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A Review on Inhalant Abuse Risk in Adolescents

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ABSTRACT

Inhalant abuse is a significant and precarious arising problem noticed among teens and youngsters throughout the world. Due to their high potential to rapidly induced euphoria and no prohibition to their use and purchase, they are highly misused by all ages. Some domestic inhalants of abuse containing volatiles and aerosols such as petroleum products, stationery products (glue, fluid, marker) and sometimes medical anaesthetic gases also and Bagging, snorting and huffing are some common methods adopted by users for inhalation. In the case of regular users or dependency, some serious consequences like the failure of kidney, liver, nervous system arising. This review studied the previous case reports and surveys performed in the field of inhalants abuse and highlight the issue of problems related to inhalant abuse by collecting data and record of past users.

Key Words: Inhalant, Abuse, Adolescents, Health risk, Society

INTRODUCTION

More than thousands of household products contain menacing chemicals. When these dangerous chemicals are properly used they make our life better but people who handle these chemicals have to be careful to protect themselves and the others around them. Nowadays many parents are bothered about drugs such as marijuana, cocaine, LSD (Lysergic Acid) and alcohol. They are always aware about the harmful effects and disorder related to these drugs of abuse but they usually disregard the popularity and risk produced to their children from familiar inhalants of abuse containing household volatile products such as spray paints, nail polish remover, glues, petroleum products (gasoline, kerosene, diesel) which can cause death (regular use for a long time), toxicity or addiction; however, kids these days are quickly discovering that public household products are economical and easy to obtain. Inhalants are one of the least studied or discussed groups of abused substances and their rate of abuse is increasing as well.¹ Inhalant abuse means “breathing intentionally” of gas or vapors with the purpose of “getting high” and for “recreational”. These vapours can be used by individuals to produce mind alerting effects and rapidly absorbed into the brain to produce a quick ‘high.’² Usually the youth or adolescent select inhalants because of their ease

of access, low prices, broad availability, legal vending and potential to rapidly induce euphoria.^{3,4} This misuse starts providing the opportunity for mind alerting experiences and becomes very soon a dependency.

Classification of Inhalants:

Inhalants are broadly classified into four categories based on their form.⁵

1. **Volatile solvents** –Liquids that are vaporizing at room temperature, when inhaled cause a state of intoxication. As an example- Paint thinner, dry cleaning fluids, petrol, kerosene, glues, correction fluids, felt tip markers, paint remover and so on.
2. **Aerosols**- Aerosols is sprays that containing solvents and propellants. An example being- Spray paints, deodorants, hair sprays, fabric protector spray etc.
3. **Gases**- Gases use in the household products as well as in hospitals includes-nitrous oxide, ether, chloroform.
4. **Nitrates** – Inhalants of this categories diverse from other inhalants because they first expand blood vessels and relaxing the muscles.

Such as Medical supplies – food preservatives, amyl nitrite found in certain adhesives and solvents etc.

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From all the categories, the volatile substances are available as legal ingredients of many common domestic products. More than 1,000 products are used as inhalants in the world. Some of the are ordinary household goods, including - nail polish remover, petrol, kerosene, glue, spray paint, correction fluid (liquid paper), shoe polish, spray paint, cleaning fluids, rubber cement, headache balms.¹ In spraying aerosol is sprayed straight inside the nose and mouth.^{6,7,8} Most commonly misused products reported to the united state poison center are petrol (41%), air fresheners (6 %), paint (13%), propane (6%) during 1996-2003.³ Such household products have been misused by different sections of the population but habit and dependency are raised among teens (Creighton, 2010). In the USA, the starting age of early volatile substance misuse averages around 13 years old with white and Spanish children more probably to combat abuse and dependency problems involving these substances than other classes of society. Inhalant abuse usually comes before other gateway drugs such as tobacco, alcohol, marijuana, or other substance abuse.⁴ One more class at risk of becoming habitual to inhalants – Especially, the members of the dental department (nitrous oxide gas as a medical anaesthetic). Even if dependency and misuse risk are a compound of some still studied psychological, environmental and genetic factors, peoples who work as the endodontist or dental specialist have the association of misuse substance peril factor are probable to fight with dependency to such anaesthetics, due to their near procedure to this inhalants. The function of nitrous oxide by dentists as a depressant in the surgery of withdrawing four molar teeth. Nitrous oxide is abused by near about 5 % of dental practitioners, a survey by ADA (American dentist association) Dentist Health and Awareness Committee.⁴

Abusing inhalant many times leading to symptoms like–vomiting, nausea, confusion, loss of inhibitions, lack of control, the interval of dozing dull that last for few hours.⁹

Common effects of abusing inhalants

Repeated inhaling high concentrations of chemicals in the volatile solvents or aerosols spray have the potential to cause heart failure and death within minutes, the heart starts overworking, rapidly, and irregularly that leads to cardiac arrest or sudden sniffing death syndrome. It can happen at the very first time or after use. Where the habit of inhalants is misused repeatedly, dangerousness also increased in such cases.^{10,11} A few detrimental and changeless consequences of inhalant abuse contains - liver or kidney mutilate (volatile solvents), blood oxygen depletion (paint thinners and varnish removers), slurred, fatigue and headache, weight loss, and anaemia, fatigue, headache, brain and CNS(central nervous system) damage (aerosols, dewaxed, glues), connective tissue damage (petrol), motor neuron disease and atrophy results walk lamely and stumble(petrol, gas cylinders, glues, cream

dispenser), hearing impairment (correction fluids, dry cleaning, gum, airbrush spray can) etc.

