

Contents lists available at ScienceDirect

## International Journal of Drug Policy



journal homepage: www.elsevier.com/locate/drugpo

Short Report

# Awareness and access to naloxone necessary but not sufficient: Examining gaps in the naloxone cascade



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ARTICLE INFO	A B S T R A C T
<i>Keywords:</i> Naloxone Narcan Opiate overdose Cascade	<ul> <li>Background: Despite promising findings of opioid overdose education and naloxone distribution (OEND) programs, overdose continues to be a major cause of mortality. The "cascade of care" is a tool for identifying steps involved in achieving optimal health outcomes. We applied the cascade concept to identify gaps in naloxone use. <i>Methods:</i> Data came from a cross-sectional survey of 353 individuals aged 18 and older who self-reported lifetime history of heroin use.</li> <li><i>Results:</i> The sample was majority male (65%) and reported use of heroin (74%) and injection (57%) in the past 6 months. Ninety percent had ever witnessed an overdose and of these 59% were in the prior year. Awareness of naloxone (90%) was high. Of those aware, over two-thirds reported having ever received (e.g. access) (69%) or been trained to use naloxone (60%). Of those who had ever received naloxone (38%), while 26% reported always carrying. Nearly half of those who had ever received naloxone, possession often/always compared to never was associated with being female (RRR = 2.88, 95%CI = 1.31–6.27) and ever used naloxone during an overdose (RRR = 4.68, 95%CI = 2.00–11.0).</li> <li><i>Conclusions:</i> This study identifies that consistent possession is a gap in the naloxone cascade. Future research is needed to understand reasons for not always carrying naloxone.</li> </ul>

#### Introduction

Naloxone (Narcan<sup>\*</sup>) is a medication that reverses opiate induced overdoses and does not have any addictive properties or negative effects on non-opiate related overdoses (Boyer, 2012; Wermeling, 2015). Naloxone access has been highlighted as one of the US Department of Health and Human Services' top three priority areas in response to the country's ongoing opioid epidemic (Kerensky & Walley, 2017; Wheeler, Davidson, Jones, & Irwin, 2012). Since the late 1990s, opioid overdose education and community naloxone distribution (OEND) programs have been implemented in 30 states and research shows the positive impact of these programs in reducing opioid related overdose deaths (Doe-Simkins et al., 2014). A 2015 systemic review of opioid overdose prevention and naloxone prescribing programs found OEND improves knowledge of opioid overdose and provides participants with the necessary skills and resources to safely administer naloxone to prevent death (Mueller, Walley, Calcaterra, Glanz, & Binswanger, 2015).

Despite these promising findings opiate overdose continues to be a major cause of mortality. In Baltimore City, from 2015 to 2016 the death rate due to heroin overdose increased 75% (260 deaths to 454) and 250% from fentanyl-related overdose (120 deaths to 419) (Maryland Department of Health & Mental Hygiene, 2017a). The Baltimore City Health Department has implemented an overdose prevention and response program since 2004 (Baltimore City Health Department, 2017b). The program has trained and dispensed naloxone to over 18,000 individuals through the city's needle exchange sites, drug treatment centers, correctional facilities and through on-line trainings. Those trained include people who use opiates, third parties at risk of witnessing an overdose, treatment providers, and correctional staff. Since its inception, the reach of the program has grown substantially, from a total of 7183 individuals trained in the five-year period from 2004 to 2009, to a total of 10,241 trained in the single year of 2016 (Baltimore City Health Department, 2017b). This has occurred within a context of evolving laws on the prescribing and dispensing of naloxone. In 2015, a statewide standing order allowed for the creation of a "blanket prescription" of naloxone to all Baltimore City residents who held a training certificate (Baltimore City Health Department, 2017a). In June 2017, a second standing order removed the training

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https://doi.org/10.1016/j.drugpo.2018.07.003

Received 20 December 2017; Received in revised form 22 June 2018; Accepted 15 July 2018 0955-3959/ © 2018 Elsevier B.V. All rights reserved.

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requirement and essentially made naloxone available over-the-counter (Baltimore City Health Department, 2017a; Maryland Department of Health & Mental Hygiene, 2017b). According to the Maryland Department of Health, more than 40 pharmacies across Baltimore City stock naloxone, and the medication is covered by the state's Medicaid plans (Maryland Department of Health & Mental Hygiene, 2017b, 2017c). Awareness, access and skills to use naloxone are requisite for optimal impact of OENDs. In a sample from a treatment center in New York, 65% were aware about naloxone, yet only 33% knew where they could access it and only 12% had ever witnessed naloxone being used (Kirane et al., 2016). Identifying gaps can enable targeted interventions to increase saturation of naloxone in communities affected by opioid overdoses.

