



An Evidence Synthesis of Pharmaceutical Interventions used in Chronic Pain Management

Professor Ashish Shetty, Dr Gayathri Delanerolle, Dr Anish Thillainathan, Dr Seung Paul Kim, Dr Heitor Cavalini, Dr Yutian Zheng, Dr Chunli Deng, Dr Arun Bhaskar, Dr Yutian Zheng, Professor Sohier Elneil, Professor Jian Shi
Imperial College London NHS Foundation Trust, UK, University of Oxford, UK, Southern Health NHS Foundation Trust, UK, Southern University of Science and Technology, China



University College
London Hospitals



Southern University of Science and Technology

INTRODUCTION

Chronic non-cancer pain conditions are highly prevalent, impacting 20% of the global population. Complexities around diagnosis and treatment of chronic pain conditions have meant that there is a paucity of standardised clinical guidelines that could potentially improve the clinical practice landscape, globally (1,2).The prevalence of pain conditions among females of all ages appears to increase more rapidly in comparison to other genders. Increase in chronic pain conditions contribute to higher healthcare costs and economic burden.

Increase in addiction and opioid use is another challenge among non-cancer chronic pain patients. Current clinical guidelines recommend non-invasive pain management options as a first-line treatment among non-cancer patients in particular, although overdose, dependency and mortality due to opioid use has consistently increased over time. It was reported that global opioid use has doubled between 2001 and 2003 to 2011 and 2013 to 7.35 billion daily doses per year. As such, there is an increasing need to better understand comparative effectiveness of interventions and to develop optimal evidence-based-practices to support future populations of patients.

We designed the Prevalence of Pain (POP) project as an initial step to explore non-cancer chronic pain management globally. In this abstract, we report 2 important findings on pharmaceutical pain management.

Objective

The aim was to report the prevalence and efficacy of pharmaceutical management among non-cancer chronic pain patients.

Study design

We designed a multi-workstream pain management project with a view to develop a data-connectivity study. This abstract reflects the first of a five-part evidence synthesis.

METHODS

We published the developed systematic methodology in PROSPERO (CRD42021235384). All peer reviewed and published randomised clinical trials, mixed methods and epidemiology studies from the 1st of January 1990 -30th April 2022 were used. We devised a meta-analysis and a network meta-analysis to compare the effectiveness of a range of pharmaceutical drugs. To assess the summary of effect sizes, a meta-analysis of mean differences between drugs and placebos were applied and reported using mean differences with a 95% confidence interval. The full analyses was conducted by R.

