



Review

Adolescent inhalant use prevention, assessment, and treatment: A literature synthesis



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ABSTRACT

Inhalant use refers to the use of substances such as gases, glues, and aerosols in order to achieve intoxication, while inhalant use disorder (IUD) encompasses both DSM-IV-TR criteria for inhalant abuse and dependence. Inhalant use among adolescents is an international public health concern considering the severe medical and cognitive consequences and biopsychosocial correlates. In this paper, we summarize the current state of the literature on inhalant use among adolescents focusing on social context, prevention, assessment, and treatment strategies. Psychoeducation, skills training, and environmental supply reduction are helpful strategies for preventing adolescent inhalant use, while parent and adolescent self-report as well as physician report of medical signs and symptoms can aid in assessment and diagnosis. Although research has only begun to explore the treatment of inhalant use, preliminary findings suggest that a multimodal approach involving individual counselling (i.e., CBT brief intervention), family therapy, and activity and engagement programs is the first-line treatment, with residential treatment programs indicated for more severe presentations. The limited nature of treatments developed specifically for inhalant use combined with high prevalence rates and potential for significant impairment within the adolescent population indicate the need for further research. Research should focus on understanding the social context of use, establishing the efficacy of current adolescent substance use treatments adapted for inhalant use, and exploring long-term outcomes.

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Inhalant use, also commonly referred to as volatile substance use or solvent use, refers to the use of substances such as gases, glues, and aerosols in order to achieve intoxication (Ives, 2006) through methods such as bagging (i.e., inhaling vapours from a bag), huffing (i.e., placing a rag soaked with the substance over the mouth or nose), or sniffing or snorting (i.e., inhaling directly from a container; Anderson & Loomis, 2003; Wu & Howard, 2007). Intoxication occurs within seconds and lasts from 15 to 60 min (Anderson & Loomis, 2003; Flanagan & Ives, 1994). Individuals report positive effects such as disinhibition, euphoria, excitement, “floating,” and feeling powerful. Negative effects include dizziness, slurred speech, and ataxia (Bowen, 2011; Flanagan & Ives, 1994).

Inhalant use is recognized by the World Health Organization (1999) as an international public health concern. In 2003, 11 countries reported an increase in inhalant use over the past year (United Nations, 2005). Especially concerning is the high prevalence of adolescent inhalant use (Howard, Bowen, Garland,

Perron, & Vaughn, 2011). According to the National Household Survey on Drug Abuse, approximately 9% of adolescents ages 12–17 report having used inhalants, and 11% of adolescents who used inhalants in the past year met criteria for inhalant abuse or dependence (Wu & Howard, 2007). While past research indicated that inhalant use was more prevalent in adolescent males, new evidence suggests that females ages 12–17 may be using inhalants at a higher rate than males (Edwards et al., 2007; SAMHSA, 2007).

Due to ease of access, lack of penalties associated with possession, and rapid onset of effects, inhalants are frequently one of the first drugs to be used by adolescents (Takagi et al., 2010). Experimentation, boredom, peer pressure, curiosity, defiance, and pleasure have been reported as reasons for initiation of use (Dell, Gust, & MacLean, 2011; Senior, Chenhall, & Daniels, 2006; Verma, Balhara, & Dhawan, 2011). In general, the benefits associated with substance use are ignored in the literature, particularly regarding substances commonly used by marginalized populations, such as inhalants (Dell et al., 2011). Inhalants are internationally viewed as a means of escaping difficult life circumstances, when in fact inhalant users report extreme physical (e.g., a rush that can be experienced multiple times in a session) and psychological pleasure (e.g., hallucinations; the excitement of risking death;

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feeling carefree and happy; seeing things as funny or amusing; feeling “no pain,” problems, or emotions; feeling “horny” or more outgoing; MacLean, 2008; McGarvey, Clavet, Mason, & Waite, 1999).

Parvizy, Nikbahkt, Tehrani, and Shahrokhi (2005) conducted a qualitative study to discover Iranian adolescents’ beliefs about substance use. Participants identified causes of use as: being free and relaxed, gaining a sense of power and authority, wishing to break the rules, and being curious about new sensations. They reported using substances as a way of coping with social problems, managing unwanted emotions, or seeking pleasure.

According to a study by Verma and colleagues (2011), the mean age of initiation of use was 11.6 years and varied from 9 to 18 years. Perron, Howard, Maitra, and Vaughn (2009) noted that the age group with highest rate of past-year use was 14 years old. This is especially concerning given that earlier age of use has been correlated with development of an inhalant use disorder (IUD; Perron, Howard, Maitra, et al., 2009). Although many adolescents report experimental use (i.e., using inhalants once or twice; Ives, 2006), one in five individuals who initiate use go on to meet criteria for IUD (Perron, Howard, Maitra, et al., 2009). Researchers have noted a typically rapid progression of use so that individuals often meet diagnostic criteria for abuse within 12 months of initial use (Perron, Howard, Maitra, et al., 2009); however, the validity of DSM-IV-TR inhalant use diagnostic categories, particularly the distinction between abuse and dependence, is questionable and does not accurately reflect levels of severity (Perron, Vaughn, Howard, Bohnert, & Guerrero, 2010).

