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Trajectories of initiation for the heroin-based drug *whoonga* – qualitative evidence from South Africa

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Data Statement:

Given the highly sensitive nature of interview questions and participants' responses to them, the raw qualitative data used in this study is confidential and not available for public sharing.

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Abstract

Background—*Whoonga* is a smoked heroin-based street drug that first emerged in South Africa a decade ago. While previous scientific reports suggest that use is growing and youth are particularly vulnerable, trajectories of initiation are not well characterized.

Methods—In 2015, 30 men undergoing residential addiction treatment for this smoked heroin drug in KwaZulu-Natal, South Africa participated in semi-structured interviews about their experiences using the drug. Interview data were coded using qualitative content analysis.

Results—Participant trajectories to initiating smoked heroin were "vertical" in the context of marijuana use or "horizontal" in the context of other hard drug use. Participants reporting vertical trajectories began smoking heroin as youth at school or in other settings where people were smoking marijuana. Several participants with horizontal trajectories started smoking heroin to address symptoms of other drug or alcohol addiction. Social influences on initiation emerged as an overarching theme. Members of participants' social networks who were smoking or distributing heroin figured prominently in initiation narratives. Surprisingly, references to injection drug use were absent from initiation narratives. Participants reported people who smoke heroin differ from those who inject heroin by race.

Conclusion—Consistent with theories implicating social and structural influences on substance use initiation, people who started smoking heroin had social contacts who smoked heroin and frequented places where substance use was common. Smoked heroin initiation for several participants with horizontal trajectories may have been averted if they accessed evidence-based treatments for stimulant or alcohol use disorders. With increasing reports of heroin use across Africa, a coordinated approach to address this growing epidemic is needed. However, because smoked heroin and injection heroin use occur in distinct risk environments, interventions tailored to people who use smoked heroin will be needed to prevent smoked heroin use, prevent transition to injection use, and mitigate other social harms.

Keywords

Opiate; opioid; nyaope; cannabis; recreational use of antiretroviral medication; HIV

Background

Whoonga is a heroin-based street drug in South Africa that has garnered increasing attention since it was first described in 2010 (Hull, 2010; McEachran, 2013; Ross, 2013) because it is rumored to be cut with household cleaning products, rat poison, and HIV antiretroviral medication (ARVs) (Cullihan, 2011; Grelotti, Closson, & Mimiaga, 2013; Grelotti et al., 2014; PlusNews, 2011). Whoonga and the similar street drug *nyaope* are categorized as distinct substances in South African epidemiological surveys (Dada et al., 2019b; News24, 2014). Although injection heroin use exists in South Africa, more admissions for heroin treatment in South Africa are related to smoked heroin (Dada et al., 2019b). Available data and news reports describe whoonga as a low-grade heroin that is smoked by itself or in

combination with other drugs like marijuana (Grelotti et al., 2014; Dada et al. 2019a). In some South African communities, smoked heroin is perceived to be widely available, inexpensive, and increasingly prevalent among school-aged youth (Grelotti et al., 2014; Ross, 2013; Shembe, 2013). While recent treatment data may reflect a relative 'leveling-off' of cocaine and methamphetamine use (Dada et al., 2016), the proportion of substance abuse treatment admissions for heroin have been increasing since the mid-1990's (Parry, Plüddemann, & Bhana, 2009). Although the admissions related to injection heroin use have been stable recently, admissions for smoked heroin nearly doubled for "whoonga/nyaope" in the province of KwaZulu-Natal – from 10–11% to 18% – from 2017 to the first half of 2018 (Dada et al., 2019b). This nascent epidemic threatens public health and safety by increasing crime, disrupting HIV treatment delivery, fomenting resistance to ARVs, and contributing to HIV risk behaviors such as transactional sex and 'bluetoothing' (intravenously injecting the blood of an intoxicated user to share a high) (Fihlani, 2011; Grelotti et al., 2014; Mkhize, 2017; Rough et al., 2014).

