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Original Article

Intentional poisoning among preadolescents at one poison center in Saudi Arabia

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ABSTRACT

Background: The epidemiology of intentional poisoning among preadolescents in conservative communities needs further exploration. Preadolescence (9-14 years) is a remarkable human developmental stage with a heightened risk for such incidents, often less discussed than adolescence. **Objective:** To present a report on intentional poisoning incidents among preadolescents visiting a single poison center in Saudi Arabia. **Materials and Methods:** A chart review of 315 poisoning reports was conducted between 2009 and 2011. It was followed by a phone interview of parents of poisoned children to investigate the demographic, incident and outcome characteristics. Cases of accidental and chronic poisoning were excluded. **Results:** Nine eligible cases were identified (2.9%); four were classified as suicidal attempts, two nonsuicidal self-injurious, and three were unknown. Of the five males and four females, three had chronic medical conditions (G6PD deficiency, epilepsy, or asthma) while six were previously healthy. Seven cases ingested medications (acetaminophen, desmopressin, augmentin and benylin, amitriptyline, and chlordiazepoxide) while two ingested clorox, all in large doses. **Conclusions:** Few intentional poisoning incidents were observed among Saudi preadolescents, which could be an underreported figure in a culturally and religiously conservative community.

Key words: *Intentional, Poisoning, Preadolescents, Saudi Arabia*

Preadolescence (9-14 years) [1] is a remarkable human developmental stage with a heightened risk for suicidal or intentional poisoning, often less discussed than adolescence [2-4]. Literature summarized the risk factors associated with intentional poisoning, which are usually related to the sociodemographics, clinical and/or the mental state of the child [5-7]. However, the epidemiology of intentional poisoning among preadolescents in conservative communities such as Saudi Arabia needs further exploration.

In Saudi Arabia, suicide is strictly forbidden by both religious and cultural principles [8]. Poisoning in preadolescents, whether intentional or accidental, are often observed in Saudi pediatric emergency departments [9]; however, sociocultural pressures often lead to an under reporting or even improper assessment of suicidal behaviors within such communities.

Suicidal ideation and behaviors are very common in adolescence [10], so identifying risk factors at an earlier age stage (preadolescence) cuts off such unfortunate events. About 51% of the Saudi Arabian population is under the age of 25 (as of February, 2012), a community witnessing a rapid growth and a large cohort of youths [11]. Intentional poisoning at one tertiary care facility in Riyadh (capital of Saudi Arabia) was observed in 79 young/middle-aged adults (aged 15-40) within a study period of 3 years [8], while 160 cases of suicide via other methods beside poisoning were observed within a 5-year period study in the Eastern Saudi region [12].

The aim of this study was to present report on intentional poisoning incidents among preadolescents visiting one poison center in central Saudi Arabia.

MATERIALS AND METHODS

Study Area/Setting

The Saudi Ministry of National Guard-Health Affairs (MNG-HA) is a tertiary health-care facility established in 1983, serving the military community of Saudi Arabian National Guards and their dependents. Besides being accredited by the Joint Commission International, MNG-HA is a certified poison center enlisted under the National Drug and Poison Information Center (NDPIC) which responds to any public or health-care professional queries regarding any poisoning incident [13]. On call toxicologists or physicians with advanced training on toxicology are readily available at both adult and pediatric emergency departments.

Study Subjects and Sampling Technique

A thorough chart review was conducted between 2009 and 2011 for all poisoning reports of children visiting the pediatric

emergency department who complained of acute poisoning. Inclusion criteria were being a Saudi preadolescent aged 9-14 years, who intentionally ingested any type of medication and/or chemical substance. The poison report of eligible subjects specifically noted intentional ingestion of a potentially poisonous substance regardless of its type and amount. Cases of accidental poisoning or over dosage of a prescribed medication as well as chronic poisoning incidents were excluded. Subjects who had a previous psychiatric illness were excluded too.

