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BACKGROUND

Background: Chronic diseases often require long-term treatment, which causes compliance and persistence issues and leads to suboptimal outcomes. Therefore, innovative approaches are required. Digital Health Interventions (DHIs) have revolutionised the landscape of healthcare, offering innovative solutions for managing chronic diseases.[1] These technologies have shown promise in enhancing preventive measures and improving clinical outcomes.[2] However, despite mounting evidence supporting their efficacy[3], a comprehensive understanding of their cost-effectiveness – which is crucial for health policy-making – remains unclear.

Aim: We aimed to understand the cost-effectiveness of DHIs the management of chronic diseases.

METHODS

A meta-review was conducted in PubMed to identify the systematic literature reviews (SLRs) focusing on the cost-effectiveness of DHIs in chronic diseases, with the following PICOS criteria:

- ✓ **Population:** Cardiovascular disease, hypertension, obesity, overweight, diabetes
- ✓ **Intervention:** Digital interventions
- ✓ **Comparator:** Usual care, pharmacotherapy, placebo
- ✓ **Outcomes:** Cost-effectiveness outcomes (ICER, cost analysis, cost of care, total costs)
- ✓ **Study design:** Systematic review, meta-analysis

Searches were conducted in December 2023. No restriction on years was applied. Only full-text papers published in English were included.

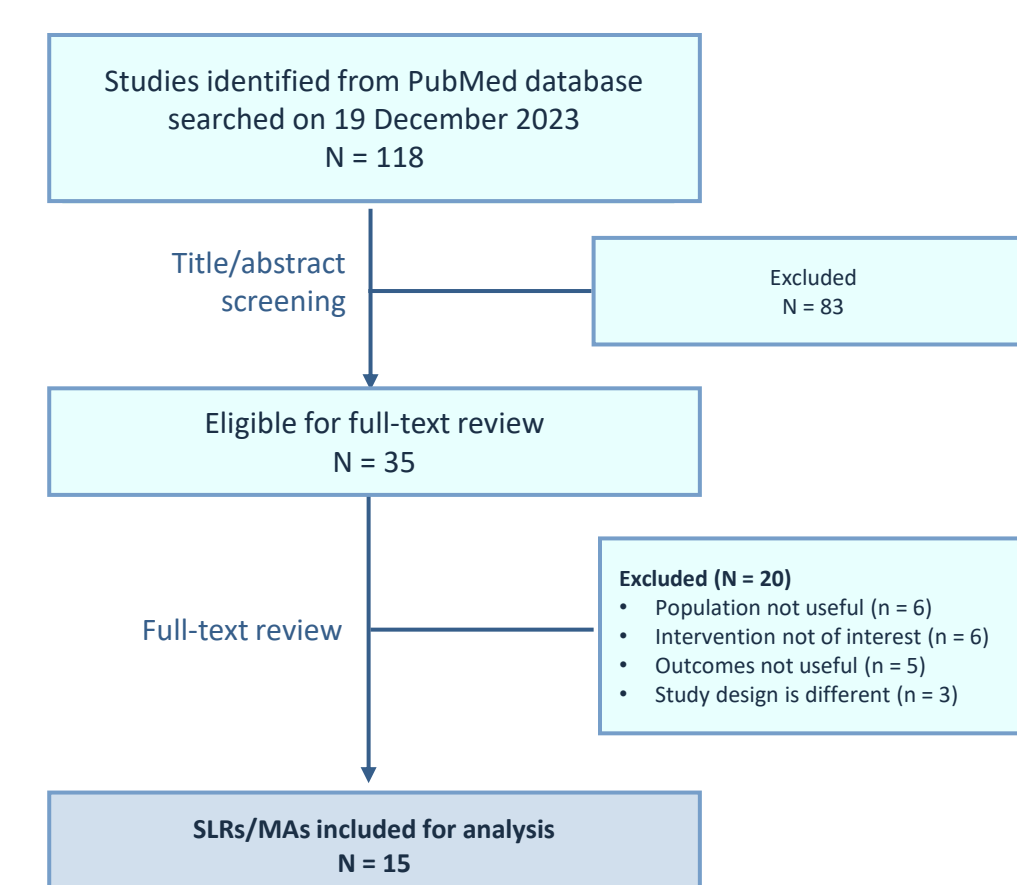


Figure 1. Study inclusion flow chart

Digital Health interventions (DHIs), including telemonitoring, telemedicine, and teleconsultation, alongside standard care, have shown to be cost-effective or cost-saving in managing chronic diseases such as CVD, diabetes, and obesity. The long-term use of DHIs should be encouraged so that the burden on healthcare systems could be significantly alleviated.