The epidemic of smoked heroin in South Arica has emerged alongside a growing heroin epidemic in Africa (Odejide, 2006). Heroin, previously rare in Sub-Saharan Africa, became more readily available in tandem with increased trafficking activity along African routes since the 1980s and 1990s (Leggett, Plüddemann, Parry, & Louw, 2002; McCurdy & Kaduri, 2016; Odejide, 2006; United Nations Office on Drugs and Crime, 2015). Qualitative data from Tanzania, Kenya, and Senegal suggest heroin has become a popular drug of abuse with an established marketplace across the region (Klein, 1999; McCurdy & Kaduri, 2016; Pasche & Myers, 2012; Raguin et al., 2011; Syvertsen et al., 2016; Tiberio et al., 2018). As in South Africa, heroin in Tanzania and Kenya is frequently combined with marijuana and smoked as a 'cocktail' (McCurdy, Williams, Kilonzo, Ross, & Leshabari, 2005; Mital, Miles, McLellan-Lemal, Muthui, & Needle, 2016; Syvertsen et al., 2016; Tiberio et al., 2018). In these contexts, initiation of heroin can be brokered by peers or drug merchants who expose often socially vulnerable youth to heroin for the first time by coopting existing smoking practices or settings, applying peer pressure, or by "tricking" them (i.e., exposing them to heroin without their knowledge) (Hobkirk, Watt, Myers, Skinner, & Meade, 2016; McCurdy et al., 2005; McCurdy & Kaduri, 2016).

Given the expanding scope of the smoked heroin epidemic in South Africa and a concern that it may lead to a wider epidemic of injection heroin use and HIV among other public health and safety problems, effective prevention, treatment, and harm reduction strategies are needed. A detailed understanding of trajectories to the initiation of smoked heroin in South Africa may help identify targets for intervention and contextualize this local epidemic against the backdrop of heroin use in other African countries. Data on how individuals are exposed to this form of heroin is limited. A qualitative analysis of interviews with four adolescent whoonga users from a high school near Durban identified peer pressure, poor parent-child bonding, and ignorance of the drug's potential for dependence as factors behind their beginning to smoke heroin (Shembe, 2013). Our sample, taken from the largest qualitative study of people smoking heroin in South Africa to date, includes a diversity of ages, educational, ethnic and employment backgrounds intended to shed light on a wider spectrum of ways people first smoke heroin. Here we present an analysis of interviews with

the goals of describing trajectories of smoked heroin initiation and identifying targets for intervention.

Methods

Participants and procedures

In 2015, we conducted qualitative interviews with 30 participants receiving residential treatment for whoonga addiction at a large, not-for-profit substance use treatment facility in Durban. Participants were eligible if they were 1) aged 18 years or older, 2) admitted voluntarily for substance abuse treatment related to whoonga use, 3) able and willing to provide written informed consent, and 4) isiZulu or English-speaking.

Treatment center staff informed patients admitted for whoonga addiction about the study, and those who expressed interest were referred to the study team. Participation was voluntary. Participants could decline to be interviewed with no impact on their treatment. Because of physical discomfort related to the early stages of heroin withdrawal, interviews were arranged for approximately one week after participants' admission to the facility. Study staff reached out to those who expressed interest in the study and, for those still willing to participate, arranged an interview in a private setting at the facility. After completing the informed consent process, each participant answered a brief demographic questionnaire and completed a 60–90 minute semi-structured interview. Interviews followed an interview guide that contained questions and probes exploring multiple domains of the lived experience of heroin use in this context. The interview guide was developed and refined by study staff with input from staff at the treatment facility. It was translated into isiZulu, back-translated into English, and reviewed for equivalence by the study team. Interviews were recorded, transcribed, and translated into English when necessary, and stripped of identifying information for analysis.

Participants were compensated 100 ZAR (approximately $7 US) for their time. All study procedures were approved by Institutional Review Boards at The Massachusetts General Hospital / Partners Healthcare, the University of California San Diego, and The University of the Witwatersrand's Human Research Ethics Committee.

