UNIVERSITY OF CALIFORNIA SAN DIEGO

Barriers and facilitators to substance use treatment engagement for the heroin-based drug Whoonga: Qualitative evidence from South Africa

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in

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by

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The Thesis of Emily Hardy is approved, and it is acceptable in quality and form for publication on microfilm and electronically.

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ABSTRACT OF THE THESIS

Barriers and facilitators to substance use treatment engagement for the heroin-based drug Whoonga: Qualitative evidence from South Africa

by

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Master of Arts in Global Health

University of California San Diego, 2022

Professor Bonnie Kaiser, Chair

Background: Whoonga is a smoked, heroin-based street drug in South Africa. Also known as nyaope, its use poses a significant public health and safety problem for South African communities. Studies have shown that smoked heroin-related treatment admissions have increased, but nothing is known about barriers and facilitators to treatment access.

Methods: In 2015, semi-structured interviews were conducted with men undergoing residential substance use treatment in Durban, South Africa for smoked heroin use. In 2017, similar semi-structured interviews were conducted with men and women who smoke heroin and were recruited from the social networks of participants in residential substance use

treatment. Participants were interviewed about their experience with the drug and substance use treatment. Interview data were coded using qualitative content analysis.

Results: Interviews were conducted with 30 men in substance use treatment and 10 men and women from the social networks. Participants identified that the cost of substance use treatment, stigma related to substance use, and the addictive nature of the drug were barriers to treatment engagement. Although stigma among families led to alienation which made it difficult for the participants to leverage family resources to access treatment, direct family involvement in funding substance use treatment was an important facilitator to treatment access. Although we were expecting medication assisted treatment such as methadone to be a facilitator to treatment engagement, participants perceived methadone as another type of addiction and highlighted their own observations of how methadone was being abused in the community. Though neither barrier nor facilitator, improving physical health and repairing broken relationships were identified as motivators that influenced treatment engagement.

Conclusion: There were a number of barriers to treatment access and very few facilitators, despite a lot of motivation to engage in treatment. Methadone could be a facilitator because it can overcome the addictive nature of the drug; therefore, work to change the perceptions of methadone in this population might enhance treatment access. Familial and social relationships were highlighted as barriers, facilitators, and motivators for substance use treatment engagement. Therefore, interventions targeting families might be a useful strategy to promote treatment engagement in those suffering from whoonga addiction. There are complex and overlapping social and biological forces at work and biobehavioral interventions

that leverage motivators and facilitators to overcome barriers may have the most lasting impact on treatment engagement and treatment success.

INTRODUCTION

Whoonga is a heroin-based street drug that was made popular in South Africa around 2009 (Grelotti et al., 2014; Hull, 2010; Jhb, 2019). Also known as nyaope, whoonga is unique in its appearance and is distributed as a fine, white powder that is generally smoked, but can be injected (Grelotti et al., 2013, 2014). The prevalence and affordability of smoked heroin in South African communities places adolescents and young adults at increased risk of use, leading to a significant increase in treatment admissions for this age group (Bala & Kang'ethe, 2021; Fernandes & Mokwena, 2016; Tyree et al., 2020). Although substance use treatment data are limited, there is an increasing demand for heroin-use treatment in the KwaZulu-Natal province of South Africa, with treatment admissions nearly doubling from 10%-18% in 2018 (Dada et al., 2019; Parry et al., 2005). Persistent heroin use threatens the health and well-being of its users and creates both public health and community safety concerns with the depressant action of the drug putting users at risk of overdose and long-term health consequences associated with opioid dependence (Bala & Kang'ethe, 2021; Fernandes & Mokwena, 2016; Parry et al., 2005). Research on medication assisted treatment (MAT) and methadone maintenance treatment (MMT) has shown it to be available in the local setting and effective for opioid use dependence, with a reduction in addiction symptom severity over time (Ubuguyu et al., 2016).

Globally, medication assisted interventions for the opioid epidemic have taken precedence, despite the growing concern of illicit and medical opioid use in South Africa (Harker et al., 2020; Palamar et al., 2016). Epidemiological data from substance use treatment admissions reveals social change, including a decline in interpersonal relationships, as a correlate to illicit drug use (Peltzer et al., 2010). Admissions for opioid use dependence have been associated with treatment for therapeutic misuse of opiate/pain medications and intentional

misuse for intoxication (Parry et al., 2017). Qualitative data examining the perspectives of treatment providers from rehabilitation centers in the South African Community Epidemiology Network on Drug Use (SACENDU) suggested they would benefit from further education on addiction treatment and dependence in the context of providing services to those seeking treatment (Parry et al., 2017). Further data evaluating the socioeconomic needs, perceptions of drug use, and the social and educational conditions of opioid use are needed to better understand substance use treatment initiation from the perspective of social change (UNODCCP, 1999).

Given the increase in smoked heroin related treatment admissions in South Africa and health and safety concerns associated with its use, a broader range of treatment and harm reduction strategies are needed. South Africa's first opioid agonist therapy project was built in Durban, where existing treatment programs were abstinence-based with treatment options such as methadone or buprenorphine being highly inaccessible and only available through the private sector (Marks et al., 2020). Prior studies have shown that opioid-related treatment admissions have increased, but nothing is known about barriers and facilitators to treatment access. Barriers in the context of substance use treatment refers to the social or biological forces that prevent an individual from treatment engagement. Facilitators refer the social or biological forces that inhibit treatment engagement. A detailed understanding of the barriers and facilitators to substance use treatment engagement for smoked heroin use may help identify motivators for maintaining treatment engagement and adherence. In this paper, we present an analysis of interviews that draw on individual experiences with smoked heroin use, with the goal of identifying barriers and facilitators to seeking treatment.

