Correlates of Mandrax use and condom beliefs in preventing sexually transmitted infections among a cohort of South African prison inmates

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Background: This study was designed to identify the extent to which self-reported Mandrax use impacts condom-use beliefs amongst South African prison inmates.

Methods: Participants were inmates from four prisons in the provinces of KwaZulu-Natal and Mpumalanga. In total, 357 inmates participated in the parent study of which 121 are included in this analysis based on their self-reported use of Mandrax. The questionnaire was developed in English, translated into Zulu, and back translated into English. Age significantly predicted the use of Mandrax: younger prison inmates reported higher use. Linear regression analysis was conducted to determine whether the use of Mandrax was associated with length of incarceration and other demographic variables, as well as participants' self-reported condom use beliefs behavior.

Results: Regression results indicated that two factors operationalizing condom-use beliefs were impacted by Mandrax use: 1) it is important to use condoms every time you have sex ($p < 0.01$); 2) condoms work well to prevent the spread of HIV ($p < 0.02$). Both factors were also inversely related to Mandrax use.

Conclusion: STI prevention programs among prison inmates that seek to promote safer sex behaviors among men must address attitudes to condom use, specifically consistent and correct use of latex condoms and reducing substance misuse.

Keywords: Condom use, Drug use, Mandrax, Prison inmates, South Africa

Introduction

It is well documented that sexual risk taking and increased risk for STIs is strongly associated with substance use.^{1–6} This is particularly apparent among incarcerated populations, which also display substance use as common problem behavior. In fact, research has noted the association between incarcerated populations' history of substance use and increased risk for STIs such as HIV due to low levels of condom use among male inmates.^{1,7–9}

Although substance use patterns vary according to assorted demographic factors and the substance used, there is limited information on how specific substances like Mandrax impact beliefs about risk taking and condom use among prison inmate populations, especially in Africa.

Most of the knowledge base regarding condom-use beliefs and drug use has been derived from studies conducted in high income countries.^{10–12} Studies that have specifically targeted African prison

inmate populations have either taken a holistic purview of substance use^{13,14} or have focused on individual drugs such as marijuana.¹⁵ Given that the lifestyles and socio-economic conditions of high income countries vary from African countries, additional research is needed to examine the impact of substance use practices on sexual risk taking. Moreover, studies need to examine these issues in the context of drugs that may be specific to different geographic regions. In South Africa, one such substance is the sedative Mandrax. Mandrax is a synthetic drug that is made and processed in tablet form. The active ingredient in Mandrax is methaqualone. The tablet is usually crushed and mixed with marijuana and smoked in a pipe.

The use of Mandrax among African populations has been documented among male and female heroin injection drug users in Tanzania,¹⁶ outpatients attending rural and urban health centres in Kenya¹⁷ and secondary school students in South Africa.¹⁸ Research has shown significant differences in use between men and women

in South Africa, and that its use is a significant predictor of HIV risk behaviors.¹⁹ When mixed with marijuana and smoked by adolescents in South Africa, it is a strong correlate of suicide ideation.¹⁸ Taiwo and Goldstein observed that nearly 4% of a random sample of Grade 7–12 students reported using the substance.²⁰ Research also suggests that smoking Mandrax and marijuana in combination is a major predictor of individuals defaulting from multidrug-resistant tuberculosis treatment.²¹ Additional studies have shown that the use of Mandrax is problematic and a serious health risk concerning increasing risk for contracting and spreading STIs including HIV,²² thus another reason for examining its relationship to condom use associated beliefs and behaviour.^{19–25}

