

Substance use and its associated factors among school students

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ABSTRACT

Background. There is lack of comprehensive data on substance use and associated factors among school students in Delhi, India.

Methods. We used a cluster sampling method based on sections of classes in schools to conduct this study in two government-run schools in Delhi. All enrolled students from 8th, 9th and 11th grades participated ($n = 405$). The WHO Student Drug Use questionnaire was administered in a single session for a class section for assessing substance use.

Results. The participation rate was 90.6%. The rates of past 12 months' use of tobacco, alcohol, cannabis and inhalants were 22%, 12.1%, 12.1% and 8.6%, respectively, while rates for 'sedatives and tranquillizers' were 4.9%, opium 2.7% and other opioids 1.2%. Lifetime use of heroin was reported by two students and use in the past 12 months by one student. Multiple substance use was high. Higher age was associated with the use of alcohol and cannabis. According to logistic regression model results, use by a family member significantly increased the probability of using tobacco (adjusted odds ratio [AOR] 11.3; 95% confidence interval (CI) 3.4–37.8) and alcohol (AOR 3.75; 95% CI 5.1–1059.3). Similarly, use by peers significantly increased the probability of tobacco (AOR 7.7; 95% CI 2.0–29.8) and cannabis use (AOR 5.7; 95% CI 1.5–21.5). Having poor harm perception significantly increased the chances of inhalant use by students (AOR 5.5; 95% CI 1.5–20.1).

Conclusion. The study results bring to attention the prevalent and important problem of substance use among schoolchildren. We recommend that (i) intervention strategies for school settings are important and need to factor in the use of illicit substances (cannabis); (ii) psychosocial intervention by trained school counsellors in school settings is the mainstay for intervention for cannabis and inhalants; and (iii) heroin users should be referred to healthcare facilities for detoxification.

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INTRODUCTION

Barring a few surveys in developed countries, for example, USA (Monitoring the Future), Canada (Ontario Student Drug Use and Health Survey) and Europe (European School Survey Project on Alcohol and other Drugs), most countries including India lack a regular monitoring system for substance use, especially for adolescents and students.^{1–3} The magnitude of substance use is thus frequently underestimated. Studies on substance use among schoolchildren in India have mostly focused on tobacco.^{4,5} Inhalant use has been of interest in a few studies⁶ but reported mostly among special groups.^{7,8} Only a few studies have focused on substance use among school students.^{9–11} When a news story (<http://indiatoday.intoday.in/story/cheap-availability-whiteners-thinners-drug-abuse-delhi-school-students-india-today/1/269481.html>) mentioned that drug use was common among Delhi school students, especially those funded by the Delhi government, it brought attention to the lack of data of school students from Delhi. Though a few studies from Delhi have reported on tobacco use,^{5,12,13} a comprehensive assessment of substance use among school students in Delhi has not been done in the past four decades.¹⁴ Our study fills this information gap.

METHOD

Sample

Two government-run (afternoon shift) schools, which had only boys, were selected based on convenience. The sample size was calculated as 319 based on the prevalence of ~15% for tobacco use in the past 1 month found in the Global Youth Tobacco Survey (GYTS) India 2009 ($\alpha=5\%$ and absolute precision ± 4).¹⁰ The sample comprised all enrolled students from 8th, 9th and 11th grades from all sections (total 10) of one school and three randomly selected sections, one from each of the 8th, 9th and 11th grades selected by lottery from the other school.

Assessment

The WHO Student Drug Use questionnaire was used to assess substance use.¹⁵ It was translated into Hindi through the translation–back translation–retranslation method and tested on 5 adolescents attending the Child Guidance Clinic at Psychiatry Department, All India Institute of Medical Sciences, New Delhi after obtaining informed consent from them and the accompanying adults. The inputs from the participants were considered, and appropriate changes were made after consultation with seven psychiatrists including three senior psychiatrists of the hospital. Additionally, four questions in a semi-structured format not covered in the WHO questionnaire

were answered by the students, namely: (i) Is there any immediate family member or person residing with the student currently having alcohol or drug use problem?; (ii) Is there any close friend using alcohol or drugs?; (iii) What is your self-perception regarding harm of substances?; and (iv) Whether the student has ever received any other kind of treatment, therapy or professional counselling for giving up use of alcohol or drugs?

