East African Medical Journal Vol. 83 No. 9 September 2006
DRUG USE AND ITS ASSOCIATION WITH DEVIANT BEHAVIOUR AMONG RURAL ADOLESCENT STUDENTS IN SOUTH AFRICA
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ABSTRACT

Objective: **To examine prevalence of drug use in adolescent students in a rural South African community, and to measure the association between drug taking and deviant behaviour.**
Design: **Cross-sectional survey using self-administered questionnaires.**
Setting: **Seven middle and secondary schools in Moretele District, Mpumalanga Province, South Africa.**
Subjects: **A random sample of 357 rural students comprising 193 (54.1%) females and 164 (45.9%) males, aged 11.7 to 19.9 years (mean age = 15.8; SD = 21.99).**
Main outcome measures: **Self-reported use of drugs. The prevalence of bullying, absenteeism and weapon-carrying among respondents who had used substances was determined.**
Results: **Responses were obtained from 357 Grade 7-12 students. Alcohol was the most commonly used drug by the respondents. Reported lifetime prevalence of alcohol use was 47.9% (95% CI: 42.6-53.2%); tobacco, 18.2% (95% CI: 14.4-22.7%), inhalants, 5.9% (95% CI: 3.8-9.0%); cannabis 5.6% (95% CI: 3.5-8.7%). Reported use of mandrax (3.9%), tranquillizer (3.6%) and cocaine (1.4%) was low. Multivariate logistic regression analysis showed that being male (adjusted odds ratio [AOR] = 2.21; 95% confidence interval [CI] : 1.33-3.36; p = 0.002), initiating alcohol use before the age of 13 years (AOR: 2.25; 95% CI: 1.15-4.40; p = 0.018) and alcohol use were associated with absenteeism. Alcohol use, irrespective of the duration and being a male (AOR: 3.51; 95% CI: 1.50-8.20) was associated with bullying. The significant factors associated with weapon carrying were alcohol, male sex and initiating alcohol use before 13 years of age.**
Conclusion: **Drug use, particularly alcohol is common among adolescent students, especially males. There is also a positive association between drug use and undertaking precarious behaviour.**

INTRODUCTION

Adolescence is a period of physical and psychological development. It has also been described as a stage of increased curiosity, experimentation and the quest for personal identity (1). In the past few decades, there has been an increased awareness of the growing trend in substance use among adolescents both in developing and developed countries (2-5).

Besides from the rising prevalence of drug use, there is a growing concern about the deepening problem of socially unacceptable and violent crimes committed by young people (6-9).

Drug use is often cited as one of the key factors responsible for undertaking risky behaviour (10-12). Although, there is no consensus on which of these two factors precedes the other, some authors have suggested that both substance use and risky behaviour (here called deviancy) are the result of

an antecedent history of a dysfunctional social and cultural environment (13).

South Africa has witnessed many social and political changes in the past decade. The political transition and transformation that occurred in the 1990s has led to rural-urban migration. The general perception is that licit and illicit drug use among South African youth is increasing and that violent crimes are being committed at increasing levels by this group (4,14). Alcohol and tobacco are the most commonly used drugs among teenagers in South Africa while cannabis is the most commonly used illicit drug (15-18). The psychoactive drug, mandrax, made from a mixture of methaqualone and diphenhydramine or diazepam, is unique to South Africa (14). It is second only to cannabis as the most commonly used illicit drug is some segments of the South African community (18).

The primary objective of this study was to estimate the prevalence and frequency of substance use among adolescent students in a rural South African district by conducting a cross-sectional survey. Secondly, we sought to determine whether an association between alcohol, tobacco and illicit substance use, and psychosocial and behavioural functioning.

We tested the hypothesis that there is an association between substance use and deviant conduct among adolescent students.

MATERIALS AND METHODS

We conducted a cross-sectional survey of seven schools between March and April 2004. Study participants were recruited from middle and secondary schools in Moretele District. Moretele is a largely rural district, comprising three sub-districts - Libangeni, Marapyane and Mmametlhake and is located in the Northeastern region of Mpumalanga Province, South Africa.

