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ORIGINAL RESEARCH

Road hazard: a systematic review of traffic injuries following recreational cannabis legalization

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Abstract

Purpose Acute cannabis use is associated with impaired driving performance and increased risk of motor vehicle crashes. Following the Canadian *Cannabis Act*'s implementation, it is essential to understand how recreational cannabis legalization impacts traffic injuries, with a particular emphasis on Canadian emergency departments. This study aims to assess the impact of recreational cannabis legalization on traffic-related emergency department visits and hospitalizations in the broader context of North America.

Methods A systematic review was conducted according to best practices and reported using PRISMA 2020 guidelines. The protocol was registered on July 5, 2022 (PROSPERO CRD42022342126). MEDLINE(R) ALL (OvidSP), Embase (OvidSP), CINAHL (EBSCOHost), and Scopus were searched without language or date restrictions up to October 12, 2023. Studies were included if they examined cannabis-related traffic-injury emergency department visits and hospitalizations before and after recreational cannabis legalization. The risk of bias was assessed. Meta-analysis was not possible due to heterogeneity.

Results Seven studies were eligible for the analysis. All studies were conducted between 2019 and 2023 in Canada and the United States. We found mixed results regarding the impact of recreational cannabis legalization on emergency department visits for traffic injuries. Four of the studies included reported increases in traffic injuries after legalization, while the remaining three studies found no significant change. There was a moderate overall risk of bias among the studies included.

Conclusions This systematic review highlights the complexity of assessing the impact of recreational cannabis legalization on traffic injuries. Our findings show a varied impact on emergency department visits and hospitalizations across North America. This underlines the importance of Canadian emergency physicians staying informed about regional cannabis policies. Training on identifying and treating cannabis-related impairments should be incorporated into standard protocols to enhance response effectiveness and patient safety in light of evolving cannabis legislation.

Keywords Recreational cannabis legalization · Traffic injuries · Trauma · Emergency department visits · Hospitalizations · Systematic review

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Résumé

Objectif La consommation aiguë de cannabis est associée à une conduite avec facultés affaiblies et à un risque accru d'accidents de la route. À la suite de la mise en œuvre de la Loi canadienne sur le cannabis, il est essentiel de comprendre l'incidence de la légalisation du cannabis à des fins récréatives sur les blessures de la route, en mettant l'accent sur les services d'urgence canadiens. Cette étude vise à évaluer l'impact de la légalisation du cannabis à des fins récréatives sur les visites et les hospitalisations aux urgences liées à la circulation dans le contexte plus large de l'Amérique du Nord.

Méthodes Une revue systématique a été menée selon les meilleures pratiques et a été rapportée en utilisant les directives PRISMA 2020. Le protocole a été enregistré le 5 juillet 2022 (PROSPERO CRD42022342126). MEDLINE(R) ALL (OvidSP), Embase (OvidSP), CINAHL (EBSCOHost) et Scopus ont été fouillés sans restriction de langue ou de date jusqu'au 12 octobre 2023. Des études ont été incluses si elles examinaient les visites aux urgences et les hospitalisations avant et après la légalisation du cannabis à des fins récréatives. Le risque de biais a été évalué. La méta-analyse n'était pas possible en raison de l'hétérogénéité.

Résultats Sept études étaient admissibles à l'analyse. Toutes les études ont été menées entre 2019 et 2023 au Canada et aux États-Unis. Nous avons trouvé des résultats mitigés concernant l'impact de la légalisation du cannabis récréatif sur les visites aux urgences pour les blessures de la route. Quatre des études incluaient une augmentation des accidents de la route après la légalisation, tandis que les trois autres études n'ont révélé aucun changement significatif. Le risque global de biais était modéré parmi les études incluses.

Conclusions Cet examen systématique met en évidence la complexité de l'évaluation de l'impact de la légalisation du cannabis récréatif sur les blessures de la route. Nos résultats montrent un impact varié sur les visites aux urgences et les hospitalisations en Amérique du Nord. Cela souligne l'importance pour les médecins d'urgence canadiens de se tenir informés des politiques régionales sur le cannabis. La formation sur l'identification et le traitement des déficiences liées au cannabis devrait être intégrée aux protocoles normalisés afin d'améliorer l'efficacité de l'intervention et la sécurité des patients à la lumière de l'évolution de la législation sur le cannabis.

