

Analysis of the Pattern of Acute Poisoning in Patients Admitted to a Governmental Hospital in Palestine

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Abstract: The objectives were to (i) analyse the pattern of poisoning and (ii) study gender distribution and management protocol of poisoning in patients diagnosed with acute poisoning. A retrospective analysis of cases diagnosed with acute poisoning and admitted to the emergency department of Al-Wattani governmental hospital during the year of 2008 was carried out. Data from patients' medical files were collected and then analysed using Statistical Package for Social Sciences (SPSS; SPSS Inc., Chicago, IL, USA), version 16. There were 674 cases diagnosed with acute poisoning in 2008 which accounted for 1.5% of the total admission to the hospital. The mean age of the cases was 21.8 ± 18.1 years. Approximately, 58% of poisoning cases occurred at home. Male to female ratio was 1.5:1. The maximum number of poisoning occurred during summer season. Poisoning cases were maximum in the age category >18 years. More than half (92%) of the cases were of unintentional type of poisoning. Unintentional poisoning was significantly more common among males (61.3%; $p < 0.01$), while intentional was more common among females (64.8%; $p < 0.001$). The causative agents encountered were mainly biological agents (77.4%), pharmaceuticals (11.6%), and other chemicals (10.9%). The most common route of poisoning was through stings (72.3%), followed by oral ingestion (23.5%) and inhalation (3.4%). The majority (91.1%) of cases did not undergo any decontamination methods. Of those who had decontamination procedure, gastric lavage was the most commonly used. This is the first study in Palestine that presents data on the pattern of acute poisoning. Awareness campaigns should be held about potentially toxic materials in the region, and methods of poison prevention should be spread among the public.

Acute poisoning is a worldwide problem [1–4] and could be intentional or unintentional. The unintentional or accidental poisoning is common among children and contributes to increased childhood morbidity and mortality [5–8]. Children get poisoned accidentally because of their exploratory nature and their desires to imitate adults. Adults do also get poisoned through intentional poisoning that could be a suicidal attempt.

Poisoning can occur as a result of a wide range of causative agents. Those include chemicals such as cleaning agents, cosmetics and other household products. Medications are other major causative agents of poisoning in many countries and are expected to be available in every house. Pesticides are more prevalent in agricultural countries and are encountered in many acute poisoning cases [9–11]. Animal envenomations are a problem in many areas of the world that are home for poisonous snakes, spiders and scorpions [12–14]. In Palestine, all above-mentioned agents are available and contribute to poisoning all year round.

A 'Pubmed' search using the key words 'acute poisoning' and 'Palestine' was carried out before the start of the project. The search showed zero results. Therefore, the objective of

this study was to investigate and analyse the pattern of acute poisoning among cases admitted to a major referral hospital in north Palestine. Furthermore, gender distribution and management protocol of acute poisoning were analysed.

Materials and Methods

Settings and study design. This was an observational, retrospective study where all patients who visited at the emergency room of Al-Wattani Governmental hospital and diagnosed with acute poisoning in 2008 were included in the study. Al-Wattani hospital is a 200-bed referral hospital located in the northern part of Palestine. The hospital has an emergency, paediatric, ICU and internal medicine departments.

Data extraction and analysis. Data collection was made using a special form developed by the authors at the Poison Control and Drug Information Center (PCDIC)/An-Najah National University. The form had four sections. The first section contained demographic information about the poisoning case. Such demographic data included age, gender, weight and residence. The second section of the form contained information about the toxic material encountered, the route of intoxication and amount ingested, if any. The third section of the data collection form contained information about the clinical symptoms present upon admission to the emergency room, time elapsed as the intoxication and the first aid provided prior to arriving at the emergency room. The final section of the form included questions regarding management of the case in general and decontamination procedures implemented in particular. All cases were classified as either intentional or unintentional based on the information obtained from the patient and his/her family. Furthermore, the causative

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agents of poisoning were classified into: biological, chemical and pharmaceutical.

Data collection was made by two clinical pharmacists who were well trained on how to collect the information from the files, and on conducting interviews, if needed, with poisoned patients or their families. Most medical files were quality-checked for data accuracy through personal interview with the patient and the attending physician and matching the information obtained with those present in the medical files. This study was made possible by an agreement between the university and the Ministry of Health and was approved by the ethics committee. All data were entered and analysed using Statistical Package for Social Sciences (spss 16). Continuous data were presented using mean \pm S.D. while categorical data were presented as frequency and percentage. Chi-square was used to test for associations between categorical variables. $p < 0.01$ was considered statistically significant.