Analytic approach

We employed a descriptive qualitative content analysis approach to the data (Altheide, 1996). Our initial codebook was comprised of etic codes derived from the semi-structured interview guide and from a prior qualitative study on perceptions of this form of smoked heroin (Grelotti et al., 2014). It consisted of a label and a definition (Silverman, 2010) for each code related to the overarching domains: the drug itself, characteristics of its users, interactions between the drug and the community, and perceptions of what is needed to stem the epidemic. Because more than one coder was involved in coding (Burla et al., 2008), intercoder reliability was assessed by double-coding interviews until suitable agreement between coders was achieved (Cohen's kappa = 0.85) for four consecutive double-coded interviews, after which interviews were single-coded. Throughout the coding process, emic codes were derived from interview transcripts and incorporated into the codebook, such that

our analysis scheme reflects both investigator- and participant-defined aspects of heroin use. NVivo version 11 (QSR International, Melbourne, Australia) was used for the analysis.

As each participant was prompted to relate their first experience smoking heroin, we applied an 'initiation' sub-code to these descriptions and their contextual elements. After all codes were applied, we developed matrices to assess the representation of prior drug experience and other elements in participants' initiation experiences. Where a certain combination of features consistently appeared together, these were understood to represent different trajectories of initiation. In addition to these trajectories, social influences on participants' experience of initiation were identified and examined as overarching themes. In a post-hoc analysis, we applied directed content analysis (Hsieh & Shannon, 2005) to examine participants' narratives for experiences and perceptions of injection heroin use.

Results

Participant Characteristics

Characteristics of participants are summarized in Table 1. As there were no inpatient or residential treatment options for women at the time of the study, all participants were male. A majority of participants identified as Black. All reported a household monthly income of ≥ 5,000 South African Rand (greater than approximately $414 US), with the exception of one participant, who did not know his household income.

Trajectories of smoked heroin use

Participants' narratives of smoked heroin initiation reflected multiple pathways to use, with two trajectories emerging in qualitative analysis: 1) participants started smoking heroin in the setting of marijuana use because of curiosity, boredom with marijuana, and/or social influences; or 2) started smoking heroin as an alternative to "hard" drugs or to modulate effects of hard drugs or heavy alcohol use. Social influences on substance use initiation emerged as an overarching theme. Individual trajectories, even for participants who reported that they sought out heroin on their own, were influenced by members of their social network and/or the social milieu. References to injection drug use were absent from participants' initiation narratives. Participants suggested that injection drug use was uncommon among people who smoke whoonga and suggested people who inject heroin and people who smoke heroin may differ by race.

Introduced to smoked heroin in the setting of marijuana use

Participants saw marijuana use as a near-universal precursor to smoking heroin. Multiple interviewees asserted that all users of smoked heroin had at one time smoked marijuana cigarettes, and often also alcohol and tobacco cigarettes.

> *You can't tell me that you have smoked whoonga but haven't smoked marijuana.* (20 year-old participant)

> *It starts slowly. It starts by drinking alcohol. If you drink; many people like a cigarette. When you drink you also tend to smoke. That is how it starts having started by smoking a cigarette. So people…say that it is nice when you drink*

alcohol and smoke weed, and it goes on and on until they end up in whoonga. (30 year-old participant)

Several participants reported a direct transition from smoking marijuana to smoking heroin. Many of these "vertical" trajectories from smoking marijuana to smoking heroin occurred when they were students. Introduced to smoking heroin while smoking marijuana with schoolmates in their social network, their initiation took place during the school day at school or off-campus while absent from school. Participants smoked cigarettes containing adulterated heroin powder, tobacco, and marijuana. These heroin-containing cigarettes looked like "a small Zulu cigarette" (i.e., a typical marijuana cigarette) and could be mistaken for a marijuana cigarette by someone unaware of the added heroin.

I was made to know it by boys I was dancing with at school. We used to dodge school during break times and stay in the forest and smoke the Zulu cigarette. (20 year-old participant)

Several other participants reported a vertical trajectory outside of the school setting, first smoking heroin in a social milieu where they and members of their social network were accustomed to using marijuana and/or alcohol. While smoking marijuana, participants reported being introduced to heroin by friends who smoked heroin or other social contacts such as drug merchants who sold both marijuana and heroin. These social gatherings occurred in their neighborhood or in spaces that were socialized for drug use, such as "the house where we would smoke weed." In some cases, drug merchants hosted users of both drugs at their own homes.