Data Collection

Children exposed to poisoning received their emergency assessment and treatments by licensed pediatric emergency physicians. As per hospital policy, a poisoning incident form needs to be filled and signed based on their initial clinical assessment. Between 2009 and 2011, an Institutional Review Board (IRB) approved study protocol (RR08/019) was being conducted in which its study investigators incorporated their data collection forms with the hospital reporting forms based on an agreement with the chairman of emergency department. Study investigators delivered group training sessions for a team of 35 ED pediatric physicians on how to properly obtain the informed consent and gather study related information.

Two investigators thoroughly revised these poison reports collected from the previously conducted study protocol (RR08/019) and by consensus identified eligible cases for this study based on the preset inclusion/exclusion criteria. Noneligible subjects or those with unclear contact information were dropped out. One of the investigators validated the reports by verifying them with the archived medical records, while the other conducted phone interviews with the subjects and their parents. During the phone interview, further details on the incident were questioned. Phone calls were of great importance as the factor of anxiousness or stress exhibited by the children and their parents during the emergency visit might have led to an inaccurate history or description of the incident [14,15].

Suicidal and nonsuicidal terms are often misused among health-care practitioners [5]. Suicidal ideation is defined as possessing passive thoughts to be dead, followed by a suicidal plan, a preparatory act, and then a suicidal attempt [16,17]. An attempt can be either nonsuicidal self-injurious behavior where the child only intends attention seeking or a suicidal attempt where the intention is death. Suicide is the death due to such attempt [17].

The data collection forms were sourced out from the reporting forms used by the Saudi Ministry of Health and NDPIC and it comprised: (1) Written informed consent: Previously obtained and verbally reconfirmed from the subjects and their parents during the phone call, (2) Preadolescent characteristics: Investigators retrieved the age, sex, medical/psychiatric history, and Body mass index (BMI) category from the poison reports and confirmed them with the medical records, (3) Incident characteristics: Investigators questioned the subjects and their parents simultaneously about the poison type (medication or chemical product), amount ingested and reason behind the incident. Incident was later classified as a suicidal attempt or a nonsuicidal self-injurious, based on the Columbia Classification Algorithm of Suicide Assessment, sourced from the FDA's pediatrics suicide risk analyses, the self-directed violence uniform definitions and recommended data elements [16,17], (4) Outcome characteristics: Investigators obtained the Canadian triage 5 level assessment scale, arrival time to emergency department, vital signs (normal vs. abnormal), physical examination results, diagnostics tests, admission status (in-hospital admission vs. discharge), and length of hospital stay (hours) from the poison reports. The triage scale is an internationally recognized valid and reliable tool which classifies cases arriving to the emergency departments according to their clinical urgency; resuscitative (I), emergency (II), urgent (III), less urgent (IV), and nonurgent (V) [18].

Ethical Considerations

Written informed consents were initially retrieved from the previously conducted study protocol (RR08/019). In addition, IRB has issued a reapproval for this study (IRBC/762/15). Subject identifiers in the written consents were utilized to trace the contact information (phone numbers). Verbal consents via phone interview were obtained as a reminder or a reconfirmation on the new purpose of this research study. Study investigators reassured the subjects or their parents during the phone interview that the confidentially of their reported information will be preserved. Detailed data of individual cases were documented on forms with coded anonymous identifiers under the strict control of two study investigators. Study investigators had no influence on the self-reporting of subjects.

RESULTS

Between 2009 and 2011, 315 cases of child poisoning cases were identified, of which 9 (2.9%) study subjects (all Saudis) met the preset inclusion criteria. Equal gender distribution was observed with 5 (56%) males and 4 (44%) females. Their age ranged between 9 and 14 years, 3 cases (33.3%) were 9-10 years old, 2 cases (22.2%) were 11-12 years old, and 4 cases (44.5%) were 13-14 years old. Two cases were overweight (BMI >25). Six cases had no previous health problems, while one case each had G6PD deficiency, epilepsy, or asthma. One case was admitted due to the previous family history of intentional poisoning. Sample characteristics are presented in Table 1.