The term “IUD” as used in this article refers to disordered use and encompasses both DSM-IV-TR criteria for Inhalant Abuse Disorder and Inhalant Dependence Disorder. The DSM-5 has combined substance abuse and dependence into a single continuum. Two of ten symptoms are required to meet criteria for a substance use disorder (American Psychiatric Association, 2013). However, because the studies referenced in this article were conducted before the release of DSM-5, disordered use is defined according to DSM-IV-TR criteria. The term “inhalant use” will be used to encompass both disordered and non-disordered (i.e., without significant functional impairment), experimental, or one-time use. The term “misuse” will be used synonymously with “disordered use” to refer to use associated with functional impairment.

The severity of complications that can arise even after a single episode of inhalant use makes it a national public health concern. There are a number of health behaviour theories in the literature on which to build prevention, policy, and treatment models (Brewer & Rimer, 2008). Research has not yet shown one theory to be more effective than the others (Noar & Zimmerman, 2005), therefore this paper utilizes a transtheoretical clinical focus when summarizing prevention, assessment, and treatment methods for adolescent inhalant use. Given that research in the area of adolescent inhalant use remains limited, disseminating knowledge about available research is necessary for the development of both clinical procedures and public policies that specifically target adolescent inhalant use. This article highlights key findings regarding prevention, assessment, and treatment of inhalant use among adolescents. Social risk factors associated with use, and physical and psychological consequences of use will be discussed to provide context. Clinical recommendations to address adolescent inhalant use will also be discussed.

Risk factors and complications

Social factors impacting adolescent inhalant use

A multitude of risk factors impacts the initiation and maintenance of inhalant use during adolescence. Higher rates of inhalant

use have been reported in marginalized populations including the poor, the mentally ill, and those who are involved in the juvenile or criminal justice systems (Howard, Walker, Walker, Cottler, & Compton, 1999) or the child welfare system (Fettes, Aarons, & Green, 2013). Prevalence is also higher in rural communities or isolated communities associated with high rates of unemployment, poverty, and violence (Baydala, 2010).

At the individual level, problem behaviours (e.g., delinquency, interpersonal violence), sensation seeking, other drug use, history of physical or sexual abuse, and a recent major depressive episode have all been associated with increased risk of adolescent inhalant use (Garland, Howard, Vaughn, & Perron, 2011; Howard, Perron, Vaughn, Bender, & Garland, 2010; Nonnemaker, Crankshaw, Shive, Hussin, & Farrelly, 2011; Perron, Howard, Maitra, et al., 2009). Individuals with neuropsychological disorders, learning disorders, and behaviour disorders also disproportionately make up the population of inhalant users (Howard et al., 2010; Perron, Howard, Maitra, et al., 2009).

At the family level, parental monitoring, strong family values, higher family income, and parental respect were associated with decreased risk of adolescent inhalant use (Nonnemaker et al., 2011; Ober, Miles, Ewing, Tucker, & D’Amico, 2013). On the other hand, parental criminality and absent parenting has been associated with increased risk (Perron, Howard, Maitra, et al., 2009). In addition, parental or older sibling drug use has been found to increase risk for adolescent inhalant use (Ober et al., 2013; Perron, Howard, Maitra, et al., 2009). Low level of parental education has also been associated with adolescent inhalant use according to a U.S. national survey on adolescent substance use (Bachman, O’Malley, Johnston, Schulenberg, & Wallace, 2011; Howard et al., 2011; Johnston, O’Malley, Bachman, & Schulenberg, 2009).

Peer groups and beliefs also impact risk of inhalant use among adolescents. Deviant peer role models, including friends who use inhalants, have been associated with increased risk for use (Perron, Howard, Maitra, et al., 2009), and the majority of youth who reported having used inhalants also reported that their friends use inhalants (McGarvey et al., 1999). In fact, studies have shown that most adolescents use inhalants in their own homes or at the homes of friends (McGarvey et al., 1999). High levels of perceived peer drug use have been correlated with increased risk of use (Ober et al., 2013). Additional peer-related risk factors include: high levels of perceived popularity and frequency of talking about drugs (Nonnemaker et al., 2011; Ober et al., 2013). Conversely, a high sense of drug-refusal self-efficacy was found to be a protective factor (Ober et al., 2013).

Physical and psychological complications

Inhalant use poses a serious public health issue due to the physical complications that can occur even after a single use (Bowen, 2011). The National Inhalant Prevention Coalition (NIPC) reports about 100–125 deaths per year resulting from inhalant use in the United States. However, this number is likely an underrepresentation due to the probability that many inhalant-related deaths are not reported as such (NIPC, 2010). Death can occur from anoxia, cardiac dysfunction, extreme allergic reaction, severe injury to the lungs, or central nervous system depression (Bowen, 2011). Inhalant use affects the heart so that any sudden excitement or physical exertion can cause death, commonly referred to as sudden sniffing death syndrome (SSDS; Adgey, Johnston, & McMechan, 1995; Anderson & Loomis, 2003). Death can also result from complications stemming from method of use. For example, aspiration of the compound or vomit might occur as well as fire-related injuries (some inhalants are heated; Bowen, 2011).

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