Whoonga/nyaope/sugars	An addictive street drug composed of low-grade heroin and is smoked
Arosto	IsiZulu word referring to 'withdrawal;' the physical symptoms associated with stopping or reducing the use of an addictive substance
Dagga	IsiZulu word referring to 'marijuana;' a psychoactive drug derived from the Cannabis plant
Rand	The official currency of the South African Common Monetary Area; also referred to as 'ZAR';'1 USD = ~15.82 ZAR
Methadone	A synthetic opioid drug used in medication assisted treatment for opioid use disorders
MAT	Medication Assisted Treatment; the use of prescription medication in combination with counseling and other behavioral therapies for the treatment of substance use disorder

Figure 1: List of frequently used terminology in this thesis

BACKGROUND AND LITERATURE REVIEW

Literature Review

Research on experiences of whoonga use and addiction treatment remains limited. In the initial phases of the literature review process, multiple data sources were used. Google Scholar served as the primary database for my searches but produced an overwhelming number of results. Although the database established a list of research articles that addressed the themes of barriers, facilitators and motivators in substance use treatment, the scope was broad and not generalizable. PubMed was used to narrow down relevant research articles, which specifically addressed "addiction treatment [in] South Africa" and background addressing "whoonga/nyaope [in] South Africa. After relevant sources were identified, research articles were saved to Zotero for review. Abstracts for preferred articles addressing barriers and facilitators to substance use treatment, methadone maintenance therapy (MMT), and medication assisted treatment (MAT) were transferred to a separate document and sorted by relevant themes. Zotero was used throughout the writing process to embed in-text citations and keep track of sources used as references.

Historical Perspectives of Whoonga

Whoonga is unique in its appearance and is distributed as a fine, white powder that is rumored to contain a combination of household cleaning products, rat poison, and HIV antiretroviral medication (Grelotti et al., 2013, 2014). Whoonga was first introduced when the South African government began offering free antiretroviral drugs (ARVs) in the private sector to make HIV treatment more accessible and affordable to those infected (de Villiers, 2016; Meyer-Rath et al., 2017). It was found that the antiretroviral drug, Efavirenz, may have intoxicating effects on patients including dizziness, lucid dreaming, hallucinations and delusions,

and euphoria (Grelotti et al., 2013; Inciardi et al., 2007). As such, these patients would abuse Efavirenz for its euphoric effect by using it to enhance the experiences of common street drugs (Grelotti et al., 2013; Inciardi et al., 2007). The combination of antiviral medication and illicit street drugs ultimately led to the discovery of Whoonga (Jhb, 2019).

Whoonga is also known in South Africa as Nyaope or "sugars" and is primarily composed of a low-grade heroin that is smoked by itself or with marijuana (Grelotti et al., 2014; Tyree et al., 2020). The end of Apartheid in 1992 increased affordability and accessibility to drugs, leading South Africa to become one of the world's largest producers of cannabis (Johnson, 2007). Consistent with previous studies on the trajectories of initiation of Whoonga use, the heroin drug was often introduced in the same setting of marijuana use (Tyree et al., 2020). In South Africa, heroin is frequently used with marijuana in the form of a joint and many within the use environment are given the drug 'cocktail' without their knowledge of its contents (McEachran, 2013; Tiberio et al., 2018; Tyree et al., 2020). The initiation of use in this context is prevalent throughout South Africa as drug merchants expose socially vulnerable or at-risk youth . (S. A. McCurdy et al., 2005; S. McCurdy & Kaduri, 2016; Tyree et al., 2020). Further, the initiation of whoonga use is heavily influenced by the substance use "risk environment", including the social situations, structres, and places in which a risk is produced. (Tyree et al., 2020).

Whoonga and Public Safety

Heroin, known for its euphoric "highs," is one of the most dangerous opioids and poses a significant public safety concern due to the risk of death and overdose (NIDA, 2021). The initiation of opioid use is often as a strong, prescription pain relief medicine that relaxes the body and helps to relieve pain (NIDA, 2021). However, due to the addictive nature of opioid use, there

is a potential for abuse and misuse (NIDA, 2021). Whereas heroin use in general poses a significant public safety concern, there is an additional, unique concern surrounding whoonga use in South African communities.

A study by Grelotti and colleagues introduces the drug, whoonga, and some of the public safety concerns surrounding its use (2014). This study addresses media reports that describe incidences in South Africa in which HIV patients and school-aged children were smoking a drug that was believed to contain antiretroviral medication (ARVs) and were experiencing hallucinogenic and euphoric affects (Grelotti et al., 2014). The drug, whoonga, was learned to be associated with an increase in criminal activity and nonadherence to HIV treatment, creating a significant challenge to healthcare staff and clinicians regarding the spread of HIV through exposure to untreated HIV-infected individuals (Grelotti et al., 2014). Furthermore, the study addresses the impact of whoonga in the community as a known concern in which community efforts are in place to raise awareness of the issue and target areas where the drug is used (Grelotti et al., 2014).

Characteristics of Whoonga Users

Whoonga use does not discriminate by age, though is found to be especially prevalent among young people (McGarry, 2019). Key informants in a study by Grelotti and colleagues support the suggestion that whoonga is used by adolescents and school-aged children – some as young as 14 years of age (Grelotti et al., 2014). Given that adolescents are among the more prevalent of users, it is unsurprising to find whoonga users congregated in large social groups. Adolescent whoonga use is more frequently associated with crime and public safety issues including prostitution, mugging, and housebreaking (Khumalo et al., 2019).

In a *Daily Maverick* press article by Mark Hunter, the multiple dimensions of the whoonga user are addressed (Hunter, 2018). In this piece, whoonga users are described as "young jobless men," in their 20s and early 30s seen restlessly working in piece-work jobs such as car washing, mechanics, and contracting work in order to sustain their addiction (Hunter, 2018). Communities of whoonga users have congregated throughout South African townships and are seen to reside in peri-urban areas (Khumalo et al., 2019). Despite high rates of unemployment among whoonga users, whoonga addiction is not limited to lower-class communities (Hunter, 2018). However, those who were among highly vulnerable populations were at a higher risk of use (DeAtley et al., 2020b; Hunter, 2018).

