

Clinical characteristics and treatment outcomes of women with heroin dependence in Johannesburg, South Africa

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Background. There has been a steady increase in the number of women with heroin dependence in South Africa (SA). Data from developed countries suggest that women with substance use disorder have unique treatment needs. There are limited SA data on women with heroin dependence and their response to treatment.

Objectives. To describe the clinical and psychosocial characteristics of women entering inpatient rehabilitation for heroin dependence, determine the outcomes of treatment 3 and 9 months after rehabilitation, and compare these findings with male heroin users.

Methods. We conducted a longitudinal study of 44 women with heroin dependence who were admitted to a rehabilitation facility in the West Rand Municipality of Gauteng Province, SA. The participants were assessed during admission and 3 and 9 months after leaving inpatient rehabilitation. Structured interviews measured changes in drug use, psychopathology, social functioning, injecting and sexual behaviour, criminality and general health. Statistical analysis of these outcomes and comparison between women and men at 3 months and 9 months was performed by a generalised estimating equation. Fixed and time-varying covariates were included in the models.

Results. At baseline, 40% of female participants were HIV-positive, 50% engaged in sex work, 27% were injecting heroin users, and 75% were diagnosed with a comorbid mental illness. Thirty-seven (84%) and 30 (68%) were re-interviewed at the 3- and 9-month follow-up points, respectively. Of these, 6 were abstinent from all substances at 3 months and 2 at 9 months. Compared with males, females had a higher prevalence of HIV infection ($p=0.006$) and mental illness ($p=0.0002$) at enrolment. At 9 months, women had similar levels of drug use and criminality to men but scored significantly worse in terms of general health, social function and risky sexual behaviour.

Conclusions. Women with heroin dependence in Johannesburg have high rates of HIV infection and comorbid mental illness and low rates of abstinence after inpatient detoxification and psychosocial therapy. Women fared worse than men in many domains of treatment outcome. This study builds evidence for the need for gender-sensitive substance rehabilitation facilities in SA.

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Data from the Western Cape Province of South Africa (SA) show that among women seeking treatment for substance abuse, the proportion of heroin-related admissions increased significantly from 4.8% in 2000 to 5.6% in 2013.^[1] With increasing use of the heroin-based drug nyaope in Gauteng Province and other parts of SA, it is expected that more women are becoming in need of treatment for heroin dependence throughout the country.^[2,3] Although lacking in detail, the South African National Drug Master Plan (2013 - 2017) listed women with substance use disorders as a priority area for attention and action by national and provincial departments.^[4]

Epidemiological research shows that women with substance use disorders often have a different course of illness and treatment needs to men.^[5] Telescoping, the term used to describe rapid progression from use of first substance to substance dependence and first admission to treatment, is often seen in women with opioid, cannabis and alcohol dependence.^[6,7] Despite using less of the substance for a shorter period of time, women therefore typically present with a more severe clinical profile than men. Women also tend to have more psychiatric and non-psychiatric comorbidities and more severe social difficulties.^[5] Furthermore, the dual diagnosis of mental illness and substance use disorder infers a poorer prognosis.^[8-10] Women with substance dependence are more likely than those without to contract HIV, experience intimate partner violence and engage in sex work.^[8,11,12] Added to these harms, women also face significant barriers to accessing treatment.^[13,14]

In an SA context, awareness of treatment options and geographical access to treatment were notable barriers to treatment for women in the Western Cape.^[14] Qualitative data from Australia highlighted social stigma, concerns about child care and the perceived economic and time costs of treatment as a few of the deterrents preventing women from accessing treatment.^[13] The United Nations General Assembly Special Session on the World Drug Problem in 2016 emphasised the specific needs of women. The outcome document calls for a gender-sensitive drug policy that eliminates all forms of discrimination against women and a policy that takes into account the specific needs and circumstances they face.^[15]

Gender-sensitive treatment services have been evaluated in developed countries. Studies suggest that women in women-only treatment programmes have better outcomes than those in mixed-gender treatment programmes.^[16-18] Additionally, randomised controlled trials have demonstrated the efficacy of gender-specific treatment services that cater to the specific needs of subpopulations of women with substance use disorders.^[19-22] These include women with children, women with comorbid psychiatric disorders, and women in the criminal justice system.

