An- Najah National University

Faculty of Graduate Studies

Poisoning Among Children at Jenin District

By

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Committee Decision

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This thesis was defended successfully on the 21st of May 2003 and approved by:

Committee Members	*Signature*
1. Dr. Ansam Sawalha (Supervisor)	
2. Dr. (Internal examiner)	
3. Dr. (External examiner)	

DEDICATION

Dedicated, with love, to my wife, and children

my family and my friends

DECLARATION

No portion of the work referred to in this thesis has been submitted as an application for another degree or qualification of this or any other university or institute of learning.

Ahed Ghaleb Ahed Moh'd

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I sincerely hope that this study will be beneficial to the policy makers, planners, and health workers in Palestine.

Abstract

Poisoning is any unwanted effect on human body that can result due to exposure to natural or synthetic substances. Poisoning is highly related to the public awareness and the correct handling of these poisoning substances.

This study was conducted to spot the light on the poisoning problem, mainly among children with an overall objective was to decrease the morbidity and mortality rates of children due to poisoning through better understanding of the causes, symptoms, and management of poisoning cases.

The study was conducted on poisoning cases that were presented to the emergency room of Jenin Governmental Hospital and admitted to the pediatric unit during the period of January 2000 to August 2002. A total of 127 poisoning cases, up to 14 years old, were presented to Jenin Hospital during the study period.

The results showed that the majority of cases were presented with mild to moderate poisoning symptoms, 74% of the cases aged from 1-5 years old, predominantly male. Most of the poisoning cases

(85%) occurred at home and resulted from oral poisoning and with symptoms of digestive system poisoning. The majority of the poisoned cases were due to chemical products including pesticides and petroleum materials mainly kerosene.

Our findings strongly indicate a lack of public awareness about handling of chemical materials (storage, labeling and first aid in case of poisoning). Carelessness and lack of parental knowledge might be one of the main factors that led to most of the poisoning cases, house was not calming oases in Palestine. Therefore, childproofing home and educational programs from the Ministry of Health and other Non-Governmental-Organizations could be the most effective prevention methods to decrease morbidity and mortality from accidental poisoning in children. In addition, the establishment of poison control center may have an essential role in controlling the poisoning problem.

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Abbreviations

UNODCCP	United Nations Office for Control and Crime Prevention
MMWR	Morbidity and Mortality Weekly Report
AFP	American Family Physician
BMJ	British Medical Journal
NGT	Naso Gastric Tube
EPA	Environmental Protection Agency
DPIC	Drug and Poison Information Center
FDA	Food and Drug Administration
FPIC	Florida Poison Information Center
EHC	Environmental Health Center

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AAPCC	American Association of Poison Control Center
CDC	Centers for Disease Control and prevention
VSA	Volatile substances abuse
NCIPC	National Center for Injury Prevention and Control
PNHP	Palestinian national health plan
PCBS	Palestinian central bureau of statistics
NCHS	National Center for Health Statistics

CHAPTER I
INTRODUCTION

1.1 General Introduction

Poisoning can be defined as any unwanted effect on human body, this includes allergy, nausea, vomiting, headache, liver damage, and many others including even death (American Association of Poison Control Centers, 2002). Poisoning may occur due to the exposure to natural or synthetic substances such as drugs, household items, cosmetics, agricultural products, industrial chemicals, food, plants, and animal venom's. Poisoning is more prevalent in children compared to adults. Curiosity, inability to read warning labels, desire to imitate adults, and inadequate supervision are the most common causes that may lead to childhood poisoning (Tish D., 1999).

With the massive development in the industry, the causes of poisoning increased drastically. In general, it was found that poisoning is the fifth leading cause of death in USA and it ranked first among children (MMWR, 1989). The center for disease control (CDC 2002) reported that in the year 2000, about 2.2 million poisoning cases occurred, 920 of which resulted in death, and 64% of these poisoning incidences occurred in children.

The number (CDC and MMWR, 1986) of poison-related deaths among children under 5 years of age decreased from approximately 450, in the year 1961 to 55 in the year 1983 in USA. This decrease is due to

increased awareness concerning poisons, facilitated in 1961 by the passage of public law 87-319 (75stat.681).

For all ages unintentional poisoning death rates are higher in the United States and in Denmark, where it is estimated that poisoning rate is about 13 per 100000 (NCHS, 1998). In Israel and Netherlands, on the other hand the rates are the lowest approximating 1-2 per 100000.

Our bodies are exposed to a wide variety of chemicals and thus they are contaminated with many toxic substances, hundreds of contaminants have been found in human fat, however, children were found to be more susceptible to the toxic effects of chemicals compared to adults (Michael A., 1998). This increased susceptibility may be due to many factors such as:

- The organs and tissues in children bodies (brain and reproductive organs) are still growing which makes them more sensitive to xenobiotics.
- Children have less ability to detoxify chemicals.
- Children eat, drink, and breathe more per weight compared to adults.
- Children are more likely to put things in their mouths and eat things they shouldn’t.
- Children have a longer life span ahead of them for chemically induced health problem to progress.

- Their immune system is less developed.

Poisoning is highly related to the public awareness and the correct handling of these poisoning substances either at home or at any other locations. Preventing poisoning is much more efficient than treating poisoning. Methods of poisoning-prevention are mainly accomplished through awareness programs about the safe handling and storage of poisonous materials, and the correct management of poisoning cases. Knowledge of the signs and symptoms of poisoning by the public has an important role in decreasing the mortality and morbidity rates of poisoning. This is due to increased ability of the public to the early discovery and fast treatment of intoxication once it occurs.