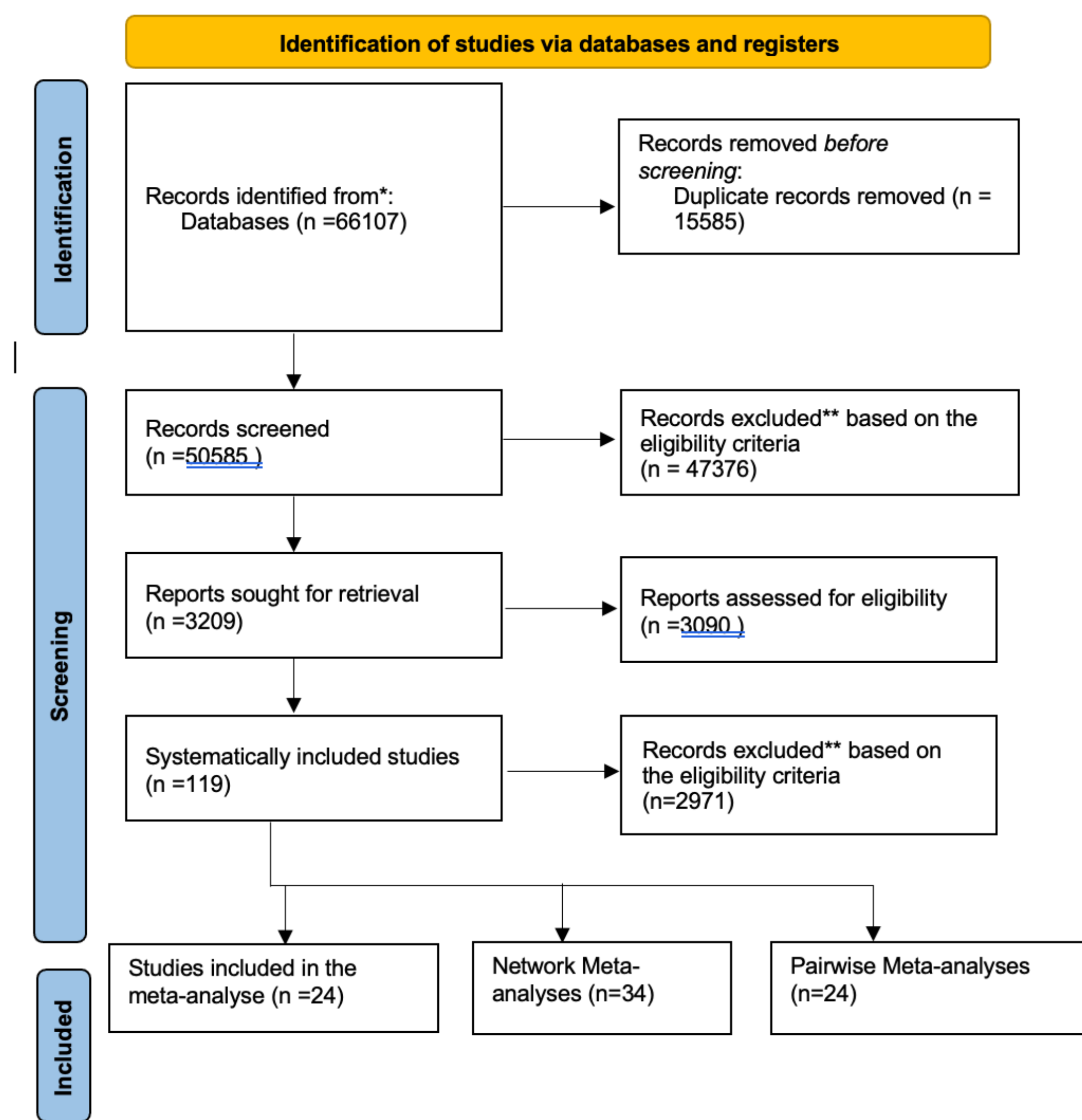


Figure 1. PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only

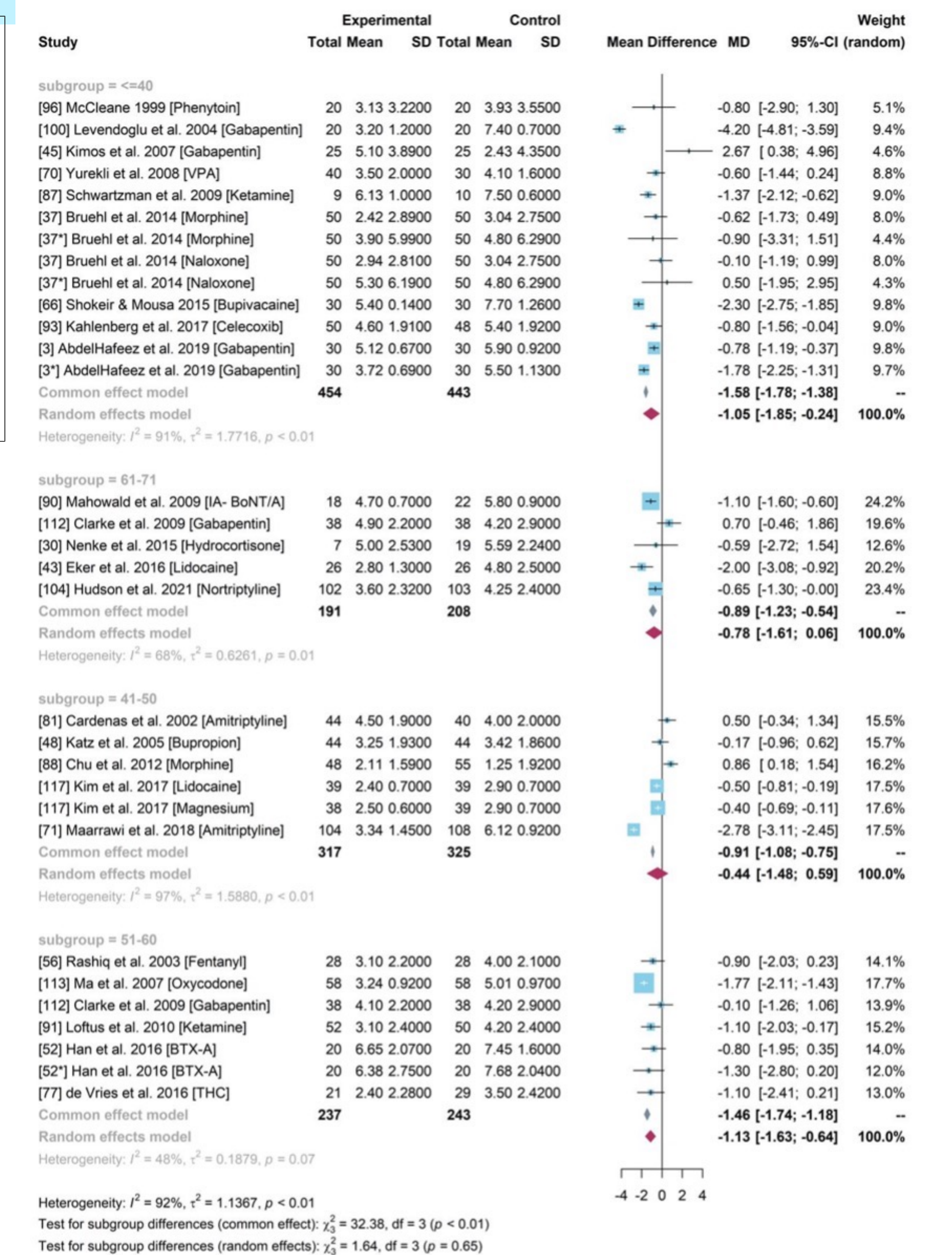


Figure 2. Forest plot for the mean difference of pain scores between experimental group and control group across different mean age of participants.

RESULTS

A total of 119 studies were systematically included from 66,107. Of the 119, 22 were used in the meta-analysis and 46 for the network meta-analysis. The meta-analysis had 2546 patients leading to a pooled mean difference of -0.77 with a 95% CI -1.22, -0.32. A significant difference between chronic pain scores of patients using NSAID drugs in comparison to those taking placebo. A 0.77 point of pain reduction was demonstrated under a random effects model. Significant drug efficacy was shown by BTX-A, Ketamine, Ningmitai and THC. Based on the negative pooled mean differences, a pain reduction of 0.98, 1.26, 0.95 and 1.02, respectively was identified. The network analyses was developed into two sub-networks to assess common comparisons between Opioids and Placebo (network-2) and Opioids and non-Opioid drugs (network-1). Network-1 comparison between indicated a significant treatment effect with a mean difference of -0.79 and a 95% CI of -4.51 and -0.09. Network-2 also used the placebo as the reference mean group included Bupivacaine and