Clinician's capsule

What is known about the topic?
It is unclear what impact the legalization of recreational cannabis has on health outcomes, specifically traffic injuries.

What did this study ask?
Does recreational cannabis legalization affect rates of traffic-related emergency department visits and hospitalizations?

What did this study find?
Studies show mixed results, with some indicating increased traffic injuries and others noting no significant change.

Why does this study matter to clinicians?
Informs emergency medicine physicians of the unpredictable effects of cannabis legalization on traffic injuries, emphasizing preparedness and adaptability.

Introduction

Motor vehicle crashes are a major cause of fatalities and injuries worldwide. Every year, these crashes result in over 1.35 million deaths and up to 50 million injuries [1]. This represents an important socio-economic burden, costing an average of 2.7% of a country's gross domestic product [2]. Recently, a large prospective cohort study involving 6956 injured drivers found that 18 % tested positive for tetrahydrocannabinol [3]. These findings raise significant concern as acute cannabis use is associated with impaired driving performance [4] and increases the likelihood of motor vehicle crashes [5, 6]. With the increasing legalization of recreational cannabis worldwide, understanding its impact on motor vehicle crashes and related outcomes is essential. As a result, cannabis-impaired driving is of increasing global concern [7]. Given the high morbidity and mortality rates associated with motor vehicle crashes, both healthcare professionals and policymakers need to be aware of the impact of changes in cannabis policies on health outcomes [8].

The relationship between the legalization of recreational cannabis and traffic injuries and fatalities is a complex issue with mixed evidence. Recent studies in the United States have produced varying findings on the impact of recreational cannabis legalization on motor vehicle crashes [9, 10]. While most studies from Colorado reported an increase in post-legalization motor vehicle crashes [10], some found no difference [9, 11]. In Washington, predominant findings point to a rise in motor vehicle crash fatalities post-legalization [11], but some results were inconclusive or indicated no change [9]. In Oregon, most studies observed a post-legalization rise in motor vehicle crashes [10, 11]. Research spanning multiple U.S. states often showed an increase in motor vehicle crashes post-legalization [12]. Similarly, in

Uruguay, a study found that recreational cannabis legalization was associated with a 52.4% increase in light-vehicle driver fatalities [13]. Despite the growing body of literature on the outcomes of recreational cannabis legalization, its impact on non-intentional injuries, particularly traffic injuries, remains unclear.

Following the Canadian *Cannabis Act*'s implementation on October 17, 2018 [14], it is essential to understand how recreational cannabis legalization impacts traffic injuries, with a particular emphasis on Canadian emergency departments. Accordingly, this systematic review aims to assess the impact of recreational cannabis legalization on traffic-related emergency department visits and hospitalizations in the broader context of North America. By comparing trends before and after legalization, we seek to clarify whether such policy changes are associated with variations in traffic-injury rates. Such insights are particularly pertinent for Canadian emergency departments to anticipate changes in healthcare demands and to support strategic healthcare planning and policy development.

Methods

Protocols and registration

The protocol was developed according to A Measurement Tool to Assess Systematic Reviews (AMSTAR-2) [15] standards and reported in adherence to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement and guidelines (Appendix 1) [16, 17]. The protocol was registered prospectively with the International Prospective Register of Systematic Reviews (PROSPERO) on July 5, 2022 (PROSPERO CRD42022342126).

Eligibility criteria

Observational studies with a control or comparison group, including cohort and casecontrol designs, were eligible. Case series, case reports, reviews, editorials, commentaries, notes, letters, and opinions were excluded. Only articles published in peer-reviewed journals were included.

Search strategy

The search strategy was defined following the PICO framework [18]. The population of interest was patients presenting to the hospital with traffic injuries. This group was then limited to adults 16 years of age or older. The exposure of interest was recreational cannabis legalization. Measures of the outcomes before and after recreational cannabis legalization or measures of the outcomes in jurisdictions with cannabis legalization compared to those without cannabis legalization were included. Studies containing prehospital or hospital data or population-level data were included, regardless of the country of origin. Outcomes of interest included the number and proportion of traffic injuries.