In Palestine, it was observed that poisoning materials are within the reach of children and the most common causes of poisoning were:-

1. Ingesting kerosene, medicine, or spoiled food.
2. Agricultural pesticides and fortunately, in many poisoning cases, the doses were much smaller than the lethal dose, so they resulted in mild poisoning. However, in other less fortunate cases, the doses were high enough to cause permanent side effects or even death.

One of the major factors that increased the risk of poisoning in Palestine is that many children work in farms or in certain industries like shoe-making or other places, which makes children constantly exposed to poisoning materials.

Children poisoning in Palestine is a real problem. During the years of occupation attention haven't been directed toward this aspect and available data about the causes of poisoning and depth of the problem are very limited. Few studies were conducted and were mainly concerned with the effects of environmental pollution on human health, yet none of these studies dealt with children poisoning. In general, these studies have shown that the main cause for pollution in Palestine is the agricultural pesticide. Exposure of farmers and their families to pesticide is a serious health problem, as many of these pesticides had been banded in many countries as they were classified as highly toxic humans (Environmental Health and Toxicology Unit, Birzeit University 1989).

More work is needed especially in the area of toxicology as it affects future generations. Therefore, the overall objective of this project is to decrease the morbidity and mortality rates of children due to poisoning. This may be done through better understanding of the causes, symptoms, and management of poisoning cases. This current project focuses on the Jenin District.

1.2 Study Setting

This part of the study is designed to shed light on the West Bank in general and the northern Palestinian districts in (Jenin).

1.2.1 Geography and Demography of the West Bank

The area of the West Bank is about 5,800 square km. It is a hilly region composed of four regions: the Jerusalem Mountains in the center, the Hebron Mountains in the south, the Nablus Mountain in the north and the Jordan valley comprising part of the Syrian- African rift and stretching north and south along the Jordan River. The West Bank ranges fall between the coastal plain in the west and the Jordan Valley in the east with a width of 40-65 km, and an average height of 2,400 feet. The West Bank is divided into eleven districts: Nablus, Salfit, Tulkarm, Qalqelia, Tubas, and Jenin districts in the north, and Bethlehem, and Hebron districts in the south, and Ramallah, Jericho and Jerusalem districts in the center (Abu-Khadir N., 2002).

According to Palestine National Health Plan (PNHP, 1997) the total population of the West Bank during (2000) was estimated at 2,011,930. Around 43% of the population resided in the northern districts, 29% in the central districts and 28% in the southern districts of the West Bank. In November 1997, the Palestinian Central Bureau of Statistics (PCBS) released the official results of its population census, housing and establishments. Population estimate in the Palestinian territories West Bank and Gaza Strip were approximately 3,150,056 (Abu-Khadir N., 2002).

Table 1. Palestinian population Estimates for Selected Years

Governorate	2000	2001	2002	2003	2004	2005
Jenin	216126	225711	236428	247305	258321	269464
Tubas	39239	41067	43110	45187	47298	49441
Talkarm	142865	149188	156242	163397	170621	177940
Qalqiliya	78029	81942	86290	90729	95250	99860
Salfit	52137	54595	57339	60130	62968	65851
Nablus	278317	290621	304347	318240	332299	346476
Ramallah &Al-Bireh	231690	243432	256483	269827	283446	297330
Jerusalem	354417	3670032	380422	394105	408042	422222
Jericho	35352	37066	38968	40894	42839	44803
Bethlehem	147121	153954	161579	169317	177170	185128
Hebron	436637	457781	481433	505694	530541	555965
West Bank	2011930	2102360	2202641	2304825	2408795	2514480
Gaza Strip	1138126	1196591	1261909	1329670	1399796	1472333
Palestinian Territory	3150056	3298951	3464550	3634495	3808591	3986813

Adopted from - PCBS, 2000 / *Mid Year- Population Projections

1.2.2 Age Structure

The age structure of the population in Palestine is not particularly different from the age structure in any other Middle East country as can be deduced from data presented in table 2 below.

Table 2. Percentage Distribution of Palestinians by Selected Age Groups

Age Group	Percentage
O-14	47.1%
15-64	49.4%
65+	3.5%

Adopted from - PCBS, 2000

The population of Palestine according to PNHP (1994) is expected to increase by approximately 45% from 1992-2002. Life expectancy at birth according to estimates provided by UNICEF, JEPPA (Abulibdh,

Smith, Nabris and Shahin, 1992) and FAFO (1993) is approximately 66 years and projected life expectancy made by PCBS (1995) indicates continuous increase during the period 1992-2012. For the Palestinian population in the West Bank, it would mean an increase from 66.8 years to 72.8 years.

1. 3 Causes of poisoning

There are many compounds and substances that can cause poisoning in children. The causative agents vary from one place to another according to the general environment surrounding the children. The old saying states, 'All chemicals are poisons, there is none which is not a poison. The correct dose differentiates a poison from a remedy' (Paracelsus). Warhurst M.W., 1998, considered that we are all exposed to lots of toxic substances through our life. Such toxins are found in our food, environmental contaminants, household products, textiles, industry and air polluting factories, traffic, and landfill sites. The most common causes of poisoning can be grouped into the following: -

1.3.1 Agricultural pesticides

According to data compiled by the American Association of Poison Control Centers (AAPCC), an estimated 79000 children were involved in household or pesticide poisoning or exposures in the year 1995. A

pesticide is defined by the U.S. Environmental Protection Agency (EPA) as any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. The Poison Control Center at the Children Hospital in Omaha (Lary D., and Clyde O., 1997), reports that the agricultural pesticides are responsible for 4.6 % of all accidental exposures reported. A recent study by (Clyde.O, 1997) about the exposure to agricultural chemicals showed that anhydrous ammonia caused 24% of the incidents of poisoning, while herbicides caused 22%, and insecticides caused 54% incidence. Another study by John T., 2002, reports an annual mortality rate from pesticides of 35.3%; of which 74% occurred in children under 10 years of age.

