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High occurrence of witnessing an opioid overdose in a sample of women who use heroin in Tanzania: Implications for overdose prevention

Haneefa T. Saleem^a, Samuel Likindikoki^{b,c}, Bareng A. S. Nonyane^d, Jessie Mbwambo^e, Carl Latkin^f

^aDepartment of International Health, Bloomberg School of Public Health, Johns Hopkins University, 615 North Wolfe Street, Room E5033, Baltimore, Maryland USA 21205

^bDepartment of Epidemiology and Biostatistics School of Public Health and Social Sciences Muhimbili University of Health and Allied Sciences P.O. Box 65015 Dar es Salaam, Tanzania

^cDepartment of Psychiatry and Mental Health School of Medicine Muhimbili University of Health and Allied Sciences P.O. Box 65001 Dar es Salaam, Tanzania

^dDepartment of International Health Bloomberg School of Public Health Johns Hopkins University 615 North Wolfe Street, Room E5610 Baltimore Maryland USA 21205

^eDepartment of Psychiatry and Mental Health School of Medicine Muhimbili University of Health and Allied Sciences P.O. Box 65001 Dar es Salaam, Tanzania

^fDepartment of Health, Behavior and Society Bloomberg School of Public Health Johns Hopkins University 624 North Broadway Avenue Hampton House Room 737 Baltimore, Maryland USA 21205

Abstract

Background: Opioid overdose is preventable and reversible. To target overdose prevention training and naloxone distribution, it is important to understand characteristics of those people who use drugs most likely to witness an overdose. In this paper we reported the proportion and characteristics of women who use heroin that had witnessed an opioid overdose in Dar es Salaam, Tanzania.

Methods: We conducted a cross-sectional survey with 200 women who use heroin. We fitted unadjusted and adjusted logistic regression models with witnessing an opioid overdose as the dependent variable and sociodemographic and drug-related variables as independent variables.

Results: The majority of participants (85%) reported having ever witnessed an opioid overdose. Age (adjusted Odds Ratio [aOR]=1.09; 95% CI: 1.02–1.12), having ever attempted to stop heroin

haneefa.saleem@jhu.edu .

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use (aOR=11.27; 95% CI: 2.25–56.46), history of arrest (aOR=3.75; 95% CI: 1.32–10.63), and spending time daily in places where people use drugs (aOR=3.72; 95% CI: 1.43–9.64) were found to be independently associated with ever witnessing an overdose.

Conclusions: Findings suggest the need for expanded access to naloxone to lay people and community and peer-based overdose prevention training in Tanzania, including the distribution of naloxone in settings with high drug use.

Keywords

overdose; heroin; women; Tanzania

INTRODUCTION

Opioid overdose is preventable and reversible. Naloxone is an opioid antagonist that can reverse overdose to prevent death. Increased access to naloxone for people likely to witness an overdose in community settings can not only prevent opioid overdose deaths but also provide opportunities for linking people who use drugs (PWUD) to treatment for opioid use disorder and other health services (Giglio, Li, & DiMaggio, 2015). The annual prevalence of opioid use in Africa is approximately 1.0% (compared to 1.2% globally), with 3.5 million people estimated to use any form of opioid, including heroin (UNODC, 2020). Though the prevalence of opioid use is comparable in Africa to global estimates, much of the existing literature on opioid overdose prevention and naloxone distribution is focused on high-income countries (McDonald & Strang, 2016), with little research done in Sub-Saharan Africa. Furthermore, in Tanzania access to naloxone is limited to trained health professionals in specialized hospitals and medication-assisted treatment clinics, however the World Health Organization (WHO) recommends increasing the availability of naloxone in community settings and training those most likely to witness an overdose in the management of opioid overdose (WHO, 2014). Knowing who might witness an overdose in pre-clinical, community settings will be critical to preventing overdose deaths by targeting overdose prevention educational training and naloxone distribution.

