

The High Cost of Bath Salts

A Study of the Health Care Burden of Illicit Synthetic Drug Use in Duluth, Minnesota

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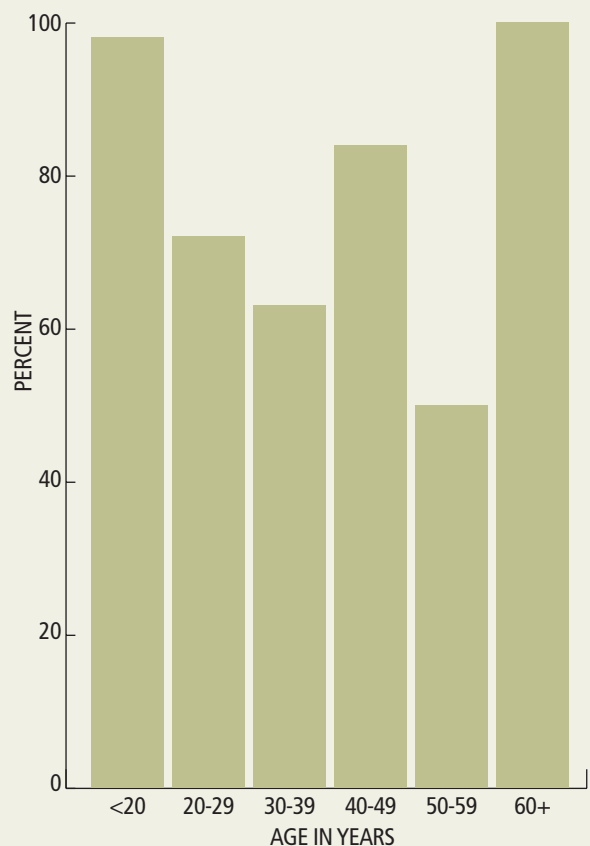
The Minnesota Department of Health conducted an exploratory epidemiologic investigation into the health care burden of illicit synthetic drug (ISD) use in Duluth, Minnesota. Staff reviewed medical records of 78 patients with suspected ISD use who were treated in emergency departments at two Duluth-area hospitals from January through September 2013. Most (67%) were unemployed, 75% arrived at the hospital by ambulance or police escort and 57% were admitted to the hospital. Use of ISDs has the potential to create a significant burden on the health care system and public services. Therefore, effective prevention and response strategies need to be developed.

During the past two years, news media have followed the story of a popular head shop in Duluth that was selling so-called “bath salts” and other products labeled “not for human consumption” that individuals were purchasing to become intoxicated.^{1,2} The products contained illicit synthetic drugs (ISDs), a category that includes synthetic cathinones (bath salts)—chemicals that are related to amphetamines—and synthetic cannabinoids. The shop reportedly made more than \$6 million a year² selling such substances until a federal raid shut it down in the summer of 2013.³ The raid was the culmination of two years of growing public awareness in Duluth about ISD use.

Starting in 2010, public safety officials and health care personnel in Duluth began noticing that the number of people using ISDs was rising, as were the number of cases of disruptive behavior and of health consequences related to ISD use. In one case, police found a man wielding a knife in a laundromat and having paranoid delusions. It took several officers to restrain him and take him to the hospital. In another, an individual was found hiding in bushes and exhibiting strange behavior.

FIGURE 1

History of Polysubstance Use among Illicit Synthetic Drug Users Seen in Duluth Emergency Departments by Age Group (N=58)



Over the ensuing two years, peace officers and emergency department personnel increasingly found themselves dealing with issues associated with ISD use.

In July of 2013, the Minnesota Commissioner of Health authorized the Minnesota Department of Health to investigate the ISD problem. Although several previous studies have described the toxidrome associated with ISD use,^{4,7} this investigation sought to estimate the effect of ISD use on health care in a single community during a set time period.

