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Pattern And Severity of Acute Poisoning Among Adolescents: A Six Months Prospective Study in Poison Control Center- Ain Shams University Hospitals

Hanan Hamed Mostafa, Nabil Nassif Rezk, Aya Shawky Khater and Sarah Atef Abdelaziz[1]

[1] Forensic Medicine and Clinical Toxicology Department, Faculty of Medicine, Ain Shams University, Cairo, Egypt.

Abstract

Adolescence is a cross road in life, the positive force in the society and is the gateway to the promotion of health. Most behavioral patterns acquired during adolescence will last a lifetime affecting the health and wellbeing of future adults.

Acute poisoning is one of the most common health related problems in adolescents due to its high frequency, morbidity and mortality worldwide. Moreover, alcohol and illicit drug abuse with their possible acute intoxication are considered among the most important global public health problem with their genesis and initiation during adolescence.

The aim of the study: is to study the pattern and severity of poisoning among adolescent patients admitted to the Poison Control Center, Ain Shams University Hospitals (PCC-ASUH) over a six months period from the first of July 2013 to the end of December 2013, aiming to give sufficient information to provide adequate supply of treatment required for the most common intoxications.

Subjects and methods: All poisoned adolescents during the study period were enrolled and evaluated with more focus on those admitted to inpatient wards and intensive care unit (ICU) as more data can be obtained owing to longer hospital stay. The evaluation of severity of intoxication of the patients under the study was assessed according to the Poisoning Severity Score (PSS) of European Association of Poisons Centers and Clinical Toxicologists.

Results:

Out of the 1931 acutely intoxicated adolescents received by (PCC- ASUH), 408 adolescents were admitted. Tramadol was the most commonly abused agent among adolescents (50.9%). Accidental poisoning was more common in early adolescence while self-poisoning was more prevalent among middle and late adolescents. Substance abuse represented 6.55% in late adolescence while only 2.54% in early adolescence stage. By applying PSS, it was found that 65.2% were classified as grade 0, 23.6% as grade 1, 7% as grade 2, 3.8% as grade 3 and 0.4% as grade 4.

Conclusion: Self-poisoning represented a real tragedy among adolescents with self-poisoning being the most common manner of poisoning and the most common age group affected was the late adolescence period while accidental poisoning was common in early adolescence stage. Higher PSS was associated with lower age as well as increased hospital stay duration.

Introduction

Adolescence is the transitional complex period in human growth and development occurring between childhood and adulthood from ages 10-19 years (Sodhi et al., 2012; WHO, 2013). It is characterized by major biological, psychological and social changes as well as various challenges and opportunities (Buitelaar, 2012).

Acute poisoning is a leading cause of death among adolescents including unintentional poisoning, suicide and homicide (Cheng et al., 2006).There are many factors responsible for poisoning among adolescents such as increased risk-taking behavior, low levels of harm avoidance, anxiety, tendency to act impulsively and ignoring the negative consequences of

their behavior which may lead adolescents to initiate alcohol and illicit drug use with possible acute unintentional overdose (Dawas et al., 2008; Ringenberg, 2013).

Moreover, suicide and self -poisoning are major public health problems among adolescents, with rates of self-harm and suicide being high in the adolescence period and it is the second most common cause of death in adolescents worldwide (Hawton et al., 2012)

From the above mentioned factors and due to lack of records in Egypt, we can conclude that there is an increasing need for studying the pattern and outcome of acute poisoning among adolescents to highlight the magnitude of the problem and its reflection on the society.

Aim of the study

This work aims to study the pattern and severity of poisoning among adolescent patients admitted to the Poison Control Center, Ain Shams University Hospitals (PCC- ASUH) over a six months period from the first of July 2013 to the end of December 2013, aiming at managerial benefits to provide adequate supply of treatment required for the most common intoxications.

Subjects and Methods

A cross-sectional hospital based observational descriptive study was performed on acutely intoxicated patients of both sexes, aged 10-19 years admitted to PCC- ASUH for a duration of six months from the 1st of July 2013 till 31st of December 2013 with more focus on those admitted to inpatient wards and intensive care unit (ICU) owing to their longer hospital stay.

Sociodemographic data included age, sex and residence, clinical data and outcome were recorded. The evaluation of severity of the medical condition of patients in the study was assessed according to the Poisoning Severity Score (PSS) of European Association of Poisons Centers and Clinical Toxicologists (Persson et al., 1998; Junk et al., 2005).

The occurrence of a particular symptom was checked against the chart and the severity grading assigned to a case was determined by the most severe symptom(s) or sign(s) observed. According to this score the patients were classified into:

None (0): No symptoms or signs related to poisoning.

Minor (1): Mild, transient and spontaneously resolving symptoms.

Moderate (2): Pronounced or prolonged symptoms.

Severe (3): Severe or life-threatening symptoms.