The search strategies were developed by an information specialist and peer-reviewed by another information specialist using the PRESS guideline. Drafting of the search strategy for the concept of cannabis was informed by Bombay et al.'s review (2021) and Kuharic et al.'s Cochrane review (2021) [19, 20]. In addition, the search strategy for the concept of traffic accidents was informed by Desapriya et al.'s Cochrane review (2014) [21]. The search was conducted in MEDLINE(R) ALL (OvidSP), Embase (OvidSP), CINAHL (EBSCOHost), and Scopus. Each database was initially searched from inception until October 12, 2023. A manual search of reference lists of the included articles was conducted to identify additional potentially relevant articles. No search filters, language limits, or publication restrictions were applied to any database. The search strategies of the databases can be found in the supplemental file.

Study selection

All identified studies were uploaded to a web-based systematic review software, Covidence (version 2.0, Veritas Health Innovation, Melbourne, Australia), and duplicates were removed. A pilot screening and assessment tool was developed and tested on randomly selected articles. The tool was refined until an acceptable inter-reviewer agreement was established. Pairs of independent reviewers first assessed the titles and abstracts eligible for systematic review, followed by the full-text review of articles deemed eligible or uncertain. Two reviewers were involved in assessing and screening for every level of inclusion, and conflicts were resolved by a third author.

Data extraction

A data extraction grid was developed by the research team and tested before being incorporated into Covidence for the extraction of relevant information by independent reviewers. Study variables were extracted to Microsoft Excel 365 (Version 16.75.2, Microsoft Corporation Inc, Redmond, Washington). The following data were extracted: study author, study dates and publication dates, population characteristics, exposures and comparators, and outcomes of interest. If effect sizes could not be determined based on the data provided, attempts were made to contact the authors for clarification and additional data.

Risk of bias

The risk of bias in each study was assessed independently by two reviewers. All conflicts were resolved by consensus and by involving a third reviewer if necessary. The Cochrane Risk of Bias in Non-randomized Studies—of Interventions (ROBINS-I) tool was used to assess the risk of bias in the results of non-randomized studies [22].

Data synthesis

A narrative synthesis of the findings was performed. Although a meta-analysis was initially planned, it was deemed unfeasible due to the substantial heterogeneity observed among the included studies.

Results

Study selection

The database search identified 4,562 citations. A total of 1894 duplicate records were removed using Covidence (Veritas Health Information, Melbourne, Australia), which left 2668 citations for the initial screening phase (Fig. 1). As a result, seven studies met all inclusion criteria [23–29].

Study characteristics and measured outcomes

The seven included studies were conducted in Canada ($n = 5$) and the United States ($n = 2$) and published between 2019 and 2023 (Table 1). The primary settings for these studies were emergency departments and