Pesticide can enter the body through several ways, such as oral, dermal and through inhalation (Norman N., 1993). Pesticides are becoming increasingly dangerous and constitute one of the major causes of poisoning, since they can be found in most of the houses nowadays. Such pesticides include cockroach sprays and baits; insect repellents; rat and other rodent poisons; flea and tick sprays, powders, and pet collars; kitchen, launder, and bath disinfectants and sanitizes; products that kills mold and mildew; some lawn and garden products, such as weed killers; and some swimming pool chemicals (Lary D., *et al.*, 1997). Since 1981 the law has required most residential-use pesticides to carry a signal of “danger” or “warning” and to be in child-resistant packaging (EPA).

Over 75% of the homes in the United States use at least one pesticide product indoors per year (AAPCC). Unfortunately, household surveys have shown that pesticides kept at home are within the reach of children. Bathrooms and kitchens were sited as the areas in the home most likely to have improperly stored pesticides (Wayland J., *et al*., 1991).

1.3.2 Household items

Nowadays, the causes of poisoning can be found everywhere inside the houses. Drug and Poison Information Center (DPIC), reported that poisoning at the home could be subdivided into kitchen 41%, bathroom 21%, bedroom 12%, and all other places 26% (CCHMC, 1999-2002). In 1999, May Tran reported that more than 90% of all poisoning cases of children occur at home, these poisoning incidences occur due to household items.

Iron containing tablets are the leading cause of pediatric poisoning deaths for children under 6 years of age in the United States (Audrey.T, 1996), (FDA No 97-12331). According to the AAPCC from 1986 to 1994, 38 Children between 9 months and 3 years died from accidentally swallowing iron-containing product.

Liza C., and Barry P., 1996 found that these items include soups, detergents, corrosives, medications and cosmetics; the (AAPCC, 2002) reported that in the year 2000 the most common forms of poison exposure

for children under the age of 6 are cosmetics and personal care products (13.3%), cleaning products (10%), and analgesics (7.6%).

In Australia it was reported that 20% of the household items contain a dishwasher detergent, strong alkaline dishwashing-detergent have been responsible for sever corrosive injuries in children aged one to three years (Liza C., and Barry P., 1996). Caustic ingestion is a major public health problem, accounting for an estimated 26000 ingestion of corrosive agents each year in USA.

Studies by Rosenblatt, 1999 found that toxic household cleaners pose acute dangers in addition to their chronic or cumulative effects on the body and that, 11% of all calls to poison control centers in that year involved a child and cleaning products.

A major cause of house unintentional poisoning that is virtually universally implicated is kerosene (paraffin). A study from Zimbabwe showed that kerosene was a major component of household agents responsible for poisoning (John T., 2002). Reports from India also showed kerosene ingestion is the most common cause of accidental poisoning among children. A study conducted in Saudi Arabia found that among 140 accidental child-poisoning cases, hydrocarbon ingestion accounted for the highest proportion of poisoning (40%). Out of 56 children with hydrocarbon intoxication, 54 consumed kerosene (John.T, 2002). In Jordan kerosene poisoning was also reported to be the most

commonly encountered cause of poisoning (57.4%) followed by drug poisoning (25.9%) (Rfi A. and Shatnai M., 1995).

1.3.3 Other industrial chemicals

Many industrial products that exist in different forms constitute a major cause for poisoning. The followings are some of the most important ones:-

- Petroleum product

Petroleum products include (1) Aliphatic chemicals such as, gasoline, kerosene, benzine, mineral spirits, furniture polishes, paint thinners, and other solvents, (2) Aromatic petroleum product:-toluene, benzene, and xylene. In recent years inhaling or sniffing some of these products has become popular among young people, especially drug users, because the fumes can produce a “high” feel. This can be a deadly practice as evidenced by the number of young people who have died from cardiorespiratory problems or suffered sever liver damage from sniffing correction fluids, glue, carbon tetrachloride, and other petroleum-based chemicals (Thomas P., 1998).

Sudden death related to exposure to volatile substances in USA showed that there were 110 deaths in 1960; and 114 deaths in 1974. In the United Kingdom, VSA-related sudden deaths have increased from 2 in 1971 to 122 in 1991. Prevalence of VSA elsewhere in Europe showed

similar rates to those reported from the United Kingdom in 1991. In 1990 a survey of 15-year-old conducted in Denmark, reported a 5% VSA prevalence rate (Flanagan R.J. and Ives R., 1994).

- Hydrocarbons

Hydrocarbons are organic compounds that are made primarily of carbon and hydrogen molecules. They provide power for vehicles, are found in homes, and are used in every industrial process. HCs are formed by distilling petroleum or wood and consist of aliphatic (carbon chain) or aromatic (carbon ring) molecules. HC toxicity is divided readily into clinical syndromes based on the organ system most severely affected. The lungs are affected most commonly, but instances of neurological, cardiac, gastrointestinal, renal, hematological, and skin pathology are well documented.

The toxicity of HCs is a function of the individual compound characteristics including its viscosity, volatility, surface tension, and the chemical activity of any of its side chains. Less viscous compounds spread more easily and, thus, are more toxic. Pulmonary toxicity usually results from aspiration or diffusion of ingested HC. Even small amounts of HC may cause chemical pneumonitis; because many HCs have poor water solubility, they penetrate deep into the bronchopulmonary tree causing bronchospasm followed by an inflammatory response. In the

alveoli, volatile HCs may displace oxygen and surfactant, leading to hypoxia and/or diffuse hemorrhage exudative alveoli's.

