

Inhalant substance abuse among adolescents in Manipur, India: An upcoming issue

Abstract

Background: Inhalant use, an important, yet-under recognized form of substance abuse has been reported commonly among adolescents in India but the true extent of the problem is not known due to paucity of data. **Aims:** To assess the prevalence and determinants of inhalant substance used amongst the adolescents in Manipur. **Settings and Design:** This cross sectional study was conducted among 1671 adolescent studying in Eighth to Twelfth standard in schools of Imphal-East District Manipur, India during March to June 2013. **Materials and Methods:** Schools were selected by simple random method and a semi-structured self-administered questionnaire adapted from the 'UNDCP/WHO Global initiative on Primary Prevention of substance abuse' was used for data collection. Univariate and Multiple logistic regression analysis were performed for association between ever users and selected variables. **Results:** Mean (SD) age of the students was 14.5(1.32) years, with males constituting 923(55.2%). Prevalence of ever users was 186 (11.1%) and glue/dendrite was the commonest substance abused 98(52.7%). Being male, belonging to joint family and increase in age were found to have significant higher risk of being a user, whereas higher level of parental education shows a protective effect. **Conclusion:** An increased effort for prevention, treatment along with sensitization of parents and teachers is a distinct challenge for policy makers.

Key words: Adolescents, glue/ dendrite, inhalant use, Manipur

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INTRODUCTION

The term inhalants include a wide range of pharmacologically diverse substances that readily vaporize. Inhalant abusers use these volatile products that are capable of producing a quick and generally pleasurable sensory experience, that quickly dissipates leaving little or minimal “hangover” symptoms. These substances are widely available, inexpensive, easily concealed and legal for specific intended uses but are intentionally misused by abusers^[1] The effects include slurred speech, light headedness, euphoria, hallucinations, drowsiness etc. Long term consequences including liver, kidney damage and hearing loss has been reported.^[2] Inhalants are appealing to adolescents since the “high” achieved with inhalants occurs rapidly and disappears relatively quickly, compared with other drugs. Thus, a user can sniff after school and still return home sober.^[3]

There are few reports on inhalant use in India which are mostly clinic based or case reports.^[4-7] Few studies have reported inhalant abuse among street children and it has also been linked to school drop-out.^[3,8] Inhalant use among children has been seen to precede or act as a predictor for substance use later as they grow up.^[9-12]

Despite long standing awareness of the significant morbidity and mortality associated with inhalant abuse, research and concrete data on its use and effects has been comparatively sparse in India. For these reasons, we took up this study to have a preliminary idea about the prevalence and associated factors of inhalant use among adolescents in our State.

MATERIALS AND METHODS

This cross sectional study was conducted in high schools and higher Secondary schools located in Imphal East District of Manipur, a state in the North-Eastern part of India during March to

June 2013. Study population comprises of all adolescent school children studying in standard Eighth to Twelfth in the sampled schools. Sample size was calculated based on a prevalence of 9.9% among 10th grade school children [13] by using a precision of 1.5% and at 5% significance level a sample size of 1522 was calculated. Assuming a little more than 10% non-responders, the sample size was increased to 1600.

Sampling design

From the list of high schools and higher secondary schools located in the district the schools were sampled sequentially using lottery method and all eligible students in the selected schools were included. Absentees on the date of visit and refusals to participate were excluded. A total of 12 schools were selected till the required sample size was reached.

Study tool comprises of a self-administered, semi-structured questionnaire which was adapted from the 'UNDCP/WHO Global initiative on Primary Prevention of substance abuse- Overall Evaluation: Baseline Assessment Guidelines and instruments'. [14] The questionnaire contained two parts- the *Socio-demographic profile* like age, sex, class, religion, father's and mother's educational qualifications and occupations, family type etc. and the *KAP questions*: based on knowledge, attitude and practice on inhalant substance abuse.

Collection procedure

After giving brief introduction and purpose of our visit, verbal informed consent was obtained from the participants. Students were requested to give the correct and true information without concealing anything as the information obtained will be used for research purpose only maintaining strict confidentiality. Any unclear question(s) were clarified and participants were informed that any question which they feel uncomfortable to answer may be omitted.

