

## Poisoning and its Related Factors in Children under 6 Years Old in Rasht

Kobra Shirdelpour<sup>1</sup>, Seyede Zahra Shafipour<sup>2\*</sup>, Mahshid Mirzaei<sup>2</sup>, Ehsan Kazem Nejad Leili<sup>3</sup>, Anita Nath<sup>4</sup>

<sup>1</sup>Department of Nursing (Pediatric), School of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht, Iran

<sup>2</sup>Department of Nursing (Pediatric), Instructor, School of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht, Iran

<sup>3</sup>Social Determinants of Health Research Center (SDHRC), Bio-Statistics, Associate Professor, Guilan University of Medical Sciences, Rasht, Iran

<sup>4</sup>Fellowship in Reproductive Epidemiology, Associate Professor, Indian Institute of Public Health, Public Health Foundation of India, Bangalore

\*Corresponding author School of Nursing and Midwifery, Rasht.

E-mail: shafipourz@yahoo.com

Received: 2015June15; Accepted: 2016January05

### Abstract

**Introduction:** Poisoning is a major public health problem and one of the most common causes of child mortality, particularly in developing countries. Incidences of poisoning are variable according to the cultural and economic characteristics of particular communities.

**Objective:** The purpose of this study was to analyze cases of poisoning in children under 6 years of age underwent hospitalization in a health center of Rasht.

**Materials and Methods:** This study was conducted as a case-control study. The study included 2160 cases of hospitalized children under 6 years old. The study duration was 4 months. There were 2 groups, 70 children hospitalized because of poisoning (case group) and a control group of 105 people (1.5 times that of the case group) that consisted of children under 6 years of age and , non-hospitalized. Information gathered by questionnaire included; demographic information on individuals and families, as well as method of poisoning and the child's condition after hospitalization. Information was collected from interviews and medical records. Data were analyzed after collection using descriptive statistics (frequency distribution, means and standard deviation) and inferential statistics (chi-square tests, t-test).

**Results:** The findings showed that most children (51.4 %) were between the ages of 1-3 years. Of the total sample 64.3 % were boys and 35.7 % were girls. In 80% of cases, poisoning was accidental and 97.1% were gastrointestinal in nature. In 51.4% cases, the cause was poisoning from medicine; 36.1% of cases were caused by methadone and in 17.1% of cases incidents had occurred in the kitchen. There was significant difference in both case and control groups in terms of father's level of education ( $P = 0.012$ ) and mother's job ( $P = 0.025$ ).

**Conclusion:** Results showed that the most common cause of poisoning in children aged 1-3 was from pharmaceutical drugs; determined by the side effects of poisoning. A low rate of parental awareness was considered to have contributed to these cases of poisoning so parental awareness was determined as significantly important for improving childcare in the study region.

**Keywords:** Poisoning, Hospitalized Child, Epidemiologic Factors.

## Introduction

Poisoning is a major public health problem and is one of the most common causes of referral to a hospital emergency department. Other important

considerations are; that poisoning is the fourth leading cause of death after road accidents, burning and drowning [1] and that poisoning may occur intentionally or unintentionally [2]. Poisoning can occur in any individual, irrespective of age. Other considerations related to poisoning are as follows; around 70% of poisoning cases occur in children and over 90% of these are accidental: acute poisoning of children is one of the most common types of emergency and a cause of child mortality, particularly in developing countries [3,4].

Despite some successes in intervention strategies to prevent accidental poisoning in children, the use of pesticides is still considered as a contributing factor [5, 6]. Prevalence of poisoning is high in advanced countries and is increasing in developing countries, such as in the United States of America approximately 8.2 million people are affected by poisoning, of which 1.6 million are children, under 6 years old [7, 8].

Children under 6 years of age are at the developmental stage in which they search and explore their surroundings, in doing so they may inadvertently gain access to apparently safe places where poisonous materials are stored; children can also be poisoned by exploring objects with their sense of taste [9]. Patterns of prevalence and risk factors change over time and in cases of acute poisoning of children, there are differences from one country to another and some variability is evident even between geographic areas within a country [5].

The greatest cause of poisoning in developed countries is from drug abuse and in developing countries it is from the use of pesticides (Organophosphate) [3]. Several seemingly safe medicines can be fatal for some people especially children

and 70 % of poisoning referrals, according to information centers of the country, are from drug poisoning [10].

In Iran, poisoning is the most common cause of hospitalization (8.2 per thousand) and was the second most common cause of death [11] from 2007 to 2010, on average, 7% of deaths caused by accidents and unintentional injuries were attributed to poisoning [10].

