



## Themes and trends in intentional self-poisoning: Perspectives from critical care toxicology



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### ABSTRACT

This research investigated the substances employed by and experiences of patients who come to acute treatment after self-poisoning. A retrospective search of the Toxicology Investigators Consortium Registry was performed to characterize a large cohort of patients. A detailed prospective study of one inpatient toxicology service was also conducted.

Patients chose readily available agents for self-poisoning. Most cases involved at least one substance that affects the central nervous system (CNS). The majority were prescription psychotropics and narcotics. When they had access to both CNS-active and CNS-inactive medications, patients almost invariably ingested a mind-altering agent. After recovering neurocognitive function, most patients were not actively experiencing suicidal thoughts. However, more than half of patients without CNS toxicity continued to have suicidal ideation after coming to care.

These findings are consistent with the hypothesis that many suicidal patients may be seeking an altered psychosomatic state rather than death *per se*.

### 1. Introduction

The overall purpose of this study was to use objective data from populations of medically serious overdose patients to highlight themes and potentially changing trends in intentional self-poisoning. Choices patients make when taking purposeful overdoses parallel medication availability and prescribing patterns (Prescott et al., 2009; Staikowsky et al., 2004; Tournier et al., 2009). Ease of access has been consistently reported as a major factor in determining what is ingested in suicide attempts, thus making over-the-counter (OTC) drugs more widely used than prescription medications in the United States (Staikowsky et al., 2004). Annual reports of the American Association of Poison Control Centers' National Poison Data System (NPDS) from the end of the twentieth century confirmed that OTC medications were more commonly ingested in overdose than prescribed compounds. Decades ago, aspirin was a frequently ingested poison, commonly kept in large amounts for analgesic use in most homes (Inciardi, 1977). Although potentially lethal, aspirin overdoses are now relatively rare, as its use

has largely shifted to smaller, regular dosing for vascular health. Acetaminophen has remained the single drug most commonly chosen for intentional ingestions, involving roughly 16% of all reported cases in which patients die (Rasimas, 2011). OTC overdose is not consistently as common in other countries, like Norway, where recent research has shown rates of self-poisoning with prescription medications to be much higher (Gjelsvik et al., 2012). Trends are changing in this direction in the U.S., as well now, with many more prescription medications available than in the past (Bronstein et al., 2011; Tournier et al., 2009), and through many sources – not all of them legitimate. Abusable substances also play a role, sometimes taken in excess with suicidal intent, but more frequently intoxicating to the point of disinhibition and alterations in judgment that make suicidal action more likely (Coklo et al., 2009). In addition to traditional agents like alcohol and cannabis, a variety of synthetic drugs are now available online for easy purchase and delivery. Since overdoses are the most common method of suicide attempt in most industrialized regions, including the United States (CDC, 2015), the array of compounds readily available has both public

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health implications and consequences for individual patients at risk to harm themselves.

We suspected that the demographics of overdose choice are being affected by the greater number of potential overdose options being advertised, synthesized, prescribed, shared, and sold. A research database of patients coming to acute care compiled by medical toxicologists (experts in the treatment of poisoning) could be particularly useful in cataloguing the current array of poisons chosen by individuals sick enough from purposeful exposures to need life-saving interventions. The Toxicology Investigators Consortium (ToxIC) Registry offers such an opportunity to document which classes of medications have been involved in serious suicide attempts. As medical toxicologists involved with this Registry, we decided that a prospective study of the patients presenting to our own critical care service over the course of one year could lend further insights with more detailed data on the agents being used, the presence of addictive intoxicants, and patients' associated experiences of suicidality during the course of treatment.

A variety of convergences of intrapsychic, interpersonal, and behavioral phenomena are all labeled "suicide attempts." It is important to remember that not all self-poisonings are undertaken with intent to die, and even suicidal patients are often conflicted about their decisions. Relief from a terrible state of mind, escape from unbearable circumstances, or an attempt to recapture a lost sense of control may all be more common motivations than seeking death itself (Bancroft et al., 1976; Birtchnell and Alarcon, 1971; Schnyder et al., 1999; Shneidman, 1993). Mental health professionals have recognized a number of goals along the lines of communicating with and influencing other people that patients, themselves, may not consciously endorse (Bancroft et al., 1979; Bancroft and Hawton, 1983; Michel et al., 1994). These themes are also common in the motivations and experiences of the mentally ill who misuse addictive substances without overt intent to harm or kill themselves (Laudet et al., 2004; Warner et al., 1994). Many suicide attempters and substance abusers act impulsively, with availability of means being a central factor in how self-destructive thoughts may translate into actions with critical illness consequences (Klonsky et al., 2016).

