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Adolescent Suicidal Ingestion: National Trends Over a Decade

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A B S T R A C T

Purpose: Suicide attempts by adolescents most commonly involve the overdose of medications. To date, there has been little information on the over-the-counter or prescription medicines that adolescents ingest for self-harm. Identification of medications chosen in suicide attempts may help guide anticipatory guidance to parents by primary care providers and Poison Centers in prevention programs.

Methods: This was a retrospective observational study using the American Association of Poison Control Center's National Poison Data System. Data were collected on patients aged 13–19 years old at the time of their substance ingestion, between the years 2004 and 2013 and that were coded as reason for ingestion of "intentional-suspected suicide."

Results: During the 10-year study period, there were 390,560 poison center calls for intentional-suspected suicide in the United States between 2004 and 2013, accounting for 80.3% of all "intentional" ingestion calls in the adolescent population. Over the entire age range, the most common substance ingested included acetaminophen (10.9%), ibuprofen (9%), selective serotonin reuptake inhibitors (7.7%), atypical antipsychotic (6%), and antihistamines (5%). The most common medications coded as resulting in major clinical effects or death were antidepressants and atypical antipsychotics.

Conclusions: Adolescent ingestion choices for suicide attempts have remained relatively consistent over the past 10 years. However, there was a recent decrease in selective serotonin reuptake inhibitor ingestions. The most common medications used in an overdose attempt were ibuprofen and acetaminophen. Further preventative efforts are needed in this at-risk population from multiple providers at various levels.

IMPLICATIONS AND CONTRIBUTION

Adolescent mental health and suicidal attempts are on the rise in the United States. This study aims to identify medications that are commonly used for intentional self-harm. This knowledge can improve preventative efforts from a multidisciplinary approach to inform patients and families.

Adolescent mental health acute concerns are a common presentation to the emergency department (ED) with over 560,000 visits per year in the last decade at an estimated total cost of $1.2B [1,2]. Approximately, one third of all pediatric patients with depression have had self-harm, suicidal intentions [2]; however, unlike other methods of self-injury, self-poisoning is often nonfatal, which raises the important opportunity to focus on prevention and outreach as many adolescents who have a toxic ingestion have been found to have repeat attempts [3].

Previous studies of adolescent self-harm substances chosen have noted variable results, including increases in hospitalization for acetaminophen, decreasing salicylate ingestions, increases in over-the-counter ingestions, as well as prescription sedatives

Conflicts of Interest: The authors have no or conflicts of interest to disclose.

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and antidepressants [4–8]. It is important to periodically reassess adolescent self-harm ingestions to direct adolescent poisoning prevention methods and awareness of emergency physicians who will undoubtedly care for these patients acutely. If more accurate information is available, it would improve the ability of physicians and poison centers to increase effective prevention strategies and be aware of high-risk medications for adolescents at risk of self-harm. The objective of this study was to investigate recent trends in adolescent self-harm ingestions over the most recent decade using a large national database.

Methods

This was a retrospective observational study using data collected through the National Poison Data System (NPDS). The American Association of Poison Control Centers maintains this database and provides deidentified data upon request. Data are collected when a citizen or health care provider calls one of the US Poison Centers and these data are collected by specialists in poison information at each poison center and entered into a national database in real time using a uniform set of definitions and guidelines. The study population included all calls of ingestions for patients aged 13–19 years during the years of 2004–2013. Calls that were coded for reason of ingestion as "intentional-suspected suicide" were included in the analysis. Calls were coded at the judgment of trained nurses and pharmacists after discussion with the calling party to determine if suspected suicide attempt was the likely reason. "Suspected suicide" therefore should include all calls related to self-harm resulting from suicidal thoughts and intent. Data variables obtained included age, gender, route of ingestion, reason for ingestion, clinical outcome, and substance(s) ingested. Clinical outcome was coded using a priori definitions from the NPDS coding manual for: no effect, minor effect, moderate effect, major effect, or death [9]. Minor effects include symptoms that are the result of the exposure but are minimally bothersome to the patient. Moderate effects include symptoms that are more pronounced, more prolonged, or more of a systemic nature than minor symptoms. A major effect is when resulting symptoms from the exposure are life threatening or result in significant residual disability or disfigurement. If one of these effects was noted in the database, the implication is that the patient had clinical effects that were related to the ingestion. Strict definitions for each clinical outcome can further be found in the NPDS coding manual version 3.1 [9]. This study was exempt from review at our institution after initial determination by our institutional review board.