Sampling methods: A multi-stage sampling technique was employed in the survey. The district was initially divided into clusters which correlated with the three sub-districts. We randomly selected three schools from one of the sub-districts and two from each of the other sub-districts. We deliberately over-sampled Mmametlhake sub-district because of its larger population.

A complete list of eligible students was obtained from selected schools and these were subsequently divided into subgroups according to their gender and grade level. A random sample of participants was then chosen from each stratum. Selected students were then contacted and invited to participate in the self-administered survey.

Eligibility criteria: Participants were considered eligible if they were between 10 and 19 years of age, a middle or secondary school student in the district, and had provided written, informed consent. Potential under age participants who failed to obtain the written permission of their parents or guardians before the survey were excluded.

Survey instrument: The survey was modeled after the questionnaire used in the World Health Organisation's 'Student Drug Use Surveys' (19). It was adapted to suit the South African setting with the exclusion of some drugs and inclusion of other commonly used drugs such as 'mandrax.' The questionnaire comprised three sections: section I sought to obtain the socio-demographic data; section II was on the use of different drugs; and section III sought information on the behaviour of the participants.

The questionnaire was piloted and translated to Setswana, the local language. A ficticious drug, 'bonzo' was included in the questionnaire as a measure of the validity of the responses.

The self-administered questionnaires were completed by the participants. The survey was conducted during the lunch breaks to avoid interfering with the academic and social activities of the students. To protect the anonymity of the participants, we asked teachers to leave the classrooms while the questionnaires were being filled and the students each placed their completed questionnaires in sealed envelopes.

Ethical consideration: Ethical approval for this study was granted by the Committee for the Research on Human Subjects of the University of the Witwatersrand, Johannesburg. Participation was voluntary. Written informed consent was obtained prior to the survey. Participants younger than 18 years assented to the study and we obtained written permission from their parents or guardians. To ensure that this was done, the informed consent forms were distributed among the potential participants one week prior to the scheduled day of the survey.

The purpose of the study was explicitly stated in the forms and participants were informed of their right to refuse to partake in the survey without any recriminations.

Respondents were assured of their confidentiality and anonymity. They were not required to fill in their names on the questionnaires and their teachers were excused from the classroom during the administration of questionnaires. Substance use and behavioural problems are sensitive issues and subjects may be unwilling to state that they use drugs for fear of legal reprisals and social ramifications.

Analysis: The data were analysed using EPI-info and STATA statistical software packages. Chi-square (X^2 tests for independence) was used to detect differences between male and female respondents, as well as the association between drug taking and conduct. Logistic regression analysis, using STATA software package was used to obtain odds ratios and determine the variables that were associated with absenteeism, bullying and weapon carrying.

We estimated that a sample size of 404 students would be required to provide a confidence interval of 95% and a power of 80%. The response rate was 88.4%.

RESULTS

Of the 404 students invited to fill out the questionnaires, nine (2.2%) were excluded either because they refused to participate in the survey or were absent on the day of the survey. The responses of 38 (9.6%) of the 395 participants who completed the questionnaires were excluded from the analyses for the following reasons: inconsistent responses (17); incomplete data (16); and use of 'bonzo' (5).

Respondents whose data were excluded comprised 30 males and eight females; however, they were not significantly different from the final sample with regards to age. Twenty nine (76.3%) of them reported lifetime use of at least one drug. Complete information was obtained from 357 respondents, 193 (54.1%) females and 164 (45.9%) males. The ages of the respondents ranged between 11.7 and 19.9 years (mean age = 15.8; SD = 21.99). The mean ages of the male and female students were 15.49 and 15.65 years respectively. Fourty four point eight percent of the respondents were middle school students while 55.2% were in secondary school during the survey.

Prevalence of drug use: Total reported lifetime use of alcohol was 47.9% (95% CI: 42.6 - 53.2%); tobacco was 18.2% (95% CI: 14.4 - 22.7%); inhalants 5.9% (95% CI: 3.8 - 9.0%); and cannabis 5.6% (95% CI: 3.5 - 8.7%). Lifetime use of mandrax (methaqualone), diet pills, tranquillizers, cocaine was low among the respondents.