The "cascade of care" has been a useful tool for identifying specific steps involved in achieving optimal health outcomes. The "cascade" concept originated with HIV but has been applied to other health conditions such as diabetes and hepatitis C (Ali, Bullard, Gregg, & del Rio, 2014; Linas et al., 2014). Overdose prevention involves multiple steps. With regards to naloxone distribution programs first individuals must be aware that naloxone is an effective opiate overdose intervention. Then they must have access and training to use naloxone during an opiate overdose event. However, in order to be effective in saving lives individuals must have possession during drug use episodes and use it with the person experiencing overdose. Therefore we conducted a cross-sectional survey with a community-based convenience sample of people who use drugs about their uptake and use of naloxone

#### Materials and methods

The survey was conducted from December 2016 to September 2017 as part of a larger randomized controlled trial for people living with hepatitis C. Participants were recruited by posting flyers at drug treatment centers, medical clinics and other community-based organizations that serve individuals who use drugs and by word-of-mouth. Eligibility criteria for the study were: aged 18 and older and self-report lifetime history of injection drug use. After providing informed consent participants were interviewed by trained research assistants in a private office. The current analysis was restricted to individuals who reported lifetime use of heroin (n = 353). All study procedures were approved by the Johns Hopkins University Bloomberg School of Public Health Institutional Review Board.

#### Measures

Naloxone cascade

Five pillars of the cascade were assessed.

Awareness: Participants were asked if they had ever heard about Narcan or naloxone (yes/no).

Access: Participants who were aware about naloxone were asked if they had ever received a kit containing naloxone (yes/no)."

*Training*: Participants who were aware about naloxone were asked if they had ever been trained to use naloxone (yes/no).

*Use*: All participants who were aware about naloxone and had received a kit were asked if they had ever used naloxone during an overdose (yes/no).

*Possession*: Among those who had ever been trained or received naloxone were asked how often they carried naloxone with them (never, rarely, sometimes, often, always).

#### Witnessing overdose experience

Participants indicated the number of overdoses they had witnessed in their lifetime and when the most recent witnessed overdose occurred. We categorized their responses as never, more than 1 year ago and in the past year.

#### Personal overdose history

Participants reported the number of lifetime overdoses they had experienced and when their most recent overdose occurred. We categorized their responses as never, more than 1 year ago, and in the past year.

#### Drug use characteristics

Participants self-reported use of heroin, prescription opiates, cocaine, crack and any injection drug use in the prior six months (yes/no).

#### **Demographics**

Self-reported sex, age, highest education and homelessness in the prior six month were recorded.

#### Analysis

Univariate statistics were used to summarize variables. Comparisons between frequency of carrying naloxone were made using ANOVA for continuous variables and chi square statistics for categorical variables. In instances where the cell size was less than 10 the Fishers exact statistic was applied. The mlogit statistical procedure was used to identify variables independently associated with carrying naloxone. Variables that were statistically significant < 0.10 were selected for entry into the mlogit model. We report the relative risk ratios and 95% confidence intervals which are estimations of the Odds Ratio.

#### Results

The sample (n = 353) was majority male (65%) and mean age was 46.5 years (SD = 10.7). Two-thirds had  $12^{th}$  grade education or higher (60%) and 43% reported being homeless in the past six months.

More than half reported use of crack (64%), heroin (74%) and injection (57%) in the past six months. One-third reported cocaine use and 24% prescription opiate use in the prior six months. Two-thirds reported lifetime personal overdose experience and 30% had overdosed in the prior year. Witnessing an overdose was common (90%) and of these 59% had witnessed an overdose in the prior year.

Naloxone Cascade

Fig. 1 displays the naloxone cascade. A majority of the sample were Aware of naloxone (90%), had Access to naloxone (69%) and received Training (60%). Nearly half of those aware and had received a kit containing naloxone had ever used it during an overdose (45%). Of those who were aware and received a kit with naloxone, over one-third never (36%) or rarely/sometimes carried naloxone (38%), while 26% reported always/often carrying.

Table 1 presents results of bivariate associations with frequency of carrying naloxone. A greater proportion of participants who were female sex (p = 0.06), reported witnessing an overdose in the prior year (p = 0.02), reported injection in the prior year (p = 0.05) and those having ever used naloxone (p < 0.001) carried naloxone often/always compared to never and rarely sometimes.



Fig. 1. Naloxone cascade among 353 study participants who reported a lifetime history of heroin use, Baltimore, MD.

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