Data were collected from January 2012 to August 2013. Two visits were made to distribute consent forms and additional three visits to collect back consent forms. A questionnaire was administered to a single section in a single session of 40–50 minutes on a pre-scheduled day following a brief orientation.

Ethical approval for the study was obtained from the institute's ethics committee and permissions were sought from the concerned school authorities. Written informed consent for participation was taken from the parents and assent from the students before inclusion in the study. Appropriate referral and guidance services were provided to the students who contacted the research team. A discussion session was held after the study with the students. The teachers were present to maintain order but did not distribute or collect or provide clarification needed about the questionnaire and were not moving around in class so they were not able to see the responses.

Data were analysed using SPSS 16.0. Non-parametric tests (Wilcoxon-rank sum, Chi-square and Fisher's exact) were used for comparison of age, class, paid job and four questions in the semi-structured questionnaire between users and non-users independently for respective variables. This was followed by univariate analysis (calculating unadjusted odds ratios [OR]) and then multivariate logistic regression (calculation of adjusted odds ratio [AOR]) for all the factors found significant in univariate analysis for tobacco, alcohol, cannabis and inhalant use.

RESULTS

The consent forms were distributed to all the 447 enrolled students, of which 405 (90.6%) participated in the study. Of the students enrolled, 93.2% from the 8th grade, 90.2% from the 9th grade and 89.6% from the 11th grade took part in the study. The participation rate from individual sections varied from 86.8% to 94.3%. The mean (SD) age was 16.4 (1.85) years (range 13–23 years). Overall, 87.9% of students were between 13 and 18 years of age and 62 (15.3%) students were employed in a paid job. More than 90% of the students had been attending school regularly in the past 1 year.

Overall, 94 (23.2%) students had used any substance in lifetime, 90 (22.2%) students in the past 12 months and 74 students in the past 1 month. Of the 90 substance users in the past 12 months, 22 (had used one substance, 20 two substances and 48 had used three or more substances. Use of substances overall and for all substances (except for tobacco and cannabis which were a little higher in the 9th grade) increased in higher grades. No opium, heroin, other opioids, stimulants and hallucinogen use was reported in the 8th grade students.

Among our sample, for the past 12 months, the use of tobacco, alcohol, cannabis and inhalants was 22%, 12.1%, 12.1% and 8.6%, respectively. The past 12 months' use of 'sedatives and tranquillizers' was 4.9%, opium was 2.7% and other opioids was 1.2%. The lifetime use of heroin was reported by 2 students and use in the past 12 months by 1 student. Four students admitted to stimulants' use and 3 students to hallucinogens use in lifetime. One student each reported using them in the past 12 months as well. Opium use was reported by

9th and 11th grade students. Heroin use was reported only by 11th grade students. No student reported cocaine use (Table I).

Age of onset of substance use

The most common age of starting tobacco use was 13–14 years. Inhalants, sedatives and tranquillizers were most commonly initiated at 15–16 years. For alcohol, cannabis, opium and other opioids, the most common age of onset was 17–18 years. The two students who reported using heroin had started at ≥ 19 years of age.

Factors associated with substance use

Students in both schools were compared with respect to grade, mean age, employment status and use of the four most commonly used substances (tobacco, alcohol, cannabis and inhalants) in the past 12 months. No significant difference was found.

Factors (age, employment, use of substances by family, use by peers and harm perception) associated with the use of tobacco, alcohol, cannabis and inhalants in the past 12 months were assessed and then subjected to univariate analysis and then those found significant were assessed based on multivariate logistic regression (Table II).

Tobacco

An initial analysis showed all factors (except grade) to be significantly associated with tobacco use. However, the AOR showed that a family member's use of substances was the strongest predictor of tobacco use, wherein odds of tobacco use in a student increased almost 11-fold if a family member used substances (AOR 11.3; 95% confidence interval (CI) 3.4–37.8). Students with a friend using substances had 8-times higher risk of using tobacco (AOR 7.7; 95% CI 2.0–29.8).