The most threatening and most common cause of poisoning in children aged 4 to 5 years are reportedly from combinations of drugs including methadone [12]. Children often have easy access to household chemicals that can cause severe complications [13, 14]. More than 90% of cases in which children encountered toxic substances occurred at their home or near their home [9, 15].

Severe poisoning can have substantial and irreparable effects such as psychological – emotional, it can also lead to death. Treatment for cases of poisoning can be costly for families as well as healthcare systems [16, 17]. Disability caused by poisoning not only affects a child's health but also his or her education, and the life of other members of the family [18]. Many costs are imposed on the healthcare system from cases of accidental poisoning [19].

Given that incidence of poisoning is very variable according to the cultural and economic characteristics of different communities, the high prevalence of poisoning in children and the importance of early diagnosis and quick treatment, this research was done to determine the prevalence of poisoning and its related factors in children under the age of 6 years in one of the educational and treatment centers for children in Rasht. The aim of the study was to identify types of poisoning and related factors, in order promote preventive measures and healthcare among this group of the society.

## Materials and Methods

The present research was conducted as a case - control study over a period of 4 months (from September beginning to the end of 2014).

Data were collected after approval of the ethics committee at Guilan University of Medical Sciences.

The sample size necessary to evaluate poisoning was based on poisoning ( $P=6\%$ ) during a one month-pilot study with 95% confidence and considering wrong estimate at 1%; the necessary sample size was determined as 2160 people out of which 70 people constituted the case study group and the control group was 1.5 times larger, such that 105 people were included in the control group. The study tool was a questionnaire for demographic information and individual information, family and information on information on the child's status and poisoning after hospitalization. Separate questionnaires were designed for the case and control groups. To collect data, the researcher referred to the emergency department during different shifts and selected children under 6 years of age that had been hospitalized because of poisoning.

For each case, after consideration of the inclusion criteria and obtaining written consent from each child's parents, the appropriate questionnaire was completed by the researcher. During the period of 4 months, 2160 children under 6 years old were hospitalized and of these, 70 were

hospitalized because of poisoning, these cases were selected as the case group. To collect data from the control group, the researcher gradually selected parents with children under 6 years old that had visited the center to meet hospitalized children.

Then with consideration of inclusion criteria and with written consent, the questionnaire relating to the control group was compiled. 105 children (1.5 times of the case group) were selected as the control group. Data were analyzed using the Chi-square test and the T test. This was done after data collection and the information had been coded and entered using SPSS21 software, to determine the percentage of people who had been referred to 17 Shahrivar Hospital, confidence interval of 95% was used and to determine factors associated with poisoning.

## Results

The results of this study showed that of 2160 children under 6 years of age that had been hospitalized in the 17 Shahrivar Hospital in Rasht, 70 children had been hospitalized due to poisoning, and that prevalence of poisoning in these children was 3.24% with confidence interval of 95% (2.49 – 3.98). Most cases (51.4%) were during toddler and most poisoning cases (64.3%) were males. Information of sex frequency in both case and control groups was determined as statistically significant ( $P = 0.03$ ).

**Table 1. Determining and comparing individual factors (age and sex) in children less than 6 in case and control groups**

Variables	Study group	case		control		Sig.
		number	percentage	number	percentage	
Sex	Boy	45	64.3	50	47.6	0.030
	Girl	25	35.7	55	52.4	
	Total	70	100	105	100	
Age	28 days - up to one year	12	17.1	28	26.7	0.309
	1-3	36	51.4	45	42.9	
	3-6	22	31.4	32	30.5	
	Total	70	100	105		

**Table 2. Distribution and prevalence of poisoning based on the factor of causing poisoning**

Cause of poisoning	Number (percentage)
Medicine	36 (51.4)
Insecticide	3 (4.3)
Cleaner	5 (7.1)
Bleach	3 (4.3)
Antiseptics	3 (4.3)
Burn materials	2 (2.9)
Opium and its derivatives	8 (11.4)
Other things	3 (4.3)
<b>Total</b>	<b>70 (100)</b>

**Table 3. prevalence distribution of poisoning based on some variables**

variables	Number (percentage)	
<b>Poisoning route</b>	Digestive	68 (97.1)
	Cutaneous	1 (1.4)
	Parenteral	1 (1.4)
	<b>Total</b>	<b>70 (100)</b>
<b>Poisoning mode</b>	By accident	56 (80)
	By parents	56 (80)
	Other things	2 (2.9)
	<b>Total</b>	<b>70 (100)</b>
<b>Poisoning time</b>	Morning	9 (12.9)
	Noon	7 (10)
	Evening	27 (38.6)
	The night	27 (38.6)
	<b>Total</b>	<b>70 (100)</b>