Fatal (4): Death

Finally, the PSS was correlated with age, manner of poisoning, type of toxic agent, hospital stay duration in the PCC- ASUH, vital data on admission, and causes of ICU admission in trial to highlight various risk factors affecting the severity of poisoning in this specific age group.

Ethical considerations

Approvals of director of (PCC- ASUH) and regional Ethical Committee as well as informed consent were obtained from either the legal guardians of the patients or the patients themselves.

Statistical Analysis

The obtained results were statistically analyzed using SPSS (Statistical package for Social Science) version 19 software.

Results

A prospective descriptive study was conducted on acutely intoxicated adolescents aged 10-19 years admitted to (PCC- ASUH), over a period of six months starting from the first of July 2013 till the end of December 2013.

The total number of acutely intoxicated adolescents admitted to the PCC- ASUH was 1931 representing 20.4% of the total number of cases received (9459). Out of the 1931 acutely intoxicated adolescents received, 408 adolescents were admitted to PCC- ASUH wards either inpatient wards or ICU.

Middle adolescence (14-15 years) and late adolescence (16-19 years) constituted about 85.7% of whole adolescent population in this study with mean age (16.166 ± 2.353 years).

The percentage of females was higher than males. The majority of patients were from Cairo governorate (Table 1). Self-poisoning was the most common manner of poisoning. The main route of poisoning was ingestion as shown in Table 2.

The most prevalent toxins involved in acute poisoning among adolescents were insecticides (13.98%) and pharmaceuticals including central nervous system (CNS) drugs (9.63%) as shown in Table 3. Accidental poisoning in adolescents was mainly due to food poisoning (56.5%) while the majority of adolescents committed suicide by using insecticides (18.7%). Tramadol was the most commonly abused agent among adolescents (50.9%) as in (Table 4).

Accidental poisoning was more common in early adolescence (50.36 %) while self-poisoning was more prevalent among middle and late adolescence representing (76.68 % & 78.58 %) respectively. As regards poisoning due to substance abuse, it represented 6.55% in late adolescence while only 2.54% in early adolescence (Table 5).

Table 6 shows that most of the patients (78.87%) were treated in ED and discharged after an observation period not exceeding 6 hours while 16.57% were admitted to inpatient and only 4.56% were admitted to ICU.

Regarding the outcome, most of patients were discharged with complete recovery (92.2%), 7.1% against medical advice (AMA), 0.4% died and 0.3 % were transferred to another department either due to

presence of comorbidities or development of complications (Table 6).

Table 7 shows significant difference in the outcome of patients regarding hospital stay duration and delay time.

In this study, PSS was applied to assess the severity of poisoning and it was found that 65.2% were classified as grade 0, 23.6% as grade 1, 7% as grade 2, 3.8% as grade 3 and 0.4% as grade 4 (Table 8).

On correlating PSS with different factors, it was found that higher PSS was associated with increased hospital stay duration. There was significant positive correlation between pulse, temperature and respiratory rate with the PSS; higher PSS was associated with tachycardia, hyperthermia and tachypnea. As regards, systolic blood pressure (SBP) and diastolic blood pressure (DBP), the results showed that there was a negative (indirect) correlation between blood pressure and PSS; higher PSS was associated with lower SBP and DBP. Also there was negative correlation between age of adolescent poisoned patients and PSS, higher PSS was associated with lower age. There was statistically significant difference between the different manners of poisoning; PSS was significantly higher among criminal cases. As regards the types of toxic agents used, the highest mean PSS was among patients of insecticide poisoning while patients with overdose of antibiotics had the lowest mean PSS (Tables 9, 10 and 11).

Although neurological causes (coma and/or convulsions) were the most common indication for ICU admission, yet patients with respiratory failure had the highest PSS as in (Table 12).

Organophosphorus compounds (OPC) were responsible for death in more than half of dead cases as in (Table 13).

Table (1): Sociodemographic data (age, sex and residence) of acutely intoxicated adolescents admitted to (PCC- ASUH) during the period from 1st July 2013 to 31st December 2013.

Age groups (years)	Number	Percentage (%)
Early adolescence (10-13)	276	14.3%
Middle adolescence(14-15)	343	17.8%
Late adolescence (16-19)	1312	67.9%
Total	1931	100%
Mean ±SD	16.166±2.353 years	
Range	(10-19) years	
Sex	**Number**	**(%)**
Male	528	27.3%
Female	1403	72.7%
Total	1931	100%
Residence	**Number**	**(%)**
Cairo	1383	71.62%
Kalioubeya	321	16.62%
Giza	175	9.06%
Other Delta Governorates	16	0.83%
Upper Egypt Governorates	31	1.61%
Suez Canal Governorates	5	0.26%
Total	1931	100%

Table (2): Manner and route of intoxication in all acutely intoxicated adolescents admitted to (PCC- ASUH) during the period from 1st July 2013 to 31st December 2013

Manner	Number	Percentage (%)
Suicidal	1424	73.74%
Accidental	398	20.61%
Overdose	106	5.49%
Criminal	2	0.10%
Therapeutic error	1	0.05%
Total	1931	100%
Route	**Number**	**Percentage (%)**
Oral	1798	93.11%
Inhalation	88	4.56 %
Sting/bite	42	2.18 %
Injection	3	0.16%
Total	1931	100%

Table (3): Types of toxic agents encountered in all acutely intoxicated adolescents admitted to (PCC- ASUH) during the period from 1st July 2013 to 31st December 2013 in relation to whole cases and to the toxin group.