Long-standing abuse of volatile solvents, such as toluene break down the myelin sheath of fatty tissue that surrounds and protect nerves fibres, transmit messages effectively and quickly its break down leads to tremors or muscle spaming arms and legs, learning disabilities, hallucinations etc. Somebody can be suffocated because volatile substances are absorbed in the lobes of the lungs speedy than oxygen and finish up displacing oxygen, causing the consumer to lose sense and stop breathing. Consciously, chances of suffocation increase when inhaling by using a plastic bag and paper in a closed area.

Therefore, the objective of this study was to trace the types (nature) of inhalants abused in India, the Involvement of age group and gender type in these cases and trends (methods of use) commonly adopted by the addicts.

Status of inhalants among adolescent

The survey in Virginia from 1887 to 1996 revealed that 13-22 years aged males are more abusing inhalants as compare to females. A computerized report of deaths in Virginia was investigating to recognition of all deaths during this inhalants products misuse event. The report includes the record of time/day, month, location of death, gender, substance misuse, past of drug abuse, anybody markings Survey results from more than fifty deaths associated with intentionally abusing of volatile substance.¹² Abusing from some household products arising the high risk of mortality and morbidity in adolescents all over the world because they are often unaware of health-related issues and serious damage to their organs by inhalation of such products.¹³ The negligence of substance abuse by adolescents was also discussed in the literature. According to the survey, nearly about 20% of high and middle school students experiments with different delivery methods of inhalants substances. So it needs to emphasize education and awareness among the young, their parents and the community.¹⁴ An data of 2000-2001 NSDUH (National household surveys on drug abuse) in the United States found that amid adolescents under the age of 17, the preponderance of lifespan use and history of use in past 8.8%, about 50.9% of inhalant users noticed using many types inhalants, 46.4% started using before their 13 age and nearly about 19.8% abused inhalant in one time in a weak. Adolescents also reported delinquent behaviour, dependency, progression, multiple drug abuse.¹⁵ Some common inhalants like Glue sniffing demand and its threat to health in adolescents and children in India is a big problem for the medical community. The popularity of glue-sniffing increases continuously due to its easy availability, cheap rate and their misuse causes major risk for vital organs and sometimes results from death. Therefore, awareness and education are necessarily required to control of spreading of inhalant abuse.¹⁶ Key

aspects of inhalant abuse, various methods used for different types of inhalants, chronic effects, morbidity and mortality rate among the youth and adolescents were discussed in clinical report which advised the requirement of realization and attention of the peoples regarding of misuse of substances by children and suggested the paediatrician's role in prevention and identification.¹⁷ Sometimes peer group pressure, curiosity unemployment, poor family support makes it a primary initiative of abuse among the adolescents. Inhalant abuse and dependency from India include sniffing (67%), huffing (19%), bagging (14%) of typewriter erasing fluid due to their low prices, no legal control on sale, easily purchase from at all stationary/ general stores.¹⁸

It was also noticed that misuse of inhalants is a spreading problem among those children who were lived with their families in the streets, with domestic violence was in their life, with hunger, 7-8% of school droplet who had run away from villages.¹⁹ The trend of substance abuse was high in male students, as the age increases the tendency of using inhalant also increase. A survey in district Ambala, Haryana (India) among the 7th to 12th standard students of age 13 to 19 years revealed 42% of students used a combination of more than one drug also with alcohol (44.49%) and tobacco (14.42%). Also, the extent and addiction of substance abuse are high in north areas and causing serious health impacts among students.²⁰ Another structured questionnaire from the 'UNDCP/WHO global in Manipur, (India) on primary prevention of substance abuse' also concluded that males are more likely to be forever users. Also indicated that glue is the commonest abusing inhalants in participants about 98(52.7%). The preponderance of inhalant abuse offers a demand to parents, society, health organizations as well as state Govt. to should take up action at the stage of school or the primary level.²¹ As determined by a study in 2011, about 1/10th of the US population has misused or addicted to inhalants at a certain moment in their lives – we're talking about 22.5 million people in the USA. The group at risk for abusing these products are the youth, especially the underage. In another analysis of people subjected to this misuse for the first time in the previous year, more than 68% of these users were underage and were new to this activity. In one more study, about 58% of people who used inhalants initiated towards the end of ninth class. A 3rd survey showed that near about 20 % of middle and secondary school students had abused inhalants at one day in their life.⁴ Near about 52 street children (5-17 years aged) in Nepal were addicted to glue sniffing for the last 1 year. Among users 54.35% was tried more than 5 times in a day, Prevalence was 89.13% in those who had no awareness and knowledge about side effects of glue sniffing and 52.17% of children sniffing such inhalants to overcome their problems or stress and also results of peer group pressure.²² Therefore, studies for the evaluation of public health and the impact of substance misuse in adolescents should be con-

ducted at various intervals of time. Also, there is a need for attention among street children because of lack of guidance, without security, education, they are moving towards dubious futurity.