Based on age, in the both case and control groups, there was no significant difference (Table 1). The main factor for cause of poisoning that had lead to hospitalization in children under 6 years was medicine (4.51%). Also, the majority of drug poisoning cases were from methadone (36.1% of cases) (Table 2). In the majority of the sample group (80%) the reason for poisoning was accidental and in 97.1% of

cases this was from gastrointestinal poisoning. Most cases of poisoning (38.6%) had occurred in the evening or at night and 17.1% of cases had occurred in the kitchen. In the majority of cases (47.1%), the length of hospitalization was more than 24 hours, and 50% had reported personal satisfaction on discharge (Table 3).

**Table 4. Determining and comparing some family factors associated with poisoning in children less than 6 years in case and control groups**

Study group Variable		Case	Control	Sig.
<b>Father's age</b>	Middle	34.61	33.94	0.4670
	standard variation	5.96	5.98	
<b>Mother's age</b>	Middle	29.87	29.95	0.9230
	standard variation	5.88	5.13	
<b>Father's education</b>	Illiterate	Number	3	0.0120
		Percent	4.3	
	<Diplomas	Number	29	
		Percent	41.4	
	Diploma	Number	22	
		Percent	31.4	
	> Diploma	Number	16	
		Percent	22.9	
	Total	Number	70	
		Percent	100	
<b>Mother's education</b>	Illiterate	Number	3	0.0542
		Percent	4.3	
	<Diplomas	Number	28	
		Percent	40.0	
	Diploma	Number	29	
		Percent	41.4	
	> Diploma	Number	10	
		Percent	14.3	
	Total	Number	70	
		Percent	100	
<b>Father's job</b>	Working	Number	8	0.0080
		Percent	11.4	
	Farmer	Number	1	
		Percent	1.4	
	Employee	Number	18	
		Percent	25.7	
	Self-employed	Number	43	
		Percent	61.4	
	Total	Number	70	
		Percent	100	
<b>Mother's job</b>	Housekeeper	Number	61	0.0250
		Percent	87.1	
	Employed	Number	9	
		Percent	12.9	
	Total	Number	70	
		Percent	100.0	

No significant difference was determined in terms of age of parents in both groups (cases and control). In terms of father's literacy level, both the case and control groups had significant difference ( $P = 0.012$ ). In terms of the mother's education no significant difference was determined between the case and study groups. In terms of father's job a statistically significant difference was seen in both case and study groups ( $P = 0.008$ ). In terms of the mother's job, significant difference was seen in the both the case and control groups ( $P = 0.025$ ) [4].

### Discussion

The results of the study showed that in 70% poisoning cases, poisoning had occurred during the age range of 1-3 years old. In this regard in the study of Shabestari et al., the majority of poisoned children were in the 1-3 age group [20]. Khajeh in Zahedan et al., [21] Abbas et al in Pakistan and Khajeh et al., [22] in Zahedan reported similar results. Children in the 1-3 age range, due to their mobile and curious stage of development that involves exploring their environment the sense of taste, this age group was considered at greater risk of accidental poisoning than other age groups.

Analysis of poisoning cases showed that boys were involved in the majority of cases. The research of Hares Abadi et al., showed more cases of poisoning involved boys than girls [3]. But the results of a research in Shiraz reported the largest number of poisoning in girls [23]. It seems that boys, due to being active and courageous, were more susceptible to accidental poisoning in comparison with girls of the same age.

In addition, results showed that in the majority of studies, medicine was the cause of poisoning leading to hospitalization in children under 6 years old. Also, most cases of poisoning by medicine were caused methadone.

A study conducted by Farzaneh et al., in children under 13 years in Ardabil

reported that medicine was the cause of most cases of poisoning [24]. A research in Zahedan also reported the most common cause of poisoning was medicine [25]. Also, a research in Arak reported the most common cause of poisoning in children was from medicines, and gastrointestinal medicines in particular [20]. Due to curiosity and easy availability of medicines, as well as a lack of parental attention and neglect by parents, or use of medicines in the presence of children, children were more susceptible to poisoning from medicine.

In the present study, in most cases, the children were poisoned accidentally. In a study conducted by Azimi et al., the reason for poisoning in most subjects was also reported as accidental [26]. Accordingly, children in this age group tend to put everything in their mouths so poisoning in this age group can be considered inadvertent and accidental.

