2017 Annual Report of Medical Toxicology Consultations/General Directorate of Poison Control Centres-Ministry of Health-Saudi Arabia

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Abstract

One of the most important medical emergency that results in sever morbidity and mortality is acute poisoning especially in developing countries. Young children contribute the majority of accidental poisoning cases all over the world. A retrospective analysis of poisoning calls received by the ministry of health Saudi Poisons Control Centers (Phone “937”) from the public as well as, from hospitals who registered poisoned patients during the one-year period (1st January to 31st December 2017) showed a total of 12566 calls. Children below 6 years of age constituted the vast majority of cases (84.2%). The majority of calls received were from public callers (87.3%). Males represented 57.9% of cases and Riyadh was the city with the largest number of calls received representing 37.5% of all calls. Furthermore, 98.5% of poisoning occurred at home, while 97.2% of exposures were accidental. We also found that 64.7% of public callers were advised to observe the patient at home and would not need to go to a hospital. Oral route of exposure constituted 95% of all routes of exposure. Drugs were the most common cause for poisoning consultations (59%) followed by household chemicals (25%). Non-toxic ingestions constituted 16% of all calls received. In conclusion, this study highlights the significance of raising public awareness of the risk factors and hazards present for household chemicals that children below 6 years of age are at higher risk of exposure to poisoning. In addition, Saudi Poisons Control Centers play a vital role in providing timely management guidelines for the management of poisoning cases thereby helping to save precious lives.

Keywords: Phone consultation; Poisoning; 937 Services; Saudi Arabia; GDPCCs

Introduction:

Poisons are potentially harmful agents that can damage the human body [1]. Poisoning develops when these toxic substances are either ingested, inhaled, or penetrated through the skin, with exposure often occurring intentionally or unintentionally in homes [2]. Exposure to poisonous substances is one of the most significant public health problems with important indicator rates of morbidity and mortality all over the world [3]. A World Health Organization report in 2012 revealed that an estimated 193,460 deaths were caused annually because of unintentional poisoning worldwide, of which 84% occurred in low and middle-income countries [4].

The availability of a national medical call center system “937” offers great potentials in public health section. To operate in a satisfying way a poison information service is dependent on two main items namely; a specifically trained, highly qualified and well educated staff on one side, and consistent, up to date, convenient toxicological information sources on the other side. The availability and readiness to provide poison information service, via phone, 24/7/365 availability is a basic requirement to enable bridging the gaps between the need for toxicology consultation and shortage in specialized toxicology specialist and consultant [5].

The epidemiology of acute poisoning is different between countries [6,7] and changes over time [8]. These changes may be due to trends in medication prescription and in addition to the availability of abused drugs with different types [9]. Intensive care unit management of the poisoning cases requires rapid diagnosis and supportive care while using specific antidotal treatment in some cases [10,11]. Otherwise, poisoning may lead to complications and fatalities.

In Saudi Arabia, there have been multiple research reports of poisoning among population and citizen [12,13], with the peak incidence occurring in children aged 1-7 years. Among all reported cases of poisoning, acetaminophen is the most common cause [14]. There are some reports of recommendations from poison control centers such as direct assessment, interventions, home management and observation [12]. Indeed, majority of poisoning conditions can be managed at home, and reducing hospital visits and admissions cost.

In the current study, we aimed to identify the most common poisons in Saudi Arabia Citizens. We also aimed to deeply investigate the type of poisoning, route of exposure, the need for hospital admission, and the arrival time at hospital.

Material and Methods

This study was conducted by the General Directorate of Poison Control and Forensic Chemistry Centers (GDPCCs), Ministry of Health, Saudi Arabia. The poisoning calls received by all Saudi Poison Control Centers via a specific phone line “937” were thoroughly analyzed throughout the period of the study 1st of January, till 31st of...
December, 2017 and entered in a pre-set form that is incorporated within retrievable database. All calls received from the public as well as, from hospitals that received poisoned patients were recorded. Cases with chronic toxicity and cases with incomplete information were excluded from the study. Information regarding the calls included the caller’s name, address, patient’s address, age, sex, type of substance consumed, amount, mode of intake, route, time of intake, time delay from exposure to seeking medical advice, presenting symptoms or signs, investigations requested and finally the consultations and medical advice given such as observation at home, go to hospital for observation or admission. The various poisoning agents were subcategorized into 4 main categories, household chemicals, medications, gases and animal poisons.

Statistical analysis

All data was analyzed using IBM SPSS, Version 20 (IBM Corp., Armonk, NY, USA), with P-values of <0.05 considered statistically significant. Descriptive statistics are reported as frequencies and percentages, as appropriate. Chi-squared tests were used to determine associations between qualitative variables.

