-336.
41. Swaroop S, Grab B. Snake bite mortality in the world. Bull WHO. 1954;10:35–76. [PMC free article] [PubMed]
42. Vinayak Y. Kshirsagar, Minhajuddin Ahmed, Sylvia M. Colaco Clinical Profile of Snake Bite in Children in Rural India, Iran J Pediatr. 2013 Dec; 23(6): 632–636.]
43. Watson, W., Litovitz, T., et al. (2003). 2002 Annual report of the American Association of Poison Control Centers Toxic Exposure Surveillance System. Am J Emerg Med, 21(5), 353.