It is well documented that cannabis and Mandrax abuse in combination is unique to South Africa, the abuse of these drugs mainly occurs in the form of inhalation by smoking although it can be swallowed or injected.²⁶ Within a few minutes of smoking Mandrax, the user usually feels relaxed, calm and peaceful although some may feel aggressive as the effects of the drug start wearing off.^{27,28} The effects last for several hours during which the user will have a dry mouth and very little appetite. Some users will have slurred speech, nausea, stomach pains and exhibit red, glazed or puffy eyes, especially if the Mandrax is taken together with cannabis.²⁹ When used on its own, Mandrax is a CNS depressant employed to reduce stress and anxiety.³⁰ It is not uncommon for individuals to increase usage in order to achieve the same effects as before, which is an indicator of an addiction developing. Depression, insomnia, anxiety and irritability, headaches, restlessness and eating problems are also common among users.^{26–29} One study investigating the prevalence of recent drug use among 1050 individuals arrested by the police in South Africa revealed that 45% tested positive for at least one drug (mainly cannabis or Mandrax).³¹

Significantly, none of the studies accounted for in the literature investigated Mandrax use among prison inmates or the possibility of it being a contributing factor to STI risk practices among this population. Studies published to date which examine substance use in the context of HIV and STI risk behaviors have targeted inmate populations outside of South Africa and have not specifically studied the relationship between condom use beliefs and Mandrax.^{32–35} This is a significant area for investigation given recent reports of increase in the demand for treatment of patients in trauma units who test positive for cannabis and/or Mandrax, since a high proportion of these cases involve cannabis and Mandrax-positive arrestees.²²

Condom use behavior and beliefs are essential in STI risk reduction and prevention.^{9,36} Consequently, intervention efforts have focused on increasing condom use among people from high risk groups. The literature supports the premise that people who are at the greatest risk of STIs come from high risk populations and tend to give an account of inconsistent or low levels of condom use.^{37–39} Empirical support for such low levels of condom use among prison inmate populations is limited although there are a number of reasons documented for other high risk populations.^{36,38,39}

Thus examining how the use of Mandrax may likely impact condom use beliefs among South African prison inmates is important if health education interventions are to be designed to engender efficacious behaviors to reduce STI risk for this population, based on increased and consistent condom use. With this understanding, the purpose of this analysis was to conduct an exploratory study designed to identify the extent to which self-

reported Mandrax use impacts condom use beliefs among a sample of South African prison inmates.

Methods

Study setting and participants

Study participants were inmates from four prisons in the provinces of KwaZulu-Natal and Mpumalanga. All were randomly selected to participate in the study. The aforementioned prisons were classified as medium-sized, medium-security facilities. The sites were selected based on the need to follow participants after being released from prison to their communities, as the intervention was a long-term 12 month cohort study. In total, 357 inmates participated in the parent study of which 121 are included in this analysis based on their self-reported use of Mandrax. The general inclusion criteria for participants was that they had to be pre-release male inmates aged 18 years or older, who were scheduled to be released from prison within 3 months of receiving the intervention program. Prior to this investigation, institutional review board approval was obtained from the South African Medical Association Ethics Review Committee (SAMAREC) and informed consent was obtained from those who volunteered to take part in this study. The questionnaire was interviewer administered as most prison inmates had very low literacy levels. Participants reported their age, ethnicity, years of formal education, number of years' incarcerated, prior arrests, and marital status.

The questionnaire was developed in English, translated into Zulu and back translated into English by a team of research assistants who were involved in the project as data collectors and health educators. It was administered either in English (in the prisons in Mpumalanga province) or in Zulu (in the prisons in Kwazulu-Natal province).

Description of the study intervention

The curriculum used for the study intervention was adapted and developed from the work of researchers who had engaged in a similar project with offenders in the USA.⁴⁰ Four former prison inmates were recruited and underwent training as peer educators to conduct the training sessions in the prisons. Two of the peer educators were HIV-positive and had to disclose their status to the participants in their intervention group.⁴¹ They had agreed to do this during their recruitment interview. The training process also provided another opportunity to fine tune the intervention. Preliminary qualitative studies were conducted by the South African correctional system and provided vital information for tailoring the intervention to black African male inmates and to capture the cultural and socioeconomic context and prison experience of South Africa.⁴¹