Although they presumably have had access to a variety of different kinds of compounds when making impulsive decisions to poison themselves, patients on our toxicology service often present ill from agents with the potential to quickly and profoundly alter the way they think and feel. Based upon clinical experience in both medical toxicology and consultation-liaison psychiatry in acute hospitals, we have been impressed with the range of ambivalent and complex thoughts and feelings expressed by overdose patients, including the observation that most do not appear actively suicidal after surviving their ingestions. We suspect that the main goal of many suicide attempts often may not be death *per se*, but rather obliteration of consciousness. If this formulation were correct, we would expect that medications viewed as sedating or mind-altering (not necessarily lethal) would commonly be taken in purposeful overdose. There has, indeed, been a suggestion that psychotropics, sedatives, and prescription pain medications have been climbing up the list of frequently-chosen agents of self-poisoning in recent years (Bronstein et al., 2011; Gjelsvik et al., 2012). The present study was also designed to examine this overall trend.

We hypothesized that data from the ToxIC Registry would indicate that in cases of critically ill self-poisoning, considerably higher rates of prescription psychotropics are now involved compared to rates of OTC medications. We expected that findings from a prospective study of our own toxicology patients would demonstrate a similar shift toward greater use of prescription mental health medications in self-poisoning. Based upon the idea that obliteration of consciousness may be central to overdose intent that is reported as suicidal, we hypothesized that patients with different agents available to them would preferentially ingest compounds that act directly on the central nervous system (CNS) – referred to as "CNS-active" compounds. In addition, we hypothesized that overdose patients who do not experience an appreciable alteration

of consciousness would be more likely to report ongoing suicidal ideation after coming to care than those whose purposeful ingestions result in delirium, profound sedation, or coma. The dynamics are complex, but persistent suicidal ideation could reflect failure of the ingestion to alter the psychosomatic state from which a patient may seek relief via overdose. We used patient report and intentional gathering of data in our own bedside practice to probe this relationship between altered states and the course of suicidality. Although this aspect of the study is not deeply detailed due to the exigencies of active critical care, it does offer the advantage of direct observation of and gathering of data from patients in the wake of self-poisoning to correlate with the psychological literature. The results also have implications for both the care of specific individuals after overdose and for the health of the general population vis-à-vis medication safety.

## 2. Methods

Both a retrospective analysis of a database of suicide attempts by poisoning and an overlapping one-year prospective study of similar patients at a single center were compared to identify trends in medications and other substances used in self-poisoning. The purposeful exposures were sufficiently severe to bring the patients to acute hospital care.

### 2.1. Retrospective study

For the retrospective portion of this work, we analyzed data added to the ToxIC Registry during the first 15 months of its use (Jan 10, 2010 to April 8, 2011). The ToxIC Registry provided a repository of clinical toxicology cases from 55 sites in North America along with one hospital in Haifa, Israel (Wax et al., 2011). Only patients cared for directly by medical toxicologists are catalogued, with de-identified descriptive and statistical data entered into a password-protected database for use by contributors. We searched the Registry for all cases of intentional pharmaceutical and non-pharmaceutical exposures—the categories of patients corresponding to what would typically be called suicide attempts by poisoning. During this phase of the Registry's existence, case data reports did not all include age, sex, racial, ethnic, and other demographic information; focus in creating it was on the substances involved, treatments, and acute toxicologic outcomes. The database does not record any follow-up information about repeat self-poisoning or subsequent mortality by suicide.

Cases in our study were analyzed on the basis of which classes of substances were used, with specific attention to their ability to directly affect the CNS. Queries were also made for comorbid alcohol intoxication. Distinctions between some substances of abuse (e.g. psychostimulants, sedatives) and therapeutics (e.g. antidepressants, anticonvulsants) are not always clearly made in the Registry, but instead may be characterized by broad chemical class. The cases contributed to ToxIC by our own medical toxicology practice were removed from this retrospective analysis, as they were included in our prospective study. This method allowed for a direct comparison between broader trends in self-poisoning and the specific experience at one center, with additional detail and analysis offered by the prospective portion of the work.

### 2.2. Prospective study

For the prospective leg of the study, beginning in July 2009, an intentional gathering of data on all patients treated for self-poisoning at PinnacleHealth Hospitals was undertaken, concluding in July 2010. This period corresponded to the first year experience of two fellows in training who, together, saw every patient cared for by Pinnacle Toxicology in that year. The setting is the highest volume inpatient toxicology practice in North America. PinnacleHealth Hospitals serve a diverse urban, suburban, and rural population, with emergency care of around 38,000 patients annually. Patients are either referred to the

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