Alcohol

Grade and having a paid job were not significantly associated with alcohol use. Students aged 16–18 years were about 4-times likely to use alcohol (AOR 4.3; 95% CI 1.3–14.9) and those >18 years were 8-times more likely to use alcohol (AOR 7.8; 95% CI 1.8–33.4) compared to those aged 13–15 years. Having a family member using alcohol increased the risk about 4-times (AOR 3.75; 95% CI 1.5–10.59.3).

Cannabis

Age, family member/peer use and harm perception were found to be significant on initial analysis. There was no significant association with grade and employment status. However, in logistic regression, AOR was found significant for age and use by peers. The risk of using cannabis by a student increased 15-times for age 16–18 years (AOR 15.3; 95% CI 3.2–72.0) and 42-times for age >18 years (AOR 42.1; 95% CI 6.1–292.2). Use by a friend added 6-times more risk to the student using cannabis (AOR 5.7; 95% CI 1.5–21.5).

Inhalants

Age, use by family members and peers and harm perception of alcohol and drugs were found statistically significant in initial analysis ($p < 0.001$), while grade in which the student was studying and employment status were not significant. In logistic regression, AOR showed that the student was 5-times more likely to use inhalants due to poor perception of harms associated with its use (AOR 5.5; 95% CI 1.5–20.1; $p = 0.01$).

TABLE I. Substance use in different grades

Substance	95% CI											
	Total (n=405) (%)			8th grade (n=96) (%)			9th grade (n=110) (%)			11th grade (n=199) (%)		
	12 months	1 month	95% CI	12 months	1 month	95% CI	12 months	1 month	95% CI	12 months	1 month	95% CI
Tobacco	22.0 (17.9-26.0)	16.5 (12.9-20.1)	17 (9.7-25.2)	12.5 (5.8-1.9)	25 (18.0-34.7)	22.7 (14.8-30.7)	21.6 (15.8-27.4)	15.1 (10.1-0.1)				
Alcohol	12.1 (8.9-15.3)	5.7 (3.4-7.9)	7.3 (2.0-12.6)	4.2 (0.1-8.2)	10.9 (5.0-16.8)	4.5 (0.1-8.5)	15.1 (10.1-20.1)	7.0 (3.4-12.6)				
Cannabis	12.1 (8.9-15.3)	6.2 (2.6-9.7)	8.0 (2.6-13.8)	4.2 (0.1-8.2)	16.4 (9.3-23.3)	10.9 (0.0-22.4)	11.6 (7.1-16.0)	4.5 (1.6-7.4)				
Inhalants	8.6 (5.9-11.4)	4.4 (2.4-6.5)	7.3 (2.0-12.3)	4.2 (0.1-8.2)	8.2 (3.0-13.4)	2.7 (0.0-5.8)	9.5 (5.4-13.7)	5.5 (2.3-8.7)				
Sedatives + tranquilizers	4.9 (2.8-7.0)	0.1 (0.0-1.9)	4.2 (0.0-8.2)	2.1 (0.0-5.0)	2.7 (0.0-5.8)	-	6.5 (3.1-10.0)	1.0 (0.0-2.4)				
Opium	2.7 (1.1-4.3)	0.7 (0.0-1.6)	-	-	2.7 (0.0-5.8)	0.9 (0.0-2.7)	4.0 (1.3-6.8)	1.0 (0.0-2.4)				
Other opioids	1.2 (0.1-2.3)	-	-	-	1.0 (0.0-2.7)	-	2.0 (0.0-3.8)	0.5 (0.0-1.5)				
Heroin	0.2 (0.0-0.7)	-	-	-	-	-	0.5 (0.0-1.5)	-				
Others (stimulants/hallucinogens)	0.2 (0.0-0.1)	-	-	-	1.0 (0.0-2.7)	-	1.0 (0.0-2.4)	-				

