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Short Communication

Increased use of heroin as an initiating opioid of abuse

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HIGHLIGHTS

- Heroin as the first opioid of abuse has grown significantly in the past decade.
- Heroin as an initiating opioid now exceeds hydrocodone and oxycodone.
- Such increases among inexperienced opioid users could lead to increased risk of overdose.

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ABSTRACT

Introduction: Given the relatively recent growth in access to heroin and a more permissive atmosphere surrounding its use, we hypothesized that an increasing number of persons with limited experience and tolerance to opioids would experiment with heroin as their first opioid rather than more common prescription opioid analgesics.

Methods: Individuals entering substance abuse treatment for an opioid use disorder in the period 2010–2016 (N = 5885) were asked about the specific opioid they first regularly used to get high. To limit long-term recall and survival bias, analyses was restricted to opioid initiation that occurred in the past ten years (2005–2015).

Results: In 2005, only 8.7% of opioid initiators started with heroin, but this sharply increased to 33.3% ($p < 0.001$) in 2015, with no evidence of stabilization. The use of commonly prescribed opioids, oxycodone and hydrocodone, dropped from 42.4% and 42.3% of opioid initiators, respectively, to 24.1% and 27.8% in 2015, such that heroin as an initiating opioid was now more frequently endorsed than prescription opioid analgesics.

Conclusions: Our data document that, as the most commonly prescribed opioids – hydrocodone and oxycodone – became less accessible due to supply-side interventions, the use of heroin as an initiating opioid has grown at an alarming rate. Given that opioid novices have limited tolerance to opioids, a slight imprecision in dosing inherent in heroin use is likely to be an important factor contributing to the growth in heroin-related over dose fatalities in recent years.

1. Introduction

The United States has been burdened by an epidemic of opioid abuse and overdose deaths over the past two decades (Manchikanti, Fellows, Ailinani, & Pampati, 2010). It began in earnest in the 1990s with sudden increases in the number of prescribed opioids, in particular novel extended release opioids not adulterated with acetaminophen or NSAIDs (e.g., OxyContin®) (U.S. OxyContin abuse and diversion and efforts to address the problem [Report to Congressional Requesters, #GAO-04-110], 2003). As the diversion of prescription opioids increased, they were perceived by abusers to be safer due to their legality and readily apparent brand and dose specificity, which helped avoid accidental overdose (Daniulaityte, Falck, & Carlson, 2012). In an effort to address this growing problem, a number of "supply" reduction efforts were launched by federal agencies and the pharmaceutical companies benefitting from the sale of these products. These include, but are not limited to, statewide prescription monitoring programs intended to discourage doctor shopping and "script doctors" (Brady et al., 2014), increased physician education on the appropriate use of opioids (Alford, 2016), and the development of abuse deterrent formulations of opioids which make it difficult to crush or solubilize tablets for insufflation or IV injection (Cicero & Ellis, 2015a).

Recent studies have shown that these supply-reduction efforts have been modestly successful in reducing the supply of prescribed opioids and subsequent diversion for non-therapeutic purposes (Dart et al., 2015a). Thus, those already dependent on prescription opioids were faced with a dilemma: find more money to buy harder to find and more expensive prescription opioids, or find a cheaper alternative. For many,

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the solution was a transition to heroin, a popular alternative given its steadily lower price, making it more widely accessible and with a high comparable, if not stronger, than prescription opioids (Cicero, Ellis, Surratt, & Kurtz, 2014; Compton, Jones, & Baldwin, 2016). Thus, to meet increased demand, there has been a significant dealer-driven increase in supply. As a result of this increased supply of cheap, accessible heroin, we hypothesized a spillover effect, where an increasing number of persons inexperienced with opioids might begin to experiment with readily available heroin as their first opioid of abuse, rather than a less risky, but also less accessible prescription opioid. Given the imprecision in titrating doses and the potential for potent adulterants (e.g., fentanyl analogues), we anticipated that, should our hypothesis be supported, this emerging trend could very well be associated with an increase in heroin related overdose fatalities, particularly in novice opioid users who lack the degree of tolerance found in more experienced ones.

To determine whether there has been, in fact, an increase in the use of heroin as a first opioid, we analyzed data on opioid use initiation patterns (i.e., first opioid regularly used) using self-administered surveys in opioid-dependent patients (N = 5885) entering one of over 150 substance abuse treatment programs around the country from 2011 to 2016.