Most HCs cause direct mucosal irritation and are absorbed quickly across tissue layers. Some can cause chemical burns. Ingestion causes burning pain in the mouth and throat, abdominal pain, nausea, and vomiting. Emesis increases the risk of aspiration.

Long-term workplace exposure or abuse of HCs may result in chronic headaches, cerebellar ataxia. Certain volatile agents, such as butane, benzene, toluene, and xylene, are acute CNS depressants.

The AAPPC lists HCs as the 12th most common agent for poison exposure. In 1997, 3% of cases reported to US poison control centers involved HC exposure; of these cases, 95% were unintentional and approximately 60% were pediatric (Jeremia J., 2001).

1.4 Symptoms and signs of poisoning

Each chemical group affects the human body in a different way. Methods of exposure, amount of toxins, nature of the substances, are just a few factors that influence the symptoms and singes of poisoning (Audrey T., 1996).

The followings are the general poisoning symptoms associated with various degrees of poisoning: -

Mild poisoning

Headache, fatigue, weakness, dizziness, restlessness, perspiration, nausea, diarrhea, loss of appetite, loss of weight, thirst, moodiness, soreness, skin irritation, and eye irritation.

Moderate poisoning

Sever nausea; sever diarrhea, loss of appetite, excessive saliva, stomach cramps, excessive perspiration, trembling, muscle in coordination and muscle twitches, extreme weakness, mental confusion, blurred vision, difficulty breathing, coughs, rapid pulse, flushed or yellows skin, and weepy eyes.

Sever poisoning

Fever, intense thirst, increased rate of breathing, uncontrollable muscle twitches, pinpointed pupils, convulsion, inability to breathe, unconsciousness.

1.5 Prevention of poisoning

Most people regard their home as a safe as heaven, a calming oasis in an often-stormy world (Hingley, FDA No.97-1233; Audrey T., 1996). But home can be a common place for accidental poisoning. Donovan summarized the methods of prevention as follow: -

- Medicines and household products must be kept in a locked cabinet
- Always store medications in their original containers

- Don’t remove the medication label, read the instructions before use
- Use child–resistant packing whenever possible
- Turn the light on when you are taking or giving medications
- Don’t take any medications in front of the children; children love to imitate their parents
- Never call medicine candy, this can confuse your children, use the medicines proper name
- Teach your children not to eat or drink anything unless you or an approved person gives it to them
- Every six months clean out your medicine cabinet, and safely dispose of old medications
- Keep poisonous plants out of the reach of children
- Watch for repeat poisoning. A child who is already swallowed a poison is more likely to try it again
- Community–based prevention education program are an important component for preventing poisoning and have been shown to change parental poison-storage habits
- The public and health workers need to be more aware and constantly reminded about toxic materials and poisoning
- Poison control centers in the country are an important community resource since they can provide information and guidance to the

general public and health professionals, particularly about first aid and medical management of poisoning.

In general a multifaceted comprehensive approach with education and environmental modification effort, as well as use of simple, cost effective measures such as use of child-proofing containers, are useful in educating parents and the public about poisoning and it's prevention.

The responsibility to deal with this problem is a collective one involving the community, public health workers, policy-makers, consumer groups, and none-governmental organizations with private sector.

1.6 First aid steps in poisoning (Norman N., 1993)

It was estimated that about 75% of poisoning could be treated at home (Florida Poison Information Center). Therefore, awareness and training programs for the public about first aid management for poisoning can play an important role in the correct handling of poisoning cases and decreasing the possible damage. First aid procedures dependent mainly on the route of entry of the poison some of the first aid actions that may be performed are listed below (Thomas P., 1998).

- **Poisoning in the eye**

Flood the eye with Luke warm water 10 cm above the eye, continue for 15 minutes, and blink the eye as much as possible during the

flooding. Do not force the eyelid open and don't allow the eyes to be rubbed.

- **Poison on the skin**

Remove contaminated clothes and flood the affected area with water for 10 minutes, then wash it with soap and water and rinse. Contaminated clothes must be destroyed and if chemical skin burns occur; rinse the area with lots of water, remove the clothes and cover with soft clean clothes. The use of grease or ointments should be avoided.

- **Inhaled poison**

Transfer the patient to fresh air to minimize the risk of further exposure. If the victim is not breathing start artificial respiration and continue it until the victim is breathing or medical help arrives.

- **Swallowed poison**

Look into the victim's mouth, and remove all tablets, powder, or any material that may be present. Examine the mouth for cuts, burns, swelling, or unusual coloring or odor. If the person is awake and able to swallow, give one glass of water.

1. 7 Call poison control center

Never give any medications prior to calling the poison control center in your area. When calling, do the following:

- Identify your self

- Give your relationship to the patient
- Give your telephone number
- Describe the patient by name, age and sex
- Have the container or poison nearby, explain how the poison was taken, when and how much, if the package is available give the trade name and ingredients if they are listed
- Describe how the patient is acting, the general appearance, skin color, respiration, breathing difficulties, and mental status
- If you are unable to reach the poison control center, transport the victim to the nearest emergency service.

1.8 Management of childhood poisoning

The American Academy of Clinical Toxicology and the European Association of Poison Centers and Clinical Toxicologists have recently produced new guidelines on gut decontamination. The initial step in obtaining treatment is usually a telephone to a poison control center. In the emergency room the physician can do the physical assessment and stabilization of vital signs. The next step is to decide if there is a need for gastric decontamination to decrease absorption in the small intestine (Jeffrey T., 2000). Scientist described several ways to decrease the absorption process, these includes:

1. **Activated charcoal**

The use of adsorptive agent decreases the amount of toxicant that is present in the stomach and available for absorption. This can reduce absorption of toxin by up to 75%. Activated charcoal should be given as a single dose (50) gram for an adult, and 1g/kg body weight for a child up to 12 years) up to 1 hour after ingestion. This may be repeated every 4 hours. Activated charcoal is contraindicated in case of aspiration pneumonia, (Toxicol J. and Clin T., 1997).