I started it in 2009 in my neighborhood. I was with my friends and we were smoking, then they introduced me to say there is this certain drug. Then I tried it… I only thought it is just a drug like marijuana because I was smoking marijuana obviously. (32 year-old participant)

Maybe there are some who smoke weed and there are some that smoke whoonga, perhaps in the same place, perhaps at the same merchant. You will also end up being hooked there. (30 year-old participant)

Many participants with vertical trajectories reported asking friends or others for heroin because of boredom with marijuana. Marijuana use was said to have started at a young age, "from standard 4" (primary school, grade 6). Over time the "guff" (high) experienced from smoking marijuana would lose intensity. As one participant put it: "I ended up no longer feeling [marijuana]". At this point several participants were "tempted to try something new." Participants became curious about heroin and desired to smoke it after witnessing their friends smoke heroin and noticing that their friends' high was visibly more intense. There were also rumors about smoked heroin enhancing the pleasure of sexual intercourse by delaying time to orgasm.

You would see him getting drugged more, but you are smoking the same thing… Then you say to yourself, I would also like to smoke this drug. (29 year-old participant)

Each initiation narrative had a social context. Although most participants viewed initiation of heroin as a personal choice, they were influenced by those around them. Some

participants felt “pressured” to smoke heroin by their friends. One participant “was just made to smoke a [heroin-laced marijuana cigarette] thinking that it was just [marijuana]” by his friends. The social milieu also factored into the initiation narrative of participants who started smoking heroin as a form of “therapy” to manage psychosocial stress. For example, spending time in an informal settlement exposed one participant to heroin which he first smoked while experiencing psychosocial problems.

> *I used to go buy marijuana at the dealer’s house and it is in the squatter camp. So I go there and sit and see all the other guys doing whoonga. I got into an argument with my mom and my sister. She does not live too far from us and I said okay let me try whoonga. Maybe that will help me, because marijuana was not working, I was still upset. I tried [smoking heroin] and all my problems just melted away. Paranoia, everything, just went away.* (36 year-old participant)

One participant had a very unique set of social influences on heroin initiation. Although it is not clear from his narrative that he was using alcohol or marijuana at the time, he reported that he decided to initiate heroin out of frustration with a friend who had been falsely spreading rumors that he was already using it.

> *I said no one trusts me so I do not give a damn and that is when I started smoking.* (27 year-old participant)

Although most participants knew that they were smoking heroin the first time they used it, several participants were not aware of its addictive potential. Many first-time users of heroin transitioning from marijuana had experienced marijuana to be somewhat benign, providing a high while allowing the user to have some agency over their use. Participants noted they expected a similar experience with heroin and did not anticipate that the drug might be more addictive than marijuana. Participants did not appear to learn about the downside of smoked heroin from others. One participant who had been smoking marijuana was told something had been added to the marijuana but thought it “was not anything that would hook me in such a way.” Another participant was not aware that smoked heroin says he hadn’t considered the possibility that heroin could be consumed in a cigarette and pointed out “we see these things on TVs… heroin that is an injection and we expect it in that form.” Others acknowledged they knew that they were smoking heroin but did not expect it to be addictive.

> *Okay, I know that marijuana is a drug and it’s not needed, but it is better because it doesn’t have an arosta (withdrawal syndrome) and doesn’t make me sick that way… When I was introduced to [smoked heroin], I thought it was the same as marijuana.* (32 year-old participant)

Started smoking heroin in the setting of “hard” drug or heavy alcohol use

“Horizontal” trajectories, transitioning from “hard” drugs like crack cocaine, also occurred and were heavily influenced by members of their social network and the social milieu. Several participants who regularly purchased other drugs from a merchant reported first using heroin when it was offered to them by the same dealer. One participant was given heroin when the pill he preferred to smoke was not available, and another when his dealer for crack cocaine recommended it to him. One participant transitioned from methaqualone (Mandrax) to smoked heroin because his dealer shared heroin that the dealer himself had

been smoking. This participant found the high of smoked heroin so much more enjoyable that he "had no interest in Mandrax anymore." Despite the transactional nature of these initiation stories, participants suggested being introduced to this new drug was part of having a social relationship with a dealer.

