The effects and impact of second-hand cannabis smoke exposure on nurses working in the community

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Abstract
This article explores the work, health and safety risks that may be associated with the exposure of nurses to second-hand cannabis smoke while working in the community. Emerging evidence suggests the benefits of cannabis in the treatment of several chronic and terminal illnesses. This has led to some countries, like Australia, decriminalising or legalising the use of cannabis for medicinal purposes. Smoked cannabis is one of several routes of administration. However, cannabis smoke may have an impact on those in close proximity to the consuming patient. As a result, community healthcare workers, including nurses, may passively inhale cannabis substances while visiting patients in their home. This poses a work health and safety risk to the community nurses and other healthcare workers. This review intends to raise awareness of this fact and reveals that more research and education is needed to strengthen policies and procedures around the nursing practices in the care of patients who choose to use smoked medicinal cannabis for symptom management. The successful use of cannabis in the treatment of a range of chronic or terminal medical conditions, such as chemotherapy-induced nausea and vomiting, palliative care patients or childhood epilepsy, is currently widely discussed and reported around in the media and specialised literature (Suraev et al. 2017; Wong & Wilens 2017; Hausman-Kedem & Kramer 2017; Abrams 2018). The use and cultivation of cannabis for any purposes in Australia, including medical research for acute and chronic disease management, has been prohibited since the early twentieth century (Rodman 2015).

Keywords
working, exposure, community, cannabis, smoke, effects, impact, second-hand, nurses

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ABSTRACT:
This article explores the work, health and safety risks that may be associated with the exposure of nurses to second-hand cannabis smoke while working in the community. Emerging evidence suggests the benefits of cannabis in the treatment of several chronic and terminal illnesses. This has led to some countries, like Australia, decriminalising or legalising the use of cannabis for medicinal purposes. Smoked cannabis is one of several routes of administration. However, cannabis smoke may have an impact on those in close proximity to the consuming patient. As a result, community healthcare workers, including nurses, may passively inhale cannabis substances while visiting patients in their home. This poses a work health and safety risk to the community nurses and other healthcare workers. This review intends to raise awareness of this fact and reveals that more research and education is needed to strengthen policies and procedures around the nursing practices in the care of patients who choose to use smoked medicinal cannabis for symptom management. The successful use of cannabis in the treatment of a range of chronic or terminal medical conditions, such as chemotherapy-induced nausea and vomiting, palliative care patients or childhood epilepsy, is currently widely discussed and reported around in the media and specialised literature (Suraev et al. 2017; Wong & Wilens 2017; Hausman-Kedem & Kramer 2017; Abrams 2018). The use and cultivation of cannabis for any purposes in Australia, including medical research for acute and chronic disease management, has been prohibited since the early twentieth century (Rodman 2015).

OVERVIEW OF THE ISSUE:
Possession of cannabis is illegal in most countries, and even the death penalty may apply for the sale and possession of cannabis in some countries (Edwards et al. 2011). In general, the negative portrayal of cannabis is not only associated with drug addiction and health behavioural issues (Agrawal et al. 2016; Agrawal & Lynskey 2006; Agrawal et al. 2017), but also associated with criminal offences by the media and general public (Pedersen & Skardhamar 2010; Morris et al. 2014).

However, emerging evidence suggesting the usefulness of cannabis as medical therapy, and the increase in patients supported who are suffering these conditions in the community has led several countries, including Australia, towards legalising or decriminalising the use of cannabis for medicinal purposes.
RISKS TO HEALTH IN THE TARGET GROUP (COMMUNITY NURSES):

While smoking cannabis is not a route of administration supported by the Australian Therapeutic Goods Administration, patients may choose to inhale cannabis smoke as a treatment modality at home, unaware that this may pose a work health and safety risk to the nurses and other healthcare workers who visit patients in the community.

PROJECT OUTLINE:

This article represents a synthesis of relevant literature for nursing practice exploring the effects and possible impact of second-hand medicinal cannabis smoking on nurses working in the community. The authors examine key findings identified and provide analysis of their relevance to nursing and healthcare workers working in the community.