Toxic agent	Number	Percentage in relation to whole cases (%)	Percentage in relation to toxin group(%)
Insecticides group	270	13.98%	
Organophosphorus	56	2.9%	20.7%
Carbamate	133	6.89%	49.3%
Undefined	81	4.19%	30%
Unknown	239	12.38%	
Food poisoning	225	11.65%	
Central nervous system drugs	186	9.63%	
Antidepressants	38	1.97%	20.4%
Antiepileptic	45	2.33%	24.2%
Sedative hypnotics	13	0.67%	7%
Antipsychotics	35	1.81%	18.8%
Unknown CNS drug	55	2.85%	29.6%
Cardiopulmonary medications	182	9.43%	
Beta blockers	31	1.61%	17.03%
Calcium channel blockers	4	0.21%	2.2%
Digoxin	7	0.36%	3.85%
Other antihypertensive drugs	19	0.98%	10.44%
Theophylline	121	6.27%	66.48%
Analgesics and anti-inflammatory drugs	180	9.32%	
Paracetamol	40	2.07%	22.2%
Salicylates	7	0.36%	3.9%
Nonsteriodal anti-inflammatory drugs	133	6.89%	73.9%
Antimicrobial drugs	134	6.94%	
Tramadol	89	4.61%	
Chemicals	81	4.19%	
Corrosives	69	3.57%	85.2%
Hydrocarbons	12	0.62%	14.8%
Endocrine drugs	70	3.63%	
Oral hypoglycemics	60	3.11%	85.7%
Others (hormones, antithyroid...etc.)	10	0.52	14.3%
Rodenticides(zinc phosphide &anticoagulants)	65	3.37%	
Gas poisoning	64	3.31%	
Carbon monoxide	60	3.11%	93.75%
Others (Hydrogen sulphide, tear gases…etc.)	4	0.2%	6.25%
Animal poisoning	41	2.12%	
Scorpion	21	1.09%	51.2%
Snake	20	1.03	48.8%
Others (antihistaminic, cold remedies,…etc)	37	1.92%	
Alcohol	25	1.29%	
Cannabis	24	1.24%	
Vitamins and minerals	16	0.83%	
Opiates	3	0.16%	

Table (4): Distribution of all acutely intoxicated adolescents admitted to (PCC- ASUH) during the period from 1st July 2013 to 31st December 2013 classified according to toxic agent in relation to manner of poisoning.

Manner of poisoning	Type of toxic agent	Number	Percentage (%)
Accidental (Number=398)	Food Poisoning	225	56.5%
	Gas poisoning	64	16.1%
	Chemicals	59	14.8%
	Animal poisoning	41	10.3%
	Insecticides	4	1.0%
	Central nervous system drugs	3	0.8%
	Unknown	2	0.5%
Suicidal (Number =1424)	Insecticides	266	18.7%
	Unknown	237	16.6%
	Cardiopulmonary medications	181	12.7%
	Central nervous system drugs	181	12.7%
	Analgesics & anti-inflammatory	180	12.6%
	Antimicrobials	134	9.4%
	Endocrine drugs	70	4.9%
	Rodenticides	65	4.6%
	Others	37	2.6%
	Tramadol	35	2.5%
	Chemicals	22	1.5%
	Vitamins and minerals	16	1.1%
Therapeutic error (Number =1)	Cardiopulmonary drugs	1	100%
Substance Abuse (Number =106)	Tramadol	54	50.9%
	Alcohol	25	23.6%
	Cannabis	24	22.6%
	Opiates	3	2.8%
Criminal (Number =2)	Central nervous system drugs	2	100%

Table (5): Chi-Square statistical analysis of manner of poisoning in all acutely intoxicated adolescents admitted to (PCC- ASUH) during the period from 1st July 2013 to 31st December 2013 in relation to age.

Manner	Age group								P-value
	Early adolescence		Middle adolescence		Late adolescence		Total		
	N	%	N	%	N	%	N	%	
Suicidal	130	47.1	263	76.68	1031	78.58	1424	73.74	0.000*
Accidental	139	50.36	66	19.24	193	14.71	398	20.61	
Substance Abuse	7	2.54	13	3.79	86	6.55	106	5.49	
Therapeutic	0	0	0	0.00	1	0.08	1	0.05	
Criminal	0	0	1	0.29	1	0.08	2	0.10	
Total	276	100	343	100	1312	100	1931	100	

P value < 0.05 is considered statistically significant, N: Number, %: Percentage, x^2:173.349

Table (6): Fate and outcome of acutely intoxicated adolescents presented to (PCC- ASUH) during the period from 1st July 2013 to 31st December 2013.