Men certainly also suffer the severe harms associated with substance abuse. However, despite our knowledge of the specific vulnerabilities of women with substance use disorders, drug policy and treatment services, including those in SA, often fail to address these unique issues adequately. Heroin is the most potentially harmful of the

substances of abuse.^[23] It is therefore critically important to have an in-depth understanding of the characteristics of women with heroin dependence and to evaluate the outcomes of treatment for those who have had the opportunity to access it.

Objectives

To describe the clinical and psychosocial characteristics of women entering inpatient rehabilitation for heroin dependence, determine the outcomes of treatment 3 and 9 months post rehabilitation, and compare these findings with those for male heroin users.

Methods

This was a prospective cohort study of heroin users. Women were recruited from a state-funded drug and alcohol rehabilitation centre in Gauteng. At the time of data collection, the facility had 20 beds allocated to women and ~200 for men. Men were recruited from this facility and a second, exclusively male, rehabilitation centre in Soweto. A convenience sample of newly admitted heroin users were screened for study criteria. Of a total of 317 males and females screened, 8 did not fit the inclusion criteria and 5 refused participation. No females refused to participate. Four males were excluded at the time of baseline psychiatric interviews because they were assessed as actively suicidal. The final cohort comprised 44 females and 256 males.

Patients admitted to the facilities were voluntarily seeking treatment for substance abuse and most were referred by community-based social workers. A minority was referred by the courts. Both rehabilitation programmes entailed 1 week of inpatient detoxification followed by 6–8 weeks of psychosocial rehabilitation. The rehabilitation programmes consisted primarily of group sessions led by social workers and addiction counsellors. Upon completion, most patients returned home and were encouraged to see their local social workers for follow-up and to attend community-based self-help groups such as Narcotics Anonymous. Baseline and follow-up data were collected between July 2017 and January 2019. The study was approved by the University of the Witwatersrand Human Research Ethics Committee (ref. no. M1704100).

We screened clients who reported that nyaope/heroin was their primary drug of abuse. In order to be enrolled in the study, participants had to have reported using heroin during the months prior to admission, be >18 years of age, be willing to provide locator information for follow-up to occur, and be able to provide informed consent. Participants were assessed during rehabilitation and then followed up 3 and 9 months after leaving inpatient rehabilitation. Participants were not compensated for their participation, but were given ZAR100 for transport if they returned to the research site for their follow-up interview. In some cases, the principal investigator (PI, NM) did home and/or hangout-spot follow-up visits. Participants who were seen at home or hangout spots were not compensated. No telephonic interviews were done.

Structured interviews

All baseline and follow-up interviews were conducted face to face by the PI, who is a psychiatrist and was not part of the treating team at the rehabilitation facilities. Participants did not read or answer any of the questionnaires on their own. At baseline, a detailed sociodemographic and past substance use questionnaire created specifically for the study was administered. The Opiate Treatment Index (OTI),^[24] which included sections on past-month drug use, past-month injecting and sexual practices, social adjustment, past-month criminal history and general health, was administered at baseline and both follow-up occasions. Drug use estimates in the OTI are based on the average use episodes of a substance per day. Drug use

is expressed as a Q score, which describes the frequency of drug use. A Q score of 1.00–1.99 indicates daily use, and a score >2.00 indicates use more than once a day. The social functioning, injecting and sexual behaviour, and criminality sections are scored with higher scores indicating greater severity or dysfunction.

The Mini International Neuropsychiatric Interview (MINI), version 7.0.2 for DSM-5,^[25] was administered at baseline and both follow-up points to determine the presence of the following psychiatric conditions: major depressive episode (MDE, past and current), suicidality (current, lifetime and future risk), manic and hypomanic episodes, social anxiety disorder, obsessive-compulsive disorder, post-traumatic stress disorder (PTSD), psychotic disorders, generalised anxiety disorder (GAD) and antisocial personality disorder (ASPD). Screening for ASPD was only done at the baseline interview.