Materials and Methods

We used a case series design to study a convenience sample of patients with suspected ISD use who were treated in emergency departments at two Duluth-area hospitals from January through September 2013. Because specific diagnostic codes for ISD use were not available, we identified cases using poison center data or through physician recall. We then reviewed the medical records related to those cases. Health Department epidemiologists designed an abstraction form, built on previous work by the Michigan Department of Community Health, to study emergency department (ED) visits after ISD use.⁷ We defined a case of ISD use as a patient who was evaluated in the ED and had ISD use or suspect use documented in the medical record. Arrival and discharge diagnosis codes, such as acute respiratory failure, acidosis and rhabdomyolysis, were abstracted from the medical record for 34 of the cases; history and type of mental illness were abstracted for 44 other cases. Ten charts were re-abstracted by a second reviewer to check for variance. A Cohen’s kappa variance test was used to measure the inter-rater reliability of the chart abstractors.

Results

Eighty-one cases of possible ISD use were identified, and researchers reviewed the medical records related to those cases. For 78 of the cases, ISD use or suspect use was documented in the medical record. Fifty-eight individuals (74%) self-reported having used an ISD. Of those, 38 (66%)

reported using cannabinoids, 15 (26%) cathinones, and five (9%) reported using both.

The median age of users was 34 years (age range: 12 to 73 years), and 54 (69%) were male. Fifty-eight patients (74%) from

all age groups had a history of polysubstance use (Figure 1). The unemployment rate in the sample population was 67%. Most of these patients were taken to the hospital. Thirty six (46%) arrived by police escort, 23 (29%) by ambulance (Figure 2).

FIGURE 2

Mode of Arrival to Emergency Department (N=78)

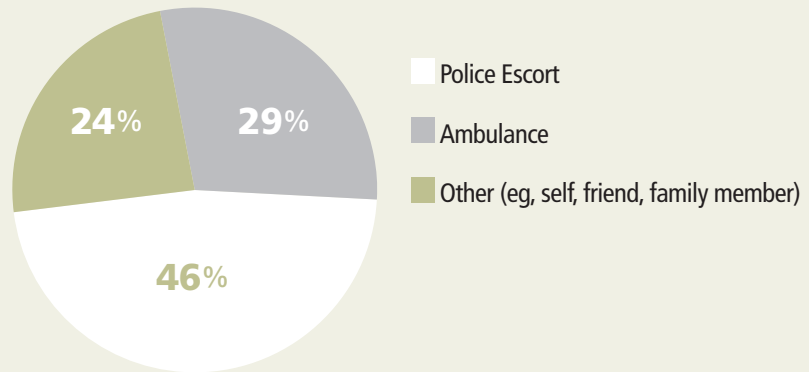
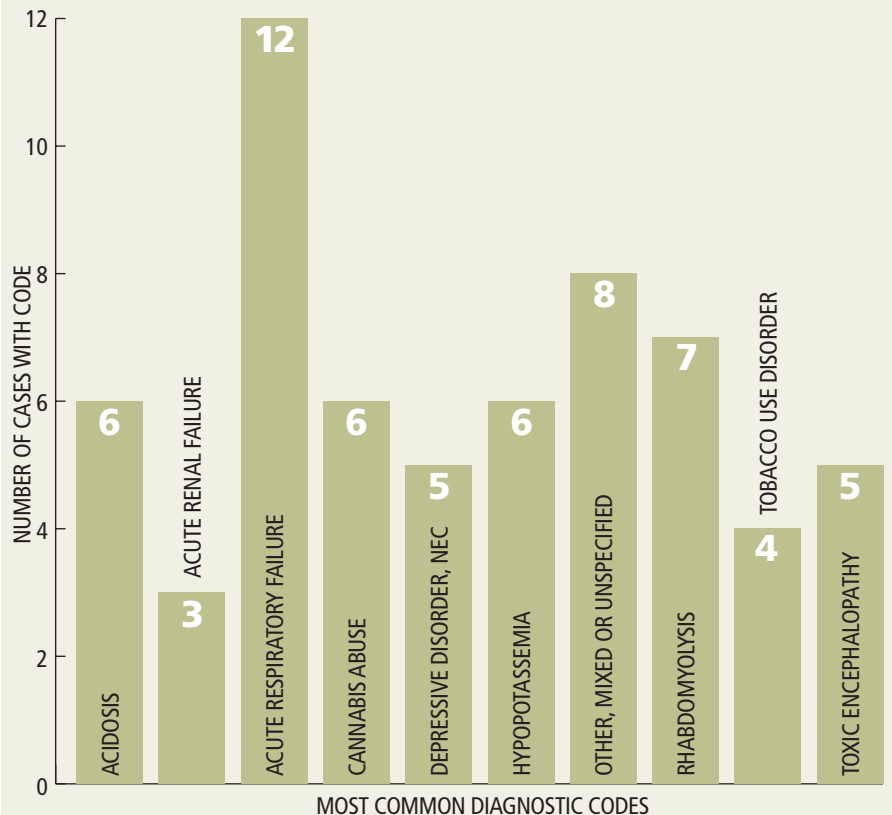


