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Journal of Pain Research [Open Access](#)  
Volume 13, 2020, Pages 3281-3294

## Causes , nature and toxicology of fentanyl-associated deaths : A systematic review of deaths reported in peer-reviewed literature

(Article) ([Open Access](#))

Cheema, E.<sup>a</sup> , McGuinness, K.<sup>a</sup>, Abdul Hadi, M.<sup>a</sup>, Paudyal, V.<sup>a</sup>, Elnaem, M.H.<sup>b</sup>, Alhifany, A.A.<sup>c</sup>, Elrggal, M.E.<sup>c</sup>, Hamid, A.A.<sup>a</sup>

<sup>a</sup>School of Pharmacy, University of Birmingham, Birmingham, United Kingdom

<sup>b</sup>Department of Pharmacy Practice, Faculty of Pharmacy, International Islamic University, Kuantan, Malaysia

<sup>c</sup>Department of Clinical Pharmacy, College of Pharmacy, Umm Al-Qura University, Makkah, Saudi Arabia

### Abstract

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**Purpose:** Fentanyl poisoning has been widely reported , yet there is a lack of systematic evaluation of the nature and toxicology of associated deaths in the published literature . This article aims to systematically review the nature , causes , routes of administration and toxicology of fentanyl-associated deaths using case studies and case series in peer-reviewed published literature . **Methods:** Four electronic databases including Embase, Medline (via Ovid), Scopus and Google Scholar were searched from inception until October 2019 to identify the studies reporting fentanyl related deaths . Two independent reviewers screened and selected the titles and then evaluated the full texts. Only case studies and case series were included. A structured data extraction tool was used to extract data on the number of deaths , routes of administration, concomitant drug use and toxicological data. The Joanna Briggs Institute quality assessment tool was used to evaluate the quality of included studies. Data were synthesized narratively. **Results:** Of 1251 articles identified during initial search, 8 case reports and 9 case series met the inclusion criteria. A total of 1969 deaths were reported in the included studies. Deaths were concentrated in the north American region (n = 1946) and the Nordic region (n = 22). Reported causes of death included fentanyl overdose (n = 321, 56.4%), mixed drug toxicity (n = 196, 34.5%), natural (n = 28, 4.9%), other drug toxicity (n = 10, 1.8%), fentanyl and ethanol intoxication (n = 8, 1.4%), incidental (n = 5, <1%) and aspiration (n = 1). Most common routes of use were intravenous (70.5%) and transdermal routes (23.0%). Deaths came swiftly via the intravenous route. Mean level of blood fentanyl amongst all reported deaths was 0.024 µg/mL. **Conclusion:** Literature related to fentanyl-associated deaths predominantly come from North America. Deaths are comparatively lower or not reported in peer-reviewed publications from the rest of the world. Abuse through intravenous administration, mixed drug toxicities and self-treatment of breakthrough pain are mainly responsible for majority of the reported deaths . © 2020 Cheema et al.

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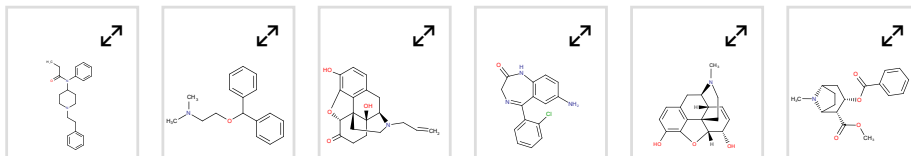
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🔍 Cheema, E.; School of Pharmacy, University of Birmingham, Room 356, Robert Aitken Building, Edgbaston, Birmingham, United Kingdom; email:[e.cheema@bham.ac.uk](mailto:e.cheema@bham.ac.uk)  
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