People who experience an overdose are more likely to witness an overdose (Bohnert, Tracy, & Galea, 2012). Recent research from Tanzania has demonstrated high rates of non-fatal overdose among women who use heroin (Saleem et al., 2021), so it is likely that many of these women have also witnessed overdosed, but this has not been explicitly examined. Furthermore, previous research has described the risks of violence that women who use drugs face in traditionally male-dominated drug hangouts in Tanzania, which lead them to isolate themselves (Zamudio-Haas, Mahenge, Saleem, Mbwambo, & Lambdin, 2016). This may result in gender differences in witnessing an overdose and have implications for reaching women with overdose prevention interventions. In this paper we report the prevalence of witnessing an opioid overdose in a sample of women who use heroin in Dar es Salaam, Tanzania, and identify characteristics associated with witnessing an overdose.

METHODS

Data for this analysis are from a cross-sectional survey conducted between November 2018 and February 2019 in Dar es Salaam, Tanzania among 200 women aged 18 years and older who reported heroin use in the past month. Women were recruited through a chain-referral approach using seeds identified by community outreach workers engaged in harm reduction efforts for PWUD. Each survey participant received three recruitment coupons to recruit peers into the study. Participants received a primary incentive of 10,000 Tanzanian shillings for completing the survey and a secondary incentive of 4,000 Tanzanian shillings for each eligible peer recruited. Detailed study methods are reported elsewhere (Saleem et al., 2021).

Informed, oral consent was obtained from each participant before the survey. Surveys were administered in Swahili through face-to-face interviews conducted in a private room on-site at a community-based organization. The survey questionnaire included questions on witnessing an opioid overdose, sociodemographic characteristics, drug use, HIV testing and treatment, stigma, and mental health.

The study was approved by ethical review boards at the Muhimbili University of Health and Allied Sciences, National Institute for Medical Research in Tanzania, and Johns Hopkins University Bloomberg School of Public Health.

Measures

Outcome variable—Our primary outcome, having ever witnessed an opioid overdose, was a dichotomous variable assessed through a survey question on whether the respondent had ever witnessed someone overdose from using heroin.

Sociodemographic variables—Sociodemographic variables included age (continuous) and unstable housing in the prior six months (dichotomous), which was assessed using the question: “At any time during the past six months, did you not have a regular place to stay.”

Drug use variables—We included variables related to drug use that we hypothesized would be associated with having friends or acquaintances who use drugs. These covariates included years spent using heroin (continuous), ever injected drugs (dichotomous), ever attempted to stop using heroin using any method (dichotomous)—as people may have decided to stop using heroin after witnessing someone overdose—ever attempted to stop using heroin unassisted or without any other intervention (dichotomous), and ever attempted to stop using heroin with medication-assisted treatment for opioid use disorder (MAT) (dichotomous). Polydrug use in the prior 6 months was based on self-reported use of marijuana, cocaine, valium or prescription pain medications (any use), or petrol/glue in addition to heroin use; it was measured dichotomously. History of arrest (dichotomous) was assessed as having ever been arrested for any reason. People with a history of arrest might have others who use drugs in their social networks, which increases their exposure to policing and risk of arrest. Daily exposure to places where drugs are used in the prior six months was measured dichotomously.

Data Analysis

We used Fisher's exact tests for categorical variables and t-tests for continuous variables to examine sociodemographic and other differences between participants who reported ever witnessing an opioid overdose and those who had never witnessed overdose. We fitted unadjusted and adjusted logistic regression models with witnessed opioid overdose as the dependent variable and sociodemographic and drug-related variables as independent variables. Independent variables exhibiting significant associations with ever witnessing an overdose ($p < 0.05$) in unadjusted models were then fitted into a multivariate logistic regression model.

RESULTS

Characteristics are summarized for the study sample by whether or not they had ever witnessed an opioid-related overdose in the Table. An overwhelming majority of participants (85%) reported having ever witnessed an overdose.