Confirmed suicidal attempts were confirmed in four cases (44.4%), whereas two cases were classified as nonsuicidal self-injurious (22.2%). Three of the cases were intentional poisoning but were not able to be classified (33.4%). The reasons behind the intentional poisoning incident as admitted by the child and/or the parents were either predisposed by a game play with siblings, being overweight/the stressful weight control measures, experiencing social stressors, and/or their chronic medical conditions. Seven cases ingested medications in high doses and beyond the toxicological doses [19] (acetaminophen, desmopressin,

Table 1: Characteristics of the sample

Characteristics	n (%) 9 (100%)
Gender	
Male	5 (55.6)
Female	4 (45.4)
Age (years)	
9-10	3 (33.3)
11-12	2 (22.2)
13-14	4 (44.5)
Previous medical history	
Healthy	6 (66.7)
Chronic disorder	3 (33.3)
Poison type	
Medication	7 (77.8)
Chemical	2 (22.2)
Type of intentional incident	
Suicidal attempt	4 (44.4)
Nonsuicidal self-injurious	2 (22.2)
Not classified	3 (33.4)

n: Frequency

augmentin and benylin, amitriptyline, and chlordiazepoxide), while two ingested Clorox (a household bleach product), all in large doses.

The chief medical complains upon ED admission mainly included gastrointestinal disturbances (nausea, abdominal pain, and vomiting) with some cases presented with more severe signs/symptoms (altered consciousness, tachycardia, hypercalcemia, and unresponsiveness). The Canadian triage assessment level was observed Level I in (11.1%) of the cases, Level II in (22.2%), Level III in (44.4%), and Level IV in (22.3%). Some cases (22.2%) were stabilized in the ED before being discharged, while the majority (77.8%) was hospitalized, with a hospital length of stay ranging between 3 and 72 hours. All were referred to a psychiatric clinic for consultation after discharge. The toxicological characteristics of various ingested poisons are given in Table 2.

DISCUSSION AND CONCLUSIONS

This study sheds light on a small number of preadolescents who intentionally ingested a potentially poisonous death-leading drug or chemical product in Saudi Arabia, a relatively conservative community. Any preadolescent (9-14) is presumably able to differentiate between a medication tablet/pill and a piece of candy. During early adolescence, youth typically progress from concrete logical operations and problem solving to acquiring the ability to develop and test hypotheses. That is they analyze/synthesize data, grapple with complex concepts, and think reflectively [20,21]. In this report, some cases ingested more than one tablet encased in clearly labeled manufacturer containers. A typical accidental ingestion of a medication would be ingesting a single pill left on a table assuming it as a chewable candy. Chewing such drugs will obviously trigger an offending bitter taste (such as paracetamol) [22], which is a clear indication that it is not a sweet candy. On the same hand, some cases ingested Clorox in considerably large amounts (1/4-1/2 cup). A preadolescent should be also capable of distinguishing a Clorox by color, odor, and lip sensation from the first sip. Authors believe that such an age group and large amounts of ingested poison products indicate that the incident is intentional rather than accidental.

A number of preadolescents in this study admitted to having a suicidal ideation and implemented the act of ingesting a poison product with a clear intention of death. In addition, other cases were confirmed to be nonsuicidal self-injurious cases, as the intention of death was not clearly confessed but rather an attention seeking behavior due to a certain conflict. The literature stated that in one school, 23/387 (5.9%) of preadolescent students who were assessed prospectively exhibited a suicidal ideation or self-harm behaviors [23]. The lifetime prevalence of nonsuicidal self-injury in literature is estimated to vary between 7.5% and 8% for preadolescents, increasing to 12% and 23% among adolescents [24]. In Saudi Arabia, almost 3% of intentionally poisoned cases were younger than 12 years as reported by a single poison center during their 4-year period study [25].