Fate	Number	Percentage (%)
Discharge after observation in ER for period not exceeding 6 hours	1523	78.87%
Inpatient wards	320	16.57%
ICU	88	4.56%
Total	1931	100%
Outcome	**Number**	**Percentage (%)**
Complete recovery	1781	92.2%
Transfer to other departments	5	0.3%
Discharged against medical advice(AMA)	137	7.1%
Death	8	0.4%
Total	1931	100%

ER: Emergency room, ICU: Intensive Care Unit.

Table (7): ANOVA one way statistical analysis of outcome of acutely intoxicated adolescents admitted to (PCC-ASUH) during the period from 1st July 2013 to 31st December 2013 in relation to delay time and duration of hospital stay.

	Complete recovery			Discharge AMA			Death			Transfer to another department			ANOVA	
	Mean	±	SD	Mean	±	SD	Mean	±	SD	Mean	±	SD	Fc	P-value
Delay time (hours)	5.889	±	6.835	5.836	±	6.354	12.143	±	16.077	25.000	±	15.556	6.689	<0.001*
Duration of hospital stay (days)	1.334	±	1.077	1.299	±	0.779	4.857	±	2.193	5.500	±	3.536	34.549	<0.001*

AMA: Against Medical Advice.

Table (8): Distribution of the acutely intoxicated adolescents admitted to (PCC- ASUH) during the period from 1st July 2013 to 31st December 2013 according to PSS.

Grade		Number	Percentage (%)
PSS	0	1259	65.2%
	1	456	23.6%
	2	135	7.0%
	3	73	3.8%
	4	8	0.4%

Table (9): Correlation between hospital stay duration, vital data and age f patients with PSS in all acutely intoxicated adolescents admitted to (PCC- ASUH) during the study period from 1st July 2013 to 31st December 2013.

Correlations		
Hospital stay duration (Days)	**PSS**	
	r	**P-value**
	0.221	<0.001*
Pulse	0.448	<0.001*
Systolic blood pressure (SBP)	-0.171	<0.001*
Diastolic blood pressure (DBP)	-0.236	<0.001*
Temperature	0.168	<0.001*
Respiratory rate	0.386	<0.001*
Age	-0.090	<0.001*

P value less than 0.05 is considered statistically significant

Table (10): ANOVA one-way statistical analysis showing comparison between groups classified according to manner of poisoning as regards the PSS in the adolescent poisoned patients in all acutely intoxicated adolescents admitted to (PCC- ASUH) during the study period.

Groups			PSS			ANOVA	
		N	Mean	±	SD	Fc	P-value
Manner	Suicidal	1424	0.434	±	0.858	15.667	<0.001*
	Accidental	398	0.782	±	0.527		
	Substance Abuse	106	0.415	±	0.904		
	Therapeutic	1	1.000	±	.		
	Criminal	2	1.500	±	0.707		

P value less than 0.05 is considered statistically significant SD: Standard deviation, Fc = variance ratio calculated by ANOVA one-way statistical analysis

Table (11): ANOVA one-way statistical analysis for comparing different toxic agents as regards the PSS in all acutely intoxicated adolescents admitted to (PCC- ASUH) during the period from 1st July 2013 to 31st December 2013.

Toxic agent		PSS			ANOVA	
	N	Mean	±	SD	Fc	P-value
Cardiopulmonary	182	0.945	±	0.944	40.944	<0.001*
Central nervous system drugs	186	0.672	±	1.042		
Analgesics	180	0.039	±	0.221		
Endocrinal system drugs	70	0.214	±	0.508		
Antimicrobials	134	0.000	±	0.000		
Vitamins and minerals	16	0.125	±	0.500		
Chemicals	81	0.037	±	0.333		
Insecticides	270	1.000	±	0.000		
Rodenticides	65	0.308	±	0.683		
Food poisoning	225	0.981	±	1.112		
Animal poisoning	41	0.268	±	0.708		
Gas poisoning	64	0.938	±	0.500		
Tramadol	89	0.618	±	1.153		
Opiate	3	0.000	±	0.000		
Cannabis	24	0.042	±	0.204		
Alcohol	25	0.280	±	0.458		
Others	37	0.135	±	0.536		
Unknown	239	0.017	±	0.204		

P value less than 0.05 is considered statistically significant SD: Standard deviation, Fc = variance ratio calculated by ANOVA one-way statistical analysis

Table (12): ANOVA statistical analysis for comparing different causes of ICU admission in acutely intoxicated adolescents admitted to ICU according to PSS during the study period.