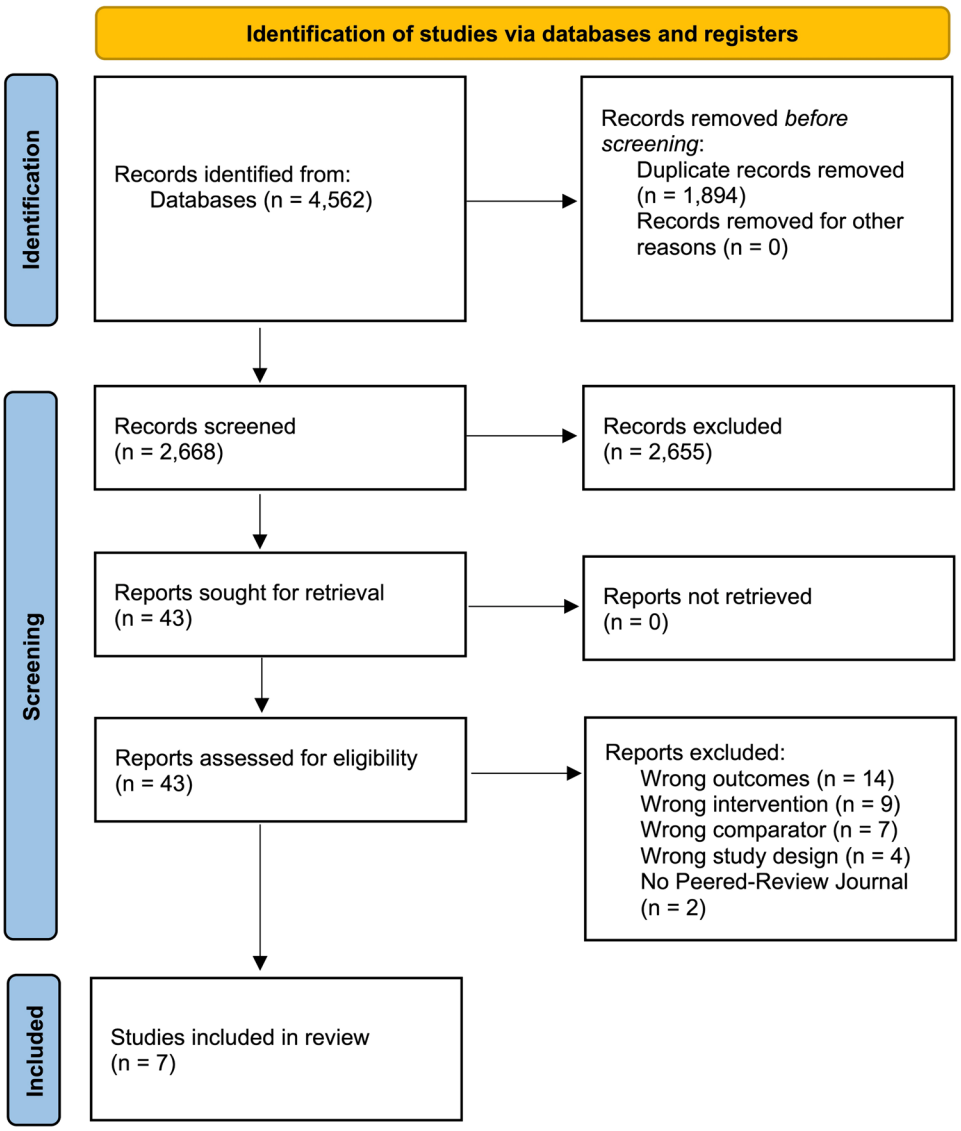

Fig. 1 PRISMA study flow diagram

Table 1 Characteristics of studies included in systematic review

Study	Location	Period	Sample size	Study design	Cannabis legalization	Outcome measures
Ball et al. [23]	Adult trauma centre in London, Ontario, Canada	July to September 2018; November 2018 to January 2019	351	Retrospective cohort	Before vs After cannabis legalization in Canada	Positive urine tetrahydrocannabinol screening in trauma patients
Borst et al. [24]	Five adult trauma centres in San Diego County, California, USA	January 2010 to June 2018	11,491	Interrupted Time Series Analysis	Before vs After cannabis legalization in California	Positive blood and urine tetrahydrocannabinol screening in trauma patients
Brubacher et al. [25]	Four trauma centres in British Columbia, Canada	January 2013 to March 2020	4,409	Prospective Cohort	Before vs After cannabis legalization in Canada	Positive blood tetrahydrocannabinol screening in trauma patients
Callaghan et al. [26]	Emergency departments in Ontario and Alberta, Canada	April 2015 to December 2019	239,673	Interrupted Time Series Analysis	Before vs After cannabis legalization in Canada	Emergency department visits and hospitalizations for traffic-related injuries
Grigorian et al. [27]	Trauma centre in Orange County, California, USA	January 2013 to December 2017	21,173	Retrospective cohort	Before vs After cannabis legalization in California	Positive urine tetrahydrocannabinol screening in trauma patients
Myran et al. [28]	Emergency departments in Ontario, Canada	January 2010 to December 2021	418	Repeated cross-sectional	Before vs After cannabis legalization in Canada	Documented* cannabis-involved traffic-injury emergency department visits
Walker et al. [29]	Emergency departments in Ontario and Alberta, Canada; and hospitalizations in Ontario, Alberta, British Columbia, Manitoba, Saskatchewan, Nova Scotia, New Brunswick, Newfoundland and Prince Edward Island	January 2010 to March 2021	1,725,074	Interrupted Time Series Analysis	Before vs After cannabis legalization in Canada	Emergency department visits and hospitalizations for traffic injuries