Urine was collected for a multi-drug urine test (MDUT) for all participants who were able to provide a sample. Urine collection was unsupervised; however, a research assistant was trained to identify any unusual changes in colour, temperature or smell. The MDUT tested for the presence of opioids, cocaine, amphetamines, methamphetamine, cannabis and benzodiazepines.

Sample size estimation

Sample size estimation for the comparison of female and male groups was based on the χ^2 test (for categorical variables) with up to 4×2 table size, and the independent-samples *t*-test (for continuous variables); for the detection of a medium effect size ($w=0.3$ and $d=0.5$, respectively) with 80% power at the 5% level of significance, minimum sample sizes of 122 and 128, respectively, are required. Sample size calculations were carried out in G*Power.^[26]

Data analysis

Comparison of follow-up status (those seen v. those lost to follow-up (LTFU)) for categorical variables was carried out with the χ^2 test. Fisher's exact test was used for 2×2 tables or where the requirements for the χ^2 test could not be met. Continuous variables were assessed by the independent-samples *t*-test. Where the data did not meet the assumptions of these tests, a non-parametric alternative, the Wilcoxon rank-sum test, was used. Comparison of gender groups at enrolment was carried out analogously.

Comparison of binary outcomes at enrolment, 3 months and 9 months was performed by a generalised estimating equation (GEE) model with the outcome as the dependent variable, observation point as the independent variable, and participant as the repeated measure. Treatment completion, intravenous (IV) drug use, depression and PTSD (all at enrolment) were included as covariates. Continuous outcomes were compared analogously by a linear mixed model (the outcome was log-transformed if necessary, to meet model assumptions, followed by back-transformation of model estimates).

Comparison of binary treatment outcomes between men and women at 3 months and at 9 months was performed by a GEE model with the outcome as the dependent variable, gender as the independent variable, and participant as the repeated measure. Treatment completion, IV drug use, depression and PTSD (all at enrolment) and readmission were included as covariates. Continuous outcomes were compared analogously as described above.

Data analysis was carried out using SAS version 9.4 for Windows (SAS Institute, USA). A 5% significance level was used.

Results

Characteristics of women at treatment entry

The median (interquartile range (IQR)) age at enrolment was 27 (22–30) years (Table 1). Twenty participants (45%) had a grade 10

Table 1. Baseline sample characteristics by gender

Characteristic	Women (N=44)	Men (N=256)	p-value
Age at study enrolment, median (IQR)	27 (22 - 29)	27 (23 - 30)	0.85
Age at first substance use, median (IQR)	15 (13 - 16.5)	14 (13 - 16)	0.28
Age at onset of heroin use, median (IQR)	19.5 (16 - 23)	19 (17 - 22)	0.79
HLoE (up to grade 11), n (%)	28 (63.6)	182 (71.1)	0.34
Employment status (any past month), n (%)	10 (22.7)	152 (59.4)	<0.0001*
OTI drug use scores			
Heroin, median (IQR)	8 (4.5 - 10)	7 (4.5 - 10)	0.35
Cannabis, median (IQR)	5.3 (0.6 - 9)	6.5 (2.6 - 10)	0.46
Substance use (any use in past month), n (%)			
Alcohol	7 (15.9)	42 (16.4)	>0.99
Crystal methamphetamine	9 (20.5)	49 (19.1)	0.84
Crack cocaine	15 (34.1)	63 (24.6)	0.20
Methaqualone	8 (18.2)	47 (18.4)	>0.99
Social functioning score, mean (SD)	29.6 (4)	26 (5.8)	0.0001*
Criminality score, mean (SD)	2.8 (3)	4.3 (3.3)	0.0014*
General health score, mean (SD)	23.6 (7)	18.9 (7.2)	<0.0001*
HIV-positive, n (%)	16 (40.0)	28 (14.5)	0.0006*
Psychiatric comorbidity, n (%)			
Any mental illness (excluding ASPD)	33 (75.0)	115 (44.9)	0.0002*
MDE	25 (56.8)	77 (30.1)	0.001*
GAD	23 (52.3)	55 (21.5)	<0.0001*
PTSD	19 (43.2)	34 (13.3)	<0.0001*
ASPD	18 (40.9)	139 (54.3)	0.11
Lifetime sexual trauma, n (%)	26 (59.1)	6 (2.3)	<0.0001*