FIGURE 3

Diagnostic Codes of 34 Patients with Illicit Synthetic Drug Use Seen in Duluth Emergency Departments



The methods used for ISD administration included smoking the substance (37 cases or 47%), ingesting the substance (eight cases or 10%) or injecting the substance in (three cases or 4%). In 29 cases (37%), the route of administration was not reported.

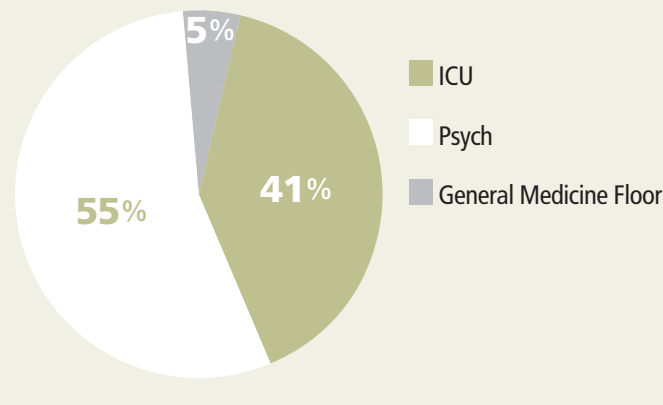
We found diagnosis codes were distributed disparately among the 34 cases analyzed. They included acute respiratory failure (19%), rhabdomyolysis (11%), cannabis abuse (10%) and renal failure (5%) (Figure 3). The most common signs/symptoms experienced by ISD users were agitation (13%), violent behavior (12%), anger/aggression (7%), bizarre behavior (6%), confusion (6%), hallucinations (6%) and anxiety (5%). Twenty-six (59%) of the 44 ISD patients whose records were reviewed for a history of a mental health disorder had documentation of a mental illness. The most common diagnoses were anxiety (32%), depression (30%), bipolar disorder (14%) and chemical dependency (14%). Six patients were noted to be suicidal after using ISDs. All of them had a history of mental illness. Thirty-four (44%) of the ISD users were treated in the emergency department only, and 44 (56%) were admitted to the hospital. Of the 44 ISD patients admitted to the hospital, 18 (41%) were admitted to the intensive care unit, 24 (55%) to the psychiatric unit, and two (5%) to the general medicine unit (Figure 4); the median length of stay was four days (range one to 39 days). The coefficient for the Cohen's kappa variance test was 0.63, which is within the range of substantial agreement, showing that the inter-rater reliability between case abstractors was within an acceptable range.