Results

Our results indicate that in 2017 (1st of January to 31st of December) 12566 poisoning calls were received by GDPCCs (Figure 1). One thousand five hundred and eighty-seven (12.6%) patients were admitted following acute poisoning to the hospitals, among which, 735 presented with clinical manifestations of poisoning. Overall, there was an increasing trend in the number of cases reported, with the highest number of cases being reported in the fourth quartile (October-December, 2017) (Figures 1-4). To aid the analysis, we divided patients into the following age groups. Less than six years, six to less than twelve. Twelve to less than eighteen, eighteen to less than twenty-four, twenty-four to less than thirty-nine. Thirty nine to less than sixty and more than sixty years. Most patients were children younger than 6 years (85%) and more than half (58%) were male (Table 1).

| Age                           | No.   | %    |
|-------------------------------|-------|------|
| Less Than Six Years           | 10620 | 85   |
| From Six to less than Twelve Years | 535  | 4.3  |
| From Twelve to less than Eighteen Years | 198  | 1.6  |
| From Eighteen To Less Than Twenty Four Years | 225  | 1.8  |
| From Twenty Four to less than Thirty Nine Years | 443  | 3.5  |
| From Thirty Nine to less than Sixty Years | 333  | 2.7  |
| More than Sixty Years         | 212   | 1.7  |

| Sex                           |       |
|-------------------------------|-------|
| Male                          | 7285  |
| Female                        | 5281  |

| Occupation                    |       |
|-------------------------------|-------|
| Employed                      | 1134  |
| Unemployed                    | 416   |
| Student                       | 396   |
| Preschool                     | 10620 |

| Time of occurrence (year quartiles) |       |
|-------------------------------------|-------|
| First quartile (January-March)      | 1773  |
| Second quartile (April-June)        | 2935  |
Third quartile (July-September) & 3648 & 29  
Fourth quartile (October-December) & 4210 & 34  

Table 1: Demographic characteristics of the studied cases.

Figure 2: The residence of the studied cases handled to Saudi poison control centers during the year 2017.

Figure 3: The mode of positioning of reported calls to Saudi poison control centers during the year 2017.

Figure 4: The types of drug overdose poisoning cases reported by Saudi poison control centers during the year 2017.

Figure 5: The types of analgesics overdose poisoning cases reported by Saudi poison control centers during the year 2017.
Poisoning data

Medications were the most common cause of poisoning (59%), followed by household chemicals (25%), while nontoxic ingestions constituted 16% of the total number of calls received. When comparing age groups, the number of calls concerning children below 6 years of age were significantly higher than the older age groups (p<0.001). The number of calls reported from Saudi Central Region, Riyadh was significantly higher than the rest of the kingdom (p<0.001). No significant differences were found between poisoning type and gender.

There were 1030 (8.2%), and 1042 (8.29%), cases of accidentally ingested corrosives and accidentally ingested chemicals, respectively. Our results show that analgesics (25.8%), vitamins (22.4%), antihistamines (11%), antibiotics (5.8%), oral bronchodilators (5.8%), CNS drugs (5.7%), and cardiovascular drugs (4.5%) were the most frequently ingested medications (Table 2). Other ingested medication classes included gastrointestinal medications, herbal products, immune suppressants, and topical agents.

Of the accidentally ingested analgesic medications, acetaminophen was the most commonly ingested (57% of all analgesics overdose poisoning reports, n=1088), followed by nonsteroidal anti-inflammatory drugs (37% of all analgesics overdose poisoning reports, n=703) (Figure 5).