IQR = interquartile range; HLoE = highest level of education; OTI = Opiate Treatment Index; SD = standard deviation; ASPD = antisocial personality disorder; MDE = major depressive episode; GAD = generalised anxiety disorder; PTSD = post-traumatic stress disorder.
*Significant at $p < 0.05$.

or 11 qualification, and 16 (36%) had attained a grade 12 or higher level of education. Ten participants (23%) had had some form of employment during the preceding 6 months, and of these 9 did piece work/informal employment. The majority (64%) lived in formal accommodation, while 12 (27%) lived in informal housing (such as a *zozo* or shack) and 4 (9%) were living on the streets. The majority (66%) had one or more children. There were no significant differences between males and females with regard to age at the time of study enrolment. Compared with males, a higher proportion of females had children ($p=0.001$) and were unemployed ($p < 0.0001$) (Table 1). The median (IQR) age of onset of first substance use was 15 (13 - 17) years and the median age at first use of heroin was 20 (16 - 23) years. The median duration of heroin use was 5 (4 - 9) years. The majority smoked heroin in combination with cannabis (73%), while 27% had injected heroin during the past month. The median length of stay at rehabilitation was 43 (31 - 44) days. Twenty-nine women (66%) completed the entire inpatient programme. Fifty-five percent used two or more substances. The median Q score for heroin was 8 (4.5 - 10.0) and the median Q score for cannabis was 5.3 (0.6 - 9). The most common substances used in the past month (other than heroin, cannabis and tobacco) were crack cocaine (34%), crystal methamphetamine (21%) and methaqualone (18%). Compared with men, there were no significant differences in age of first substance use, age of onset of heroin use, number of substances used and length of stay in inpatient rehabilitation (Table 1).

Excluding ASPD, 33 women (75%) were diagnosed with a mental illness (Table 1). The most common were MDE (57%), GAD (52%), PTSD (43%) and social anxiety disorder (21%). Thirty-six participants (82%) had experienced suicidal feelings during the

past month and 52% had a lifetime suicide attempt. Thirty-four (77%) reported that they had experienced trauma, and 26 (59%) had experienced sexual trauma; of these 10 (38%) were sexually assaulted during childhood. Sixteen percent reported experiencing intimate partner violence. Sixteen women (40%) reported being HIV positive. Four women (9%) had never had an HIV test and therefore did not know their HIV status. Compared with males, females had a significantly higher prevalence of HIV ($p=0.006$), mental illness ($p=0.0002$) and sexual trauma ($p < 0.0001$) (Table 1).

Twenty-four women (56%) had had two or more sexual partners during the past month and 50% had been paid for sex during the past month. Seventeen (39%) never or hardly ever used condoms with regular sexual partners. With regard to crime, 68% had engaged in crime in the past month. The most common types of crime were property crime (52%) and dealing drugs (27%). Six (14%) had committed fraud during the past month and 5 (11%) reported violent crime. When comparing women and men, women had a significantly higher number of sexual partners, and a significantly higher number were paid for sex. There was no significant difference in use of condoms between men and women. Criminality was significantly higher in males. Women had significantly poorer social functioning scores ($p=0.0001$) (Table 1).

Comparison between women seen at 3 and 9 months and those LTFU

At 3 months, 37 (84%) of participants seen at baseline were re-interviewed. Of the 7 LTFU, 4 could not be found as the family reported that they had relapsed and were mainly living on the streets. At 9 months, 30 participants were re-interviewed and 6 of the 14 LTFU were reported to be living on the streets.

Owing to the small number of females LTFU, it was not possible to analyse differences between those seen and those LTFU. When comparing the entire group (males and females), there were a few significant differences between those seen and those LTFU. At 3-month follow-up, a higher proportion of participants who were followed up successfully had been living in formal housing at enrolment, compared with those LTFU ($p=0.042$). At the 9-month follow-up, those who were followed up successfully had a higher median duration of heroin use (7 v. 6 years; $p=0.033$), a lower proportion of cannabis without heroin users ($p=0.048$), a lower proportion of mental illness ($p=0.047$), a higher proportion of methaqualone users ($p=0.0098$) and a higher proportion living in formal housing ($p<0.0001$).