DISCUSSION

Early onset and frequent substance use among adolescents predispose them to a dependent pattern later in life.¹⁶ There is lack of data on substance use and associated factors among school students in Delhi, and our study attempts to fill this information gap. We assessed substance use among 8th, 9th and 11th grade students as the mean age of onset of substance use among school students in Indian studies is 13-14 years, which corresponds to grade 7th or 8th.^{5,6,9-13} Substance use among girls in India being low, two boys-only schools were selected. The cluster sampling method based on sections of classes in schools, which is a standard method for school-based studies, was used.^{15,17} Self-report questionnaires administered anonymously are considered a reliable method for the assessment of substance use and problem behaviours in adolescents including students^{15,17} and were used to ensure correct reporting by the students. The participation rate of 90.6% in our study was higher than rates of >80%-85% regarded as adequate in school-based studies.^{15,17} In addition, >90% of students were attending school regularly in the past 1 year decreasing the chances of missing any substance users. Such data on regularity of students attending school are generally lacking from India.⁶⁻¹⁰

The mean age of the students was 16.4 years, and a small proportion (12.1%) were >18 years of age. Both the schools were run in the afternoon shift and catered to students from families of lower socioeconomic strata. It is possible that the students may have started their schooling at a later age and/or dropped out from school in-between and re-joined due to multiple reasons. Nearly 15.3% of the sample was employed and contributing to the family income. This was also probably related to their low socioeconomic status.

Tobacco, alcohol, cannabis and inhalants were the most commonly used substances in decreasing order, which is similar to other studies from India^{9-11,14} and distinguished from monitoring surveys from developed countries,¹⁻³ which report alcohol to be more common. A higher prevalence of use of various substances in a school-based study from Manipur⁹ in northeastern India and a lower prevalence in Dehradun¹¹ in northern India have been reported. Factors such as differences in the study population, sampling method, grades in which students were studying and inclusion of girls could explain the differences. The findings from our study also cannot be compared with studies of street children or those accessing services in the community through non-governmental organizations (NCPCR study)¹⁸ as rates and patterns of substance use in such populations may be different.

Poly-substance use was common with nearly 12% of students using three or more substances. Tobacco, inhalants and 'sedatives and tranquilizers' were initiated at early ages. The use of alcohol and cannabis though started at lower ages of 11-12 years, the onset peaked later at 17-18 years. The age of onset was >15-16 years for other substances. The use of heroin started late at ≥19 years of age. These findings were consistent with those of other studies that have also noticed an increasing trend of substance use with the grade in which the students were studying and lower age of onset for substances legally available for adults and higher age for illicit substances.^{1-3, 9-12}

The past 1 month use of each of the four most commonly used substances, i.e. tobacco, alcohol, cannabis and inhalants was ~50% compared to their past 12 months' use (80% for tobacco). This suggests that those who have ever used may be using in the past 1 year, but about half of them are not using on a regular basis. Past month tobacco use at 16.5% was lower than

TABLE II. Multivariate logistic regression of factors for substance use (past 12 months)

Variable	Category	Tobacco 12 months		Unadjusted OR	p value	Adjusted OR	p value
		Yes (n=89), n (%)	No (n=316), n (%)				
Age (years)	13–15	20 (22.5)	130 (41.1)	1.0		1.0	
	16–18	49 (55.0)	157 (49.7)	2.0 (1.1–3.6)	0.015	1.7 (0.5–6.0)	0.373
	>18	20 (22.5)	29 (9.2)	4.5 (2.1–9.4)	<0.001	0.5 (0.1–3.8)	0.481
Paid job	No	65 (73.0)	278 (88.0)	1.0		1.0	
	Yes	24 (27.0)	38 (12.0)	2.7 (1.5–2.8)	0.001	2.3 (1.0–11.1)	0.053
Family use	No	22 (24.7)	295 (93.4)	1.0		1.0	
	Yes	67 (75.3)	21 (6.6)	42.7 (22.2–82.3)	<0.001	11.3 (3.4–37.8)	0.001*
Friend use	No	17 (19.1)	283 (89.6)	1.0		1.0	
	Yes	72 (80.9)	33 (10.4)	36.3 (19.1–68.9)	<0.001	7.7 (2.0–29.8)	0.003*
Harm perception	Yes	26 (29.2)	306 (96.8)	1.0		1.0	
	No	63 (70.8)	10 (3.2)	74.1 (34.0–161.4)	<0.001	2.6 (0.6–11.2)	0.185