After collecting the questionnaire a short interactive health talk was delivered for about 30 to 40 min with the school teachers in attendance. Basic knowledge like risk factors for abusing inhalants, their side effects and methods to prevent inhalant substance abuse were provided to the students.

Operational definitions

Inhalants were defined as volatile substances that release chemical vapours that can be inhaled to induce a psychoactive or mind altering effect. *Inhalant abuser* - Any adolescent who ever abuse inhalant (s) for its psychoactive effects.

Statistical analysis

Data collected was entered into Ms Excel spreadsheet and transferred to SPSS version 11.5. Descriptive statistics like mean, median, percentages and analytical statistics like chi-square test and multiple logistic regression analysis were performed to look for association between ever users and selected variables. A $P < 0.05$ was taken to be significant.

Ethical issues

Permission from school authorities was obtained prior to visiting the schools. Purpose of study was explained and Verbal informed consent was taken from the participants and strict confidentiality was maintained. An interactive health talk was given after data collection.

RESULTS

A total of 12 schools were selected, consisting of 4 Govt. schools and 8 private schools. The number of eligible students was 1993, out of which 332 were absent on the day of visit, so 1671 students were included in the study. There were no refusals to participate.

Males constitute 923 (55.2%) and majority of the study population 519 (30.9%) were of 14 years with maximum proportion 521 (30.25%) of students belonging to 9th Grade. As the 10th board results were still awaited during the study period there were no eleventh class students enrolled in any of the schools. Almost half 910(54.5%) of the students belong to hindu religion and majority of them 1009(60.4%) belong to nuclear family [Table 1].

Most of the students 1207 (72%) have heard about inhalant substances and 345 (20.6%) of them feels that it will be very easy to obtain such substances if they wanted. Around 682 (40.8%) reported knowing classmates who are users. Majority 620 (37.10%) responded 'peer pressure' being the reason for abuse and almost half of the respondents 691 (41.4%) were not aware about harmful effects of inhalant use. In many of the families 578 (34.6%) the issues of drugs and drug abuse were never discussed [Table 2].

The study recorded a prevalence of 186 (11.1%) of ever users with first time use being highest during 13 to 14 years of age 73 (39.2%). Majority of them 150 (80.6%) reported 'friends' as the one who introduced them to inhalant use and 'glue/dendrite' 98 (52.7%) was the substance most commonly abused followed by 'Correction fluid/ Eraz-X' 57 (30.6%). A few of the ever users 11 (5.9%) reported use of other oral drugs like 'SP/N10'(Spasmo-proxyvon/ Nitrazepam) besides using inhalants. Majority of them 152 (81.7%) have tried to quit the habit in the past and 68 (36.6%) reported being absent from school or having poor school performance due to the habit [Table 3].

Table 4 shows the crude and adjusted logistic regression analysis with being 'ever users' or not as the dependent variable with selected independent variables. Males showed a significantly higher risk of being a user as compared to females (OR 4.037, 95% CI 2.655 to 6.139). The odds of being a user significantly increase with increasing age (OR 2.355, 95% CI 1.587 to 3.494). The crude analysis showed an increasing risk of exposure with increasing grades from 8th to 12th grade but this effect was no longer seen in the adjusted analysis. Higher the father's education, the risk of being a user decreases significantly but no such relationship is observed with mother's educational level. Ever users are significantly more likely to come from joint families (OR 1.633, 95% CI 1.165 to 2.289) as compared to nuclear family and being an user is significantly more likely to know classmates who were also users (OR 3.017, 95% CI 2.106-4.321).

Table 1: Percent distribution of the respondents by ever users of inhalants according to background characteristics