Statistical analysis

All analyses were descriptive in nature. The five most common substances ingested in "intentional-suspected suicide" calls were tabulated for the entire study period and plotted over time. The five most common substances resulting in "death" or a "major clinical effect" regardless of ingestion intention were also plotted over time. The five most common medications were selected for summary reporting as a wide range of medications were noted in the database that were from various classes of medications. To see if choices in medications differed by gender, US region, or age group, the most common substances were compared between subgroups. Regions compared were Northeast, Midwest, South, and West. Subgroups for age were defined as ages 13–15, 16–17, and 18–19 years. The frequency of substances ingested and result ("death" or "major clinical effect" vs else) was analyzed by subgroups.

Results

There were 390,560 poison center calls for intentional self-harm in adolescents between the ages of 13 and 19 years to US poison centers between 2004 and 2013, accounting for 80.3% of all adolescent "intentional" ingestion calls. Approximately, 30% of patients experienced no clinical effect in this study cohort. However, of the intentional self-harm calls, 3.1% resulted in outcome coding of "death" or "major clinical effect." The most common substances intentionally ingested resulting in this outcome were atypical antipsychotics and antidepressants (Figure 1).

The most common unique/isolated agent ingested was ibuprofen in approximately 9% of calls, followed by selective serotonin reuptake inhibitor (SSRI) in 7.7%, acetaminophen without combination in 7.5%, atypical antipsychotics in 6%, and benzodiazepines in 4.7% (Table 1). However, when acetaminophen in combination with other drugs is added to acetaminophen alone, the amount of calls involving acetaminophen were 10.9% of calls. Antihistamines, including diphenhydramine alone, were responsible for approximately 5% of calls for suspected suicide. Ibuprofen remained the most common medications ingested across the study period (Figure 2).

When analyzed by gender, most calls were for female adolescents (73.6%), but ingestions in males more commonly resulted in "death" or "major clinical effect" than in females. Overall, the top five substances ingested were the same, but of the top three substances, 3/3 were prescription drugs for males and 2/3 were over-the-counter medications for females. There was no marked variation by geographic region in the percent of cases of "death" or "major clinical effect" (range 2.0%–3.5%). Similarly, those with no effect plus minor effects remained consistent across geographic regions (range 69%–79%).

Calls were distributed evenly across age groups (13–15: 34.8%, 16–17: 35.6%, and 18–19: 29.4%). Although ibuprofen remained the most common in all age subgroups, SSRIs were the most common substance in the older teenagers, both in the 16–17 and 18–19 age groupings after ibuprofen. Acetaminophen was the second most common in younger adolescents. However, SSRIs incidence remained consistent across the age groups, responsible for 8.05%, 7.87%, and 7.28%, respectively for the age groups 13–15, 16–17, and 18–19 (Tables 2–4). Finally, "death" or "major clinical effect" increased with age group (range 2.5%–3.7%).

Discussion

Adolescent mental health issues are on the rise, and acute presentations to the ED are frequent and commonly involve ingestions in a self-harm attempt [1,10]. The American Academy of Pediatrics released a committee statement on adolescent suicide as it is the third leading cause of death in this age group [11]. One goal of the statement is to educate pediatricians on signs of depression/suicidal behavior and the need for early intervention. A common mode of suicide attempts in this age group is through intentional substance ingestion. In our study cohort, antidepressants and antipsychotics appear to be the most common intentional-suicidal ingestion related to serious