A recent study by Nadine Harker was conducted to advocate for the extension of opioid use treatment services and in response to the informational need of treatment access in South Africa (Harker et al., 2020). This study utilized treatment admissions data collected from the South African Community Epidemiology Network on Drug Use (SACENDU), including data from 86 treatment centers (Harker et al., 2020). Descriptive analyses were employed to create a sociodemographic profile of individuals enrolled in treatment for an opioid use disorder with 'time' identified as a continuous variable among varying opioid use trends including the use of smoked heroin (Harker et al., 2020). The results of the study revealed that opioid users were predominantly male (85.7%) and were a mean age of 27 (ages reported were 8-86) (Harker et al., 2020). Over the course of this study, opioid related treatment admissions for the drug whoonga were found to increase between the years 2012-2014 and increase between 2015-2017 (Harker et al., 2020). Whereas heroin users were more likely to self-refer to substance use treatment, whoonga users were found to be seven times more likely to be referred to treatment through social services and 2.5 more likely to be referred through the judicial system than through self-

referral (Harker et al., 2020). Consistent with patterns of other opioid use, whoonga was likely to be used daily; however, unlike other opioid use, whoonga was unlikely to be injected (Harker et al., 2020).

Initiation of Use

In 2015, one of the largest qualitative studies on the experiences of whoonga use was conducted by Tyree and colleagues to address the trajectories of initiation of smoked heroin use (Tyree et al., 2020). A qualitative content analysis was conducted to reflect the experiences of 30 men undergoing residential treatment for whoonga addiction in South Africa (Tyree et al., 2020). Tyree and colleagues identified multiple pathways of smoked heroin use, with two occurring thematically across participant experiences: the initiation of smoked heroin use in a setting with frequent marijuana use and the initiation of smoked heroin use as an alternative to using other "hard" drugs (2020). This study introduced "vertical" trajectories that described participant experiences with beginning smoked heroin use as a direct transition from using marijuana or tobacco cigarettes, and smoked heroin use occurring in a social setting where marijuana/tobacco use was common (Tyree et al., 2020). Similarly, the study introduced "horizontal" trajectories in which participants were heavily influenced by their social groups to transition to smoked heroin use from "hard" drugs such as crack cocaine and to use smoked heroin as a way to modulate the effect of these drugs or heavy alcohol use (Tyree et al., 2020). Throughout this study, there was no reference to injection heroin use. A strong recurring theme throughout the study was the initiation of smoked heroin influenced by social groups and social pressure.

A recent study by DeAtley and colleagues addresses similar trajectories for initiation of whoonga use in their study examining risk and protective factors for whoonga use among adolescent users (2020). This study revealed that individual factors such as age and hazardous

drug and alcohol use in adolescents increased the odds of whoonga use (DeAtley et al., 2020a). This study supports the findings of Tyree and colleagues, which suggests that the initiation of whoonga use may be tied to risk behaviors such as previous alcohol or illicit drug use and the adolescent tendency to want to experiment in social settings in which these substances are used.

Whoonga Treatment

Opioid agonist therapy or medication assisted treatment that utilizes prescription medicine such as methadone or burprenorphine is limited in South Africa. Current treatment programs in South Africa generally follow a more abstinence-based approach (Scheibe et al., 2017). Opioid substitution therapy uses an opioid agonist or partial agonist in the form of a medication to minimize the negative effects of withdrawal, minimize cravings, and reduce opioid response by binding to receptors in the brain (NIDA, 2021a; Scheibe et al., 2018). In the appropriate dose, methadone and buprenorphine are highly-effective and a part of an evidence-based treatment protocol (WHO, 2009). Methadone is prescribed for opioid maintenance and aims to reduce frequency of use, improve physical and mental health, reduce HIV risk and infection, improve social function, and minimize criminal activity associated with substance use (Fullerton et al., 2014).

South Africa's first low-threshold opioid agonist therapy project was developed in Durban by the research group of Marks, Scheibe, and Shelly as an advocacy tool utilizing a harm reduction approach to treatment and with the intent to improve the quality of life of heroin users receiving opioid agonist therapy (2020). This study was one of the largest qualitative studies addressing participant experiences with heroin use in South Africa and included thirty semi-structured interviews, two focus groups, ten oral histories, and ethnographic observations addressing the initiation of heroin use and experiences with methadone maintenance therapy

(Marks et al., 2020). The results of the study revealed a 74% retention rate in abstinence of opioid use following 1 year of methadone maintenance therapy, which was higher than the global average and 50% higher than the projected retention rate proposed by the study team (Marks et al., 2020). Upon completion of the project, the research team prosed suggestions for the improvement of substance use treatment in poorly resourced areas such as Durban including a need to control the dependent service user by means of daily contact with a provider, continued supervised dosing of opioid agonist medications, routine drug testing, and developing an achievable set of goals for successful abstinence (Marks et al., 2020).

METHODS

This thesis is part of larger study conducted in 2017 and was supported by the Harvard University Center for AIDS Research.

Participants and Procedures

In 2015, semi-structured interviews were conducted among men receiving residential treatment for smoked heroin addiction at a large, non-profit substance use treatment facility in Durban, South Africa. In 2017, an additional 10 semi-structured interviews were conducted among men and women using smoked heroin but not receiving treatment. They were recruited from the social networks of participants in residential substance use treatment. Eligibility criteria included: 1) the individual is 18 years of older, 2) the individual was voluntarily admitted for substance use treatment (first cohort only), 3) the individual is able and willing to provide written informed consent, and 4) the individual is a native isiZulu or English speaker.

Separate interviews were conducted with Key Informants, including residential treatment staff and social workers. These interviews addressed an alternate perspective to the experiences of whoonga use and do not directly reelect participant perspectives.