Of the 54 male students who indicated that they had ever used tobacco, 79.7% of them had smoked it either as cigarettes, pipe or had used both. Among the female respondents, however, snuff (63.6%) was the most commonly used form of tobacco. Of these, six (54.5%) had tried snuff alone and one (9.1%) reported having ever smoked cigarettes and sniffed snuff.

Lifetime prevalence of drug use among male and female respondents is compared in Table 1. Lifetime use of alcohol, tobacco, cannabis and inhalants was significantly higher in males than females surveyed ($p < 0.05$). A significantly higher proportion of females indicated that they had ever used diet pills ($p = 0.002$).

Table 1

Lifetime use of drugs

Drug	(%) and 95% CI of male lifetime users (n = 164)	(%) and 95% CI of female lifetime users (n = 193)	P-value	Odds ratio (OR)
Alcohol	59.8 (5 1.8 - 67.3)	37.8 (31.8 - 45.1)	<0.001	2.44 (1.59 - 3.74)
Tobacco	32.9 (25.8 - 40.7)	5.7 (2.9 - 10.0)	<0.001	8.12 (4.07 - 16.02)
Cannabis	11.0 (6.6 - 16.8)	1.0 (0.1 - 3.7)	<0.001	11.77 (2.69 - 51.55)
Inhalants	9.1 (5.2 - 14.6)	3.1 (1.1 - 6.6)	0.02	3.14 (1.19 - 8.28)
Mandrax	6.7 (3.8 - 10.8)	1.6 (0.4 - 4.9)	<0.001	4.55 (1.98 - 11.45)
Diet pills	0.6 (0.0 - 3.4)	7.3 (4.0 - 11.9)	0.002	0.08 (0.01 - 0.60)
Tranquillizers	4.9 (2.1 - 9.4)	2.6 (0.8 - 5.9)	0.25	1.93 (0.62 - 6.01)
Cocaine	1.8 (0.4 - 5.3)	1.0 (0.1 - 3.7)	0.52	1.78 (0.29 - 10.78)

Overall, 132 (37.0%) respondents had taken alcohol within 12 months of the survey. Tobacco was reportedly used by 37 (10.4%) of the students and cannabis by 11 (3.8%) within the previous year. Drug use within the previous year between male and female students is compared in Table 2.

Table 2

Drug use in the past year

Drug	(%) and 95% CI of male users	(%) and 95% CI of female users	P-value	Odds ratio (OR)
Alcohol	50.6 (42.7 - 58.5)	25.4 (19.4 - 32.1)	<0.001	3.01 (1.93 - 4.70)
Tobacco	18.9 (13.2 - 25.6)	3.1 (1.1 - 6.6)	<0.001	7.26 (2.75 - 17.90)
Cannabis	5.5 (2.5 - 10.2)	1.0 (0.1 - 3.7)	0.02	5.5 (1.18 - 26.04)
Inhalants	4.3 (1.7 - 8.6)	2.6 (0.8 - 5.9)	0.38	1.68 (0.52 - 5.39)
Cocaine	1.8 (0.4 - 5.3)	0.5 (0.0 - 2.9)	0.24	3.58 (0.37 - 34.73)

Current prevalence of drug use: Reported use of a drug in the month preceding the survey was used as an approximation of current use. Slightly under one-fifth of the respondents reportedly took alcohol within the month of the survey (18.5%; 95% CI: 14.7 - 23.0%). Tobacco had been used by 6.7% (95% CI: 4.4 - 10.0%) and (2.5% (95% CI: 1.2 - 4.9%) indicated that they had used cannabis.

Boys were more likely to report recent use of alcohol (p <0.001) and tobacco (p <0.001) compared with girls in the survey (Table 3).