In each of the participating sites, 12 sessions were conducted during a period of 6 weeks, with each session lasting 1.5 h for a total of 18 h for the full intervention. The curriculum covered the following topics: 1. HIV and AIDS; 2. STIs; 3. nutrition and TB prevention and management; 4. alcohol and other drug abuse; 5. sexuality and gangsterism; 6. manhood and general life skills. All sessions were planned between 09:00 and 12:00 h in the educational section of all the participating prisons. Two health educators who had no prior history of incarceration conducted all the sessions for the control groups. Participants in the control arm of the experiment were shown a series of videos covering

various health issues, such as cholera, malaria, and TB. They also received copies of HIV and STI information, education and communication materials distributed to the general public as part of the government's prevention program.

Mandrax use prior to incarceration

Mandrax use was measured using one item with a scale of 1 to 6 (1 = daily, 2 = more than once a week, 3 = less than once a week, 4 = more than once a month, 5 = once a month, 6 = never), where participants were asked to indicate how often they smoked Mandrax before being imprisoned.

Condom use beliefs

Attitude towards condom use in sexual encounters, which measured negative beliefs about using condoms, was assessed using 8 items ($\alpha = 0.68$) with a 5-point answering scale (1 = strongly disagree to 5 = strongly agree). Questions asked addressed opinions such as 'condoms are embarrassing to use', and 'a woman loses a man's respect if she asks him to use a condom'.

Statistical analysis

Data were examined with the use of SPSS software version 16.0 (IBM, Armonk, NY, USA). Descriptive statistics were employed to present a profile of the participant's demographic characteristics. In addition, linear regression analysis was conducted to determine whether the use of Mandrax was associated with length of incarceration and other demographic variables, as well as participants self-reported condom use beliefs behavior. The regression models were constructed using Mandrax use as an independent variable and all variables were entered independently in each regression equation. Individual linear regression models were not adjusted for age given the small range of respondent ages and the use of a single dependent variable in our analysis for each equation.

Results

Table 1 provides an overview of the study sample. The majority of the respondents identified themselves as black (96.7%; 174/180), and their average age at baseline was 28.7 years ($SD = 7.8$). More than a third of the respondents reported having attended school up to Grade 9 (age 14; 34.7%; 42/121) and slightly more than one fifth (24.8%; 30/121) only completing school at the primary level (Grade 7, age 12). Almost 50% (60/121) reported being unemployed at the time of their most recent arrest with an additional 36.4% (44/121) indicating they earned less than R10 000 (South African Rand) annually. Additionally, the majority of sample participants reported being married (76.3%; 90/118); with more than two-thirds indicating this was their first time being incarcerated (66.9%; 81/121).

Table 2 presents estimates from multiple linear regressions of participants' ethnographic characteristics on self-reported Mandrax use. Age of inmates significantly and inversely predicted use of Mandrax: younger inmates reported higher Mandrax use and rates of use. The other variables were statistically indistinguishable from zero, indicating that there was no difference between Mandrax use, with respect to ethnicity, education, income, prior history of incarceration, number of prior arrests, total years imprisoned or marital status.

Table 1. Demographic profile of the study participants based on self-reported Mandrax use ($n = 121$)

Variable	% (n)
Province	
MP	53.7 (65/121)
KZN	46.3 (56/121)
Ethnicity	
Black	96.7 (117/121)
Caucasian	0.8 (1/121)
Indian	0.8 (1/121)
Mixed	1.7 (2/121)
Education	
Grade 7	24.8 (30/121)
Grade 8	12.4 (15/121)
Grade 9	34.7 (42/121)
Grade 12	19.0 (23/121)
Technical/college	1.7 (2/121)
No education	7.4 (9/121)
Annual income prior to incarceration	
Unemployed	49.6 (60/121)
<R10 000	36.4 (44/121)
R10 000–R19 999	8.3 (10/121)
R20 000–R29 999	3.3 (4/121)
R30 000–R39 999	1.7 (2/121)
R40 000–R49 999	0.0 (0/121)
>R50 000	0.8 (1/121)
Marital status ^a	
Yes	76.3 (90/118)
No	23.7 (28/118)
First time in prison	
Yes	66.9 (81/121)
No	33.1 (40/121)

KZN: KwaZulu-Natal province; MP: Mpumalanga province; R: South African Rand.