Treatment history for women between index rehabilitation and 9 months

Of the participants, 19 (51%) reported attending Narcotics Anonymous peer-support groups at 3 months and 6 (20%) at 9 months. At 9 months, 2 participants had received treatment at a halfway house. From enrolment to 9 months, 2 participants reported receiving psychotropic medication and 1 received individual therapy sessions after discharge from the inpatient facility. Three women reported falling pregnant during the study period. Specific details of the obstetric outcomes were not collected for this study. None of the participants who were pregnant received opioid agonist maintenance treatment (OAMT).

Treatment outcomes for women at 3 and 9 months

At 3 months, 6 participants (16%) were abstinent from all substances (excluding tobacco) and 2 (7%) were abstinent from all substances at 9 months. Thirteen (35%) were abstinent from heroin at 3 months and 6 (20%) at 9 months (Table 2). Heroin and cannabis abstinence decreased significantly from 3 to 9 months. Alcohol abstinence decreased significantly from enrolment to 3 months (84% at enrolment v. 59% at 9 months; $p=0.017$). There was no significant improvement in the prevalence of any mental illness from treatment entry to 3 and 9 months post treatment. There was significant improvement in mean social functioning scores from treatment entry to 3 months, but no significant improvement thereafter. There was a

significant deterioration in general health scores from 3 to 9 months ($p<0.0001$).

Comparison of treatment outcomes between men and women

Total abstinence was significantly higher in women at 3 months ($p=0.008$) (Table 3). There were no significant differences between men and women in total abstinence at 9 months and heroin abstinence at 3 and 9 months. Past-month alcohol use was significantly higher in men at 3 and 9 months. At 9 months, women scored significantly worse than men in the areas of social functioning, risky sexual behaviour and general health. There were no significant differences in criminality at 3 and 9 months. Compared with men, a significantly higher proportion of women felt that their partner's use of substances contributed to their heroin relapse (74% v. 20%; $p<0.0001$).

Discussion

We have presented results of the first prospective study of female heroin users in SA. The data highlight high levels of trauma, mental illness and HIV in women with heroin dependence and expose significant gaps in treatment services. The study also draws attention to differences between men and women with heroin use disorder, and builds evidence for a need for gender-sensitive treatment services. The following discussion will provide a broader context and interpretation of the results while also making suggestions on the way forward.

During the recruitment period, we attempted to enrol as many female participants as possible, but the study concluded with a sample size of 44 women v. 256 men. The gender bias in the overall sample probably reflects the low number of women entering treatment facilities owing to the various barriers mentioned at the beginning of the article.^[14] There were considerably fewer beds allocated to women, supposedly as a result of lower demand for inpatient female admissions. When comparing baseline demographics with those of men, there were no significant differences in age at study enrolment, age at first substance use or age at onset of heroin use. However, despite similar length of drug use to men, women suffered more harms associated with heroin use. This is evidenced in our data by higher prevalences of unemployment, psychiatric

Table 2. Treatment outcomes for women[†]

Outcome	Enrolment (N=44)	3 months (N=37)	9 months (N=30)	p-value		
				En - 3 mo	En - 9 mo	3 - 9 mo
Past-month abstinence, n (%)						
Total abstinence (excluding tobacco)	0	6 (16.2)	2 (6.7)			0.26
Heroin	0	13 (35.1)	6 (20.0)			0.023*
Cannabis	6 (13.6)	12 (32.4)	5 (16.7)	0.023*	0.89	0.043*
Alcohol	37 (84.1)	22 (59.4)	23 (76.7)	0.017*	0.60	0.29
Crystal methamphetamine	35 (79.6)	30 (81.1)	24 (80.0)	0.98	0.99	0.99
Crack cocaine	29 (65.9)	30 (81.1)	20 (66.7)	0.31	0.99	0.21
Methaqualone	36 (81.8)	34 (91.9)	24 (80.0)	0.36	0.99	0.34
Any mental illness (excluding ASPD)	33 (75.0)	21 (56.8)	18 (60.0)	0.15	0.23	0.96
Criminality score, mean (95% CI)	2.4 (1.6 - 3.6)	0.7 (0.4 - 1.2)	0.7 (0.4 - 1.2)	<0.0001*	<0.0001*	0.055
Sexual behaviour score, mean (95% CI)	6.8 (5.5 - 8.2)	5.5 (3.9 - 7.2)	5.3 (4.0 - 6.7)	0.14	0.021	0.96
Social functioning score, mean (95% CI)	29.2 (27.8 - 30.6)	24.5 (22.1 - 26.9)	27.3 (25.1 - 29.5)	0.0004*	0.22	0.059
General health score, mean (95% CI)	23.4 (21.4 - 25.3)	13.5 (11.0 - 16.1)	19.6 (17.2 - 21.9)	<0.0001*	0.045	<0.0001*