Gabapentin that indicated significant results of mean difference equalling to -2.3 (95% CI = [-4.51, -0.09]) and -1.53 (95% CI = [-2.72, -0.34]) respectively. The intervention combining Bupivacaine and Dexmedetomidine also presented a mean difference of -3.3 with a 95% CI -6.41, -0.19 indicating a significant reducing in chronic pain. However, other drugs had a statistically insignificant result with a 95% CI covering 0.

CONCLUSION

NSAIDs need to be better characterized for the use of primary and secondary non-cancer chronic pain condition. Denominators for primary and secondary chronic pain conditions would be beneficial to support optimal use of polypharmacuetical approaches, especially in older adults. Optimal study designs with the help of comprehensive case definitions and sample sizes would equally benefit patient and future proofing optimal clinical practice.

REFERENCES

- Dahlhamer J, Lucas J, Zelaya, C, et al. Prevalence of Chronic Pain and High-Impact Chronic Pain Among Adults — United States, 2016. MMWR Morb Mortal Wkly Rep 2018; 67:1001–1006. <http://dx.doi.org/10.15585/mmwr.mm6736a2>
- Zimmer Z, Fraser K, Grol-Prokopczyk H, Zajacova A. A global study of pain prevalence across 52 countries: examining the role of country-level contextual factors: Examining the role of country-level contextual factors. Pain 2022; 163: 1740–50.