Table 3

Current prevalence of drug use according to gender

Drug	(%) and 95% CI of male users	(%) and 95% CI of female users	P-value	Odds ratio (OR)
Alcohol	31.1 (24.1 - 38.8)	7.8 (4.4 - 12.5)	<0.001	5.35 (2.88 - 9.98)
Tobacco	12.8 (8.1 - 18.9)	1.55 (0.3 - 4.5)	<0.001	9.30 (2.72 - 31.79)
Cannabis	4.3 (1.7 - 8.6)	1.0 (0.1 - 3.7)	0.06	4.26 (0.87 - 20.79)
Inhalants	2.4 (0.7 - 6.1)	1.6 (0.3 - 4.5)	0.55	1.58 (0.35 -7.18)
Cocaine	1.8 (0.4 - 5.3)	0.5 (0.0 - 2.9)	0.24	3.58 (0.37 - 34.73)

Table 4 shows the ages at which drugs were initially tried by the boys and girls in the study. Most (46.2%) of those who had taken alcohol stated that they began between the ages of 13 and 15 years. There was no correlation between the age at which alcohol use began and the frequency of drinking (R = 0.01; P = 0.35). Nearly one-fourth (24.5%) of lifetime tobacco users initiated the use before they were 10 years.

Table 4

Age at onset of use of different drugs by lifetime users

	Alcohol (n = 171)		Tobacco (n = 65)		Cannabis (n = 20)		Inhalants (n = 21)	
Age (years)	M	F	M	F	M	F	M	F
<10	11 (11.2)	5 (6.8)	16 (24.1)	3 (27.3)	0 (0.0)	0 (0.0)	5 (33.3)	2 (33.3)
10-12	22 (22.4)	16 (21.9)	12 (22.2)	5 (45.5)	3 (16.7)	0 (0.0)	2 (13.3)	1 (16.7)
13-15	44 (44.9)	35 (47.9)	17 (31.5)	2 (18.2)	10 (55.6)	0 (0.0)	5 (33.3)	2 (28.6)
16-18	21 (21.4)	17 (23.3)	9 (16.7)	1 (9.1)	5 (27.8)	2 (100)	3 (20.0)	1 (16.7)

We measured the association between alcohol (the most commonly used drug) and absenteeism, bullying and weapon carrying by performing multivariate logistic regression analysis (Table 5).

Forty two (11.8%) students stated that they had bullied a schoolmate within the past school term. Reported rates of bullying was significantly higher in male (16.5%; 95% CI: 11% - 23%) than in female (7.8%; 95% CI: 4.4% - 12.5%) respondents (Table 5). Among male students, there was a clear relationship between current alcohol use and bullying (Mantel-Haenszel (MH) chi-square $X^2 = 8.22$; $p = 0.004$)), but this association was not seen in females (OR = 1.95; 95% CI: 0.40% - 9.60%).

Table 5

Multivariate logistic regression analysis showing the association between significant factors and deviant behaviour

	Crude OR (95% CI)		Adjusted OR (95% CI)		P-value
Absenteeism					
Male	1.85	(1.54 - 2.22)	2.21	(1.33 - 3.66)	0.002
Age of onset of use					
≥13 years	1.00		1.00		
<13 years	2.24	(1.16 - 4.36)	2.25	(1.15 - 4.40)	0.018
Lives with both parents					
No	1.00		1.00		
Yes	0.60	(0.36 - 0.98)	0.64	(0.38 - 1.09)	0.098
Alcohol					
Lifetime use	4.58	(2.64 - 7.95)	6.85	(3.36 - 13.99)	0.000
Use in past year	3.43	(2.06 - 5.89)	2.87	(1.67 - 4.93)	<0.001
Current use	3.66	(2.07 - 6.45)	2.93	(1.61 - 5.34)	<0.001
Bullying					
Male	3.69	(1.86 - 7.34)	3.51	(1.50 - 8.20)	0.004
Lives with both parents					
No	1.00		1.00		
Yes	0.60	(0.36 - 1.10)	0.65	(0.33 - 1.29)	0.218
Age of onset					
≥13 years	1.00		1.00		
<13 years	1.11	(0.51 -2.42)	1.08	(0.48 - 2.44)	0.859
Alcohol					
Lifetime use	8.00	(3.28 - 19.53)	6.94	(2.81 -17.15)	<0.001
Use in past year	5.22	(2.57 - 10.62)	4.58	(2.15 - 9.75)	0.001
Current use	3.69	(1.86 - 7.34)	2.61	(1.24 - 5.51)	0.012
Weapon carrying					
Male	7.70	(1.73 - 34.28)	12.12	(2.71 - 54.24)	<0.001
Lives with both parents					
No					
Yes	0.81	(0.35 - 1.90)	0.75	(0.29 - 1.92)	0.545
Age of onset of use					
≥13 years	1.00		1.00		
<13 years	3.43	(1.35 - 8.73)	3.45	(1.25 - 9.46)	0.016
Alcohol					
Lifetime use	12.88	(2.97 - 55.82)	11.49	(2.52 - 52.40)	0.002
Use in past year	13.21	(3.85 - 45.42)	22.89	(5.80 - 90.24)	0.000
Current use	4.65	(1.95 - 11.07)	3.34	(1.28 - 8.71)	0.014