2. **Gastric lavage**

It is only used up to one hour after ingestion using a large-pore tube introduced through the mouth. About 10 to 15 ml per kg normal saline are instilled through the tube and then aspirated. Lavage is continued until the stomach contents are clear. The efficacy of Gastric lavage is less than 30% when performed one hour after ingestion. Gastric lavage is absolutely contraindicated after ingestion of corrosive substances and hydrocarbon solvents (Clin T., 1997).

3. **Emetics**

Syrup of Ipecac has been used previously, however it is now rarely used as an emetic, and there is no evidence that it decrease morbidity and mortality (Alison L., 1999). Clinical studies by Jeffrey have shown that an average of 30% of a toxin is recovered when ipecac syrup is administered within one hour of ingestion.

Induction of vomiting with Ipecac is contraindicating in case of poisoning with corrosive agent, beta-blockers, hydrocarbons, digitalis, clonidine and when the patient is unconscious, uncooperative or having convulsions. The dose of Ipecac is 15cc to young children 1 to 6 years of age, and 30 cc to older children and adult, (Toxicol, Clin.T, 1997).

4. Whole bowel irrigation

In this case, either a nasogastrictube (NGT) or oral route (2 liters per hour in adults) is used to give a solution of polyethylene glycol until the rectal effluent becomes clear, this method is contraindicated in case of intestinal obstruction, perforation or where the airways cannot be protected.

1. 9 Objectives

The overall objective of this study is to decrease the morbidity and mortality of children who are poisoned. This may be achieved through:

1- Identifying and correlating the symptoms of poisoning occurring as a result of intoxication with specific agents.

2- Quantifying the rate of intoxication among children.

3- Identifying the most common causes of intoxication in Jenin district

4- Studying the poisoning cases and concluding the causative agents of poisoning in children.

5- Determining the correct steps that should be taken for the management of poisoning cases using the available resources in our district.

6- Trying to establish a correlation between the incidence of poisoning and child age.

7- Identifying methods of prevention of poisoning such as education and the safe storage of chemicals.

CHAPTER II

Materials and methods

2.1 Study population

Children up to 14 years old presented to the emergency room of Jenin Governmental Hospital and admitted to the pediatric unit during the periods of January 2000 to August 2002 were enrolled in the study. A questionnaire was administered which included age, gender, type of poison, exposure time to poison, first aid, time of seeking medical help, first aid at emergency room, place of poisoning, if the poison is in original container or not, if it is reachable, the route of poisoning, time of arrival at hospital, clinical symptoms, duration of hospitalization, and evaluation of cases. Collected data was analyzed using Statistical Package for Social Sciences (SSPS) program.

This study has been carried out to estimate the frequency of poisoning in children, to identifying and correlating the symptoms of poisoning occurring as a result of intoxication with specific agents at Jenin government hospital.

2.2 Design of the study

A retrospective study, including all patients fully admitted to hospital of the study registered and diagnosed as poisoning in children, was conducted from medical records, discharge summary of the patients admitted to Jenin Governmental Hospital during the period of January 2000 to August 2002.

2.3 Setting

The researcher targeted (Jenin Governmental Hospital) using a specially designed questionnaire. The questionnaire was prepared in Arabic language.

2.4 Ethical Consideration

A formal Letter from the dean of graduate studies- Al Najah University was sent to administrative requesting the director of governmental hospital in Jenin as applicable, to allow the researcher to conduct the study.

Explanatory Form: Every eligible manager or responsible person participating was given a full explanation about the research, including: the purpose, nature of study, importance of participation in addition to assurance of confidentiality of information and voluntary participation and was given total freedom to accept or reject participation in the research as shown in Appendix.

2.5 Instrument

For the purpose was conducted from medical records, discharge summary of the patients admitted to Jenin Governmental Hospital during a year period of January 2000 to August 2002.

CHAPTER III

Results

A total of 127 cases of poisoned children were admitted to Jenin Governmental Hospital during the study period (January 2000 to August 2002). Cases were interviewed and data was collected by the researcher.

3.1. Age and gender

The study showed that the young children were more exposed to poisoning than older ones as 74% of the poisoned cases were in the age group 1-5 years compared to 13.4% of the age group 6-10 years (table 3). In addition, incidence of poisoning among males (61.4%) was much higher than among females (38.6%).

Table 3. The frequency and percentage distribution of poisoning cases according to age and gender

Group		Frequency	Percent
Age / y	1-5	94	74.0
	6-10	17	13.4
	>10	16	12.6
Gender	Male	78	61.4
	Female	49	38.6

3. 2. Place of poisoning

The highest percentage of poisoning cases (85%) occurred at home (table 4), where poisoning cases in other places like schools, farm and others represent only 15% of the cases. Data showed also that the poison was not in its original container in 77.2%, the poison container was not closed in 97.6 of the cases. The data show that the poison was within the

reach of children in 99.2% of the cases, and without any label that shows the name and ingredients of the poison in 76.4%. This indicate that the public in the study area do not have enough awareness about the correct ways of dealing with the chemical materials, mainly for those subjects related with storage and labeling of materials at home.