Characteristics	N (%)	Ever Users, N (%)	Non-Users, N (%)
Age (year)			
12	40 (2.4)	0 (0)	40 (100)
13	391 (23.4)	19 (4.9)	372 (95.1)
14	516 (30.9)	50 (9.7)	466 (90.3)
15	409 (24.5)	53 (13.0)	356 (87.0)
16	154 (9.2)	30 (19.5)	124 (80.5)
17	122 (7.3)	25 (20.5)	97 (79.5)
18	39 (2.3)	9 (23.1)	30 (76.9)
Gender			
Male	923 (55.2)	156 (16.9)	767 (83.1)
Female	748 (44.8)	30 (4.0)	718 (96.0)
Class			
8 th	490 (29.3)	30 (6.1)	460 (93.9)
9 th	521 (31.2)	52 (10.0)	469 (90.0)
10 th	457 (27.3)	68 (14.9)	389 (85.1)
12 th	203 (12.1)	36 (17.7)	167 (82.3)
School type			
Government school	287 (17.2)	40 (13.9)	247 (86.1)
Private school	1384 (82.8)	146 (10.5)	1238 (89.5)
Religion			
Hindu	910 (54.5)	76 (8.4)	834 (91.6)
Islam	241 (14.4)	26 (10.8)	215 (89.2)
Christian	289 (17.3)	62 (21.5)	227 (78.5)
Others	231 (13.8)	22 (9.5)	209 (90.5)
Father's education			
Illiterate	37 (2.2)	13 (35.1)	24 (64.9)
Upto 10 th	552 (33.0)	66 (12.0)	486 (88.0)
Upto 12 th	410 (24.5)	42 (10.2)	368 (89.9)
Graduate and above	672 (40.2)	65 (9.7)	607 (90.3)
Mother's education			
Illiterate	142 (8.5)	25 (17.6)	117 (82.4)
Upto 10 th	742 (44.4)	86 (11.6)	656 (88.4)
Upto 12 th	343 (20.5)	38 (11.1)	305 (88.9)
Graduate and above	444 (26.6)	37 (8.3)	407 (91.7)
Type of family			
Nuclear	1009 (60.4)	95 (9.4)	914 (90.6)
Joint	662 (39.6)	91 (13.7)	571 (86.3)
Total	1671 (100)	186 (11.1)	1485 (88.9)

DISCUSSION

Though, the overall prevalence of ever user of inhalants in this study was 11.1% this could be an underestimate of the real problem as absentees, school dropouts were not covered and some of the students might not be giving the true response. But the study, do confirms the general belief of the people of the region that inhalant use among school children is prevalent. However, further studies are necessary to understand the epidemiology and diverse extent of this problem.

In the study, males are significantly more likely to be ever users of inhalants as compared to females. These may relate to their

Table 2: Awareness and attitude towards inhalants use among the adolescents (N = 1671)

Variable	Response, N (%)
Aware of any substance use as inhalant	
Yes	1232 (73.7)
No	439 (26.3)
Difficulty in obtaining such substance if you want some?	
Probably impossible	440 (26.3)
Very difficult	391 (23.4)
Fairly difficult	246 (14.7)
Fairly easy	249 (14.9)
Very easy	345 (20.6)
Know any user classmate	
Yes	682 (40.8)
No	989 (59.2)
How many users you know of?	
1-3	418 (25.0)
4-6	133 (8.0)
≥7	131 (7.8)
Total	682 (40.8)
Why do they abuse such substances (multiple answer)	
Curiosity	475 (28.4)
Peer pressure	620 (37.1)
Frustrations	311 (18.6)
Fashionable	157 (9.3)
How often the issues of drugs and drug addiction discuss in your family?	
Never discussed	578 (34.6)
Sometimes	896 (53.6)
Very often	127 (7.6)
Almost daily	70 (4.2)
Aware of any harmful health effects of inhalant use?	
yes	980 (58.6)
No	691 (41.4)
Any seminar/lecture on substance abuse conducted in the school	
Yes	1066 (63.8)
No	605 (36.2)
Approve or disapprove of young people using inhalants	
approve	94 (5.6)
disapprove	1154 (69.0)
Can't say	423 (25.3)
How much young people risk in harming themselves if inhalants used regularly	
No risk	49 (2.9)
Slight risk	44 (2.6)
Moderate risk	65 (3.9)
Great risk	964 (57.7)
Don't know	549 (32.9)

aggressive nature and risk taking behaviour. Moreover as adolescents are in a transitional phase, confusion can make them susceptible to take up the unfavourable habit as an act of rebellion against parents and elders. Initiation of inhalant use started at around 13 to 14 years

Table 3: Practice and using pattern of inhalants use among ever users (N = 186)