Results

A total of 44,933 patients visited the hospital emergency room in 2008. Of those, only one-third were admitted to the hospital. Also, 674 of those who visited the emergency room in 2008 were diagnosed with acute poisoning. This constituted for 1.5% of the total emergency room visits in that year. Among the different age categories, poisoning was most common (47.2%) among people >18 years. In the age category of less than 6 years (pre-school age), the highest rate occurred among children between 1–2 years of age (53 cases, 34.6%), followed by those of 2–3 years (40 cases, 26.3%).

The majority (399, 59.2%) of the cases were males, giving a male:female ratio of 1.5: 1. Average age of the cases was 21.8 ± 18.1 years. The youngest case was 2 months old and oldest was 93 years. The number of males outnumbered that of females in all age categories (fig. 1). Most cases were city residents (50.1%). Highest incidence of poisoning was seen

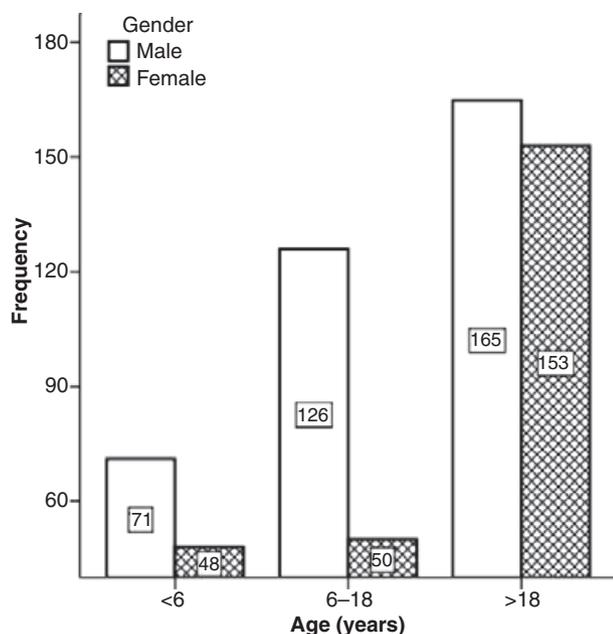


Fig. 1. Frequency of poisoning based on age and gender.

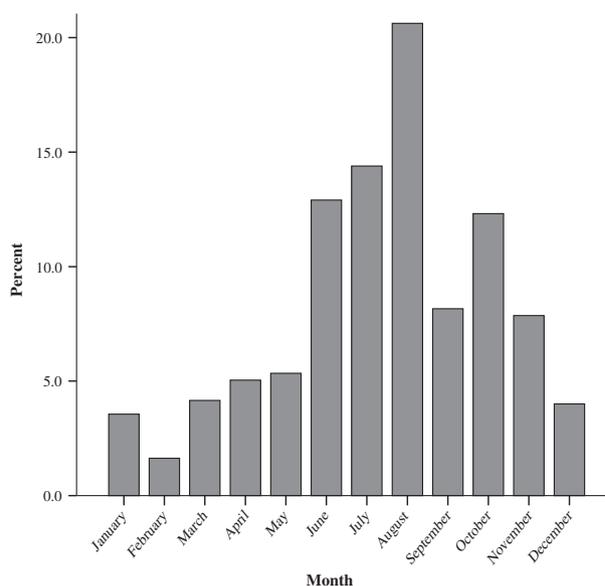


Fig. 2. Frequency of poisoning per month.

in summer while the lowest was seen during winter. Fig. 2 shows incidence of poisoning per month.

The most common causative agent reported was animal envenomation (489, 72.5%) which included insect stings and snake bites (table 1). Pharmaceutical agents were encountered in 11.6% of the cases; chemical agents were responsible for 10.9%. The remaining cases were either of unidentified or miscellaneous agents. Most cases were poisoned with one single chemical (96.7%). The route of poisoning was mainly through bites and stings (72.3%), followed by oral route (23.5%) and inhalation (3.4%). The animal bites were further analysed. It was found that most cases were because of scorpion bites followed by bee stings.

Most of the cases included in this study were because of unintentional poisoning (620, 92%), while the rest (54, 8%) were intentional type. There was a significant association between type of poisoning (intentional *versus* unintentional) and gender, with females having more intentional poisoning than males (64.8% for females *versus* 35.2% for males, $p < 0.001$). Unintentional poisoning was the other way

Table 1.

Types of unintentional poisoning.