*Documented diagnosis of cannabis using an International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) code for a mental and behavioural disorder due to cannabis use (F12.X) or for cannabis poisoning (T40.7) listed as the main or contributing reason for the traffic-injury ED visit[1]

trauma centres. The included studies employed a range of designs, including retrospective cohort, interrupted time series analysis, prospective cohort, and repeated cross-sectional. The outcome measures of the included studies varied, focusing on different aspects of cannabis consumption and its impacts. Some studies measured tetrahydrocannabinol directly through biologic tests, some using blood toxicology tests [25] to determine tetrahydrocannabinol levels, and others employing urine toxicology tests [23] or both blood and urine tests [24] for detection. Beyond measuring biologic levels of tetrahydrocannabinol, some studies indirectly examined cannabis involvement by analyzing records of emergency department visits [28], assessing the rate of traffic injuries after cannabis legalization [26, 29], or reviewing coroner data for traffic accidents leading to fatalities [24].

Risk of bias

Overall, the risk of bias was moderate among the included studies (Table 2). The primary sources of bias in the included studies were largely due to their design and data reporting. Many were retrospective observational cohort studies, which are inherently prone to selection and information bias.

Outcomes

Varied outcomes concerning the influence of recreational cannabis legalization on traffic-related injuries were found across the seven included studies, as detailed in Table 3. Four of the included studies reported increased traffic-related injuries post-legalization [24, 25, 27, 28], while the remaining three studies did not show a significant difference [23, 26, 29].

Discussion

Interpretation of findings

This systematic review reveals a complex landscape of findings regarding the impact of recreational cannabis legalization on traffic-related injuries. Our findings emphasize the importance of understanding the implications of recreational cannabis legalization on traffic-related injuries, particularly in the Canadian context. The majority of studies included were conducted in Canada [23, 25, 26, 28, 29], providing essential insight into the multi-faceted impact of such policy changes on road safety across different Canadian provinces. While findings from these studies demonstrate mixed results, with some indicating a notable increase in traffic-related injuries post-legalization and others observing no significant changes, the implications for Canadian healthcare and policy formulation are substantial. This variability demonstrates the complexity of cannabis legalization's effects on road safety, necessitating a refined approach to healthcare planning and legislative action within Canada. Specifically, these outcomes emphasize the need for policymakers to incorporate local evidence into the development of cannabis-related legislation and road-safety measures.

Comparison to previous studies

Our findings align with previous studies [30–32]. These results indicate a complex relationship between cannabis legalization and road safety, suggesting that an increase in cannabis usage does not necessarily correlate with a proportional rise in traffic accidents. These differences are likely attributable to methodological variances, which also affect the generalizability and applicability of findings. For instance, those examining overall traffic-injury visits [26, 29] and those focusing on the prevalence of cannabis detection in traffic-related trauma patients [23–25, 27, 28].

Table 2 Risk of bias assessment of included studies

Study	ROBINS-I assessment domains					
	Confounding	Selection of patients into the study	Classification of interventions	Deviations form intended interventions	Missing data	Overall risk of bias
Ball et al. [23]	Moderate risk	Low risk	Low risk	Low risk	Moderate risk	Moderate risk
Borst et al. [24]	Moderate risk	Low risk	Low risk	Low risk	Moderate risk	Moderate risk
Brubacher et al. [25]	Low risk	Low risk	Low risk	Low risk	Low risk	Low risk
Callaghan et al. [26]	Moderate risk	Low risk	Low risk	Low risk	Moderate risk	Moderate risk
Grigorian et al. [27]	Moderate risk	Low risk	Low risk	Low risk	Moderate risk	Moderate risk
Myran et al. [28]	Moderate risk	Low risk	Low risk	Low risk	Moderate risk	Moderate risk
Walker et al. [29]	Moderate risk	Low risk	Low risk	Low risk	Moderate risk	Moderate risk