Participants for the 2015 study were patients who were actively receiving treatment for whoonga addiction. Patients were informed of the study through treatment center staff and referred to study team if interest was expressed. Participation for the study was voluntary. Patients were able to decline being interviewed with no impact on their treatment. Interviews were scheduled with participants approximately one week into their addiction treatment to avoid physical discomfort related to early stages of heroin withdrawal. Interviews were set up and held in a private setting within the facility. Prior to the 60–90-minute semi-structured interview, participants completed the informed consent process and demographic questionnaire. Interviews followed an interview guide (Figures 1-3) that contained questions and probes that addressed questions about lived experience with smoked heroin use and treatment. Example of questions addressing experience of use would include "Describe what a whoonga user looks like," and "What effect did the whoonga have in your life?" The interview guide was developed and refined by study staff within the treatment facility. The guide was written in English, translated to isiZulu, and translated back to English and reviewed by the study team prior to the interviews. Interviews were recorded and transcribed.

Sample Interview Questions for Participants in Residential Treatment

- Tell me about the drugs that are available in your community
- What is your experience with using whoonga?
    - How does whoonga make you feel?
    - How do you use it?
    - Who do you use it with?
- How has whoonga impacted your life?
    - What has changed since starting whoonga?

Figure 2: Interview Guide for SANCA Participants

- How has it impacted your physical health?
- How has it impacted your relationships?

- What happens if you stop using whoonga?
- What challenges have you faced in using whoonga?
- How were you introduced to whoonga?
- What are the ingredients? How is whoonga made?
- Tell me what are the circumstances or characteristics of people that are using whoonga
  - How can you tell if a person is using whoonga?
- What is available to address whoonga in your community?
- What are your goals for treatment?
- Tell me about the experiences that you experienced in getting here. Did you have support from family/peers?
- What can be done to prevent whoonga use?

Figure 2: Interview Guide for SANCA Participants (Continued)

Sample Interview Questions for Participants not in Residential Treatment

- What is whoonga? What is your experience with using whoonga?
  - Do you use it with other drugs?
- How do you obtain whoonga?
- How/Why did you start using whoonga?
  - How do you feel when you use whoonga?
- How has whoonga impacted your life?
  - How does it impact family, relationships…

Figure 3: Interview Guides for Social Network Participants

- How does it impact your physical health, sex life…

- Have you tried to stop using whoonga on your own before?
- How would you describe someone who uses whoonga?
- What is the difference between a male and female who uses whoonga?
- How has whoonga affected the community?
    - What is available to address the whoonga problem in the community?
- What are your treatment goals?
- Did you know about SANCA before coming here?
    - How did you learn about SANCA?

Figure 3: Interview Guides for Social Network Participants (Continued)

Sample Interview Questions for Key Informants

- Tell me about the experiences of people using whoonga?
    - how do people get whoonga and what whoonga users need to do in order to be able to buy it?
    - How do people use whoonga?
    - What do people say they use whoonga for?
- What are the challenges that women face in using or obtaining whoonga?
- What challenges do children or adolescents face when they are trying to obtain whoonga?
- How is whoonga different from sugars, and nyaope?
- What is the main substance in the whoonga?
- How do you think whoonga has affected the community, families, and schools?

Figure 4: Interview Guides for Key Informants

- How has the whoonga impacted on the spread of HIV and the effort to treat it in the community?
- Why has this whoonga issue has become such a problem here in Durban?
    - What is available to address the whoonga problem?
    - When you are approaching people in the streets, what are we offering, what is the solution?
- What are some of the challenges for the users who want to get out, in terms of them getting assistance in getting help…?
- What can be done to avoid initiation?

Figure 4: Interview Guides for Key Informants (Continued)

Analytic Approach

Analysis utilized a descriptive qualitative content analysis (Altheide & Schneider, 2012). The codebook consisted of themes from the semi-structured interview guide and from prior qualitative studies addressing smoked heroin use. The codebook labeled several domains discussed in the interviews and were categorized by whoonga the drug, characteristics of the use of whoonga, the role of whoonga in the community, and participant perceptions on what is needed to address the smoked heroin epidemic. Interviews were analyzed by multiple coders. Intercoder reliability was assessed until reasonable agreement was achieved (Cohen's kappa > 0.8) for four consecutive interviews. The domains within the codebook were sectioned into subcategories that reflected participant and investigator defined aspects of smoked heroin use. (e.g., dependence, rehabilitation, withdrawal, etc.).

Each participant was prompted to address varying aspects of their experience with use. For example, a participant would be probed to discuss adverse physical symptoms of addiction,

in which the ‘withdrawal’ sub-code would be applied. Similarly, for those participants actively receiving addiction treatment for smoked heroin use, questions regarding their experiences with addiction treatment and what is available was categorized within a ‘rehabilitation’ sub-code. In some cases, certain sections of the interviews would be coded within multiple sub-codes. A participant discussing severe cravings coupled with stomach cramping or lethargy and having smoked heroin to alleviate symptoms would be coded in both the sub-codes of ‘dependence’ and ‘withdrawal.’ This combination of sub-codes frequently occurred together as participants discussed potential turning points in their addiction or the experiences that made it difficult to seek and maintain treatment. A participant discussing the expense of treatment would be categorized in the ‘wealth’ sub-code. These categories were best understood to represent potential barriers to treatment. A participant discussing family influence on seeking and receiving treatment and the social influences surrounding their experiences were identified as facilitators to addiction treatment. Consequences of smoked heroin use such as loss of employment, criminalization, and devastation of familial relationship were discussed as potential motivators to seeking and maintaining treatment. NVivo version 11.4.2 was used to complete the qualitative content analysis.

Code analyses and summaries were synthesized in an electronic document upon completion of the content analysis. Codes addressing barriers and facilitators to substance use treatment were identified and sorted as such. Each code summary was applied to its own section in the document and notes were written addressing the code analyzed by summarizing the main theme and identifying a corresponding quote. For example, a code summary addressing a barrier to treatment would include a description of the sub-code ‘withdrawal,’ notes addressing participants’ experiences with withdrawal (e.g., cravings and physical pain) and a quote

defending the main notes of the theme. Code summaries addressing facilitators to treatment would include a description of the sub-code ‘rehabilitation,’ notes addressing the themes of rehabilitation (e.g., family as a facilitator) and quotes defending the themes addressed.