Variable	Response, N (%)	Variable	Response, N (%)
Have you ever used inhalants		Lighter fluid	10 (5.4)
Yes	186 (11.1)	Spray paint	7 (3.8)
No	1485 (88.9)	Shoe polish	7 (3.8)
Total	1671 (100)	Gasoline	5 (2.7)
When do you use for first time		Paint thinner	2 (1.1)
≤10 year	23 (12.4)	Parents know about your addiction	
11-12 year	45 (24.2)	Yes	16 (8.6)
13-14 year	73 (39.2)	No	170 (91.4)
15-16 year	33 (17.7)	Use any other oral substance/drugs(SP/N10 etc)	
≥17 year	12 (6.5)	Yes	11 (5.9)
Total	186 (100)	No	175 (94.1)
Did you use in last 1 month		Ever taken to doctor for detox/de-addiction	
Yes	61 (32.8)	Yes	8 (4.3)
No	125 (67.2)	No	178 (95.7)
How often do you use		From where do you manage money to buy	
Daily	11 (5.9)	From parents	94 (50.5)
3-4 times a week	14 (7.5)	From relatives	27 (14.5)
1-2 days a week	27 (14.5)	From friends	51 (27.4)
2-3 days a month	28 (15.1)	Part time jobs	14 (7.5)
Once/ twice in past 12 months	54 (29.0)	From where you procure/get these substances	
Didn't use any in past 12 months	52 (28.0)	Shops	103 (55.4)
Where do you learn these habits		From friends	47 (25.3)
At home/relative house	15 (8.1)	Dealers	8 (4.3)
Friend's place	80 (43.0)	relatives	3 (1.6)
At school/college	46 (24.7)	Available at home	25 (13.5)
Public places	23 (12.4)	Any of your family member use	
Hostel/boarding school/ Rented place	22 (11.8)	Yes	37 (19.9)
Who introduced you to inhalants		No	149 (80.1)
Friends	150 (80.6)	Tried to stop/quit	
Family/relative	8 (4.3)	Yes	152 (81.7)
Casual acquaintance	4 (2.2)	No	34 (18.3)
Shopkeeper/druggist	4 (2.2)	Most common place for inhaling	
dealer	3 (1.6)	Friend's place	52 (28.0)
Self/no one	17 (9.1)	School toilet/playground	21 (11.3)
Do you use alone or with someone		Open fields	62 (33.3)
With friends	147 (79.0)	Home/bedroom	17 (9.1)
Alone	20 (10.8)	Classroom	5 (2.7)
With classmates	17 (9.1)	Boarding school/hostel room	29 (15.6)
With Family/relative	2 (1.1)	Absent from school or poor performance due to inhalant use	
Substance used commonly		Yes	68 (36.6)
Glue/dendrite	98 (52.7)	No	118 (63.4)
Correction fluid/Eraz-X	57 (30.6)		

for 39.2% of the ever users. In western society also inhalant use tends to start early, with 58% of users reporting first use by the end of ninth grade.^[15]

An increasing trend in the use of inhalants with increasing age is seen in this study which is contrary to findings of studies in western countries.^[16] Present conflict situation in this part of the country, low socio-economic status, poor parental education and awareness about the problem with the added increasing risk taking behaviour of adolescents with increasing age, peer pressures, frustration and emotional problems may be the reason for this difference. However; father's education seems to have a protective

role against inhalant abuse thus emphasising the importance of parental education and awareness for prevention and control of the problem. Low level of parental education has been shown to be important risk factor for inhalant use among middle and high school students.^[15] The study also shows an increasing trend in prevalence with increasing class with the lowest prevalence among eighth standard (6.1%) and highest among twelfth standard (17.1%) which is contrast to the trend in prevalence in some studies conducted in western countries which shows decreasing trend with higher grades.^[17] Among the adolescents, those who belong to Christianity are significantly more likely to be users. This may be due to their more lenient life styles, availability of more pocket

Table 4: Multiple logistic regression analysis with inhalants ever users as dependent variable with selected independent variables