En = enrolment; ASPD = antisocial personality disorder; CI = confidence interval; IV = intravenous; MDE = major depressive episode; PTSD = post-traumatic stress disorder.

*Significant at $p<0.05$.

[†]Where sample size was adequate, the model controlled for the following covariates: treatment non-completers, IV users, diagnosis of MDE at treatment entry, diagnosis of PTSD at treatment entry, treatment readmission.

Table 3. Comparison of treatment outcomes by gender†

Outcome	Men, 3 months (N=215)	Women, 3 months (N=37)	Men, 9 months (N=195)	Women, 9 months (N=30)	p-value	
					Between groups (3 months)	Between groups (9 months)
Past-month abstinence, n (%)						
Total abstinence (excluding tobacco)	10 (4.7)	6 (16.2)	9 (4.6)	2 (6.7)	0.008*	0.64
Heroin	81 (37.7)	13 (35.1)	52 (26.7)	6 (20.0)	0.57	0.29
Cannabis	56 (26)	12 (32.4)	35 (17.9)	5 (16.7)	0.14	0.84
Alcohol	91 (42.3)	22 (59.5)	99 (50.8)	23 (76.7)	0.008*	0.001*
Crystal methamphetamine	163 (75.8)	30 (81.1)	155 (79.5)	24 (80)	0.98	0.91
Crack cocaine	179 (83.3)	30 (81.1)	154 (79.0)	20 (66.7)	0.81	0.14
Methaqualone	175 (81.4)	34 (91.9)	154 (79.0)	24 (80.0)	0.26	0.41
Any mental illness (excluding ASPD), n (%)	82 (38.1)	21 (56.8)	66 (33.8)	18 (60.0)	0.53	0.07
Criminality score, mean (95% CI)	0.3 (0.0 - 4.8)	1.5 (1.1 - 2.1)	2.4 (1.8 - 3.2)	0.9 (0.3 - 3.2)	0.26	0.15
Sexual behaviour score, mean (95% CI)	4.1 (3.1 - 5.5)	8.4 (6.0 - 11.8)	3.2 (2.4 - 4.2)	5.4 (3.9 - 7.4)	<0.0001*	0.0003*
Social functioning score, mean (95% CI)	22.5 (21.7 - 23.2)	25.0 (22.6 - 27.4)	22.4 (21.6 - 23.3)	27.8 (25.4 - 30.2)	0.002*	<0.0001*
General health score, mean (95% CI)	14.5 (11.5 - 18.4)	17.4 (13.0 - 23.3)	14.5 (12.2 - 17.2)	20.2 (16.2 - 25.1)	0.14	0.001*

ASPD = antisocial personality disorder; CI = confidence interval; IV = intravenous; MDE = major depressive episode; PTSD = post-traumatic stress disorder.

*Significant at p<0.05.

†The model controlled for the following covariates: treatment non-completers, IV users, diagnosis of MDE at treatment entry, diagnosis of PTSD at treatment entry, treatment readmission.

comorbidities and HIV and poorer social functioning and general health scores in women. Our findings are therefore in keeping with the literature describing the concept of telescoping, whereby women with substance dependence display higher levels of functional impairment in a similar or shorter length of time.^[5,8,27,28]