A literature review was undertaken to find publications related to second-hand cannabis smoke. The databases searched were Web of Science, Scopus and CINAHL. The search terms used were canab* OR marijuana AND (“secondhand” OR “second-hand” OR “second hand”) AND smoke. A total of 88 papers were identified across the search: CINAHL (42), Web of Science (9) and SCOPUS (36). The search highlighted a limited evidence based on the impact of second-hand cannabis smoke on human subjects. There was no primary research on health professionals’ exposure to second-hand cannabis smoke, using either qualitative or quantitative methods.

RESULTS

THE EFFECTS OF CANNABIS SMOKE

With the increased use of cannabis, there has been a growing concern about its possible adverse effects. While there are a variety of modes of delivery, the fastest route of absorption of the active components of cannabis, tetrahydrocannabinol (THC) and cannabidiol (CBD), is via the respiratory system (Grotenhermen 2003). Thus, smoked cannabis is the most common form of consumption of cannabis for recreational use (Newmeyer et al. 2017).

Although smoking cannabis is the only route of administration not recommended by the Australian Therapeutics Goods Administration due to the harmful effects of smoke, its fast absorption (Grotenhermen 2003) could facilitate the titration when used for medicinal purposes, and may be the chosen route by the patient looking for fast symptom relief. Cannabis can be smoked alone, but it is most regularly mixed with tobacco (Meier & Hatsukami 2016).

Smoke from both cannabis and tobacco contains a mixture of compounds, including carcinogenic molecules and tar known to be the culprit of damaging effects of smoking (Hoffmann et al. 2001), although to differing degrees depending on which substance is smoked (Melamede 2005).

A logical inference is that the effects of cannabis smoke could also affect second-hand smokers (Holitzki et al. 2017), including nurses working in the community who may unconsciously and/or passively be exposed at times to the smoke of cannabis.

THC is the compound in cannabis that causes hallucinogenic results (Johannigman & Eschiti 2013). The THC from a typical cannabis cigarette that is absorbed by the mainstream smoker is found to be in the range of 20-37%.

Pyrolysis further destroys approximately 30% of the THC and the remaining 40-50% is released as side-stream smoke into the environment. In addition, there are further contaminants from the exhalation of the mainstream smoke. Therefore, regardless of the many factors that affect absorption of THC, there is a likelihood of passive inhalation of THC in non-smokers in an environment where cannabis is being smoked (Berthet et al. 2016).

HEALTH RISKS OF SECOND-HAND CANNABIS SMOKE

The effect of second-hand cannabis smoke (SHCS) must be considered in the discussion of using cannabis products as a treatment modality in the community. SHCS is defined as a combination of the side-stream smoke that is emitted from the cannabis cigarette and the exhaled smoke from the mainstream smoker (Office on Smoking and Health 2006). The effects of second-hand tobacco smoking have been extensively investigated. It is known that non-smokers exposed to second-hand smoke from tobacco have a 30% increased risk of cerebral vascular attack (CVA) (Malek et al. 2015) and that it can affect cognitive function (Heffernan & O’Neill 2013) and even future dependence (Wilson-Frederick et al. 2011).

However, the effects of SHCS are less well known due to cannabis being illegal until recently in most countries, which made research difficult to conduct.

SHCS from combustible cannabis has similar health risks to second-hand tobacco smoke due to the combustive organic material, which creates carcinogenic and mutagenic effects (Cone et al. 2015a). Cannabis contains many of the same toxins in tobacco, which are responsible for cardiovascular damage. In fact, many toxins such as ammonia, nitric oxide and hydrogen cyanide, are found in levels between three to 20 times higher in cannabis than in tobacco (American Chemical Society 2007). Studies in rodents (Wang et al. 2016) have demonstrated that exposure to cannabis smoke for as little as one minute impairs cardiovascular function for the following 90 minutes. Long-term effects of repeated endothelial dysfunction can lead to cardiovascular disease including thrombus formation, CVA and myocardial infarction (Rajendran et al. 2013).