Participants also reported horizontal trajectories when smoking heroin to modulate the effects of hard drugs or heavy alcohol use. For example, those who had used crack cocaine described how they began smoking heroin to help them function and to moderate the paranoia and sleeping difficulty that occurred with stimulant intoxication. While some participants reported being introduced to heroin by friends or acquaintances with whom they had been using crack cocaine, one participant said that a drug merchant had introduced him to smoking heroin and told him how to use the drug with crack cocaine to "drop this highness". When participants used the two drugs together, they alleviated undesirable aspects of crack cocaine and/or heroin intoxication.

> *When I was so high on crack then I could not talk, so I needed something to you know bring me down like…back to my stable state of talking to the guys… So they introduced me to this and they said, "Take this here. It will make you alright."* (23 year-old participant)

For one participant the decision to begin smoking heroin was an intentional effort to alleviate symptoms of alcohol dependence because he was told smoking heroin will help him stop drinking.

> *Actually, it was my intention to stop using alcohol, basically because alcohol was then overpowering me. I was just exploring and trying out something that would be different… Whoonga does not get along with beer, it makes you only focus on it.* (35 year-old participant)

Participants also reported initiating smoked heroin because heroin intoxication was complementary to the intoxicating effects of other drugs. A participant who drank and used ecstasy to "uplift the drink" says he first smoked heroin when his cousin gave him some of the drug while he had already been "drinking and drugging." "There are so many who are hooked just because they have used ecstasy and when they are boosting they would smoke whoonga."

Those reporting a horizontal transition appeared to be aware of that smoked heroin was addictive. For example, one participant had heard about the dangers of smoking heroin on the radio and then set out to smoke the drug because he "wanted to experience what has been said about it."

Injection heroin use

Whereas we found multiple references to people who smoked heroin influencing our participants initiation of smoked heroin, we did not find any reference to injection heroin use in initiation narratives. Participants described injection heroin use as uncommon among people who smoke heroin. One reason for this was that smoked heroin was described as a "cheaper version" of heroin that is not suitable for injection. Participants also reported that

people who smoke heroin and those who inject it differ by race: “Black people smoke heroin with marijuana and White people like injecting it, most White people and Coloured people”.

> *What I’ve noticed is that for White people, it’s bad for them. When they smoke it, they inject themselves. When you inject yourself using it, my friend, there is no hope for you.* (32 year-old participant)

Only one participant who identified as Black described injection heroin use. Although he first started using heroin by smoking it and typically smoked it, he would occasionally “put a drop of water on it” to create a liquid which he would inject when he “didn’t have money”.

Discussion

In this the largest qualitative study among South Africans who smoke heroin, we found that trajectories to smoked heroin use were heavily influenced by social and structural factors. Similar to transition to *injection* heroin use in other settings (Latkin, 1998; Sherman, Smith, Laney, & Strathdee, 2002; Small, Fast, Krusi, Wood, & Kerr, 2009), participants’ friends, peers, drug merchants, and others who were using and/or selling heroin figured prominently in the initiation narratives of those who started *smoking* heroin in this context. For example, participants’ social contacts distributed heroin to participants, glamorized its use, and/or encouraged its use (e.g., to alleviate problems related to crack cocaine). Participants seemed to exhibit a “peer preference” and assorted with like-minded peers, some of whom were already smoking heroin (Coggans & McKellar, 1994). The impact of social and structural factors could also be observed among participants who reported initiating heroin as a means to manage psychosocial distress. For example, “walking through the squatter camp” or otherwise being exposed to environments where people were smoking marijuana influenced these participants’ trajectories. The concept of a “risk environment” (i.e., “the social situations, structures and places in which risk is produced”) is a useful framework to evaluate HIV risk among people who inject drugs (Rhodes, Singer, Bourgois, Friedman, & Strathdee, 2005, p 1027), and applied here captures the dynamic interactions between practices, places, people, beliefs, and other social and structural factors surrounding the people who transitioned to smoked heroin in our study.