Some reported Case study

Case 1. A case report of a 32-year-old patient who had boot polish and alcohol dependency. Examination revealed that he was abusing boot polish for about the last 6 months. In the beginning, he used to inhales a little bit but as time progressed, then he started inhaling multiple times a day. There was no family history of drug or alcohol dependence among first degree relatives.²³

Sudden sniffing death of a 24-year old male causes cardiovascular and multi-organ system toxicity after inhaling a halogenated hydrocarbon containing keyboard dust cleaner.²⁴

Case 2. Another case report on use of inhalants showing that it is not only present among male adolescent but it's also a reason of concern for females. An episode is of an adolescent female from New Delhi who randomly came in contact with this act of inhalation. At the age of 13 years patient discovered for the first time attraction to petrol's smell and fell in dependency of its pleasant effect on herself. She started inhaling frequently not only from petrol but also from similar products kerosene. Unfortunately, in unawareness of the phenomena, her family tried to stop her only by arguing with her without taking any professional help. Their relations kept worsening. Her school failures in sixth class and fourth class also had negative effects on her life. She hadn't any other neurological disorder apart from this addiction. Overwhelming anxiety, personal failures or schizophrenia and some character disorders can bring assumptions of inhalants for self-treatment.²⁵

Case 3. A case history of schizophrenia and petrol dependence of a 37 years old patient was reported in psychiatry OPD, PGIMS, Rohtak. Parents complained of his petrol sniffing for 10 years. The patient used cannabis in his adolescent age and when he was not able to get cannabis and he looked for an alternate mean. Firstly patient inhales the boot polish and after few weeks also started petrol inhalation. He feels relaxed and hallucinogens after inhaling. In the starting patient, only a bit inhales petrol but after a few months sniffing whole the day. His parents and neighbours noticed his dependency on petroleum when he would shout, abuse and remain confined to his room and sniff large amounts. On patient Mental examination found increased psychomotor activity but the general physical examination was normal. After such findings patients were managed with tablets Risperidone 2mg IHS, Baclofen 20m.²⁶

Case 4. A 14-year-old boy who belonged to a lower working-class family brought with the grievance of deceptive onset or gradually gait instability for about last 50 days. Leading

questions disclose that the child sniffing glue from polythene bags (5-6 times/day) for the last 1 year. Examination showed he had neurosyphilis, motor ataxia. Other vital organs test resulted from normal functions but MRI of the brain showed mild diffuse cerebral atrophy and change in white matter. Counselling and management of the patient for near about one month result is gait ataxia being partially resolved. This study also discussed other consequences and complications regarding glue sniffing.²⁷

CONCLUSION

Nowadays, abuse and pervasiveness of volatile substances in children and adolescents became a challenge for parents, society and the health community. According to the records of last 2-3 years, it is found that the problem of inhalant abuse is significantly present all over the world and is growing gradually among youth.

In India, it is observed that easy approachability at each home, absence of legal restriction of domestic use products such as glue, petroleum products, fluid makes them the most demandable inhalant objects in school-age children. The category which is known to be the main target is formed by younger teens, even a part of adults and majority in homeless, uneducated and migrant status street children. All the previous studies and surveys indicated that males were more likely than females to have used inhalants to get a buzz. Also to be noticed that huffing, bagging, sniffing are the most popular pattern adopted by the users. In some users, this activity can cause serious damage and failure of vital organs and could result in deaths. Therefore there is a strong need to understand and take some useful steps regarding this perilous problem. Some new tactics should be adopted such as a family-based treatment program, strong management strategies, increasing education level and efforts to replace dangerous and mind alerting substances in familiar products with low harmful alternatives. According to a forensic point of view, it is found that there are some studies done in the field of detection, identification, analysis of inhalants by the use of conventional and modern hyphenated techniques. The review concluded that there is also a need for more knowledge and research of more sensitive methods and instrumental hyphenated techniques in all areas of identification, analysis of inhalants in metrics of toxicological importance is also significant. There is not sufficient work done according to forensic point of view. So, for this reason, it's necessary to always update our education and information to select and established more approaches, techniques for the detection of inhalants.²⁸ Therefore a global consciousness is much required to accept the use of inhalants as a high-risk problem and to face it in all respective fields to find some suitable solutions (to save more lives).

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Conflict of Interest

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S. drafted and conceived the article E.S and revised the manuscript.

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