The study by Wang et al. (2016) also noted a longer deleterious cardiovascular effect after second-hand exposure to smoke from cannabis versus tobacco. This is a very significant finding, because the nurse visiting a patient who may be smoking cannabis for medicinal purposes would most likely be exposed for more than 60 seconds. In attempts to decrease the THC levels, and thus the hallucinogenic effects, of medical cannabis by changing environmental factors, the study found that the endothelial dysfunction was independent of the level of THC of the cannabis (Wang et al. 2016). Thus, even if medicinal cannabis has reduced levels of THC, SHCS exposure may still affect the nurse’s endothelial function.

In humans, subjective drug effects of cannabis smoke inhaled passively have been found to be dose-dependent (Cone et al. 2015b). Therefore the impact on health practitioners of SHCS used by patients should not be underestimated, particularly since few health providers, including nurses, felt completely knowledgeable about marijuana’s (cannabis) health risks (Brooks et al. 2017), and may not avoid exposure during their home visit to patients utilising smoked medical cannabis.

A question that often arises is whether SHCS will cause blood levels to be high enough to test positive in the nurse who is exposed and if so, what effect may that have on the nurse’s cognition? Hours after secondary exposure to cannabis smoke, THC can be detected in screening tests of urine (Cone et al. 2015a) and oral fluids (Cone et al. 2015b), although only after exposure to high smoke concentrations. However, adequate room ventilation may reduce the level of secondary exposure to cannabis compounds (Herrmann et al. 2015; Cone et al. 2015a).
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This is an important issue that health practitioners should pay attention to when carrying out their duty at the patients’ home. A study conducted by Cone et al. (2015a) demonstrated that short-term exposure to cannabis smoke in an unventilated space produced absorption of sufficient amounts of THC for non-smokers to test positive for THC up to three hours following exposure. In their systematic review of passive exposure to cannabis smoke, Berthet et al. (2016) advised ‘experts should clearly inform persons who have to demonstrate prolonged abstinence from cannabis to avoid heavily smoky and unventilated areas’ (p. 110). Similarly, Holitzki et al. (2017) also recommend that clinicians advise cannabis users to smoke only in open outdoor spaces due to the effects of SHCS. This research would seem to indicate the need for nurses to avoid exposure to cannabis smoke in unventilated spaces, not just for potential negative implications on their health, but also potential legal implications. It also poses the question as to how this may impact a nurse’s performance as well as driving ability after visiting a patient who has been smoking medical cannabis during the visit.

In addition to this, over the last decade random roadside drug testing of drivers has become a common feature on Australian roads. Road-side drug testing determines the presence or absence of cannabis, ecstasy or amphetamines in oral fluid samples (Wilson 2012). The approach to the results differs by state.

For example, Queensland Police (2016) note in their guidelines on random roadside drug testing ‘any trace of the nominated drugs in your system and you can be penalised’. While there is no universal threshold to differentiate active smokers from SHCS (Holitzki et al. 2017), the government of South Australia (2017) has reported the level of THC present in saliva as a result of passive smoking is considerably lower than the lowest level of THC able to be detected by the saliva testing devices. After a positive result in a drug test, penalties include fines, licence disqualification and imprisonment, depending on the nature of the offence. In addition, the healthcare registration board may require them to go through the disciplinary hearing process because it constitutes a breach of the professional conduct, as they are under the influence of illicit substances while on duty. Importantly for nurses, their registration may be suspended until the hearing process is completed.

The advice of Berthet et al. (2016) on avoiding exposure to cannabis smoke in unventilated areas has particular implications for those nurses who have conditions placed on their registration as a consequence of substance related impairment. Australian Health Practitioner Regulation Agency (AHPRA) and the Nursing and Midwifery Board of Australia (NMBA) have drug testing for all practitioners with substance related impairment (AHPRA 2015). These nurses have routine hair and urine testing of a wide range of drugs, not just based on the nurse’s drug taking history (AHPRA 2015). Moosmann et al. (2014) have noted that ‘considering the severe consequences people concerned may experience, contamination issues in hair analysis still do not seem to be investigated to an extent that would be desirable’ (p.125).