Types of unintentional poisoning	Frequency (%)
Bites or stings	489 (78.8%)
Scorpion	154 (36.2%)
Bee	135 (31.8%)
Centipede	35 (8.2%)
Others ¹	165 (26.6%)
Chemicals and pharmaceutical ingestion ²	89 (14.4%)
Food	33 (5.3%)
Medication error	9 (1.5%)
Total	620 (100%)

¹Others include snake, spider, wasp and unidentified insects.

²Includes pharmaceuticals, pesticides, cleaning products, household items, personal care products and plants.

Table 2.

Frequency of the type of poisoning based on gender.

	Type of poisoning		p-value
	Unintentional (%)	Intentional (%)	
Gender			
Male	380 (61.3)	19 (35.2)	<0.01
Female	240 (38.7)	35 (64.8)	
Age category			
<6 years	119 (21.3)	0 (0)	<0.01
6–18 years	160 (28.6)	16 (29.6)	
>18 years	281 (50.1)	38 (70.4)	
Causative agent			
Biological	522 (84.4)	0 (0)	<0.01
Pharmaceutical	39 (6.3)	39 (72.2)	
Chemical	59 (9.2)	15 (27.8)	
Total	620 (100)	54 (100)	

Table 3.

The decontamination procedures carried out for the poisoned cases.

Decontamination procedure	Number (%)
Lavage	47 (7%)
Lavage and charcoal	6 (0.9%)
Charcoal	5 (0.7%)
Milk	2 (0.3%)
No decontamination	614 (91.1%)
Total	674 (100%)

around, 61.3% in males *versus* 38.7% in females ($p < 0.01$) (table 2). Intentional poisoning was mainly because of pharmaceutical agents (69.1%), and the rest was because of chemicals such as pesticides and household chemicals. Pharmaceutical agents were common in intentional poisoning (70.4%) but were the lowest in unintentional poisoning (6.3%).

In our study, most cases (618, 91.7%) were discharged on the same day from the emergency room while the rest were admitted to the internal medicine department or transferred to another hospital for further therapy. Gastric lavage was used in 47 cases (7%), while charcoal was used in five cases (0.7%), milk administration in two cases (0.3%), and both lavage and charcoal was used in six cases (0.9%). The rest of the patients did not receive any decontamination procedure (614, 91.1%) (table 3). Very few cases (5.1%) showed up at the emergency department within minutes of poisoning and the rest were hours late to arrive.

Discussion

This is the first study to describe the pattern of poisoning in Palestine. In this study, there were 674 poisoning cases which correspond to 337 cases per 100,000 inhabitants in Nablus district. Most cases occurred in the months of the summer which is in agreement with the trend of poisoning in many countries around the world [15,16]. The Palestinian population is a fairly young one with about 45.4% under the age of 15 years which may have contributed to the high frequency

of poisoning among age category <18 years (www.arab-hdr.org). In addition, the number of poisoning cases among pre-schoolers is worth analysis due the delicate nature of this category. It was noted that the highest incidence was among those between 1 and 2 years old. Other studies have shown that children in the age group of 1–4 had the maximum incidence of poisoning [17]. In this study, there was a high M: F ratio. This finding is in agreement with some published studies such as the Malangu study [18]. However, other studies have opposite findings with higher M:F such as in the USA [19,20].

In Palestine, many factors may facilitate intentional and unintentional poisoning. Among those factors is that the Palestinian environment is home for many animal species including snakes, scorpions, spiders and other insects. Houses can be invaded by those animals at anytime during the year especially during summer resulting in poisoning. In our study, the majority of poisoning cases were caused by bites and stings because of the widespread of such animals all over the Palestine area. In addition, most houses are one-storey houses and their doors and windows remain open most of the time. Using mesh for windows is not very common as well. Another possible reason is the availability of all types of medications with no restrictions. A third possible factor is the tendency of people to store medications at home in large quantities in places accessible to children [21]. This makes it possible for children to play with a variety of medications. A third potential factor is the un-regulated sale and use of chemicals and pesticides, especially among farmers. Cleaning products used at home are not in child-resistant containers and are stored under the sink or in the bathroom [22]. Cleaning products were responsible for several poisoning cases in our study. The wide variety of chemicals available in the market of developed and developing countries have played a major role in such a poisoning problem [1]. Such chemicals are most of the time stored unsafely and within the reach of children and do not have warning labelling regarding potential toxic effects. A study in Brazil found that children were more vulnerable to poisoning with such chemicals [23]. Pesticides were among the chemicals encountered in this study. Those chemicals constitute a problem in many areas of the world, both developed and developing countries [24,25]. In our study, most cases were caused by stings and bites, followed by medications. A study in Iran showed that 60.8% of the poisoning cases admitted to a hospital in Tehran were because of medications [26].