Although prior marijuana use was ubiquitous among both participants with vertical and horizontal trajectories, social and structural influences on initiation narratives were also ubiquitous. According to the Gateway Hypothesis (Kandel, 2002), smoking marijuana may have been facilitative to smoking heroin. However, rather than marijuana use is a critical stage in a sequence to smoking heroin, our findings suggest that the connection between smoking marijuana and smoking heroin may be enhanced by overlapping or shared risk environments. Both marijuana and heroin are smoked in a similar cigarette form and used or distributed by people who share the same spaces. Exposure to the social context of marijuana and heroin use, and not exposure to marijuana itself, was a critical event in the trajectory toward smoked heroin use. Altogether these data support a growing body of literature demonstrating that social and structural forces are important mediators of substance use initiation (Rhodes et al., 2011).

Accordingly, describing trajectories as vertical and horizontal in this context is not meant to imply a sequence to drug use but instead to characterize different groups at risk for smoked heroin initiation. For example, several participants with horizontal trajectories reported trying heroin to alleviate the negative effects of hard drugs and heavy alcohol use. Although the use of heroin to “facilitate the descent” from crack cocaine has been described in Senegal (Raguin et al., 2011, p. 1132), ours is the first report of the initiation of heroin to moderate the intoxicating effects and/or paranoia from stimulant use and as a means to stop drinking alcohol. Participants often started smoking heroin under these circumstances upon the advice of their social contacts. Because of a high prevalence of polysubstance use among heroin users throughout Africa (McCurdy & Kaduri, 2016; Plüddemann, Parry, Flisher, & Jordaan, 2008; Raguin et al., 2011; Syvertsen et al., 2016), these types of horizontal trajectories underscore the importance of understanding knowledge and attitudes toward substance use treatment and providing access to comprehensive treatment services.

Our findings are largely consistent with what has been observed in other heroin epidemics across Africa. Vertical trajectories of smoked heroin initiation have been similarly described in Tanzanian youth who are introduced to heroin-laced cigarettes (McCurdy et al., 2005; Tiberio et al., 2018). Economic pressures, rapid modernization, and parental mortality in the HIV epidemic have been implicated in disrupting family structures and leaving youth vulnerable to drug use (McCurdy et al., 2005; Odejide, 2006; Pasche & Myers, 2012). Limited opportunities to participate in the formal economy bring youth and adults into informal spaces where they can be exposed to drug use (McCurdy et al., 2005). In the context of stress and financial hardship, drug use may be an appealing means to cope, and drug dealing may be a means to make a living in the informal marketplace (Odejide, 2006; Peltzer, Ramlagan, Johnson, & Phaswana-Mafuya, 2010).

The similarities between South Africa and Tanzania are worrisome because, if the heroin epidemic in South Africa follows the same path, South Africa may also experience a marked expansion of injection heroin use. In Tanzania, the less refined, “brown” heroin was primarily smoked in the 1980s and 1990s (McCurdy et al., 2005). From 1998–2003, a variety of factors fueled an increase in injection use: 1) the high from smoking heroin waned with repeated exposure to the drug, 2) the more refined, “white” heroin became available, and 3) the tools for injection became more widely available (McCurdy et al., 2005). The absence of a similar widespread transition in South Africa may be due to the availability of white heroin and/or the “technology” of injection drug use. In addition to monitoring substance use treatment statistics and epidemiological surveys, following inventories of heroin seizures, reviewing reports of healthcare utilization for injection-related health problem, and conducting periodic qualitative research examining pathways of initiation among heroin users could also reveal trends in injection drug use. If there is a significant shift in the number of people smoking heroin who transition to injection, HIV incidence will likely also increase. Additional surveillance can inform efforts to scale up needle and syringe programs and medication-assisted treatment (MAT) with methadone or buprenorphine.

Our data also suggest that smoked heroin may be subject to specific social and structural forces that inhibit initiation of injection use. Unlike in Tanzania (McCurdy et al., 2005),

people initiating smoked heroin in South Africa do not appear to progress rapidly to injection drug use. In fact, smoked heroin and injection heroin use may occur in distinct risk environments. According to participants, these risk environments diverge along racial lines. Despite efforts to dismantle apartheid-related policies of racial segregation in South Africa, racial disparities persist post-apartheid (Kon & Lackan, 2008). Resultant social and structural inequalities affect economic and health outcomes (Kon & Lackan, 2008), and societal transitions may also influence drug use trends in communities and populations (Rhodes et al., 2011). Research comparing people who inject heroin with those who smoke heroin may provide additional insight into "ecological containment" or other aspects of the risk environment that might explain group differences in drug use (Valdez & Cepeda, 2008). Research of this nature will also inform the development of interventions specifically to address social and structural determinants of health affecting people who smoke heroin and their communities (Rhodes et al., 2005; Rhodes, Stimson, & Quirk, 1996).