RESULTS

Participant Characteristics

Sociodemographic characteristics of the participants are summarized in Table 1. There is inpatient and residential treatment available to women, though it is significantly less prevalent due to the prohibition of co-ed facilities. Patients enrolled in substance use treatment must either be all male or all females. In this study, the majority of participants were male. There were only 3 female participants, all of whom were recruited through the social networks of participants receiving residential treatment for whoonga addiction. The majority of participants identified as Black. Data on education and employment status were collected from the first group of residential treatment participants in 2015. No data were obtained on education or employment for residential treatment participants in 2017.

Characteristic	n	Proportion
Mean age (SD)	27.4 (9.5)	
Race		
Black	27	67.5%
Indian	9	22.5%
Mixed/Colored	3	7.5%
White	1	2.5%
Gender		
Male	37	92.5%

Table 1
Sociodemographic Characteristics of Participants (n = 40)

Female	3	7.5%
Employment Status (n = 30)*		
Full-time employed	16	53%
Part-time employed	2	7%
Unemployed	11	37%
Refused/Did not answer	1	3%
Highest education attained (n = 30)*		
Incomplete secondary	13	43%
Complete secondary	8	27%
Some post-secondary	4	13%
Complete post-secondary	5	17%

Table 1 (Continued)
Sociodemographic Characteristics of Participants (n = 40)
*Deviations from the analytical sample are due to missing data from the participants interviewed in 2017

Initiation of treatment for smoked heroin use

Participants' narratives on the initiation of treatment engagement for smoked heroin use identified barriers and facilitators to substance use treatment, and motivators to treatment maintenance. Social influences on substance use treatment engagement was a prevalent theme among both barriers and facilitators to substance use treatment. Familial support, including for participants with unstable family relationships, was highlighted as a both a facilitator and motivator for treatment engagement. References to injection drug use were not present in the study, nor reflected across participants' narratives of experience of use. Participants and key

informants suggested an infrequency with injection drug use and that people who inject heroin versus those who smoke heroin may be socioeconomically and racially different.

Key informants, including treatment center staff and social workers, provided insight on some of the limitations to initiating whoonga treatment. Many of these key informants confirmed that treatment was not readily available to women and for women to be enrolled in residential treatment, the entering group must all be female. As such, treatment groups were predominantly male.

> *The challenge that I have seen the most, the sad one there are no treatment centres for female because you can not treat males and females together because whatever could happen will put them in rape risk and so on and on so its not doable and I think that the challenge we have around Durban that girls one its not easy to come forward and say I use drugs the sum of people referred, of girls is very small. I have never had a group of girls. Its always boys.I do get referrals you find that per quarter I have one or two referrals I cant start a group with two people (clears throat) excuse me. There must be eight people to start a group. So most of the time its boys.* (Durban Child and Youth Care Center social worker)

One female participant reinforced the scarcity of treatment programs available for women and her experience with being a part of a waitlist.

> *They said…especially the girls, it is quicker for the boys because there are places but with girls there are fewer places for the girls. They only take few girls.* (32-year-old female participant)

Many participants stated that the initiation of treatment sometimes involved a placement on a lengthy waitlist and assessment period in which patients were expected to have been sober for a certain period prior to enrolling.

> *Government does subsidies only to someone that is willing but there is too much waiting period and there are too much people who do not have so a person who smokes whoonga can't (…) does not like lines first of all he/she does not have time to wait and when you get to other rehabs you will find that you have to be sober for a certain period of time if you do not have money perhaps going for assessment. So a whoonga person will not afford to do that if I tell you the truth. Because his/her problem is arosto.* (25-year-old male participant)

Figure 5: Image of a sand sculpture along the Durban oceanfront sending a message for the need to address the whoonga epidemic stating "dear president, it is your turn to come help the country fight against whoonga #nyaope (drugs); photo provided by David J. Grelotti

Barrier: Addictive Nature of the Drug

Whoonga users find it difficult to begin treatment because of symptoms of opioid withdrawal. Withdrawal, referred to as *arosto*, is characterized by intense stomach cramping, vomiting, hot and cold flashes, headaches, and fatigue. Those identifying withdrawal as a barrier to treatment would report attempting to quit smoked heroin on their own, but were often unsuccessful due to the intense physical discomfort. One of the dangers of opioid use is that dependence occurs very quickly, sometimes even after a single use, and participants would continue to use to so that they wouldn't suffer withdrawals anymore.

> *If a person stops using whoonga, it is hard to stop on his own, he must get some form of treatment to help him to calm down, such as the withdrawals you see. He can't stop on*

his own because you can't just stop when you are sick and be able to stop because you are sick the next day, and you are aggressive you have to get it, you would do whatever it takes to get it. (20-year-old male participant)

Besides pain there's this feeling that tells you that you wanna smoke. Even though you tell yourself that you are never gonna smoke but there's that thing that pushes you, like I wanna smoke, I wanna smoke. (26-year-old female participant)

Whereas most participants reported that they may have enjoyed their initial experiences of use, they found that they would only "feel good when they use [the drug]," but "within a short time, feel absolutely terrible." Despite efforts made to quit, participants found themselves going back to whoonga to avoid the "pains" associated with opioid withdrawal, and not "for the good of it."

It's not that I am scared to quit this drug, it is difficult when you have been taking whoonga for a long time, it's difficult to quit. You need something that will assist your body so that it can come out because you can't even sleep if you haven't smoked. You get headaches, you get backaches, you see all those things. You get hot and you sweat a lot of things happen to your body and if there is no treatment one can really die. (31-year-old male participant)

Barrier: Perceptions of Methadone

Methadone treatment, also referred to in South Africa as "substitution therapy," is an alternative treatment to an abstinence-based approach to smoked heroin treatment. Methadone is

described by participants as a liquid medication obtained through a prescription by a medical professional and taken by teaspoon as needed for heroin withdrawals. Although methadone is the only prescription medication available for the treatment of smoked heroin use, perceptions of methadone were negative, and participants were not keen to use it.