| Substance        | 1st Quarter | 2nd Quarter | 3rd Quarter | 4th Quarter | Total  | %   |
|------------------|-------------|-------------|-------------|-------------|--------|-----|
| None Drug overdose |             |             |             |             |        |     |
| Volatiles        | 32          | 60          | 44          | 61          | 197    | 1.57|
| Corrosives       | 107         | 235         | 282         | 406         | 1030   | 8.2 |
| Chemicals        | 131         | 221         | 307         | 383         | 1042   | 8.29|
| Insecticides     | 62          | 85          | 97          | 64          | 308    | 2.45|
| Rodenticides     | 10          | 18          | 8           | 21          | 57     | 0.45|
| Hair dye         | 6           | 11          | 7           | 5           | 29     | 0.23|
| Alcohol          | 24          | 30          | 70          | 92          | 216    | 1.72|
| Batteries        | 0           | 4           | 2           | 8           | 14     | 0.11|
| Food             | 19          | 24          | 84          | 95          | 222    | 1.77|
| CO               | 5           | 7           | 0           | 8           | 20     | 0.16|
| Snake            | 0           | 0           | 2           | 5           | 7      | 0.06|
| Scorpion         | 1           | 6           | 32          | 8           | 47     | 0.37|
| Drug overdose    |             |             |             |             |        |     |
| Paracetamol      | 158         | 366         | 244         | 320         | 1088   | 8.66|
| Salicylates      | 14          | 24          | 32          | 48          | 118    | 0.94|
| NSAIDs           | 97          | 141         | 175         | 290         | 703    | 5.59|
| Antihypertensives| 28          | 74          | 97          | 101         | 300    | 2.39|
| Antidiabetics    | 25          | 44          | 36          | 74          | 179    | 1.42|
| Antiepileptic    | 23          | 25          | 42          | 56          | 146    | 1.16|
| Sedatives        | 0           | 6           | 13          | 5           | 24     | 0.19|
| Antidepressants  | 6           | 9           | 25          | 26          | 66     | 0.53|
| Antipsychotics   | 28          | 31          | 48          | 40          | 147    | 1.17|
| Vitamins         | 198         | 548         | 511         | 402         | 1659   | 13.2|
| Drugs of abuse   | 8           | 15          | 9           | 9           | 41     | 0.33|

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Discussion

Most cases were asymptomatic, but some cases developed gastrointestinal symptoms (e.g. abdominal pain, vomiting, and diarrhea), which were most common regardless of poisoning type. 80% of public callers were advised to observe the patient at home (Figure 6) and 21% of hospital poisoning consultation calls were requested to be admitted (Figure 7). Only 47% of cases were kept in for observation in the emergency department and only 12% were admitted to ICU units in hospitals.

Table 2: Types of poisoning of the studied cases.

| Type of Poisoning | Nontoxic Ingestion | Nontoxic Ingestion | Nontoxic Ingestion | Nontoxic Ingestion |
|-------------------|--------------------|--------------------|--------------------|--------------------|
| Antihistamines    | 107                | 211                | 262                | 235                |
| Pulmonary drugs   | 102                | 89                 | 92                 | 147                |
| Creams and Lotions| 40                 | 34                 | 26                 | 82                 |
| Antibiotics       | 90                 | 56                 | 137                | 152                |
| Other             | 87                 | 30                 | 443                | 519                |
| Total             | 1773               | 2935               | 3648               | 4210               |

In poisoning consultations “937” phone calls, the medical toxicologists perform an initial evaluation of alleged suspected poisonings exposure and the first step is to determine whether the case is toxic or nontoxic exposure. In cases of non-toxic exposures of a witnessed situation with asymptomatic presentation, a period of close observation at home may be advised, which represented as 7104 home calls, 65.2%. On the opposite site, in toxic and/or symptomatic patients, they advised to immediately transport to the emergency department (3872 home calls, 34.8%) for hospital observation or admission. Same guidelines with minor variations were be noticed in the mentioned articles [22-24]. While, hospital calls represent 13% of total received “937” phone calls, from them 18.2% of consultations recommended discharge from hospital without any need for hospital observation or admission.

Findings from this study support the proposition that poisoning consultations “937” phone calls are cost-beneficial and provide a positive return on investment. As we avoided unnecessary healthcare charges including ambulance services, emergency room, physician visits, and other medical treatments. These findings provide strong support that “937” phone calls poisoning consultations provide a valuable service to the citizens of the Saudi Arabia, and that it produces a significant positive feedback on preventable or unnecessary medical evaluations and treatments.

Overall, there was an increasing trend in the number of calls received by medical toxicologists, with the highest number of received calls being reported in the fourth quarter (October to December 2017), which may be attributed to increase awareness among public and medical personnel regarding new provided toxicological consultation service through “937” phone calls in Saudi Arabia.

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In conclusion, we found that most cases of poisoning occurred in children less than 6 years and that most children could be treated only with observation. Properly applied, the retrieved information from the current study, we can be used to improve not only our understanding of local predisposing risk factors of pediatric poisoning occurrence, but also the delivery of efficient public health educational programs and pediatric poison prevention campaigns. In addition, other findings from this study enforce the proposition that the “937” poisoning phone consultation service is cost-beneficial under reasonable operating assumptions and thus provides a positive return on investment. By “937” poisoning phone consultations, we avoided unnecessary healthcare procedures like emergency room congestion, hospital crowding, physician visits, ambulance services, and other unnecessary medical healthcare facilities. On the same side, a strong medical proposition support that the “937” poisoning phone consultations,
provide a valuable service to the citizens of the Saudi Arabia, and that it produces a significant return on investment based mainly on preventable unnecessary medical evaluations, procedures and treatments.

Conflict of Interest

Authors declare that we have no conflict of interest.

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