Grade 7 (ages 12–13), Grade 8 (ages 13–14), Grade 9 (ages 14–15), Grade 12 (ages 17–18)

^a Three participants in our sample did not respond to the Marital status item, therefore this response was coded as missing, thus the denominator of 118.

Regression results detailed in Table 3 indicate that just two of the eight factors that operationalized condom use beliefs were significantly impacted by Mandrax use. These were 'it is important to use condoms every time you have sex' ($p < 0.01$) and 'condoms work well to prevent the spread of HIV' ($p < 0.02$). Both of these were also inversely related to Mandrax use suggesting that higher use of the substances reduced beliefs specific to these attitudes among inmates.

Discussion

This investigation of South African prison inmates who use Mandrax and their beliefs about condoms revealed a substantial

Table 2. Linear regression analysis of prison inmates' ethnographic characteristics using self-reported level of Mandrax use as the dependent variable

Variable	β^a	SE	p-value
Ethnicity	-0.138	0.326	NS
Age (years)	-0.052	0.021	0.01
Education	-0.047	0.094	NS
Income before arrest	0.120	0.151	NS
Prior incarceration	-0.018	0.080	NS
Number of times arrested	0.345	0.345	NS
Total years imprisoned	-0.006	0.065	NS
Marital status	0.108	0.329	NS

NS: not significant; SE: standard error.

^a β : Beta coefficients, also known as standardized regression coefficients. The beta coefficients are used by some researchers to compare the relative strength of the various predictors within the model.

Table 3. Individual linear regression analysis of prison inmates' self-reported condom use beliefs using level of Mandrax use as the independent variable

Factors	β^a	R ²	SE	p-value
Condoms are embarrassing to use	0.048	0.005	1.05	NS
Condoms can harm the body	0.058	0.007	1.04	NS
It is important to use condoms every time you have sex	-0.176	0.046	1.23	0.01
Using a condom shows you do not trust your partner	-0.024	0.001	1.53	NS
Condoms work well to prevent the spread of HIV	-0.133	0.041	0.99	0.02
Condoms also prevent pregnancy	-0.080	0.016	0.94	NS
Condoms take fun out of sex	-0.041	0.002	1.38	NS
A woman loses a man's respect if she ask him to use condom	-0.076	0.008	1.32	NS

SE: standard error.

R²: This is the proportion of variance in the dependent variable which can be explained by the independent variables. This is an overall measure of the strength of association and does not reflect the extent to which any particular independent variable is associated with the dependent variable.

^a β : Beta coefficients, also known as standardized regression coefficients. The beta coefficients are used by some researchers to compare the relative strength of the various predictors within the model.

degree of risk for the spreading of STIs once released from prison, most striking was the observation of the extent to which age influences Mandrax use behavior. This potential is particularly emphasized by findings relevant to male inmates because they

tend to engage in risky practices such as unprotected sex and substance use when they are released from prison.⁴² This behavior consequently places their female or male sex partners at risk of contracting STIs.