> *They say it is like the only cure for them, methadone…* (23-year-old male participant)

Participants would report not noticing a significant reduction in their cravings and perceived the drug to be ineffective. Methadone treatment was stigmatized in the community as participants regarded methadone as a drug itself that can create its own addiction, and in severe cases, cause death.

> *You know you can use the methadone if you are disciplined because it also has its own side-effects and it has an addiction of its own. You can stop whoonga and end up addicted to it whereas it is expensive than the whoonga because the medicine alone is three hundred rands while the straws was twenty rands.It is three hundred, you drink it maybe that week and it also has an addiction if you will not have a discipline perhaps you drink it more than a month obviously it will have its own addiction when you had stopped smoking whoonga you will crave this thing. So it is also alright when you are disciplined but if you do not have discipline it can even kill you.* (30-year-old male participant)

Participants were under the assumption that methadone was being prescribed as an alternative to smoked heroin and that the only real treatment option available was rehabilitation and detox. Participants believed that the use of the medication may be as harmful as smoked heroin itself, contributing to skepticism about its use within the communities.

> *You just can't go to the doctor and get it from them, you have to get this prescription and they write it down they tell you to take it. They will tell you take one bottle or three bottles but you still go back to smoking the sugar. Serious because I feel like you better go to the rehab or detox properly and get flushed out, like they put a trip in you for one hour, I have experienced it. I feel like no cravings no nothing, but after a while you know when you wake up with a friend and let us try later find a skeif, once you get that feeling of getting a guff back now you are going to do it again.It is like a thing like you can't resist it sometimes if you are real hard-core drug addict, maybe you can stop like one two guys I know have stopped five six years, now they came back more worst, that is how it is.* (31-year-old male participant)

> *Some get to a point where they drink methadone… a certain medication that actually kills the withdrawals but now the problem with methadone; you get addicted to this methadone you know, so I would not advice a whoonga addict to substitute whoonga with methadone because it makes no difference. Like when you are on methadone, you find that you are still on whoonga you know even though methadone is a legal drug you get it over the counter, it is an over-counter drug but rehab is the best thing.* (25-year-old male participant)

Some participants suggested that methadone may be diverted and sold on the streets through a "black market." "Black market" methadone was discussed by key informants as a counterfeit prescription written by doctors and sold in pharmacies for a profit.

> *So the black market of methadone is existing and people are using the black market, the police are now testing whether that methadone is pure methadone, if it is not pure methadone than it is as harmful as whoonga. So I can tell you first-hand from having been involved in this investigation that this is happening and that is one doctor, doctor not somebody up in some you know drug addicts stand, this is a doctor a medical doctor… certified. So the medical profession are profiting from the black market of methadone* (Key Informant - Health Educator)

Key informants offered an alternative perspective on the use of prescription medication for smoked heroin treatment. Although addiction treatment in South Africa prefers an abstinence-based approach, the use of methadone for severe withdrawal was highlighted to "reduce cravings and sustain [treatment]." However, it is suggested that the medication be taken long term for treatment retention. Key informants including the residential treatment staff suggests that "the whole medication route has to be approached really carefully."

Barrier: Cost of Methadone

Another barrier to methadone use was the cost of medication. Methadone treatment was regarded as expensive, and according to one participant, it was more expensive than whoonga.

[Methadone] is [more] expensive than whoonga because the medicine alone is three hundred rands while the straws was twenty rands… (30- year-old male participant)

A prescription for methadone could only written by a private doctor and obtained through a pharmacy. Community health workers confirmed the expense and scarcity of methadone available to those in need.

You can get a prescription from a private doctor and there are pharmacies that do sell methadone and it is very expensive and you know also has to be regulated because you can overdose on methadone as well. So you can get it and there are people who do buy methadone to get off other forms of heroin… (Community Health Educator – Urban Future Center)

Many participants who utilized medication assisted treatment for smoked heroin use found it difficult to maintain their treatment plans due to the cost and accessibility of methadone.

Yes it is very expensive, that is why many people struggle to get here and at rehabs they said they are given methadone to drink, methadone is not very effective. (20-year-old male participant)

…when I used methadone for the first two days id use methadone and then I will not smoke whoonga for the three days when I am on medication, then from the third day I would try leave the whoonga and I would just wake up with methadone but when I am

drinking methadone I am drinking like three teaspoons in the morning, three teaspoons in the afternoon and about ten o'clock at work I would drink another three teaspoons after having food then another three teaspoons at lunchtime and I would leave those teaspoons to activate in my body by the time I go to sleep I would take about two tablespoons and sleep. So a bottle of methadone won't last me say a week, it last me three days, so I ended up buying… to stock for a month I would probably buy five bottles…(25 year-old male participant)

Barrier: Cost of Addiction Treatment

Several participants identified cost as a barrier and addressed the financial obligation that came with receiving treatment. Money and wealth were recurring themes throughout the participants' narratives of addiction treatment and rehabilitation.

This thing is very costly, because treatment from here is not cheap you see. Roughly for twenty-one days you pay like twenty-two thousands for only twenty-one days. Detox is roughly fifteen thousands alone just medication then there is a psychiatrist and psychologist that still has to be paid as well you see to rehabilitate you on your thinking, on the way you view life you see, many aspects of him must change. (25-year-old male participant)

There is nothing else except for going to rehab centres well thing is the rehab centres are also expensive, because people fail to save money. I was also lucky that it is my medical aid that has helped me because it is not cash. I wouldn't have R23000 to come to rehab. (35-year-old male participant)

One participant addressed the cost of treatment in their response to what is needed to address the whoonga epidemic.