The admission rate of poisoning cases was 1.5% in Al-Wattani hospital during the study period. This is less than that reported in other places in the world and even less than that reported from other developing countries like Bangladesh, Colombia, Egypt and Pakistan [26,27]. The lower rate of admissions reported in our study may be because of the fact that not all poisoned patients were admitted to hospital; some seek help in at local nearby clinics. Some poisoning cases may also be misdiagnosed for other diseases and so are considered a regular admission case and not related to poisoning.

There are striking differences in the pattern of poisoning between developed countries and developing agricultural countries. [28–31]. Morbidity and mortality because of acute poisoning is a worldwide problem; however, its impact may be more on poor countries. It has medical and social significance. It is obvious that unintentional poisoning was responsible for the majority of poisoning cases, while intentional poisoning were the minority. This is in agreement with findings in Iran [26,31,32] while the opposite of that was found by other researchers [3]. In the developed countries, medications are mostly used for this purpose, while in developing countries, pesticides are mostly encountered in this issue [33,34]. In our study, it was noted that people have used both medications and pesticides were encountered in the deliberate self-harm attempts. In this study, most patients were treated in the emergency room and released from there, only a small percentage required to be admitted. This indicates that the degree of poisoning was not severe one and did not require hospital admission.

Analysis of the management protocols showed that there is an under-utilization of decontamination procedures particularly activated charcoal and gastric lavage. Out of 63 cases that were potential candidates for activated charcoal or gastric lavage and who were presented to the emergency room within minutes to hours, only one-third (21 cases) received activated charcoal or gastric lavage. This suggests the time of presentation to the emergency room is not detrimental in the use of activated charcoal or gastric lavage. The under-utilization of activated charcoal is attributed to lack of activated charcoal and knowledge of the importance of such decontamination method. Most emergency room physicians at the Al-Wattani hospital are currently switching from gastric lavage to activated charcoal, and this is because of the continuous input from the staff at the PCDIC.

Poison control and drug information centres have been established in developing and developed countries with the primary goal of providing information to the general public or medical institutions and professionals who are in urgent need of information pertaining to poisoning. In Palestine, the only such facility, the PCDIC, was established at An-Najah National University in 2006. Before the establishment of the PCDIC, poisoning cases were treated empirically or the Israel Poison Information Center at the Rampam Health Care Campus, Haifa, Israel, was consulted. The PCDIC is equipped with several resources to answer enquiries such as Micromedex databases, textbooks, internet sites and periodicals. The PCDIC was consulted by the emergency department at Al-Wattani hospital whenever the poisoning case is difficult to manage or the medical team has no experience with intoxicating agents.

The data obtained in this study will be used by the PCDIC to increase the public awareness regarding potential toxicity of chemical and pharmaceutical agents as well as biological envenomations through the national activity entitled 'Poison Prevention Week' held annually in the first week of April. The data will also be presented to the officials in the Palestinian ministry of health to take this into consider-

ation for future planning. Furthermore, the Palestinian ministry of health needs to make various antidotes and decontamination procedures, particularly activated charcoal, available in major hospitals in Palestine.

Finally, the present study emphasizes the importance of electronic documentation of all admissions and poisoning cases in Palestinian hospitals. Data collection was made manually and based on data available in medical charts. Unfortunately, there is no standardized form in the hospital to be used for poisoning cases. This manual documentation and lack of standardized form made the data collection difficult and time consuming. Adopting a standardized national electronic form for poisoning cases is important. Furthermore, not all data were present in the medical files and the authors have to depend on information reported by families. Such information, which was obtained from families after hours of the incident, might also affect the reliability of the data.

Limitations of the study

This study has several limitations. First, the data in this study represents only cases that were admitted to Al-Wattani governmental hospital. Other poisoning cases that were admitted to private clinics or treated at home were not included in the analysis. Therefore, the frequency of poisoning presented in this study might be an under-estimation of the actual frequency of poisoning. Second, in this study, poisoning was not confirmed with blood analysis and was based on reported information by the case or his/her family. Therefore, it is possible that some cases were misdiagnosed. Third, the information reported by families regarding poisoning could not be confirmed. Finally, the data obtained in this study pertain to cases admitted during 2008 to Al-Wattani hospital which is located in the centre of Nablus city. Therefore, a larger and longer duration study is needed to have accurate estimates of the frequency of acute poisoning in Palestine.

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