Causes of ICU admission		PSS			Test	
	N	Mean	±	SD	Fc	P-value
Administration of antidote	4	2.000	±	1.155	10.851	<0.001*
Cardiac monitoring	24	1.125	±	0.900		
Respiratory failure	12	3.333	±	0.651		
Coma (and/or) convulsions	31	2.484	±	0.811		
Mechanical ventilation	7	2.857	±	0.900		
Hematemesis	2	3.000	±	0.000		
Weakness	7	2.429	±	0.535		
Shock	1	3.000	±	0.000		

P value less than 0.05 is considered statistically significant SD: Standard deviation, Fc = variance ratio calculated by ANOVA one-way statistical analysis

Table (13): Types of toxic agent causing death in the 8 deaths in the study.

Types of toxic agents	Number	Percentage (%)
Organophosphates	5	62.5%
Zinc phosphide	1	12.5%
Tramadol	1	12.5%
Carbon monoxide	1	12.5%
Total	8	100%

Discussion

Poisoning in adolescents has been extensively studied in USA and other developed countries. However, there are few reports of poisoning from developing countries despite of being much more prominent among them; because of poor hygiene, limited access to health care resources and inadequate knowledge of poisons (Kivisto et al., 2008; Haghighat et al., 2013).

During the study period, the total number of poisoned cases received by PCC- ASUH was 9459; out of which 1931 cases were adolescents. This finding was approximately similar to the studies by Sarjami et al. (2008) on adults and adolescents poisoning in Iran and Malangu and Ogunbanjo (2009) in South Africa. However, the percentage of poisoning in adolescents was slightly higher in the study of Limjindaporn (2010) in Thailand reaching 24.5%. These findings were explained by Sharma et al. (2010) that the cause behind the high percentage of poisoning in this age group was due to self-poisoning as a result of failure in love affairs, failure in exams, difficulties of adjustment with their parents or their peers.

In Egypt, according to Annual Report of PCC-ASUH in 2011, the highest prevalence of poisoning was among adolescents and young adults owing to the tremendous emotional and economic challenges facing these particular age groups in Egypt (El Masry and Tawfik, 2013).

Middle adolescence (14-15 years) and late adolescence (16-19 years) were the most common affected age groups in the current study with mean age 16.166±2.353 years. This finding was approximately similar to that reported by study of Palimar et al., (2012) on adolescents in South India. Lam (2003) in his study on adolescents and children in Australia found that early adolescence accounted for 14.6% of cases while late adolescence stage was about 55.7 %. The mean age was (16.7 ±1.3) years in a study made by Sarjami et al. (2008) on adolescents and adults in Iran who also stated that reasons behind this may be that during these two stages most young person feels increased pressure from parents, friends and themselves concerning marks, jobs, sex and future plans.

Females were predominant than males in the current study. Similar results were found by Yip et al., (2011) in their study which was performed on children and adolescents in Hong Kong. Female predominance over male was also observed in other studies as those performed by Budhathoki et al. (2009), Randev et al. (2011), Sahin et al. (2011) and Haghighat et al. (2013) but with lower percentages. The American Association of Poison Control Centers (AAPCC) estimated that girls represented 56% of the reported exposures among adolescents in 2009 and 53.55% in 2011 (Fine, 2006).

This could be attributed to relatively high incidence of attempting suicide among females by self-poisoning (Camidge et al., 2003). Females are often exposed to social stress and strain of day to day life. Adolescent girls are more prone to emotional and situational crisis leading to attention seeking and displays of self-harm (Yip et al., 2011).

Moreover, females are more likely than males to have suicidal thoughts and poisoning is the easiest method of suicide for them, while males tend to use more injurious methods of self-killing than self-poisoning (Crosby et al., 2011).

In the present study, the majority of patients came from Cairo and the rest of patients were from other governorates. This could be attributed to their proximity to the PCC and not to higher magnitude of poisoning problem (El Masry and Tawfik, 2013).

Self-poisoning in the current study represented the most common manner of poisoning followed by accidental poisoning, then overdose of drugs of abuse while therapeutic error was detected in one case only. This was in agreement with the results of a study made by Hassanian-Moghaddam et al. (2008) on adults and adolescents in Iran. In another study performed also in Iran by Sahin et al. (2011), self poisoning was observed in 69.31% of adolescents, accidental poisoning in 29.7% and therapeutic error in 0.99% of cases. While Cheng et al. (2006) in their study on adolescents in 6 hospitals in South America found that 6% were unintentional, 36% self-poisoning, 41% alcohol intoxication, and 15% maladaptive effects of drugs. Sarjami et al. (2008) revealed that most poisoned cases were deliberate self-poisoning (84.6%), accidental and drug overdose (11.2%) and criminal poisoning (4.1%) respectively. The same results were obtained by Bhat et al., (2011) and Limjindaporn, (2010) who found that 61% were suicidal, 37.1% accidental and 1.9% other manners.

Self-poisoning is one of the most common manners of committing suicide as compared to hanging or other methods (Kiran et al., 2008). Despite the strong religious morals in Islam that ban self-destruction and deliberate self-killing, adolescents and young adults seem

not immune to attempt suicide (El Masry and Tawfik, 2013).

