

Background information of volatile substance use among Indigenous people

Introduction

Volatile substances are chemical compounds that give off fumes at room temperature [1-3]. They are also called 'inhalants' in recognition of their route of administration. Volatile substance use (VSU) is the 'practice of deliberately inhaling ("sniffing", "huffing", "bagging" or "chroming") substances that are vaporous at ambient temperatures for the purpose of becoming intoxicated' ([4], p.23).

Volatile substances are central nervous system depressants which produce an immediate and intense intoxication for users. The onset of effect occurs rapidly because the extensive capillary surface of the lungs readily absorbs the vapour, causing blood levels to peak within minutes of use [5].

There are approximately 250 household, medical and industrial products that contain potentially intoxicating volatile substances [1]. Many of these are readily available and inexpensive.

Types of volatile substances

Volatile substances are usually classified into four groups [6]:

- solvents - liquids or semi-liquids, for example [4, 6]:
 - correction fluid and thinner
 - dry-cleaning fluid
 - modelling glue
 - nail polish remover
 - petrol
 - paint thinner and paint remover
 - rubber cement

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More detailed information about volatile substance use in Indigenous people can be found at:

http://www.healthinfonet.ecu.edu.au/volatile_review

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- sealant
- glue
- felt-tip marker
- aerosols - sprays containing propellants and solvents, for example [4, 6]:
 - deodorant
 - hairspray
 - vegetable oil spray
 - spray paint (the use of spray paint as a volatile substance is referred to as 'chroming')
- gases - medical anaesthetics and fuel gases, for example [4, 6]:
 - fuel gas
 - lighter fluid
 - refrigerant
 - nitrous oxide (found in whipped cream dispensers)
- nitrites - unlike the other three groups of inhalants, this group does not directly affect the central nervous system, instead nitrites dilate the blood vessels and relax the muscles [6]. Their use occurs primarily for enhancement of sexual pleasure rather than intoxication. Nitrates include cyclohexyl nitrite, isoamyl nitrite, and isobutyl nitrate. Examples of products in this group include:
 - video head cleaner
 - room deodoriser
 - leather cleaner.

Methods of use

While the chemicals used in VSU are diverse, as is the broad range of effects, the main characteristic linking all of these substances is that they are almost exclusively inhaled [6]. Inhaling methods include:

- sniffing or snorting fumes from a container
- spraying aerosol directly into the nose or mouth
- inhaling fumes that have been sprayed or put in a plastic/paper bag (known as 'bagging')
- holding infused fabric over the mouth and nose while breathing (known as 'huffing')
- inhaling from balloons that have been filled with nitrous oxide.

Demographic information about volatile substance use

VSU is most commonly used by young people in 'socioeconomically deprived and marginalised groups' ([4], p.24). The four demographic groups most commonly identified are [1, 4]:

- young people experimenting with VSU, but who do not persist
- young people who are socially and economically marginalised who repeatedly use volatile substances
- young people in some remote Indigenous communities where petrol sniffing is common
- adults who are socially and economically marginalised who may use volatile substances when they do not have access to alcohol (opportunistic use).

Reasons why people use volatile substances

Volatile substances are used by people for a variety of reasons, including [7, 8, 9]:

- to relieve boredom
- to block hunger pains
- to cope with emotional distress
- for the exciting effects of intoxication
- to establish the reputation of being a 'rebel'
- to display power.

Physical effects of volatile substance use

The psychoactive effects of inhaling volatile substances occur rapidly but only last for a short time (5 to 45 minutes after ceasing use) [3]. However, the fat soluble nature of volatile substances means that they can be stored in neurological tissues and have a prolonged effect on the level of consciousness for a much longer time period.

Many of the harmful physical effects from VSU are reversible, especially for infrequent users [3, 4]. The damage caused by VSU is cumulative; chronic VSU is associated with an increased likelihood of permanent brain injury [1], although the extent of VSU-caused brain injury is debated in the literature [1, 3].