> *[What is needed is] to have availability of facilities that could accept people who have a whoonga problem without paying money…Because there are many people I know who wish to stop it but because they can't afford to access places like this in rehab, now they end up forced to continue because it is hard to quit on your own without using any treatment.* (35-year-old male participant)

Key informants, including as residential treatment staff, shared some of the consequences associated with the cost of treatment. One key informant shared a story of a whoonga patient who had been locked in their family's home for detox due to the cost of treatment.

> *I don't have money to take you to rehab just stay here the bedroom will be the rehab, I will tie you in the bed you will see what to do, of which this is wrong…because the day this person gets relieved from here he will go and smoke because he/she was tied in the bedroom no one was educating him/her. There is no information he/she is receiving in case you experience any withdrawals what do you do, if you come across friend same friends that smoke, what do you do, you know. There is no information that he/she is receiving but you know as his inside the bedroom the only thing he is thinking it's just that once I get out of here I am going to smoke, there's nothing else he is thinking about…* (Durban Child and Youth Care Center social worker)

Barrier: Perceptions of Treatment

Perceptions of substance use treatment was another barrier highlighted by participants. In addition to the abstinence-based approach to addiction treatment, addiction treatment may sometimes adopt practices of religious healing. One participant revealed their reluctance to engage in religion and abstinence-based treatment programs that were common throughout South Africa.

> *…these rehabs do not treat this the same way, as I have come to this one, I know there are some where they tell you that you will be treated with prayer. How can I be treated with prayer while I am suffering from arosto…Now here at [name of center] you are told that you will be treated with prayer…and you would just see that they are wasting time and mistreating people.* (35-year-old male participant)

Barrier: Stigma

Although 'stigma' was a term seldom used by participants, implications of stigma were highlighted throughout their narratives. Stigma was often described through experiences of shame faced in the home and community as an emotional consequence to their use.

> *I got kicked out of my house because of whoonga and the stigma attached to it and lost lot of friends because they look down upon whoonga most of them were crack addicts, they said why you going to whoonga you can take crack, so the crack addicts friends disappeared, and I made the whole new group of friends* (36-year-old male participant)

...you see if you were a drug addict surely people will judge you. (19-year-old male participant)

Because nobody trusts somebody that smokes. (26-year-old female participant)

Adolescents often faced stigma within the school site and were shamed for their addiction, despite efforts to maintain sobriety and attend addiction treatment. One key informant provided insight on the impact of stigma within schools:

The other issue is schools, that here he is in rehab now, he left school having messed up with teachers and learners, he was called names and he was careless even himself, after rehab he goes back to school, the stigma is still there, when he have done a little mistake they will say after all he is a boy of Whoonga, when he has done a little mistake, he is a Whoonga boy, the rehab didn't help them all those things kill. . (Durban Child and Youth Care Center social worker)

Because whoonga use was associated with HIV and ill-health, participants reported that others would make assumptions about their health and HIV status. Community statements overheard have included one individual admitting "I do not want anyone using whoonga sitting next to me." Key informants suggest that the stigma may be heightened for those with HIV given the community perception that they were already viewed as "dirty" or "a bad person" because of their addiction.

Theft, including theft from families, and other criminal acts painted a picture that whoonga users were "bad people" and could not be trusted.

> *I got kicked out of my house because of whoonga and the stigma attached to it and lost lot of friends because they look down upon whoonga.* (36-year-old male participant)

Barrier: Family

Many participants shared experiences of alienation from their families and struggled to receive emotional support throughout their addiction. Participants living with families stated having lost their housing as a result of their whoonga use.

> *They have no assistance, because most of them no longer have parents, and those who still have but they do not want to live with them, they are just smoking this thing.* (19-year-old male participant)

Participants' behavior, including dishonesty and theft, often caused significant strain on family relationships, creating tension in families and a perception that the participants' shortcomings and failures were regarded as a disappointment

> *I could see that we were not on good terms, my family and I, they don't trust me anymore.* (19-year-old male participant)

Facilitator: Family

A supportive family helped to overcome barriers of stigma and access to substance use treatment. Family was commonly cited as the people who were paying for substance use treatment, including in cases where participants no longer had positive or supportive relationships within the family.

> *Family does not want me at home anymore. Although they paid for treatment.* (25-year-old male participant)

Family was also seen as a source of encouragement in promoting substance use treatment engagement.

> *Yes I did get support from my family a lot. When I told them that I need to do something about this thing I need to go to rehab they said "yes you are right, when are you going?" And then they encouraged me.* (27-year-old male participant)

> *I am lucky because my family is better off and they are stronger and they try to do everything to help me.* (25-year-old male participant)

Motivators for Treatment Engagement

Throughout their narratives, many of the participants expressed motivation to engage in treatment for smoked heroin addiction. Motivators for treatment engagement complimented the barriers and facilitators identified for treatment engagement. Motivators for treatment

engagement were mostly intrinsic and supported individual autonomy. Participants often cited a wish to stop using whoonga so that they can "change their way of living."

> *I just want to change my way of living, so that I can be able to live with my family, and start a new life because I have since realized that this life has no future. The aim is to start a new life so that I can live with my children because I am failing even to stay with my children, I am living with my children now but when it is sunset and you find that I do not have whoonga then I get sick, there is no child that can stay with someone who is sick, you are getting stomach pains.So now the children will be seeing that daddy is sick and it is because of drug.* (35-year-old male participant)

> *My motivation was the fact that I have a life out there that I need to go back to, you need to look at the pros of life and the fact that you need to be just normal, live normal life, there is no such thing as high for everything, you shouldn't be in need of a high for everything in the day because its taking it every day you are looking for trouble.* (25-year-old male participant)

> *I just felt unhappy about using and looked at myself one day in the mirror and said no this is not me, I need to make a change also the fact that I lost almost everything my girlfriend, my family do not want to be with me anymore.* (25-year-old male participant)

Furthermore, participants were motivated to engage in treatment to be able to accomplish goals such as to remain or become employed, to continue their education, to support their family, and to repair broken relationships, especially with family.