Adolescents are faced with many challenges: establishing an identity, learning to function independently, growing intellectually and physically. All of these are difficult tasks even in supportive and stable environments and in which many adolescents cannot cope with life and eventually attempt suicide and self-poisoning (Hawton et al., 2012).

The main route of poisoning in the present study was ingestion followed by inhalation, dermal route (through skin or scalp) and finally by injection. Azemi et al., (2012) reported that (83.31%) of the cases in their study were poisoned through ingestion, then through sting or bite (13.63%), inhalation was in (3.04%) of the cases. In a study made by Sarjami et al. (2008), ingestion represented 96.3 % of the exposures while in the study of Sahin et al. (2011), ingestion accounted for 86.5% and 13.35% was through inhalation.

In general, regardless of the age group, the oral route was the most common route of poisoning (Cheng et al., 2006 and Cengiz et al., 2006) which may be attributed to the convenience and easy availability of orally consumable poisons (Tarvadi et al., 2013).

The present study showed that a variety of toxins were involved as insecticides, rodenticides, chemicals, cardiopulmonary and CNS drugs.

Rapid industrialization and exposure to hazardous chemical products, introduction of newer range of drugs for treatment, massive use of pesticides in agriculture, increase in alcohol consumption and unhealthy dietary habits had widened the spectrum of toxic products to which people of different ages are exposed and consequently the risk of poisoning is increased (Kiran et al., 2008)

Insecticides were the most prevalent toxins involved in acute poisoning among adolescents followed by pharmaceuticals with CNS drugs and cardiopulmonary medications.

In Turkey, Andrian and Sarkikayala (2004) reported 51.55 % of the cases in their study were due to insecticide poisoning followed by 30.3% due to pharmaceuticals.

In the study performed by Sarjami et al., (2008) in Iran, pharmaceuticals represented about 91% of the toxic agents used by adolescents with psychotropics 49.5%, the most prevalent type. On the other hand, Budhathoki et al. (2009) showed that insecticides were the most common type of toxin involved (59.9%) with organophosphorus the most commonly used (45.1%).

Sahin et al., (2011) in their study on adolescents and children in Iran found that pharmaceuticals presented by (48.4%) of cases in which cyclic antidepressants were the most common used drugs (11.7%). This was similar to Aqeel et al., (2009) where cyclic antidepressents and analgesics were the most commonly used drugs. Lam, (2003) found that analgesics were the most common type of toxins (47.36%) used by this age group followed by psychotropics (38.62%) while Lin et al., (2011) reported that CNS drugs (52.2%) were the most common followed by analgesics (17.6%), respiratory drugs (7.5%) and cardiovascular drugs (6%).

Easy access to pharmaceuticals through many outlets, inadequate knowledge of serious consequences of common drugs, inadequate resistant packaging may increase incidence of pharmaceutical poisoning (Azemi et al., 2012).

Acute poisoning with insecticides is a public health problem especially in developing countries as they are readily available due to inadequate regulations controlling their sale and their wide use in agriculture (Thunga et al., 2010).

The current study shows that accidental poisoning in adolescents was mainly due to food poisoning while the majority of adolescents committed suicide by using insecticides. Tramadol was the most commonly abused agent among adolescents. On the other hand, Yip et al., 2011 found that ketamine and amphetamines were the most commonly abused agents.

In Egypt, 11% of tramadol poisoning was recorded among children and adolescents (El Masry and Tawfik, 2013).

Most of the OPC poisoning and subsequent deaths occur in developing countries following deliberate self-ingestion particularly in adolescents (Mishra et al., 2012).

In the present study, nearly half of acute poisonings in early adolescence were accidental, while the majority of acute poisonings among middle and late adolescents were due to self-poisoning. Regarding acute poisoning due to substance abuse, it was more prevalent in late adolescence.

This was similar to a study by Bhat et al., 2011 where accidental poisoning constituted 75% in early adolescence while self-poisoning constituted 80.95% in late adolescence.

In the current study, most of patients were admitted to ED and discharged after an observation period not exceeding 6 hours.

These results are similar to those reported in a study by Haghighat et al. (2013) where

67.9 % of cases were admitted to ED, 26.3% to inpatient and 5.8% to ICU as well as a study done by Yip et al. (2011) but with slightly lower percentages.

High percentages of patients presented to ED and then discharged without the need for admission to inpatient or ICU was explained by Marahatta et al. (2009) who stated that most of patients always rush to hospital irrespective of amount and nature of poison ingested. Moreover, most adolescents are attention seeking.

The morbidity and mortality in any case of acute poisoning depends on a number of factors such as nature of poison, dose consumed, level of availability of medical facilities and delay time between intake of poison and provision of medical help (Kiran et al., 2008).