The results showed that in most cases poisoning had occurred in the evening or at night, and accidents happened in the kitchen. In the majority of cases, the length of hospitalization was more than 24 hours and in most cases, patients were discharged with personal satisfaction. A similar study done in Pakistan reported that incidents most commonly occurred in homes, in the kitchen and in the afternoon [27].

Shabestari et al., reported the least time of hospitalization for poisoning as one day and the maximum was 4 days [20]. While in the study of Dhakal et al., the time of hospitalization in the majority of cases was reported as less than 24 hours [28]. Since most cases of poisoning, accidents had occurred in the home and the kitchen and in the evening and night. One reason for this could be that children are mostly sleeping or in the nursery during mornings but children have more opportunity to use furniture and develop their curiosity during afternoons. It is obvious that more

incidents will occur at times when children are most exposed to risks. The average age of fathers and mothers in the both the case and control groups did not show significant difference.

Researchers consider that young mothers need more training, because they appear to have inadequate experience of childcare and control of children to prevent accidents. The results of Zarezadeh & Bahrampour showed that most fathers of poisoned children had diploma level education and the mother's education was under diploma and statistically, there was a significant difference between parents' education and poisoning [29].

Researchers consider that as fathers were more educated they probably had more awareness of the risks, as well as a better social and economic status, so fathers were better able to provide a safe home for their children. It is also expected that mothers with a high level of literacy, would be more aware of the risks and this would lower incidences of poisoning among their children. In terms of father's job status, both groups had significant difference and the majority of research samples in both groups had self-employed fathers; in terms of mother's job there was also significant difference in the both study groups, such that the majority of mothers were housekeepers in both groups but the percentage of working mothers in the case group was almost 3 times that of the control group.

The researcher considers that a mother's employment outside the home can have a significant impact on the level of childcare. It is also worth considering that working fathers spent most of their time outdoors. These cases would cause negligence in the childcare and possibly put him/her at greater risk of poisoning.

Recalling details of these incidents was sometimes difficult for parents of poisoned children and this may have affected the results of this study, beyond control of the researchers.

The results of this research can be used to plan for provision of care for families with children under 6 years old. It turns out that conducting this study for other age groups such as adolescents could be useful.

### Acknowledgments

This study was the result of a research project at Guilan University of Medical Sciences, that introduction letter of research and ethics committee was taken at the meeting on 2014/09/30 with the number of 2930230302. Hereby, researchers thank and appreciation to the Social Determinants of Health Research Center (SDHRC) and the University for approval and funding and we also thank the officials of training and treatment center of 17 Shahrivar Hospital in Rasht and especially, our sincere appreciation goes to all parents who participated in the research.

### References:

1. Imanzade F, Shiary R, Mahvelaty F. Pediatric Emergency Medicine. Tehran: Shahid Beheshti University of Medical Sciences; 2010.p. 219-220. [In Persian].
2. Jafari zad Y, Farzaneh A, Gosily R. Exploring the effects of acute poisoning in children admitted to hospital in Ardabil in 1391 [PhD Thesis]. Ardabil: University of Ardebil; 2013. [In Persian].
3. Hareth Abadi M, Sedaqat M, Vedani ML. Epidemiology of acute Congress of Addiction, Poisoning and Nursing Care. Journal of North Khorasan University of Medical Sciences. 2013;5(1):47-52. [In Persian].
4. Kliegman Robert M, Richard E, Behrman B, Nina F, Joseph W, Bonita F, et al. Nelson Textbook of Phdiatrics. 19th Ed. USA: Saunders; 2011.
5. Alazab Raed M, [...etal]. Risk factors of acute Poisoning among children: A Stady at a Poisoning unit of a university hospital in Egypt. South East Asia. Journal of Public Health. 2012; 2(2):41-47.