Factors associated with having ever witnessed an opioid overdose

In unadjusted models, age, years spent using heroin, being unstably housed in the prior six months, having ever attempted to stop using heroin, history of arrest, and daily exposure in the prior six months to places where drugs were being used were all found to be significantly associated with having ever witnessed an overdose. We did not detect a significant association with polydrug use in the prior 6 months.

In the final adjusted model, age (aOR=1.09; 95% CI: 1.02–1.12), having ever attempted to stop using heroin using any method (aOR=11.27; 95% CI: 2.25–56.46), history of arrest (aOR=3.75; 95% CI: 1.32–10.63), and daily exposure in the prior six months to places where people use drugs (aOR=3.72; 95% CI: 1.43–9.64) were all positively associated with having ever witnessed an opioid overdose. The number of years spent using heroin and unstable housing were no longer associated with witnessing overdose in the adjusted model. We examined adjusted relationships between ever attempting to stop heroin use unassisted and with MAT separately due to high correlation between the two variables and with the variable ever attempting to stop heroin use with any method. An unassisted attempt to stop heroin use was not significantly associated with witnessing an overdose. Attempting to stop heroin use with MAT perfectly predicted witnessing an overdose.

DISCUSSION

The present study examined the characteristics of women who use heroin associated with having ever witnessed an opioid-related overdose in Dar es Salaam, Tanzania. We found that the majority of participants (85%) reported having ever witnessed an opioid overdose, which is consistent with data from other settings demonstrating lifetime prevalence of witnessed overdose among people who use drug ranging from 50% to 96% (Martins, Sampson, Cerda, & Galea, 2015). Factors found to be significantly correlated with having ever witnessed an overdose included age, ever attempting to stop heroin use, history of arrest, and spending time daily in places where people use drugs. Women with these characteristics would be prime candidates for overdose prevention training. Despite previous research demonstrating

a relationship between homelessness and witnessing an overdose (Bohnert et al., 2012), we did not detect this association in our study sample.

Although previous research in this setting found women were more likely to use alone than men (Zamudio-Haas et al., 2016), we still found that a meaningful majority of the sample had recently spent time in places where people were using drugs. We know from studies in the U.S. that targeting areas with concentrated levels of drug use can facilitate reversals of opioid overdoses and reduce subsequent overdose deaths (Rowe et al., 2016). Peer-based naloxone distribution has, particularly, been effective in overdose prevention (McDonald & Strang, 2016). The high proportion of witnessing an overdose in our sample suggests women who use heroin in this setting are embedded within networks of PWUD and might also benefit from community, peer-based naloxone distribution. Also, given the relationship between using MAT to stop heroin use and witnessing an overdose, distributing naloxone through MAT clinics may further support expanding access to naloxone for possible peer bystanders of overdose events. However, hesitancy and unwillingness among individuals on MAT to accept naloxone including among those actively using heroin (Salvador et al., 2020), may need to be overcome for MAT programs to be effective sites for naloxone distribution.

The high proportion of women who use heroin reporting having witnessed an overdose underscores the need for overdose prevention training for this group and broader policy changes that expand access to naloxone to PWUD who frequently witness overdoses. The WHO recommends increasing the availability of naloxone in pre-hospital, community settings and training those most likely to witness an overdose in the management of opioid overdose, including administering naloxone and resuscitation and post-resuscitation care (WHO, 2014). Naloxone is currently available in Tanzania for use by trained health care providers managing opioid overdose within specialized hospitals and medication-assisted treatment clinics. However, there is currently no guidance on the use of naloxone by those who witness an overdose in a pre-hospital, community setting, and thus no community or peer-distribution of naloxone under the current system (Stone & Shirley-Beavan, 2018). Furthermore, though naloxone is included on the list of essential controlled medicines in Tanzania, formulations of naloxone other than injections (e.g. intranasal) have yet to be registered in Tanzania (Ministry of Health, 2017). This limits the lifesaving support that can be provided to individuals experiencing an overdose. Including intranasal formulations on the list of essential controlled medicines and committing to overdose prevention training of PWUD will allow for administration of naloxone in high drug use communities by laypersons, particularly PWUD, most likely to witness an overdose.