In this study, PSS was applied to assess the severity and several risk factors were correlated with PSS

in a trial to identify risk factors of poisoning severity in this age group. Most of cases under this study were classified as grade 0 followed by grade 1.

In a study by Jose et al. (2012), 19.8% were as grade 0, 55.37% as grade 1, 14.05% as grade 2, 8.26% as grade 3 and 2.48% as grade 4. Generally, the severe grades (grade 3 or 4) depend on the dose of poison; the manner of poisoning and the length of hospital stay (Azemi et al., 2012).

In the present study, higher PSS was associated with lower age. This may be explained by the greater susceptibility of very young patients to intoxications (Ballesrteros et al., 2003).

In the present study, there was significant difference between different toxic agents as regards PSS with insecticides associated with the highest PSS. This agrees with Taghaddosinejad et al. (2012) where there was significant difference between survivors and non-survivors as regards the type of toxin. Lee et al., (2008) stated that type of toxic agent is a significant predictor of poisoning related severity and fatality.

Among pesticide poisonings, OPC represent a major global problem with thousands of deaths occurring every year (Mishra et al., 2012).

In the present study, there was statistically significant difference between different manners of poisoning as regards PSS. These results agree with those of Lee et al., (2008) who reported a significant difference between survivors and non-survivors as regards manner of toxicity. On the contrary, Taghaddosinejad et al., (2012) reported that there was no significant difference between survivors and non-survivors as regards manner of toxicity.

In the present study, highest PSS was associated with increased duration of hospital stay. This agrees with Paterson et al., (2006) who stated that significant mortality and morbidity was associated with increase in hospital stay duration.

In the present study, higher PSS was associated with tachycardia, hyperthermia, tachypnea and hypotension. Abnormal vital signs (hyperthermia, shock status, abnormal heart rate, and respiratory distress) were found to have significant difference between survivors and non survivors (Lee et al., 2008). In addition to, Yu et al. (2012) who reported that patients with extremely abnormal vital signs had the greatest risk of mortality.

In the present study neurological manifestations; coma and convulsions were the most common indications of admission to ICU. However, patients with respiratory failure as a cause of admission to ICU have the highest PSS.

Xenobiotic-induced coma often requires ICU admission because these findings will not resolve quickly. Likewise, xenobiotic-induced status epileptics are best managed in the ICU. Poisoned patients with signs of respiratory compromise may need ICU admission, regardless of whether the respiratory compromise is caused by CNS depression, hypoventilation, or acute lung injury (Kirk and Pope, 2006).

The majority of our patients were discharged with complete recovery, 7.1% were discharged against medical advice (AMA), 0.4% died and 0.3 % were transferred to another department either due to presence of comorbidity or development of complications.

This was quite similar to the results reported by Limjindaporn, (2010). Jose et al. (2012) found that 90.1% of cases under their study were discharged with complete recovery while 2.5% died. Azemi et al., (2012) reported 96.96% recovered completely and 3.4% died. In a study by Kiran et al. (2008), 1.7% died and 3.6% were discharged AMA. The reports of mortality rates in recent studies of adolescent poisoning were low, generally less than 1% (Yip et al., 2011). Low mortality may be due to early hospital admissions, as short delay time was found in most of cases as well as availability of critical care facilities (Jose et al., 2012).

A statistically significant difference was found between outcomes of patients in relation to duration of hospital stay as well as between the outcome and delay time between intake of poison and seeking medical help.

This is consistent with Budhathoki et al. (2009) where there was statistically significant difference between survivors and non survivors as regards delay time. Hawton and Harriss (2006) reported more severe clinical presentations among those presented with a long delay time and who were deprived from immediate medical attention and early management.

In the present study, the total mortality was 8 cases; OPC poisoning in 5 cases, zinc phosphide in one case, tramadol in one case and carbon monoxide in another case. This was consistent with Malangu and Ogunbanjo (2009) who reported that more than half of dead cases in their study were due to poisoning with OPC and carbon monoxide. Davies et al. (2008) mentioned that OPC had high mortality, most patients died from cardiopulmonary failure and many patients had cardiopulmonary arrests after admission.

Yu et al. (2012) described organophosphate's cardiotoxicity in three phases: in first phase there is a brief period of intense increased in sympathetic tone manifested by sinus tachycardia; in second phase there is a prolonged phase characterized by parasympathetic outflow and manifested by atrioventricular node conduction disturbances and a third phase in which QT-interval prolongation, pleomorphic tachycardia and sudden cardiac death are characteristic. The third phase is fatal and can appear unexpectedly after exposure.

On the other hand, Lund et al., (2012) reported that more than half of the mortality cases were caused by substances of abuse while, Litovitz et al., (2001) mentioned that analgesics, sedatives and antidepressants were associated with high mortality rates. This could be explained by difference in access between different countries as well as age (Saddique, 2001).