Alcohol use, irrespective of duration of use was significantly associated with bullying (Table 5) . Of the total sample, 23 (6.4%; 95% CI: 4.2% - 9.1%) participants reported that they had taken a weapon or sharp object to school within the past school term. A significantly greater proportion of male (12.8%; 95% CI: 8.1% - 18.9%) compared with female (1.0%; 95% CI: 0.1% - 3.7%) participants reported having carried a weapon ($p<0.001$).

Table 5 above shows that absenteeism and weapon carrying were also significantly higher among respondents who had tried alcohol at least once compared with those who had not. After adjusting for other factors, including the age of onset of use, gender and family, the association was still significant.

DISCUSSION

Self-reported rates of lifetime alcohol, tobacco and cannabis use in this sample are comparative with those that have been obtained from similar South African studies (17,20). The estimates of current alcohol, tobacco and cannabis use obtained in this survey were lower than found in studies conducted in urban settings (17,21). Cocaine and mandrax use in this survey was also lower than in other similar local studies (20). The fact that the survey was conducted in a rural setting where these drugs are not easily accessible, and included young adolescents may have contributed to this.

Although, overall tobacco use was significantly higher among males, self-reported rates of smokeless tobacco (snuff) was higher among the females in the survey. That the prevalence of snuff use was significantly higher among the females in the survey is probably reflective of its societal acceptability and its perception as a safe form of tobacco (22,23). These gender differences in tobacco preference have practical implications in instituting drug prevention programmes as tobacco use in adolescents is not limited to cigarette smoking alone.

In this survey, we enquired about absenteeism, bullying and weapon carrying as examples of deviant behaviour. We asked if the respondents had taken a weapon or sharp object to school within the past three months. Male respondents in the survey were more likely than female to indicate that they had bullied someone else. We suppose that one of the reasons for the significant difference was that we enquired only about physical bullying and not verbal abuse. Bullying among females may have been underestimated on account of this.

Alcohol use, irrespective of the duration, male gender and initiating alcohol use before the age of 13 years were independently associated with weapon carrying and absenteeism.

Some potentially confounding variables were examined in this study. We did not find an association between living in a two-parent household and drug taking or deviant behaviour.

There are a number of potential limitations in this study. First, because the sample in this survey comprised only of students enrolled in schools, the findings may not have been completely reflective of drug use in the general adolescent population. Secondly, the results were dependent on self-reports by the students and there was no independent means of verifying the validity of the responses given. Thirdly, it is possible that under-reporting of drug use may have occurred. Only those students present on the day of the survey completed the questionnaires. Although, an equal number of male and female students were invited to participate, more males than females were excluded from the analysis. We took these factors into account in controlling for gender as well as age in the logistic regression analysis.

A number of other factors, including underlying psychiatric illness and personality traits that influence behaviour were not assessed in this study. The long-term impact of delinquent behaviour and drug taking on the youth and the South African society need to be further explored in well-designed longitudinal studies.

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