There are short-term and long-term physical effects of VSU [1, 3, 6]:

Short-term physical effects	Long-term physical effects
<ul style="list-style-type: none"> • a feeling of wellbeing • fatigue • headache • blurred vision • slurred speech • nausea and vomiting • increased risk-taking and loss of inhibition • agitation and aggression • confusion • hallucinations • loss of coordination • abdominal pain • heart palpitations • loss of consciousness • death 	<ul style="list-style-type: none"> • red, watery eyes • nosebleeds • lack of energy • indigestion • dizziness • frequent cough • shortness of breath • tinnitus (ringing in the ears) • angina (temporary chest pain) • stomach ulcers • chronic headache • sinusitis (inflammation of the area around the nose) • attention, memory and problem solving issues • depression • loss of hearing and sight • ataxia (lack of coordination of muscle movements) • seizures and epilepsy • reduced bone density • damage to the heart, lungs, liver and kidneys

Sudden sniffing death

Some inhalants can indirectly cause sudden death by cardiac arrest in a syndrome known as 'sudden sniffing death' [1, 10]. The hydrocarbon gases present in the inhalants appear to sensitise the myocardium to adrenaline. In this state, a sudden surge of adrenaline (for example, from a frightening hallucination or intense physical activity) can cause a fatal cardiac arrhythmia. Sudden sniffing death can occur after a single use and is associated with the inhalation of butane, propane, and the chemicals found in aerosols [6].

Asphyxiation

Individuals who inhale petrol can die as a result of asphyxiation. The oxygen in the lungs is displaced by the inhaled petrol vapour which may stop the user from breathing [1, 11]. Inhaling petrol from a bag or in a confined space (such as under a blanket) increases the risk of death from asphyxiation. The risk of death from asphyxiation also applies to Opal fuel [12]. Spraying volatile substances directly into

the mouth is thought to cause asphyxiation since the cooling agents in the aerosol propellant freeze the larynx [13].

Cognitive and neurological impairments

Cognitive impairments

Cognitive impairments from VSU include a reduced attention span, short-term memory deficits, problem solving difficulties, and impairments to visual-spatial skills. The severity can range from mild impairment to severe dementia [14]. Cognitive impairments associated with VSU appear to be cumulative, but one study found that when controlling for socioeconomic disadvantage the differences in cognitive skills among people reporting VSU were not statistically significant [15].

Neurological impairments

Forms of neurological disorders, including Parkinson's disease, appear to be linked to VSU [16-18]. The neurological damage caused by VSU is considered to be cumulative; chronic, long-term VSU is more likely to cause permanent brain injury or death than is infrequent VSU. Early studies suggested that brain injury associated with VSU was permanent [19, 20], but recent evidence suggests that significant recovery from the effects of VSU is possible where abstinence occurs prior to the development of cerebellar atrophy [21-24].

Exposure to volatile substances during pregnancy

Volatile substances can cross the placental barrier, and prenatal exposure is associated with: spontaneous abortion; low birthweight; prematurity; developmental delays; neurobehavioral problems; physical malformations; and behavioural issues later in life [25].

Social effects of volatile substance use

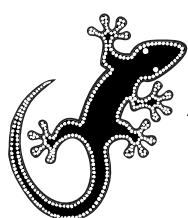
VSU is associated with a variety of social harms that involve the individuals who use volatile substances, their families, their communities, and wider society [1]. While it is not possible to draw a causal relationship between VSU and the social effects, VSU is associated with social issues, including [1, 4]:

- poor school attendance and performance
- loss of opportunities to learn cultural knowledge
- inability to obtain employment
- alienation and isolation from social support (family, friends, community)
- social stigmatisation

- increased likelihood of involvement with the police
- increased likelihood of being homeless
- damage to spirit
- fear of violence in the community (caused by volatile substance users)
- increase in antisocial behaviour (fighting, vandalism, etc).

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Australian Indigenous HealthInfoNet

The Australian Indigenous HealthInfoNet is an innovative Internet resource that contributes to 'closing the gap' in health between Indigenous and other Australians by informing practice and policy in Indigenous health.

Two concepts underpin the HealthInfoNet's work. The first is evidence-informed decision-making, whereby practitioners and policy-makers have access to the best available research and other information. This concept is linked with that of translational research (TR), which involves making research and other information available in a form that has immediate, practical utility. Implementation of these two concepts involves synthesis, exchange and ethical application of knowledge through ongoing interaction with key stakeholders.

The HealthInfoNet's work in TR at a population-health level, in which it is at the forefront internationally, addresses the knowledge needs of a wide range of potential users, including policy-makers, health service providers, program managers, clinicians, Indigenous health workers, and other health professionals. The HealthInfoNet also provides easy-to-read and summarised material for students and the general community.

The HealthInfoNet encourages and supports information-sharing among practitioners, policy-makers and others working to improve Indigenous health – its free on line yarning places enable people across the country to share information, knowledge and experience. The HealthInfoNet is funded mainly by the Australian Department of Health and Ageing. Its award-winning web resource (www.healthinonet.ecu.edu.au) is free and available to everyone.

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FEATURED ARTWORK

Rain meets creek,
creek meets river, river
meets sea

by William Miller

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