The literature stated that the majority of intentional poisoning preadolescent cases were males [26,27], whereas others stated that there are very small or nonsignificant sex differences [28]. Furthermore, previous literature findings revealed that suicidal ideation and attempts in adolescence predict future suicidal behavior in adulthood for females but not for males [29,30]. A preadolescent suffering from a chronic previous health conditions could be at higher risk of committing intentional poisoning. In this report, one case suffered from epilepsy which requires daily prescribed medications or routine lab tests, beside other complaints such as pain, fatigue, and activity intolerances. In the British study "The Truth about Suicide," researchers found at least 10% of cases linked to a terminal or chronic illnesses [31]. Furthermore, another study stated that among 1,069 cases, 18.9% gave the physical distress due to cancer, chronic pain, and heart diseases as a reason for committing a suicidal attempt [32].

Authors in this study suspected that a child being overweight or obese might be at a higher risk to commit intentional poisoning compared to those with a normal weight. In literature, an American study (sample 31,540 adolescents) found an association between being overweight and suicide risk among females only [33]. Researchers believe that other confounding risk predictors are present with overweight children including depression, failed weight control attempts, and peer pressures [33,34].

Authors in this study were scientifically and ethically compelled to present this report with such a few cases as the alternative would be discarding the data of children who experienced a life threatening scenario. However, future systematic review papers may accumulate data drawn from smaller sample size studies such as this report to present the broader picture of intentional poisoning among preadolescents. Based on the literature review, suicide is uncommon in preadolescence but becomes an extremely serious issue among adolescents. The primary role of

Table 2: Toxicological characteristics of the ingested poisons

Ingested product	Age/sex	Amount	Admission complaints	Toxicological dosages
Clorox-household bleach (sodium hypochlorite)				
Case 1	9 year/male	¼ cup	Abdominal pain	
Case 8	14 year/female	Unknown	Abdominal pain	
Acetaminophen (medication)				120-150 mg/kg per dose
Case 2	12 year/male	5500 mg	Nausea, abdominal pain and vomiting	
Case 5	14 year/female	3000 mg	Abdominal pain	
Case 6	13 year/female	4500 mg	Abdominal pain and vomiting	
Case 7	10 year/male	1,500	Abdominal pain and vomiting	
Desmopressin acetate (medication)				Above 0.1 mg daily for age>12 years
Case 3	9 year/male	2 mg	Nausea, abdominal pain and vomiting	
Amoxicilin/clavulanic acid and dextromethorphan (medications)				Above 1500 mg daily and 400 mg/70 kg
Case 4	13 year/female	6000 mg and 100 ml	Altered conscious, tachycardia, and hypercalcemia	
Amitriptyline and chlordiazepoxide (medications)				Above 25 mg per dose
Case 9	11 year/male	250 mg	Unresponsive, resuscitative	

parents, schools, and primary health-care institutions would be to screen for risk factors, recognize them and act synergistically with other specialists to prevent/treat suicidal behaviors. Primary care physicians and school nurses should also be able to identify the "warning signs" for suicide since their presence implies an attempted suicide may occur sooner than anticipated.

Limitations

The few cases described represent an incidence of 9/315 (2.9%) in a 2-year period, which authors in this study fear it could be just the tip of the iceberg. An extension in the data collection time might have revealed more incidents. Authors also feared that some cases might have been falsely reported by parents as accidental. Health personnel usually suspect intentional poisoning when the reported dose of poison is considerably high. In the end, documentation on the poison reports is a reflection of what the parents and the child described rather than what the health practitioners assumed. Phone calls after the child have been discharged home were crucial as questioning the anxious and stressed parents during the initial ED visit often leads to an inaccurate history or description of the incident [9], yet authors feared that there might be a chance for a recall bias.

Psychiatric consultation is scheduled at the outpatient clinics of this institution after the discharge from the emergency department, yet parents might be reluctant to follow-up on psychiatric appointments. The religious restrictions and cultural taboo of suicidal ideation might have put the parents in denial, thus a Hawthorne effect was suspected. Therefore, authors in this study were very meticulous in their communication with the parents who were reassured and reminded that the details of the incident is framed with confidentiality and utilized for research purposes only.

CONCLUSION

A number of intentional poisoning cases by orally ingesting a potentially harmful substance were reported among Saudi preadolescents, which might be an underreported figure in a culturally and religiously conservative community. Both suicidal attempts and nonsuicidal self-injurious behavior incidents were observed.

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