

## Abstract

*Introduction:* Acute pain management is a critical component of prehospital and emergency medical care. Opioids are effective; however, the risks and side-effects of opioids have led providers to use low-dose ketamine (LDK) for safe and effective treatment of acute pain.

*Methods:* We conducted a scoping narrative review to explore the efficacy of LDK for the treatment of acute pain in the prehospital setting and emergency department (ED) setting. The prehospital review includes studies evaluating the use of LDK in both civilian and military settings. We utilized PubMed to identify prospective and retrospective clinical studies related to this topic. We limited study inclusion to quality prospective and retrospective clinical and observational studies published in the English language prior to January 30, 2024. We did not limit study inclusion based on patient population or mode of administration. We utilized the PRISMA-ScR checklist to conduct this review.

*Results:* Using our methodology, we found 249 publications responsive to our search strategy. Of these, 178 publications were clearly outside inclusion criteria based on abstract review. Seventy-one studies were sought for retrieval and more detailed review. Of these, 22 records were excluded after review and 43 met initial inclusion criteria. An additional 22 studies were found via snowballing. In total, 64 studies met inclusion criteria for this analysis. 21 studies related to the treatment of acute pain in the prehospital setting, four of which were randomized clinical trials (RCTs). Forty-three studies evaluate the treatment of acute pain in the ED. This included 28 RCTs. Taken together, the studies suggest that LDK is non-inferior to opioids when used alone. When used as an adjunct to opioid therapy, LDK can provide an opioid-sparing effect. Ketamine doses  $<0.5$  mg/kg were not associated with significant side effects.

*Conclusions:* LDK is a safe and effective option for acute pain treatment. It can be used as an alternative therapy to opioids or used in conjunction with them to reduce opioid exposure through its opioid-sparing effect. Importantly, LDK is available in a variety of formulations including intramuscular, intravenous, and intranasal, making it an effective acute pain treatment option in both the prehospital and ED settings. LDK holds promise as an emergency treatment in the evolving landscape of acute pain management.