It is speculated that the reason a large proportion of the sample analysed in this study are married is a direct consequence of our inclusion criteria, which required that all respondents must have a permanent place of residency for follow-up and data collection upon release from prison. Nevertheless, investigating the intersection of culturally specific drug use behaviors and condom use remains valid among South African prison inmate populations, particularly since among segments of the male population in this nation being married does not necessarily equate to being in a monogamous heterosexual relationship. One recent study among Zulu men for example noted that even when married they report having multiple sexual partners.⁴³ Moreover, women are frequently reported as being subjected to high levels of male coercion and violence within sexual relationships.⁴⁴ This cannot be overlooked given that intimate partner violence and high levels of male control in a woman's relationship had been demonstrated to be associated with HIV seropositivity.⁴⁵ In addition, not only have prior investigations revealed that heterosexually transmitted HIV infection rates are highest amongst South African males while perceived vulnerability and reported condom use are low⁴⁶ more importantly, men who had not disclosed their HIV status to their sexual partners were significantly more likely to be married,⁴⁷ with abusive men being more likely to be HIV-positive and to impose risky sexual practices on their partners.⁴⁵

There are a number of important limitations of the current investigation. One issue concerns the way in which self-reported Mandrax use and condom beliefs are measured and reported. It is possible that the interviewer-administered questionnaires may have introduced a social desirability bias with respect to self-report of sensitive sexual behaviors, including drug use. Thus it is possible that risk behavior may have been under-reported. Second, given our inclusion criteria for study participation, it is possible that we may have perhaps overstated claims to unbiased population estimates because the study sample actually recruited may not fully represent the underlying population, even after adjustment based on the specific need to follow up on participants. This is important since it is possible that South African male prison inmates without a means to be followed-up for the full intervention study may have attributes such as lower socio-economic status, lower educational achievement, fewer resources and economic opportunity compared to inmates with stable residency. Further limitations of the current investigation are that our main prevention focus targeted penile vaginal HIV/STI transmission, and that no data (self-reported or biological) was collected to confirm prison inmates' HIV status.

The most important limitation is that in this study we have not included any data regarding specific lifestyle and sexual behaviors of study participants. We acknowledge that with this gap in information, the reader may be forced to make assumptions about sexual behaviors among the sample that may or may not posit a major risk for the spreading of STIs by South African prison inmate populations. An additional major limitation is reliance on the validity of men's responses to the interview questions.⁴⁸ Furthermore, research has outlined some complications that may impact validity in data when instrumentation is translated from one language to another.⁴⁹

Future STI and substance use problem behavior and risk reduction may focus singularly on younger inmates, being designed to increase men's motivation to learn the impact of corresponding safer practices on their overall health. These should target the promotion consistent condom use among men by teaching skills designed to promote the correct use of condoms while at the same time dealing with concerns such as slippage and breakage. Thus, consistent and correct use of latex condoms should be strongly promoted among this population, in particular given research that supports HIV prevalence and associated risk factors among men who have sex with men in South Africa^{50,51} and the rates of STI acquisition that occur while incarcerated.^{52–54}

Conclusion

This exploratory study found that South African prison inmates who reported Mandrax use tended to be younger and displayed the tendency to believe that condoms were not effective in the spread of STIs such as HIV, and that condom use was not important each time they had sex. The evidence suggests that such behaviors may lead to increased dissemination of STIs by this population.

One reason for this is that offender populations, through lower levels of condom use and higher substance misuse practices, often increase the prevalence of STIs when returning to their community.^{9,14,15} For example, one study noted that men with HIV who were released from prison had sexual intercourse within an average of 6 days of their release, and 31% of these men believed that it was likely they would infect their primary sexual partner.⁵⁵ Therefore, STI prevention programs that seek to promote safer sex behaviors (oral, anal and vaginal) among men by changing attitudes to condom use and reducing substance misuse behaviors may be a beneficial response to the ongoing HIV epidemic in Southern Africa.

Authors' contributions: TTS and RB designed the study; TTS, RB and SS implemented the study; SS was responsible for the data collection; TTS carried out the statistical analysis and interpretation of these data; DG and KJ conducted and drafted the literature review. TTS and RB drafted the manuscript. SES was responsible for checking the figures before the final submission by TTS and quality assurance regarding analysis (results from computer output matched what was presented in Tables) and presentation of findings. All authors have read and approved the final manuscript. TTS is the guarantor of the paper.

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