Table 4. The frequency and percentage distribution for place of poisoning and other characteristics of poison status and packaging

Group		Frequency	Percent
Poisoning place	Home	108	85.0
	School	6	4.7
	Farm	8	6.3
	Other	5	3.9
Original container	Yes	29	22.8
	No	98	77.2
Was the package closed	Yes	3	2.4
	No	124	97.6
Toxin within reach	Yes	126	99.2
	No	1	0.8
Publication (Label)	Yes	30	23.6
	No	97	76.4

3.3. Poisoning materials and rout of entrance

When our data was analyzed to study the most common toxic agents, we found that chemical products including pesticides accounted for the highest proportion of poisoning 44.1% as showed in table (5), followed by petroleum products in 31.5%, drugs 15.7%, cleaning products 5.5% and cosmetics 3.1%, concerning the route of entry, the

results showed that ingestion accounted for 86.6%, inhalation 8.7%, injection 2.4%, and others 2.4% of the cases studied.

Table 5. The frequency and percentage distribution for the type of poisoning material and the rout of entry of poison

Group		Frequency	Percent
Poison type	**Chemical**	**56**	**44.1**
	Medicine	**20**	**15.7**
	Cleaning	**7**	**5.5**
	Petroleum	**40**	**31.5**
	Cosmetics	**4**	**3.1**
Poisoning rout of entry	**Mouth**	**110**	**86.6**
	Nose	**11**	**8.7**
	Eye	**1**	**0.8**
	Skin	**1**	**0.8**
	Injection	**3**	**2.4**

3.4. First aid provided at the place of poisoning

The results showed that there is a real lack of knowledge about the first aid that should be provided in poisoning cases. The highest percentage of cases 94.5% presented at hospital without any first aid at the site of poisoning (table 6). Charcoal was used as first aid only in 1.6 % of cases, vomiting has been performed in 1.6% of cases, and other treatments in 2.4% of cases.

Table 6. Frequency and percentage for each first aid method provided for poisoning cases (at the site of poisoning)

First aid provided	Frequency	Percent
Charcoal	**2**	**1.6**
Vomit	**2**	**1.6**
Milk	**1**	**0.8**
Undressing	**1**	**0.8**
Others	**1**	**0.8**
Not provided	**120**	**94.5**

3.5. Exposure time to poison and time of arrival to hospital

Data presented in table 7 showed that in 91.3% of cases were exposed to poison for less than one hour, followed by 6.3% of cases were exposed for tow hours and the rest 2.4% were exposed for 3 to 4 hours.

The results showed also that people understand the risk of poisoning; this is reflected in their quick response in their bringing the patient to hospital. Most of the cases (90.6%) were presented at hospital in few minutes to one hour, 5.5% of cases presented at hospital in few hours, 2.4% presented after few days, and longer than this only in 1.6% of cases.

Table 7. The frequency and percentage of poisoned cases distribution according to exposure time to poison and relapsed time before arrival to hospital

Group		Frequency	Percent
Exposure time to poison /hour	1.0	116	91.3
	2.0	8	6.3
	3.0	1	0.8
	4.0	2	1.6
Relapsed time before admission	Minutes	115	90.6
	Hours	7	5.5
	Days	3	2.4
	Others	2	1.6

3.6. Poisoning symptoms

The highest percentage of cases in table (8) presented at hospital with vomiting (36.2%), dyspnea (19.7%), and abdominal pain (16.5%),

asymptomatic (13.4%), fainting (7.1%), cough (4.7%), and mouth burns (2.4%).

Table 8. The frequency and percentage of poisoned cases distribution according to the symptoms

Symptoms	Frequency	Percent
Asymptomatic	17	13.4
Vomiting	46	36.2
Dyspnea	25	19.7
Cough	6	4.7
Mouth pain	3	2.4
Abdominal pain	21	16.5
Faint	9	7.1

3.7. Emergency aid

Milk is a universal antidote, this was also reflected in our results since milk administration was done in 38.6% as shown in table (9), followed by gastric lavage (36.2%), induction of vomiting (6.3%), charcoal administration (3.9%), observation only (3.9%), undressing (3.1%), antidote (2.4%), and others 5.5%.

Table 9. The frequency and percentage of poisoned cases according to emergency aid provided at the hospital

First aid type	Frequency	Percent
Charcoal	5	3.9
Gastric lavage	46	36.2
Vomiting	8	6.3
Milk	49	38.6
Water	2	1.6
Undressed	4	3.1
Antidote	3	2.4
Antibiotic	5	3.9
Inspection	5	3.9

3.8. Treatment place and cases follow up

Data presented in table 10 shows that only (2.4%) of cases remained at home, while (94.5%) of cases was treated at the hospital, and (3.1%) were admitted to the intensive care unit. Evaluation of cases (table 10) shows that most cases (68.5%) were represented with mild poisoning symptoms, cases with moderate effect were represented by (12.6%), no poisoning effects were found in (3.9%) of cases, sever effects were observed in (3.1%) of the cases, deadly effects was represented by (0.8%) of the cases and unknown evaluation in 11% of cases.

Table 10. The frequency and percentage of poisoned cases according to place treatment and according to the effect of poisoning

Group		Frequency	Percent
Place of Treatment	House	3	2.4
	Hospital	120	94.5
	Intensive care	4	3.1
Evaluation of poisoning effect	No effect	5	3.9
	Mild effect	87	68.5
	Moderate effect	16	12.6
	Sever effect	4	3.1
	Death	1	0.8
	Unknown	14	11.0

3.9. Days of hospitalization

Most of the poisoned cases (76.4%) were hospitalized for one day, (11%) of cases were hospitalized for 2 days, (3.9%) of cases were

hospitalized for 3 days, (3.9%) were hospitalized for 4 days, (2.4%) were hospitalized for 5 days and (2.4%) of cases were hospitalized for from 6 to 23 days (Table 11).