Exposure to medicinal cannabis through SHCS could lead to the external contamination of hair, yielding false-positive results (Baciu et al. 2015).

Furthermore, SHCS can lead to enough cannabinoid presence in oral fluids, blood and urine so as to give a positive result in a drug test (Holitzki et al. 2017). Therefore, given the potential impact that SHCS can have on a nurse, appropriate consideration should be included in the discussion of the use of medical cannabis, including education of the health practitioners on these aspects.

It should be noted that each state and territory has its own regulatory frameworks for the access to medicinal cannabis (Commonwealth of Australia 2017).

According to the Guidance for the use of medicinal cannabis in Australia (Commonwealth of Australia 2017), nabiximols (an oro-mucosal spray) is the only registered cannabis product in Australia.

All other cannabis products must be accessed through clinical trials and limited Special Access Schemes, regulated and monitored by the Therapeutic Goods Administration (TGA).

In principle, the routes of medicinal cannabis administration may include oral administration, oro-mucosal sprays, topical and vapourising.

However vapourised cannabis may pose a risk of SHCS to the nurses during the patient visit, especially as no vapourisers are currently registered as medical devices in Australia (Commonwealth of Australia 2017). The impact of cannabis administered by routes other than smoking on nurses, and the use of other cannabis products such as oils or sprays requires independent analysis.

A final work health and safety factor to consider is the effect of SHCS on the foetus in the case of a pregnant nurse. There are studies that show prenatal exposure to cannabis is linked to higher rates of stillbirth, shorter length at birth and smaller head circumference. Therefore, there is suspicion that SHCS may have similar effects on the foetus.

POTENTIAL WORK HEALTH AND SAFETY RISKS TO THE COMMUNITY NURSES

Nurses working in the community are often required to commute between visits. All states and territories in Australia have laws making it an offence to operate a vehicle while under the influence of drugs. These laws allow the police to initiate drug testing if they suspect a driver of a vehicle is under the influence of an illicit substance.
In fact, the American College of Obstetrician and Gynecologists (ACOG) have stated that there is data of the negative impact on the foetus of prenatal cannabis exposure including neurological development, visual problem solving, visual-motor coordination and visual analysis, decreased attention span and behavioural problems. Therefore since 2017, ACOG has repeatedly warned obstetricians to deliver the message to pregnant women not to smoke cannabis or be exposed to SHCS (Gynecologists 2015).

CONCLUSION:

In Australia, medicinal cannabis has been a legal treatment modality since 2017 for several approved medical conditions. The current available medicinal cannabis products that may be prescribed and approved by the TGA include both plant-based and synthetic products. The route of administration may be in the form of a vapour (Queensland Health 2017) but currently, no vapourisers have been approved and registered as medical devices in Australia (Commonwealth of Australia 2017). Therefore, smoking is still the most common route of administration of medicinal cannabis. In this case, community nurses may inhale cannabis substances while they are carrying out their duty of care in the patients’ home. Exposure to the cannabis substances at work may pose some serious work health and safety issues. This review found that the effects and impact of SHCS may include:

- increased risk of cardiovascular diseases;
- deleterious effects on the foetus if the nurse is pregnant;
- altered cognitive function leading to increased risk of medical errors and car accident while commuting between visits;
- risk of drug addiction;
- positive road-side drug tests; and
- loss of nursing registration due to misuse of illegal substances.

If a nurse tests positive in a drug test, the court may impose penalties for the charge. In addition, it is a breach of the professional conduct while providing direct patient care under the influence of illicit substances. The healthcare registration board may require them to go through the disciplinary hearing process. The nurse may be suspended from work or on restricted duty until the hearing process is completed.

The use of medicinal cannabis as a treatment modality is new to Australian nurses. More research and education are required in this area to strengthen policies and procedures around the nursing practices relating to the care of patients who choose to use smoked medicinal cannabis to manage their chronic or terminal medical conditions.

References