A limitation present in the current study is that, only the adolescent patients presented to the PCC- ASUH were included. Mild or moderate cases that were managed at home or in primary health care centers and also fatal cases of intoxication that might have been referred to medico-legal departments were not included. In addition, a single - toxicological center experience could not accurately represent the actual situation in the whole country.

Conclusion

Acute poisoning in adolescents may lead to serious complications, hospitalization and sometimes death. Self-poisoning represented a real tragedy among adolescents with self-poisoning being the most common manner of poisoning and the most common age group affected was the late adolescence period while accidental poisoning was common in early adolescence stage.

Higher PSS was associated with a lower age as well as increased hospital stay duration.

Recommendations

Community-based adolescent poisoning prevention programs are required for preventing a large proportion of morbidity and mortality among them. Managerial attention to the magnitude of the problem is recommended to provide required specific antidotes for the most common poisons used among this age group.

Medical services units, other than Poison Control Centers, should gain knowledge about common intoxications among adolescents to be ready to deal with such situations and provide best care for them.

Further studies over an extended period are recommended as well as studies to compare the pattern and outcome of acute poisoning in adolescents with other age groups as children and adults are recommended.

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الملخص العربى

نمط و شدة السمية الحادة بين المراهقين: دراسة مستعرضة خلال ستة أشهر بمركز علاج التسمم مستشفيات جامعة عين شمس

حنان حامد مصطفى و نبيل نصيف رزق و آية شوقى خاطر و سارة عاطف عبد العزيز[1]

الخلفية : المراهقة هى معبر الطريق فى الحياة ، القوة الايجابية فى المجتمع و بوابة لتعزيز الصحة. إن معظم الانماط السلوكية المكتسبة خلال فترة المراهقة تستمر مدى الحياة و تؤثر على صحة و رفاهية البالغين فى المستقبل. و يعتبر التسمم الحاد واحد من المشاكل الصحية ذ ات الصلة المشتركة فى المراهقين نظرا لارتفاع وتيرة المرض و الوفيات فى جميع انحاء العالم. علاوة على ذ لك يعتبر الكحول و تعاطى المخدرات غير المشروعة و إمكانية التسمم الحاد بهما من بين المشاكل الصحية العامة و العالمية مع نشأتهما فى مرحلة المراهقة.

الهدف من الدراسة : يهدف هذا العمل الى دراسة نمط و شدة السمية الحادة بين المراهقين الذين تم حجزهم فى مركز علاج التسمم بمستشفيات جامعة عين شمس خلال فترة ستة أشهر من بداية يوليو ٢٠١٣حتى ديسمبر٢٠١٣، و تهدف لإعطاء المعلومات الكافية لتوفير الإمدادات اللازمة للعلاج المطلوب لأنواع التسمم الأكثر شيوعا.

طريقة الدراسة : وقد تم تسجيل جميع المرضى المراهقين خلال فترة الدراسة و تقييمهم مع مزيد من التركيز على الذين تم حجزهم فى عنابر المرضى الداخليين و وحدة الرعاية المركزة لإمكانية الحصول على بيانات متعددة ويرجع ذ لك لطول فترة الإقامة فى المستشفى. ولقد تم تقييم شدة المرض للمرضى وفقا لمعدل درجة خطورة التسمم للرابطة الأوروبية لمراكز علاج التسمم و علماء السموم الإكلينيكية.

النتائج: من إجمالى ١٩٣١ حالة تسمم حاد للمراهقين تلقاها مركز علاج التسمم ،تم حجز٤٠٨ حالة منهم. وكان الترامادول الاكثر استخداما من بين عقاقير الإدمان بين المراهقين (٩،٥٠%). و قد لوحظ أن التسمم العرضى هو الأكثر شيوعا فى مرحلة المراهقة المبكرة فى حين كان التسمم الإنتحارى الأكثر انتشارا فى المراهقة المتوسطة و المتأخرة. و بخصوص التسمم بسبب تعاطى المخدرات تبين انه يمثل ٥٥, ٦% فى مرحلة المراهقة المتأخرة بينما ٤ ٥, ٢% فقط فى مرحلة المراهقة المبكرة. وبتطبيق معدل درجة خطورة التسمم تبين أن ٢،٦٥ % تم تصنيفهم عند الدرجة صفر(٠) ،٦،٢٣% الدرجة الاولى ، ٧% الدرجة الثانية ، ٨،٣% الدرجة الثالثة و٤،٠% الدرجة الرابعة.

الخلاصة: يمثل التسمم الذاتى مأساة حقيقية بين المراهقين و يعتبر الأكثر شيوعا و كانت الفئة العمرية الأكثر انتشارا هى فترة المراهقة المتأخرة فى حين كان التسمم العرضى الأكثر انتشارا فى مرحلة المراهقة المبكرة. وارتبط ارتفاع معدل درجة خطورة التسمم مع انخفاض السن ، كذلك مع زيادة مدة الإقامة فى المستشفى.

١ قسم الطب الشرعي و السموم الإكلينيكية – كلية الطب – جامعة عين شمس