Table 11. The frequency and percentage of poisoned cases according to duration of hospitalization

Hospitalization / d	Frequency	Percent
1	97	76.4
2	14	11.0
3	5	3.9
4	5	3.9
5	3	2.4
6	1	0.8
9	1	0.8
23	1	0.8

CHAPTER IV

Discussion and Concluding Remarks

Ingestion of poisonous substances is a major challenge in public health and an important health problem throughout the world, particularly among children due to their curiosity and their dependence on the adults in their life. Childhood poisoning is preventable through a good management of toxic substances and their storage, and appropriate education, which can decrease the size of the problem, and minimize the complication.

4.1 Age and gender of poisoned cases

The present study showed that the highest incidence of accidental poisoning was observed among children less than five years old (74%), and males constitute 61.4% of the poisoned cases (Table 3). This pattern is consistent with other reports from USA (Tish D., 1999; AAPCC, 2002 UK and Thomas P., 1998).

The occurrence of highest percentage of poisoning in this age group may indicate that the adults (parents mainly) do not provide the necessary attention to their children. This age group is highly dependent on adults and appears to be in a high risk therefore more attention from parents or care givers is needs.

4.2 Place of poisoning and site characteristics

The highest rate of poisoning occurred at home (85%) (Table 4), this is consistent with reports from USA were 90% of poisoning occur at home (CDC, 2002).

Our findings show that poison was not in its original container in 77.2% of the cases, which complicates the process of poison recognition and treatment. Poison containers were not closed in 97.6% of cases, and were within the reach of children in 99.2%, and without any label in 76.4% of cases. All of the above seems to indicate that there is an insufficiency of educational information on safety and an apparent lack of caution in the handling of poisoning materials. These results support the earlier findings in table 3, which show that 74% of poisoned cases are in children less than 5 years age, and reveal the real need for awareness programs that should be directed towards parents about the various aspects of poisoning causes. Therefore, more attention should be directed towards dealing with the poisoning materials at home, these materials should be placed and stored in sites out of reach of children, we must pay more attention about packaging that it must be child resistant whenever possible. The labels must show the name of the poison, the ingredients, the mode of use, also show first aid and the antidote in case of poisoning. All the above must be done, in addition to continuous watching of young children.

Health education programs and health worker personnel must pay more attention to educate the public how to prevent poisoning and to change parental poison-storage habits. Furthermore, social studies may be needed to determine the family conditions that lead to such poisoning for young children.

4.3- Type and route of poisoning

Chemical products including pesticides as shown in table (5) accounted for the highest proportion of poisoning in our study (44.1%). Jenin district is an agricultural society and the use of pesticide is very common for plant protection and increasing the produce and to protect the stored cereals from insect and rodents. Therefore, more care should be directed towards the type of pesticides, the correct use, storage, and handling of those pesticides. Because the use of more potent insecticides in larger dosages poses health hazards to those using them and for environment, more attention should be drown to this issue mainly by concerned governmental bodies. In addition, more concern should be directed toward the imported pesticides and also the use of band ones.

Our findings in this respect are consistent with reports from Malaysia (Razak D., 1991) were poisoning with pesticides remain the highest among all poisoning cases there; annually about 300 die due to

pesticides. Malaysia is a largely agricultural country and the use of pesticides has raised serious concerns.

Petroleum materials are the second cause of poisoning; our findings in this respect showed that 31.5% of poisoned cases were caused by petroleum materials. Our earlier observation showed that kerosene is the main petroleum material in which the child usually drinks by mistake, since children may not distinguish between kerosene and water. Therefore, petroleum containers should be closed tightly and placed in safe places, and petroleum derivatives should not be stored in drinking bottles.

Oral poisoning accounted for the highest proportion (86.6%) of poisoned cases, this may be due to the curiosity of children in the age of 1-5 years were they will put any thing in their mouth to know what it is, and due to carelessness of the parents and lack of education in using and handling the poison that appear in the current study.

4.4-First aid provided at place of poisoning

Our findings indicate that 94.5% of the poisoning cases did not receive any first aid at the place of exposure (table 6), thus indicating a major problem in dealing with intoxication such as insufficiency and lack of knowledge about first aid procedures. Healthcare workers must pay more attention to health educational programs of the public.

4.5 Duration of exposure to poison and relapsed time before hospital arrival

The findings of the current study shows that 90.6% of cases were brought to the hospital in few minutes to one hour after intoxication (table 7). Exposure time to poison in 91.3% of cases was few minutes to one hour. These results indicate that the public has high responsibility towards transporting poisoning cases to medical facilities when intoxication occurs, and good accessibility to hospitals. This rapidness in action resulted in mild to moderate side effects of poisoning for the majority of poisoning cases, and decreased mortality rates.

4.6 Poisoning symptoms

The results of this study indicate that vomiting was the most predominant symptom of poisoning cases (36.2%) of cases, followed by dyspnea (19.7%) and abdominal pain (16.5%) (Table8). Healthworkers must give more attention to these symptoms in the educational programs as an important indicator in discovering the poisoned cases. Also the severities of these symptoms indicate the severity of the case and the bad of prognoses.

4. 7 Emergency aid at hospital

Data presented in table 9 shows that 38.6% of cases were given milk as first aid followed by gastric lavage 36.2% of case. Milk and gastric lavage is only given when the mouth is the poisoning route. So, this result supports the previous result about the route of poisoning and the fact that milk is a universal antidote.

4.8 Evaluation and place of treatment

The findings of this study (table 10) shows that 94.5% of cases required hospitalization, 68.5% of cases were represented with mild effect and 12.6% of poisoned cases had moderate effects, this result go side by side with exposure time, bringing time to hospitals and the effectiveness of first aid and treatment in Jenin hospital.