Variable	Category	Alcohol 12 months		Unadjusted OR (95%CI)	p value	Adjusted OR (95%CI)	p value
		Yes (n=49), n (%)	No (n=356), n (%)				
Age (years)	13–15	5 (10.2)	145 (40.7)	1.0		1.0	
	16–18	28 (57.1)	178 (50.0)	4.5 (1.7–12.1)	0.002	4.3 (1.3–14.9)	0.020**
	>18	16 (32.7)	33 (9.3)	14.1 (4.8–41.1)	<0.001	7.8 (1.8–33.4)	0.006*
Family use	No	9 (18.4)	308 (86.5)	1.0		1.0	
	Yes	40 (81.6)	48 (13.5)	28.5 (13.0–62.5)	<0.001	3.75 (5.1–1059.3)	0.025**
Friend use	No	8 (16.3)	292 (82.0)	1.0		1.0	
	Yes	41 (83.7)	64 (18.0)	23.4 (10.5–52.3)	<0.001	2.7 (0.8–8.7)	0.101
Harm perception	Yes	14 (28.6)	318 (89.3)	1.0		1.0	
	No	35 (71.4)	38 (10.7)	20.9 (10.3–42.3)	<0.001	1.1 (0.3–3.7)	0.814

Variable	Category	Cannabis 12 months		Unadjusted OR (95%CI)	p value	Adjusted OR (95%CI)	p value
		Yes (n=49), n (%)	No (n=356), n (%)				
Age (years)	13–15	3 (6.1)	147 (41.3)	1.0		1.0	
	16–18	30 (61.2)	176 (49.4)	8.3 (2.5–27.9)	0.001	15.3 (3.2–72.0)	0.001*
	>18	16 (32.7)	33 (9.3)	23.5 (6.5–86.3)	<0.001	42.1 (6.1–292.2)	0.001*
Family use	Yes	36 (73.5)	52 (14.6)	1.0		1.0	
	No	13 (26.5)	304 (85.4)	251.8 (34.1–1861.3)	<0.001	0.6 (0.1–2.1)	0.398
Friend use	Yes	41 (83.7)	64 (18.0)	1.0		1.0	
	No	8 (16.3)	292 (82.0)	23.3 (10.5–52.3)	<0.001	5.7 (1.5–21.5)	0.011*
Harm perception	Yes	13 (26.2)	319 (89.6)	1.0		1.0	
	No	36 (73.5)	37 (10.4)	23.9 (11.6–49.0)	<0.001	1.3 (0.4–4.9)	0.652

Variable	Category	Inhalant 12 months		Unadjusted OR (95%CI)	p value	Adjusted OR (95%CI)	p value
		Yes (n=35), n (%)	No (n=370), n (%)				
Age (years)	13–15	6 (17.1)	144 (38.9)	1.0		1.0	
	16–18	17 (48.6)	189 (51.1)	2.1 (0.8–5.6)	0.115	1.3 (0.4–4.7)	0.647
	>18	12 (34.3)	37 (10.0)	7.8 (2.7–22.1)	<0.001	3.8 (0.9–16.1)	0.074
Family use	No	7 (20.0)	310 (83.8)	1.0		1.0	
	Yes	28 (80.0)	60 (16.2)	20.7 (8.6–49.5)	<0.001	1.9 (0.5–6.7)	0.327
Friend use	No	8 (22.9)	292 (78.9)	1.0		1.0	
	Yes	27 (77.1)	78 (21.1)	12.6 (5.5–28.9)	<0.001	0.3 (0.1–1.4)	0.137
Harm perception	Yes	30 (85.7)	43 (11.6)	1.0		1.0	
	No	5 (14.3)	327 (88.4)	45.6 (16.8–123.9)	<0.001	5.5 (1.5–20.1)	0.010*