In the context of these differences, it is difficult to compare our findings to research on injection heroin use. For example, in Tanzania it is reported that people initiating others into injection heroin use were generally older than the initiates (McCurdy et al., 2005), but the presence of disparate age relationships between initiators and initiates of smoked heroin was not described in our narratives. Additionally, it may be difficult to apply interventions targeting injection drug use to this population. Nevertheless, similarities between to social and structural influences on initiation of smoked and injection heroin use suggest approaches to prevent injection heroin and other substance use may be relevant in this context. Nine percent of South African adolescents report being given illicit substances on school property (Reddy et al., 2010), and school-based initiatives have had documented success in preventing alcohol and cigarette in South Africa (Smith et al., 2008). Implementing interventions near heroin hangouts reduced injection heroin use in Tanzania (McCurdy & Kaduri, 2016). Schools and the other settings where people are smoking heroin in South Africa may be important sites for intervention. Because MAT prevents initiation of injection drug use by decreasing the number of active heroin initiators and behavioral interventions may deter people who inject heroin from initiating others (Mittal et al., 2019; Werb et al., 2018), MAT and/or behavioral interventions targeting people who smoke heroin may also reduce the number of smoked heroin initiators and initiations.

Although the largest qualitative study of smoked heroin in South Africa to date, this study has limitations. Participants were men in substance use treatment who smoked heroin, and caution must be taken in generalizing these findings to other users of heroin, including people who inject heroin and women. Although participants commented on female trajectories into smoked heroin use and the unique role of intimate partners for initiating women, we were unable to access women's lived experiences firsthand. Because of the interplay between gender and substance use (and the availability of substance use treatment), sex (and sex work), and HIV transmission in Africa (Carney, Petersen Williams, Plüddemann, & Parry, 2015; McCurdy et al., 2005; Mimiaga et al., 2014; Parry et al., 2009), research and interventions will likely need to tailored to women. Participants' experiences may also differ from people who are actively smoking heroin, some of whom may lack the ability to pay for or otherwise access substance use treatment. All participants completed at least some secondary school, and any planned school-based prevention program may not be

accessible to people at risk of initiating smoked heroin who do not attend school. Lastly, as a qualitative study, certain important details regarding initiation of the drug – such as age at first use and duration of substance use – were not captured systematically. It will be useful to explore these and other factors in epidemiological studies.

Notwithstanding these limitations, we identified several pathways to smoked heroin use in South Africa and characterized social influences on initiation. With many parallels to other heroin epidemics in Africa, international cooperation and coordination in the scale-up of MAT, harm reduction services, and other resource-conscientious interventions are recommended. However, interventions targeting injection drug use, in this context, may not reach people who smoke heroin. Only by understanding the risk environments of smoked heroin will we be able to target interventions to prevent smoked heroin use, prevent transition to injection use, and mitigate other social harms affecting the people who smoke heroin and their communities.

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Table 1 –

Participant characteristics ($n = 30$)

Characteristic	*n*	Proportion
Mean age (SD)	27 (7.0)	
Race		
Black	20	67%
Indian	7	23%
Mixed race/ethnicity	3	10%
Employment status		
Full-time employed	16	53%
Part-time employed	2	7%
Unemployed	11	37%
Refused/Did not answer	1	3%
Relationship status		
Single	6	20%
In relationship, not living together	17	57%
In relationship, living together	3	10%
Married	4	13%
Highest education attained		
Incomplete secondary	13	43%
Complete secondary	8	27%
Some post-secondary	4	13%
Complete post-secondary	5	17%
Religion		
Christian	21	70%
None	5	17%
Hindu	3	10%
Muslim	1	3%
Responsible for treatment		
Family member(s)	16	53%
Medical aid plan	11	37%
Self	2	7%
Employer	1	3%
Household monthly income		
≥5,000 Rand	29	97%
Does not know	1	3%