4. 9 Required hospitalization time

Table (11) shows that 76.4% of cases required hospitalization for one-day, thus indicating that no serious complication had occurred, effectiveness of emergency aid, treatment at hospital, and the responsibility of public toward the poisoned cases.

4.10 Recommendations and Concluding Remarks

The results indicate that the public in the study area have no enough awareness about the correct dealing with the chemical materials, mainly for those usually used at home, that includes subjects such as storage, labeling of chemicals, and about first aid needed in case of poisoning. Carelessness and lack of knowledge of parents might be the main factors that led to most of the poisoning cases, house was not calming oases in Palestine. To improve public awareness in this respect, the followings seem to be essential to recommend:

1. Childproofing home and educational programs from the Ministry of Health and other Non-Governmental-Organizations could be the most effective prevention methods to decrease morbidity and mortality from accidental poisoning in children.
2. Establishment of poison control center may have an essential role in controlling the poisoning problem.
3. Law and legislation to prevent importing and using dangerous pesticides.
4. Encouragement of the use biological control instead of using pesticides.
5. Since this study was descriptive in nature, it serves as base line data for further studies related to poising in

children, thus it is essential at this stage to recommend further research is the various aspects of this area using other variables and covering a larger sector of the population of the West Bank area.

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ملخص

التسمم هو أي تأثير غير مرغوب به على جسم الإنسان ويمكن أن يحدث بسبب تعرض الجسم الى مواد طبيعية أو مصنعة. إن ظاهرة التسمم مرتبطة بشكل كبير بمدى الوعي لدي المجتمع وبالطريقة الصحيحة للتعامل مع المواد السامة سواء كانت في البيت أو في أي مكان آخر.

لقد تم اجراء هذا البحث لتسليط الضوء على مشكلة التسمم وخاصة عند الأطفـال، ويهـدف البحث بشكل عام الى تقليل حالات التسمم وتقليل معدل الوفيات بسبب التسمم عنـد الأطفـال وذلك من خلال فهم أفضل لمسببات التسمم، وتشخيص أعراض التسمم، وإدارة حالات التسمم.

لقد أجري البحث من خلال دراسة حالات التسمم التي أدخلت الى مستشفى جنـين الحكـومي خلال الفترة ما بين شهر كانون ثاني عام 2000 و شهر آب عام 2002. لقد بلغ عدد حالات التسمم التي ادخلت الى مستشفى جنين خلال فترة الدراسة من الأطفال دون سن الرابعة عشرة 127 حالة. وقد أظهرت نتائج الدراسة أن معظم حالات التسمم كانت خفيفة لمتوسـطة، وأن 74% من حالات التسمم هي للأطفال دون سن الخامسة، ومعظمهم من الـذكور. إن معظـم حالات التسمم (85%) حدثت في البيت، ودخلت الجسم عن طريق الفم وسببت أعراض تسمم في الجهاز الهضمي. لقد كانت المواد الكيماوية وخاصة مبيدات الآفات والمـواد البترولية وخاصة الكيروسين (الكاز) هي المسببات الرئيسة لحالات التسمم.

تشير نتائج الدراسة كذلك الى أن المجتمع في منطقة الدراسة ليس لدية الوعي الكافي حـول التعامل الصحيح مع المواد الكيماوية بشكل عام، والموجودة داخل البيوت بشكل خاص، وذلك من حيث التخزين، ووضع الإشارات اللازمة التي تبين طبيعة المـادة، وكـذلك الأسـعافات الأولية الضرورية في حالات التسمم.

عدم الإكتراث وقلة المعرفة لدي الوالدين قد تكون من أهم العوامل التي تـؤدي الـى تسـمم الأطفال. ولذلك فإن البرامج التعليمية والإرشادية من قبل وزارة الصـحة والمنظمـات غيـر الحكومية قد تكون من أهم العناصر الضرورية للتقليل من حالات التسمم عند الأطفال. إضافة الى ذلك فإن انشاء مركز متخصص لمنع حالات التسمم سيكون له دور رئيسي في حل مشكلة التسمم لدي الأطفال.

بسم الله الرحمن الرحيم

الاسم .....

العمر.....

الجنس.....

عدد الأطفال في البيت .....

الام:-

العمر الحالي.....

العمر وقت الزواج.....

صلة القرابة مع الطفل المريض إذا لم تكن أمه.....

الدرجة العلمية .....

_هل سبق وتعرض لحالة تسمم في السابق الطفل المعني أو أحد إخوانه :نعم/لا

_هل الطفل يعاني من مشكلة مرضية (مرض نفسي أو ضعف إبصار) : نعم/لا

_هل يذهب الطفل إلى المدرسة :نعم/لا

_هل يشكو من مشاكل في السلوك في المدرسة :نعم/لا

الأب :-

العمر :.....

الدرجة العلمية :.....

العمل :.....

المادة السامة :-

مكان وجودها : (في البيت /في الخارج)

هل كانت في عبوتها الأصلية : (نعم / لا)

هل كانت محكمة الإغلاق : (نعم /لا)

هل كانت في مكان سهل الوصول لها : (نعم / لا)

هل كان عليها نشرة تبين اسم المادة وطريقة الإسعاف : (نعم/ لا)

المستشفى :-

نوع المادة السامة :.....

طريقة التسمم : (عبر الجهاز الهضمي / عبر الجهاز التنفسي / عبر الجلد)

غيرها حدد:.....

وقت تناولها :.....

هل أجري له إسعاف أولى في مكان الحادث(نعم/لا)

ما هو؟.....

بعد كم من الوقت تم إحضار المريض إلى المستشفى :.....

أعراض التسمم التي ظهرت :.....

:.....

:.....

الإسعاف الأولي:-

:.....

:.....

:.....