This study has limitations. First, the cross-sectional study design limits our ability to assess temporality or directions of observed associations and to make causal inferences. For example, the association between having ever attempted to stop using heroin with witnessing an overdose could be due to women who had witnessed an overdose being more likely to attempt to stop using heroin. Second, the chain-referral method that we used to recruit women from this hidden population limits the generalizability of our findings beyond the study sample. In addition, we did not assess the timeframe of witnessing an overdose. Third, we may not have had sufficient power to detect differences in the outcome by key

variables given our relatively small sample size and the high prevalence of the outcome. Since the prevalence of the outcome was high, the odds ratios overestimated the magnitude of the association. Finally, we relied on a self-reported measure of having ever witnessed an overdose that did not specify symptoms of overdose, so interpretations of overdose may have varied. We attempted to reduce this type of measurement bias by using a term commonly used in Tanzania by PWUD to refer to overdose. However, assessing how individuals define and identify overdoses would be an important contribution for future research.

We hope that these findings will serve as a catalyst for future research on overdose prevention in Tanzania and other sub-Saharan African countries, including gaps in knowledge of overdose prevention among PWUD. Ideally, findings from this study will lead to policy discussions around overdose prevention and access to naloxone in Tanzania. Given the high proportion of our sample who witnessed an overdose, we advocate for relaxing policies around naloxone access to include PWUD who are most likely to witness an overdose in the community. Moreover, these findings suggest a need for community, peer-based overdose prevention training and distribution of naloxone in settings where PWUD congregate.

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HIGHLIGHTS

- Access to naloxone is important for overdose reversal
- In Tanzania, access to naloxone is restricted to specialized health professionals
- A majority of women who use heroin (85%) had ever witnessed an opioid overdose
- Expanding access to naloxone to people who use drugs in Tanzania is critical

Table 1.

Sample characteristics and unadjusted and adjusted odds ratios for witnessed overdose (N=200)

Characteristic	Sample Characteristics		Logistic Regression Models			
	Ever witnessed an overdose	Full sample	Unadj. OR (95% CI)	p-value	aOR (95% CI)	p-value
	(n=170)	(n=200)				
	% (n)	% (n)				
Age in years, mean (range)	34 (19 – 56)	33.5 (19 – 56)	1.06 (1.01–1.12)	0.026 *	1.09 (1.02–1.12)	0.010 *
Years spent using heroin, mean (range)	6.7 (0.5 – 33)	6.2 (0.5 – 33)	1.10 (1.01–1.20)	0.035 *	0.95 (0.86–1.04)	0.263
Ever injected drugs	15% (26)	13% (26)	--		--	
Unstable housing in prior 6 months	38% (65)	35% (70)	3.10 (1.13–8.49)	0.028 *	1.83 (0.59–5.67)	0.292
Polydrug use in prior 6 months	72% (121)	70% (139)	1.68 (0.75–3.75)	0.205	--	
Ever attempted to stop using heroin using any method	44% (75)	39% (77)	11.05 (2.55–47.89)	0.001 *	11.27 (2.25–56.46)	0.003 *
Unassisted (i.e., 'cold turkey')	25% (42)	22% (44)	4.59 (1.05–20.11)	0.043 *	--	
Medication-assisted treatment	17% (28)	14% (28)	--		--	
History of arrest	85% (144)	81% (162)	3.69 (1.59–8.56)	0.002 *	3.75 (1.32–10.63)	0.013 *
Daily exposure to places where people use drugs in prior 6 months	65% (110)	60% (120)	3.67 (1.61–8.34)	0.002 *	3.72 (1.43–9.65)	0.007 *

Percentages rounded to the nearest integer

Unadj. OR: unadjusted odds ratio; aOR: adjusted odds ratio

* Statistically significant at $p < 0.05$