> *I want to go back to school, and regain people's trust you know, and not continue saying "this one is smoking whoonga" if you are smoking you do not care, my sister is who I am worried about, because she is the one that I am used to seeing most of the time when she is around and it forces me to see her, I used to no longer have time to spend with her.* (19-year-old male participant)

> *What made me come here; I came here because I do not want to lose my job, I was getting bad I do not want to ruin my family, if I wasn't going to come here now, I should not lose everything, I should be in the streets.* (31-year-old male participant)

For one participant, it was witnessing the consequences that his addiction had on his family that allowed him to recognize his need for treatment.

> *It has affected them so much because they are the ones that made me try to get help even to come here…because I saw that this is not life anymore, which I was living*. (29-year-old male participant)

Additionally, participants were motivated to engage in treatment to deflect the stigma and perceived discrimination associated with whoonga use.

My mom actually visits me at SANCA and she does not want to take me back home, I am going to actually stay at halfway house by SANCA, she said I am going to earn my trust, because she has heard so much about whoonga in the media, how bad it is, the stories like whoonga user did this, broken to that and was violent, she only read the articles. (36-year-old male participant).

One participant also found motivation to enter substance use treatment to "prove (his family) wrong."

Actually what motivated me is that, for my father to lose hope in me. And said I will never change, I can say that what motivated me, that I had to prove him wrong each and every day I put that thing in my mind that I have to prove him wrong, you see…(19-year-old male participant)

Finally, some participants were more extrinsically motivated and were motivated to begin substance use treatment upon receiving ultimatums from family threatening being disowned or kicked out of the house if they did not go to treatment.

I was caught by the police and they gave me a five years suspended sentence and also I could see my life was going downhill, I sold everything I owned and was kicked out of the house and I would ended up in the squatter camp as well, but I said no I need to save my life, this is not the life I want to live. (36-year-old male participant)

DISCUSSION

In this qualitative study among smoked heroin users in South Africa, there were several barriers to treatment engagement but only family was identified as a facilitator. Barriers can be organized into three categories: biological barriers, social barriers, and structural barriers. Biological barriers included the experience of withdrawal and negative perceptions of methadone. Social included stigma and relationships with family. Structural barriers included cost and availability of substance use treatment. This cohort of largely treatment-engaged persons were highly motivated.

The present findings of this study are largeley consistent with what is known about the addictive nature of opioid use. Heroin, the addictive ingredient in whoonga, was observed to be the subject of public safety concerns thougout South African communities and posed a significiant threat to the physical health of its users. Participant descriptions of smoked heroin withdrawal including cramping, diarrhea, and body aches were consistent with opioid withdrawal symptoms identified among heroin users in other regions such as Kenya, and in severe cases, were identified as a cause of death (Mital et al., 2016).

Participant narratives suggest that methadone delivery can be enhanced. Although we were expecting medication assisted treatment such as methadone to be a facilitator to treatment engagement, participants perceived methadone as a barrier and causing its own addiction. Current treatment has been observed to take an abstinence-based approach, which completely avoids any access to drugs, alcohol or medications, including those such as methadone which may assist with curbing cravings or minimizing the effects of withdrawal (Scheibe et al., 2017). Methadone, when used consistently and appropriately, is advocated as a harm-reduction approach to treatment rather than intended to force an outcome (Marks et al., 2020). Perceptions

that methadone is ineffective may be a result of underdosing of methadone, which is a common problem in many settings. Low-barrier access to methadone including addressing issues of cost and imporiving availability may enhance uptake and retention in methadone maintenance programs (Marks et al. 2020).

Consistent with a study addressing the initiation of whoonga use, the impact of social and structural barriers to the initiation of substance use treatment and continued treatment engagement were observed among all participants who were admitted to treatment for smoked heroin use (Tyree et al., 2020). For example, the financial expense of initiating treatment was often discussed in conjunction with the only observed facilitator to treatment of financial support from family. Social barriers including the decline of interpersonal and familial relationships were highlighted throughout the participants' narratives and suported by epidemiliogocial data suggesting social change as a correlate to drug use (Peltzer et al., 2010).

Family was cited as a barrier, facilitator, and motivator for substance use treatment engagement. Peers who use drugs and the places where participants live make up a "risk environment" for substance use and confer vulnerability for the initiation of whoonga use (Tyree et al., 2020). Ironically, one's social environment, especially family in the context of this study, was both a barrier to treatment engagement and critical for the initiation and maintenance of treatment engagement. Functional family therapy, an ecological family systems approach to substance use disorders, is a useful framework to further evaluate the social barriers of addiction that may arise from maladative familial relationships (Weisz & Kazdin, 2017) and applied here, targets the goals of participants to rebuild and maintain healthy family relationships. Further interventions targeting stigma and broken relationships in families may be a useful strategy to

capitalize on participant motivation and create a “rescue environment” to promote treatment engagement.

Although one of the few qualitative studies of smoked heroin treatment in South Africa, this study has limitations. Participant perspectives of this study were predominantly male (37 male perspectives; 3 female perspectives) and in residential substance use treatment for smoked heroin. The limited perspectives of women and exclusivity of smoked heroin use prevents generalizability of these findings. Data for this study are pre-pandemic and were collected at two different time periods (2015 and 2017). It is not known how relevant these data are to people who are currently using whoonga. Finally, Demographic information from 2017 data were limited to only age, race, and gender thus making it difficult to compare narratives based on other characteristics.

Despite these limitations, we identified barriers, facilitators, and motivators for substance use treatment engagement among smoked heroin users in South Africa. There are complex and overlapping social and biological forces at work and biobehavioral interventions that leverage motivators and facilitators to overcome barriers may have the most lasting impact on treatment engagement and treatment success. Only by understanding barriers and identifying facilitators and motivators for treatment engagement will we be able to target relevant and specific interventions to promote treatment engagement and treatment access.

This thesis, in part, is under revision in preparation for publication in a journal that is later to be determined. Committee member David Grelotti is the primary investigator of this research, a co-author, and has acknowledged and permitted the use of the material for this paper.

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