2. Methods

This report utilized data from the ongoing nationwide Survey of Key Informants' Patients (SKIP) Program, a key element of the Researched Abuse, Diversion and Addiction-Related Surveillance (RADARS®) System, a comprehensive series of programs that collect and analyze post-marketing data on the abuse and diversion of prescription opioid analgesics and heroin (Cicero et al., 2007; Dart et al., 2015b). The SKIP Program consists of a Key Informant network with annual participation of over 150 public and privately funded treatment centers, with a reasonable representativeness of the four census areas (Region [SKIP %, 2014 Census%]; Midwest [27.9%,21.2%], Northeast [15.5%,17.6%], South [33.6%,37.6%] and West [23.0%,23.6%]). Key Informants were asked to recruit clients (eighteen years and older) who were entering their substance abuse treatment program with a primary diagnosis of opioid use disorder, as defined by DSM-IV or V criteria, depending on the time of completion. Clients were asked to complete an anonymous paper survey centered on opioid abuse patterns and related behaviors, with an 85% response rate attained. The survey packet included a $20 Wal-Mart gift card and a self-addressed stamped envelope which, after completion, was used by the respondent to mail the survey (identified by a unique case number) directly to Washington University in St. Louis (WUSTL). All protocols were approved by the WUSTL Institutional Review Board.

In addition to demographics, SKIP respondents, analyzed from 2011 to 2016, were asked the specific opioid they first regularly used (i.e. 2 + times a month), categorized as 'prescription opioid' or 'heroin', and the age they began to regularly use opioids. The year regular use began was calculated (*Year of survey completion − Age at survey completion + Age of first regular opioid use = Year of beginning regular opioid use*), with the analyses restricted to those initiating use within the past ten years (2005–2015; N = 5885) to limit long-term recall and survival bias (no respondent who completed a survey in 2016 initiated opioid use in that same year), a time-period shown to have stable recall for opioid abuse (Shillington, Cottler, Mager, & Compton, 1995). Cochran-Armitage test for trend was used to determine significant changes in first opioids over time and differences in demographic characteristics between heroin and prescription opioid initiates were assessed using Pearson Chi-Square tests of comparison using IBM SPSS Statistics v24.

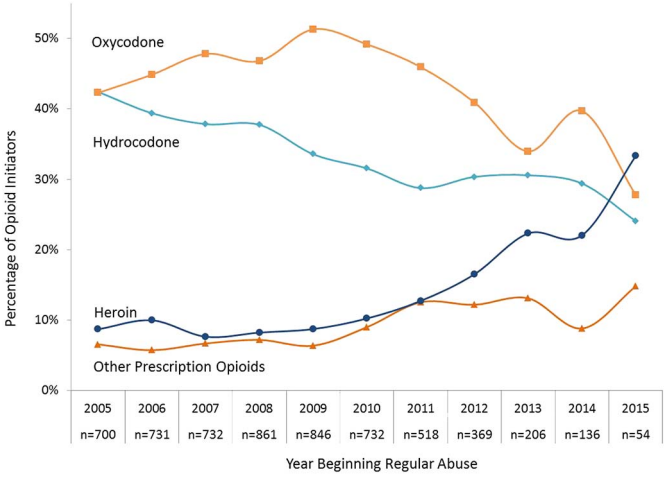

Fig. 1. First opioid of regular use among opioid initiates from 2005 to 2015 (N = 5885). Cochran-Armitage trend tests showed significant changes for heroin (< .0.001), hydrocodone (< 0.001), other prescription opioids (< 0.001), but not oxycodone (p = 0.13).

3. Results

3.1. First opioid

Fig. 1 shows the annual unadjusted proportion of total SKIP respondents who indicated initiating regular opioid use with prescription opioids (hydrocodone, oxycodone or other prescription opioids) or heroin from 2005 to 2015. Only 8.7% of opioid initiates who began regular use in 2005 started with heroin, but its use sharply increased thereafter to the point where in 2015, heroin as an initiating opioid was at its highest point, 33.3% ($p < 0.001$), with no evidence of stabilization. Hydrocodone and oxycodone were the most widely identified initiating opioids over the ten year period. While they were equally attractive for first time users in 2005 (42.4% and 42.3%, respectively), at levels in excess of heroin for several years (~10%), their rate of endorsements began to gradually decrease as initiation with heroin increased. By 2015, hydrocodone and oxycodone were at 24.1% ($p < 0.001$) and 27.8% ($p = 0.13$), respectively, below the 33.3% proportion of heroin – now the leading drug for new opioid initiates.

3.2. Demographic comparisons of recent heroin and prescription opioid initiates

As shown in Table 1, heroin initiates were compared to prescription opioid initiates across a number of demographic variables. While prescription opioid initiates were slightly older, had higher rates of college education, were slightly more likely to be white and tended to reside in more non-urban areas, all of these differences were very small (yet significant, given the sample size). Interestingly, there were no significant sex differences between the two groups.

4. Discussion

The rapid four-fold increase in the use of heroin by new initiates to opioid use from 2005 to 2015 is a striking finding with significant public health implications. Given the imprecision in estimating a correct dose of heroin, largely due to uncertainty about its purity and potential adulterants (i.e., fentanyl analogues), the possibility of overdose in opioid novices is considerable and seemingly inevitable given that they lack the ability to tolerate even small errors in calculating their initial dose of heroin. Obviously, we could not ascertain directly whether this was true in the users surveyed (i.e., with overdose death as the endpoint), but the possibility of overdose and death is a clear and present danger which must be addressed, particularly by agencies