Table 3 Summary of outcomes in included studies

Study	Magnitude of effect (absolute)	Magnitude of effect (Relative)
Ball et al. [23]	MVC-related trauma before legalization: 101; After legalization: 67. MVC trauma with positive cannabis screen before legalization: 14/51; After legalization: 11/54	No significant difference (p = 0.4)
Borst et al. [24]	THC + increased from 7.3% to 14.8% over the study period and peaked at 14.9% post-legalization in 2017. Time-series linear regression demonstrates an increase per month of 0.125% (B = 0.125) or 1.5% increase each year, $p > 0.001$	Significant increase in THC + over time, but not accelerated by cannabis legalization
Brubacher et al. [25]	Increase in the prevalence of moderately injured drivers with a THC level greater than 0 (adjusted prevalence ratio, 1.33; 95% confidence interval [CI], 1.05–1.68) and with a THC level of at least 2 ng per milliliter (adjusted prevalence ratio, 2.29; 95% CI, 1.52–3.45). Among moderately injured drivers with a THC level of at least 5 ng per milliliter, the adjusted prevalence ratio was 2.05 (95% CI, 1.00–4.18)	Significant increase post cannabis legalization
Callaghan et al. [26]	Alberta ($n = 52{,}752$ traffic-injury presentations), an increase of 9.17 visits (95% CI −18.85; 37.20; $p = 0.52$); Ontario ($n = 186{,}921$ presentations), an increase of 28.93 visits (95% CI −26.32; 84.19; $p = 0.30$)	No significant change post cannabis legalization
Grigorian et al. [27]	In the pre-legalization period, 86.8% of trauma patients had a urine toxicology and in the post-legalization period, 77.3% did ($p < 0.001$). A total of 2055 (9.7%) patients screened positive for THC on urine toxicology. Of these, 1564 presented in the pre-legalization period while 491 presented in the post-legalization period. The incidence of marijuana-positive patients in the pre-legalization cohort was 9.4% and 11.0% in the post-legalization cohort (p ¼ 0.001). The most common overall mechanism of injury in both groups was motor vehicle accident (MVA) (pre: 31.5%, post: 31.6%, p ¼ NS [not significant])	Significant increase in marijuana-positive trauma patients and mortality post-legalization. No significant difference in traffic-related trauma
Myran et al. [28]	Rate of total traffic-injury ED visits that involved cannabis increased by 475.3%: 0.18 per 1000 MVCs in 2010 to 1.01 in 2021; rate of cannabis-involved traffic-injury ED visits per capita increased by 326.6% (from 0.13 in 2010 to 0.54 per 100 000 individuals in 2021	475.3% increase in cannabis-involved visits post cannabis legalization
Walker et al. [29]	No statistically significant changes in the rate of ED visits for motor vehicle or pedestrian/cyclist injury after RCL. No statistically significant immediate or gradual changes in the rate of hospitalizations for motor vehicle or pedestrian/cyclist injury after RCL in Ontario, Alberta, British Columbia, the Prairies, and the Maritimes	No significant relative changes post-RCL

Studies assessing the total number of traffic injuries did not find significant changes following legalization [26, 29]. This could be due to a range of factors that mask the direct impact of cannabis on road safety. In contrast, research focusing on cannabis detection in trauma patients reports an increase in tetrahydrocannabinol-positive cases post-legalization [23–25, 27, 28]. This increase does not necessarily translate to a rise in overall traffic injuries, highlighting the complexity of linking cannabis legalization directly to road-safety outcomes.

In addition, external factors may have influenced cannabis user behavior and road-safety outcomes, potentially confounding the effects of cannabis legalization on traffic injuries. Notably, the COVID-19 pandemic altered cannabis consumption [33] and traffic patterns [34, 35], which could have impacted the outcomes of certain studies conducted during the pandemic [28, 29]. Furthermore, the role of polysubstance use is crucial in assessing the impact of cannabis on road safety. The concurrent use of cannabis with other substances, such as alcohol, exacerbates the risks associated with driving under the influence, due to amplified impairment effects, altered risk perception among users, and challenges in detecting and attributing impairment in traffic incidents to cannabis alone [36, 37]. This complexity highlights

the need for comprehensive research that accounts for the nuances of poly-substance use in the context of cannabis legalization. The difficulty in establishing a direct connection between tetrahydrocannabinol presence and impairment [38, 39], alongside the absence of a legal benchmark for cannabis-related impairment [40], further complicates efforts to attribute traffic accidents directly to cannabis use. Such considerations emphasize the importance of adopting multi-faceted approaches in research, policy formulation, and public health interventions that address the broader spectrum of substance use behaviors.