Discussion

Our study documented many findings similar to those reported in other studies of synthetic drug users: that they have a history of polysubstance use and mental illness and that they are predominantly male. We found the median age of ISD patients in our study was 34 years, which is slightly older than the average age in other studies.⁴⁻⁸

FIGURE 4

Admissions among 44 Patients with Illicit Synthetic Drug Use Taken to Duluth Area Hospitals (N=44)



The most common signs/symptoms experienced by ISD users in our study were agitation, violent/bizarre behavior, anxiety, anger/aggression, hallucinations and confusion. Similar findings have been reported in other studies.⁶⁻⁸ More than half of the ISD users whose cases we studied had a history of mental illness, which is slightly higher than what a similar study in Michigan found.⁷ Additionally, all of the ISD users who were noted as suicidal had a history of mental illness. Most of the ISD users were admitted to the hospital and some were admitted to the ICU, a finding also observed in other studies of ISD patients.^{7,8} Notably, over a nine-month period, there were at least 78 ISD cases that came to the emergency department for care in a community with a population of 86,000.⁹

One of the challenges in conducting this study was that there is no single diagnostic code for ISD use. Although this study made an attempt to identify a code combination that would indicate ISD use, we found the codes were too varied among cases to do so. St. Luke's hospital in Duluth has an internal system for identifying ISD use in patients. This was helpful and might be considered a prototype for coding ISD cases for surveillance purposes. Staff members of St. Luke's hospital have proposed adding unique ISD use codes to the ICD-10 coding system. The Minnesota Department of Health is collaborating with the Hennepin Regional Poison Center

and the Minnesota Hospital Association to establish a system for identifying cases involving ISD use in emergency departments. Such a system would aid future researchers as they seek to determine the health care burden of ISD use statewide. Health department officials have asked emergency physicians across the state to report suspected ISD use to the Hennepin Regional Poison Center for the period from November 2013 through December 2015 (Figure 5).

In addition to treating patients who are known ISD users, physicians have a role to play in preventing use of these substances. About three-quarters of ISD users in this study had a history of polysubstance use, pointing out that ISD use is an indicator of other substance use. Thus, strategies to address the underlying problem of substance use could also prevent ISD use. Other factors associated with illicit substance use among adolescents include lack of parental supervision, poverty and availability of drugs.¹⁰ Additionally, the Centers for Disease Control and Prevention has found that adverse childhood experiences such as abuse and neglect are linked to an increased risk of illicit drug use.¹¹ By asking patients about their living situation

and their experiences of abuse or neglect, physicians can help identify youths who may be at risk for abusing drugs, including ISDs.

Physicians also can assist in surveillance efforts. When they suspect ISD use, they can ask patients about it directly. In addition, they should report all ISD cases or suspected cases to the Hennepin Regional Poison Center. This includes cases where ISD use is the primary health concern as well as cases where it is disclosed during the medical history. Physicians may call the center themselves (800-222-1222) or delegate a staff member to make the call.

Conclusion

Physicians, health departments and poison control centers each have an important role to play in addressing the issue of ISD use. Physicians can do primary prevention of substance abuse and report ISD cases to poison centers, and poison centers can work with local health departments to describe ISD use in their community, leading to informed prevention strategies. Collaboration among physicians, health departments and poison centers is vital if we are to prevent ISD use from becoming a heavy burden in our communities. MM

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2. Oakes L. He dares Duluth to shut his head shop. *Star Tribune*. Sept. 23, 2011.
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FIGURE 5

Informational Poster Distributed to Clinics by the Minnesota Department of Health

The Minnesota Department of Health is investigating exposures to synthetic drugs. We ask you to ask patients:

- Are you now or have you recently used synthetic drugs (such as synthetic marijuana, bath salts, or other substances)?
- What have you used (ask for brand name)?
- How did you use it; and where did you get it?

The clinical toxidrome initially seen for these agents is very similar:

- agitation
- tachycardia
- hallucinations
- hypertension
- bizarre behavior

Exposure to Synthetics?
Please call Poison Center

to report every suspect case in Minnesota (November 2013-December 31, 2015): **1-800-222-1222**

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