On closer examination of the comorbidities present in women, we found that the overwhelming majority of women (75%) were diagnosed with a psychiatric comorbidity. The most common were MDE, GAD and PTSD. In keeping with data from developed countries, almost 80% reported a lifetime experience of trauma (although not all fulfilled criteria for PTSD), and the majority of the traumas reported were sexual traumas and intimate partner violence.^[29] There are limited data assessing psychiatric comorbidities in women with heroin dependence. In a sample of 49 women with heroin use disorder in Spain, 36.7% had a mood disorder, 4% had GAD and 6% had PTSD.^[30] In the USA, 29.7% of women with substance use disorder were also diagnosed with a mood disorder.^[5] In our sample, the prevalence of MDE, GAD and PTSD was markedly higher than in data from developed countries. It may be that the low number of women in our sample receiving medication for psychiatric comorbidities contributed to the higher occurrence of mental illnesses.

Between index rehabilitation and 9-month follow-up, the majority of women did not consult with psychiatrists or psychologists or receive psychotropic medication. As a result, there were no significant changes in the prevalence of mental illness over the course of the study period. We recommend that all women attending substance rehabilitation services also have access to psychiatric care. This could be achieved by including psychiatrists as members of the treating team in rehabilitation facilities and by improving communication between rehabilitation and low-threshold community-based psychiatric services.

In our sample, 12 women (27%) were injecting heroin. Fifty percent engaged in sex work and almost 40% reported rarely using condoms with their regular partners. Forty percent were HIV-positive. The increasing number of women affected by substance abuse, violence and HIV/AIDS is referred to as the SAVA syndemic in the USA.^[11] The women in our study are likely to represent one of the most vulnerable groups of women in SA. Sex work in female injecting and non-injecting heroin users is often a means of supporting their own and their partner's habit.^[27] Our study also found that 74% of women were negatively influenced by having a partner who used heroin. This is in keeping with previous studies which report that women are more likely than men to be introduced to injecting heroin by their sexual partners and that women are particularly influenced by their sexual partners' injecting behaviour.^[31,32]

Importantly, women who were pregnant during the study period continued to use heroin and did not have access to OAMT or specialised services that cater to the needs of pregnant women with heroin use disorder. World Health Organization guidelines for substance abuse in pregnant women advocate the use of methadone as maintenance therapy during pregnancy,^[33] and a recently published systematic review by leading SA researchers suggested the same.^[34] Gender-specific and gender-sensitive treatment options for women with substance use disorder have been evaluated in developed countries.^[28] Data from the present study suggest that the same is needed in SA.

We found that levels of violent trauma, mental illness, social dysfunction and physical ill health at treatment entry were substantially higher in women than in men. At 9 months, men and women had similar levels of drug use and criminality, but women fared worse in terms of general health, social functioning and high-risk sexual behaviour. Overall treatment outcomes were therefore poorer in women. Women-only treatment services and treatment

services that cater to women with children and women with the triple diagnosis of substance use disorder, mental illness and HIV should be considered in SA. Data also show that women who use drugs experience higher levels of discrimination and stigma than their male counterparts.^[27] Health and social services should therefore train all service providers adequately, and facilities should deliver a supportive, culturally sensitive and non-judgmental environment.

Study limitations

When interpreting the study results, there are some limitations to consider. We had a small sample of women compared with men. Owing to the challenges of entering treatment for women, women in this study may be representative of those with more severe dependence compared with a wider range of men entering treatment. These factors may introduce a gender bias when comparing data between men and women. While the small sample size of women compared with men poses a limitation to this study, the overall sample of 300 is in excess of the minimum sample size requirement, insuring against additional requirements arising from group imbalance. The generalisability of the study is also limited by the fact that women were recruited from one inpatient rehabilitation facility in Gauteng. Future studies should include a larger sample of women from more treatment sites. An additional consideration would be to include a control group of women not entering treatment. A control group may enable more accurate evaluation of the impact of detoxification and psychosocial rehabilitation in women with heroin dependence.

Conclusions

The cohort of women in this study represents a highly stigmatised, vulnerable group who require more representation in health policy. Our failure to meet the needs of these women will result in even higher levels of morbidity and mortality for them and for their children, and may exacerbate intergenerational trauma. Civil society, policymakers, researchers and healthcare providers should collaborate to provide gender-specific and gender-sensitive treatment for women with heroin dependence in SA.

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