Strengths and limitations

The comprehensive nature of our systematic review, with its unique focus on patient-related outcomes such as emergency department visits and hospitalizations from traffic injuries, represents a strength. This approach distinguishes our study from previous research that primarily relied on large traffic and police databases [10–12], focusing instead on traffic fatalities. However, our study is not without its limitations, including the retrospective design of most included studies, heterogeneity in methodologies, a moderate risk of bias, inconsistent reporting among the included studies, and notably, the lack of a clear and consistent signal regarding the impact of legalization on traffic-related health outcomes. This absence of clarity adds another layer of complexity to our findings, potentially limiting their generalizability. In addition, certain methodological flaws among the included studies warrant attention. One study compared data from three months before to three months after legalization, neglecting seasonal variations in driving behavior and the potential rise in cannabis usage following the announcement of legalization but before it took effect [23]. This oversight could misleadingly attribute changes in traffic-related injuries directly to the legalization without considering these variables. Another study's reliance on the International Classification of Diseases 10th Revision (ICD-10) coding of cannabis-related problems in traffic-injury cases, which was notably low at 0.04% of patients, likely underrepresents the true prevalence of cannabis involvement [28]. The significant increase in reported cases in this study may reflect changes in documentation or increased recognition rather than a genuine rise in cannabis-related traffic injuries. Given these limitations, it is imperative to interpret our findings with caution, especially in the context of the evolving legal and societal landscape surrounding legalization and its potential impacts on public health.

Clinical implications

In response to the varied impact of recreational cannabis legalization on traffic injuries, it is necessary for the Canadian health system, particularly emergency departments, to adopt focused strategies to improve patient care amid the challenges introduced by cannabis policy changes. This is particularly vital at a time when emergency departments across Canada are contending with significant staff shortages and closures [41, 42]. Strategies should include implementing standardized screening protocols for cannabis impairment, enhancing training for staff on its management, integrating mental-health services for more comprehensive care, and engaging in public education campaigns aimed at preventing cannabis-impaired driving. For example, a possible solution is to modify existing trauma center accreditation standards to include cannabis screening and interventions, in addition to measuring blood alcohol and performing a brief risk-reduction intervention [43]. Integrating cannabis screening could serve as an effective adjunct in trauma care and injury prevention. Collaborating with law enforcement for improved road safety and advocating for evidence-based policies could also enable emergency departments to effectively navigate the complexities of cannabis-related traffic injuries [44]. This approach not only addresses immediate clinical needs but also aligns with broader public health objectives, potentially influencing policy and contributing to the prevention of cannabis-related injuries.

Policy implications

Our study indicates a need for improved evaluation methods in public health policies, specifically concerning cannabis legalization. Medical interventions often undergo thorough post-implementation reviews, a practice that should be extended to public policies. For example, evaluations of alcohol-related driving policies have shown that stronger enforcement and mandatory alcohol testing reduce alcohol-related traffic incidents [45, 46]. These evaluations provide data that help refine policies to increase their effectiveness and minimize adverse effects.

Research implications

Future research should standardize traffic-injury definitions and cannabis-impairment measurement methods. Comprehensive studies considering poly-substance use, socio-economic differences, cannabis potency, and the challenges in measuring impairment are keys to accurately asses legalization's impact on road safety.

Conclusion

This systematic review highlights the complexity of assessing the impact of recreational cannabis legalization on traffic injuries. Our findings show a varied impact on emergency

department visits and hospitalizations across North America. This underlines the importance of Canadian emergency physicians staying informed about regional cannabis policies. Training on identifying and treating cannabis-related impairments should be incorporated into standard protocols to enhance response effectiveness and patient safety in light of evolving cannabis legislation.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s43678-024-00736-x.

Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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