6. Majsak -Newman G, Penny Benford P, Ablewhite J. Keeping children safe at home: protocol for a matched case-control study of modifiable risk factors for poisoning. *Inj Prev.* 2014; 0:1–5.
7. Sabzi Z. Poisoning in children admitted to the emergency department - Taleghani Hospital in 1387. *Gorgan Journal of Nursing and Midwifery.* 2010; 7(2): 76-82.
8. Rezaei AM, Momeni T, Shafiei Z. Study the most common causes of poisoning in children and relationship of type and incidence of poisoning with some parents demography informations. *Iranian Congress of Addiction, Poisoning and Nursing Care.* Mashhad: Mashhad University of medical sciences .2010.p. 27-29.
9. Wong D, Hochtberry M, Wilson D. "Wong's nursing care of infants and children. 19th, Ed. USA: Elsevier; 2011.
10. Abolghasemi N, Barkati H, Haddadi M. Little kids, big damage. Tehran: Andishe Mandegar; 2014. [In Persian].
11. Mehrpour O, Zamani N, Brent S. Atale of two systems: Poisoning management in Iran and the united states. *DARU journal of pharmaceutical sciences.* 2013; 21:2. [In Persian].
12. Faranghi F, Jafar N, Mehrgan FF. Methadon poisoning among children Referred to Loghman- Hakim Hospital. *Pejouhandeh.* 2009; 16(6):299-230. [In Persian].
13. Sengoelge M, Hasselberg, Laflamme L. Child home injury mortality in Europe: a 16-country analysis. *European Journal of Public Health.* 2010, 21(2):165-170.
14. Ahmed B, Fatmi Z, Siddiqui AB. Population Attributable Risk of Unintentional Childhood Poisoning in Karachi Pakistan. *Pars and Unintentional Childhood Poisoning.* 2011; 6(10):1-5.
15. Vasavada H, Desai P. Clinical profile and of children presenting with poisoning: A Hospital Based Study. *NJIRM.* 2013; 4(4):2-7.
16. Yuanfan A. Investigating childhood and Adolescence poisoning Exposures in New Zealand Reported to the National poisons center during 2000-2009. *Asia Pacific journal of medical Toxicology.* 2013; 15(25):2-6.
17. World Health Organisation. Health statistics and health information systems: Global Health Estimates (GHE). Disease and Injury Regional Mortality Estimates, 2000– 2011 (Cited 2014 26 Feb). Switzerland: Who; 2014. Available from: [http://www.who.int/healthinfo/global\\_burden\\_disease/estimates\\_regional/e](http://www.who.int/healthinfo/global_burden_disease/estimates_regional/e)
18. Keyes CE, Wright DW. Epidemiology of Childhood injury in Maputo, Mozambique. *Int jEmerg Med.* 2010; 3:157-163.
19. Fraga AM, Fraga GP, Stanly C, et al. Children at denger: injury fatalities among children in San Diego County. *Eur j Epidemiol.* 2010; 25:211-217.
20. Shabestari A, Purfarzad A, Ghorbani M. Acute Poisoning in Children: A Hospital-Based Study in Arak, Iran, 2008-2012. 2014; 8(26):1104-1108. . [In Persian].
21. Khajeh A, Narouie B, Noori NM. Patterns of Acute Poisoning in Childhood and Relative Factors in Zahedan, Southeast Iran. *Shiraz E-Medical Journal.* 2012; 3(13):19-26.
22. Abbas SK, Tikmani SS, Siddiqui NT. Accidental Poisoning children. *J Pak Med Assoc.* 2012 Apr; 62(4):331-4.
23. Haghghat M, Moravej H, Moatamedi M. Epidemiology of Pediatric Acute Poisoning in Southern Iran: A Hospital-Based Study. *Bull Emerg Trauma.* 2013 Jan; 1(1):28-33.
24. Farzaneh E, Amani F, Mirzarahimi M...etal. Epidemiological Study of Acute Poisoning in Children Referred to Bu-Ali Hospital of Ardabil, 2007-2011. *Journal of Ardabil University of Medical Sciences.* 2014; 14(1):55-62.
25. Sadeghi-Bojd S, Khajeh A. Chronological Variations of Children Poisoning Causes in Zahedan, South of Iran. *Int J High Risk Behave Addict.* 2014, 3(3):2-5.
26. Azemi M, Berisha M, Kolgeci S, Bejiqi R. Frequency, Etiology and Several Sociodemographic Characteristics of Acute Poisoning in Children Treated in the Intensive Care Unit. *Mater Sociomed.* 2012; 42(2):76-80.
27. Siddiqui E U, Ejaz K, Kazi S, et al. Mothers' education and working status; do they contribute to corrosive poisoning among paediatric patients of Karachi, Pakistan? *J Pak Med Assoc.* 2013; 63(8):992-996.
28. Dhakal AK, Shrestha D, Shakya A. Clinical Profile of Acute Poisoning in Children at a Teaching Hospital in Lalitpur. *Journal of Nepal Paediatric Society.* 2014; 34(2):100-103 .
29. Zarezadeh M, Bahrampour A. Poisoning Survey of Referred Children to Afzalipour Hospital in Kerman in 2009-2010. *Iranian Journal of Toxicology.* 2011; 4(4):397-401.