OR odds ratio CI confidence interval

the GYTS India, 2009 rates (19%),⁴ and an earlier study in Delhi.¹⁴ Its use by a family member and peer was found to be a risk factor for its use. Similarly, alcohol use in the past 12 months was high at 12.1%, while other Indian school-based studies reported alcohol use ranging from 6.5% to 44.5% in a lifetime.^{9–11} Use by a family member and age group ≥ 16 years were high-risk factors for alcohol use by students. The past 12 months use of cannabis at 12.1% is similar to that reported earlier from Delhi,¹⁴ while it varies from 3.1% to 14% in lifetime in other studies from India.^{9–11}

Use of inhalants in school-going children is a phenomenon documented in the past decade.^{6–8} Inhalant use in our study was 8.6% in the past 12 months, while it has been reported to be 2.6%–9% during lifetime in other studies.^{6–8} Having a poor

perception related to harms of an inhalant was found to increase the probability of its use by students. Other factors may not have emerged significantly associated with inhalant use due to the small sample of inhalant users. Past 1-year use of $>8\%$ seems high and needs to be addressed through prevention as it is believed that this increase has been more in the past few years. There is also little awareness regarding the hazards associated with inhalant use. These results suggest that, currently, not enough is being done to limit their access to school students. There are long-standing concerns that policies must be implemented to protect adolescents from the harms associated with its use as low harm perception was clearly associated with inhalant use by children.^{18,19}

Other substances, 'sedatives and tranquilizers', opium and other opioids (pharmaceutical opioids) were reported with prevalence of <5% in the past 12 months and <1% in the past 1 month. Other Indian studies have also found similar prevalence of opium, sedatives and tranquilizers in school children.^{9,10} Heroin use was reported by 2 students, which is a cause for concern. Expected problems associated with heroin use in school settings are increased risk of dropout and severe psychosocial problems. The use of other substances (i.e. stimulants and hallucinogens) was minimal and no cocaine use was reported akin to other Indian studies.^{9,10} The use of stimulants could possibly be a fallacious finding as stimulant use is not seen in government drug dependence treatment centres located in the National Capital Region including the adolescent clinic run at our institution that provides services to young substance users who are often from a similar socio-economic background. Assuming that this was reported as a fake drug, such reporting is negligible (<1%) and does not reduce the reliability of the response to other questions.¹⁷

Use of substances by family members emerged as a strong predictor with a nearly 11-fold increase among students who reported having family members who used tobacco and 4-fold increase if they used alcohol. Family substance use can be a risk factor in terms of biological vulnerability and modifying attitude towards substance use through social learning.²⁰ An association between alcohol use by family members and adolescent use has been documented.²¹ Thus, unique intervention challenges exist for adolescents as the timing of specific parenting behaviours and their indirect effects on substance use is crucial.

Nearly 98% of total students and non-users expressed willingness to admit to the use of cannabis, opium and heroin in the questionnaires if they were using them, which shows openness to admit substance use by students in an anonymous self-report questionnaire, which further strengthens our findings.

Conclusions

Our study provides data on the rates of substance use among school students although it is limited in terms of generalizability due to a small sample size and only boys being included. The identification of risk factors associated with different substances provides useful insights for developing school-based drug prevention and intervention programmes. The focus of responses among school students should be largely on prevention, early identification and intervention rather than intensive treatment of dependent use, which is often done in adult substance users.²² Psychosocial intervention in school would remain the mainstay for intervention for substances such as cannabis and inhalants and screening for health damage due to inhalants is important. Psychosocial intervention can be carried out in school settings itself by trained school counsellors. Interventional strategies for school settings need to factor in illicit substances such as cannabis and heroin as well. Heroin use, although infrequent, would need referral to healthcare facilities for treatment of withdrawal.

Contributions

AD, PB, RS, MM were involved in protocol preparation, conduct of study, data analysis and manuscript preparation.

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Conflicts of interest. None declared

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