Characteristic	Crude OR	95% CI	P value	Adjusted OR	95% CI	P value
Gender						
Female	1			1		
Male	4.756	3.174-7.125	0.000	4.037	2.655-6.139	0.000
Class						
VIII	1			1		
IX	1.664	1.041-2.659	0.03	0.933	0.545-1.596	0.80
X	2.680	1.709-4.205	0.000	1.131	0.642-1.992	0.67
XII	3.085	1.831-5.197	0.000	0.518	0.228-1.175	0.116
Age (year)	2.210	1.736-2.814	0.000	2.355	1.587-3.494	0.000
Family type						
Nuclear	1	—		1		
Joint	1.554	1.142-2.115	0.000	1.633	1.165-2.289	0.004
Religion						
Hindu	1			1		
Muslim	1.366	0.853-2.189	0.19	1.401	0.837-2.347	0.20
Christian	3.023	2.089-4.372	0.000	2.326	1.534-3.526	0.000
Others	1.189	0.722-1.960	0.49	1.094	0.638-1.874	0.74
Father's educational level						
Illiterate	1			1		
Upto 10 th	0.251	0.122-0.516	0.000	0.329	0.140-0.770	0.010
Upto 12 th	0.194	0.092-0.411	0.000	0.219	0.090-0.533	0.001
Graduate and above	0.198	0.096-0.407	0.000	0.284	0.118-0.681	0.005
Mother's educational level						
Illiterate	1			1		
Upto 10 th	0.589	0.392-0.961	0.03	0.893	0.498-1.602	0.70
Upto 12 th	0.583	0.337-1.008	0.05	0.900	0.464-1.748	0.75
Graduate and above	0.425	0.246-0.736	0.002	0.832	0.419-1.651	0.59
Know any user classmate						
No	1			1		
Yes	4.039	2.890-5.644	0.000	3.017	2.106-4.321	0.000

money or the Christian students were giving honest response. Ever users are more likely to belong to joint families than nuclear. In joint families, the parents/elders may be less vigilant about their children than in a close knit nuclear family.

In this study, only 59% are aware of any health related problems caused by using such substances. This may be due to lack of discussions among family members, lack of seminars or lectures in school regarding the inhalant substance abuse and its consequences. As our state is one of the high prevalent states in the HIV/AIDS scenario most of the health awareness campaigns cum seminars held in schools so far have been focussing on oral and intravenous drug use and its consequences and the area of inhalant substance abuse has been ignored. Around 5.9% of the ever users reported use of other psychoactive substances along with inhalant. Associations between early-onset inhalant use and risk for later heroin and intravenous drug use, antisocial behavior, and polydrug abuse have also been identified.^[18] Reports suggest that childhood and adolescent inhalant use may be an early warning sign for membership in a subgroup of antisocial youths who are marked by high levels of polydrug use and psychosocial impairment, as well as earlier onset of

behavioural problems and antisocial conduct than are typical of non-users of inhalants.^[19-21]

Glue/dendrite (71.16%) appears to be the most common inhalant substance abused followed by correction fluid, lighter fluid etc. Such items are reported as commonly abused by adolescents in other studies.^[22] Recently local students' organisations have been demanding the ban of sale of such items to children but no legal actions have been taken up so far. Influence of peer pressure (34.13%) is rated highest for initiating the habit. Other reasons being curiosity, frustration and some feels it's fashionable to be a user. We also found that users around 68% felt the need to give up the habit. Motivation and support on the part of the family, teachers and close ones should help the users to come out of this habit. The school being an essential part in a students' life can promote effective and healthy life styles and conduct lectures or seminars and thematic lessons on inhalant substance abuse.

We covered around 12 High Schools and Higher Secondary Schools including both Govt. and private schools of Imphal East District. Characteristics of adolescents in the state are more or less similar so our sample could be representative of the adolescent population

in the State. Interactive Health Talk was given after collection of data that could clear their doubts and misconceptions. The students were provided with basic information about the health effects and long-term consequences of inhalant abuse and its prevention. They were advised to spread our messages to those whom we fail to reach in our study. Absentees could not be covered whose characteristics might differ from rest and the prevalence might be higher among them. A further study, with house to house survey can be taken up to cover the absentees, school dropouts and street children to get a better understanding of the problem.

CONCLUSION

Inhalant abuse offers a distinct challenge to parents as well as the health care provider, who needs to become more aware of the extent of the problem, the substances commonly abused and its health consequences. State Government should take up initiative and incorporate the problem and the adverse health effects of inhalants use in the school curriculum as early as the primary level. There is also a need to advocate for the replacement of dangerous and psychoactive substances in common products with less harmful alternatives.

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