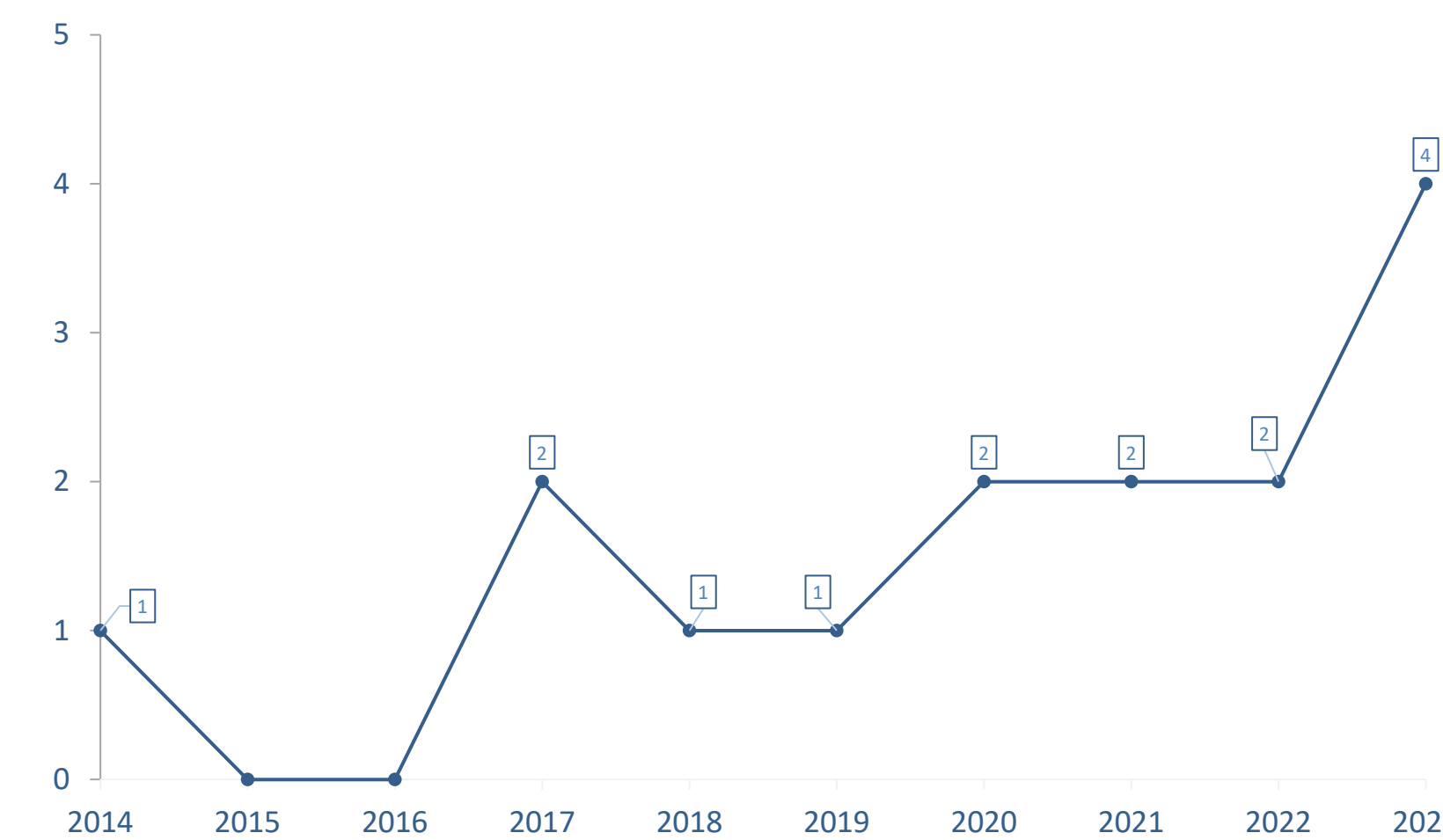


Figure 2. SLRs on DHIs by publication year

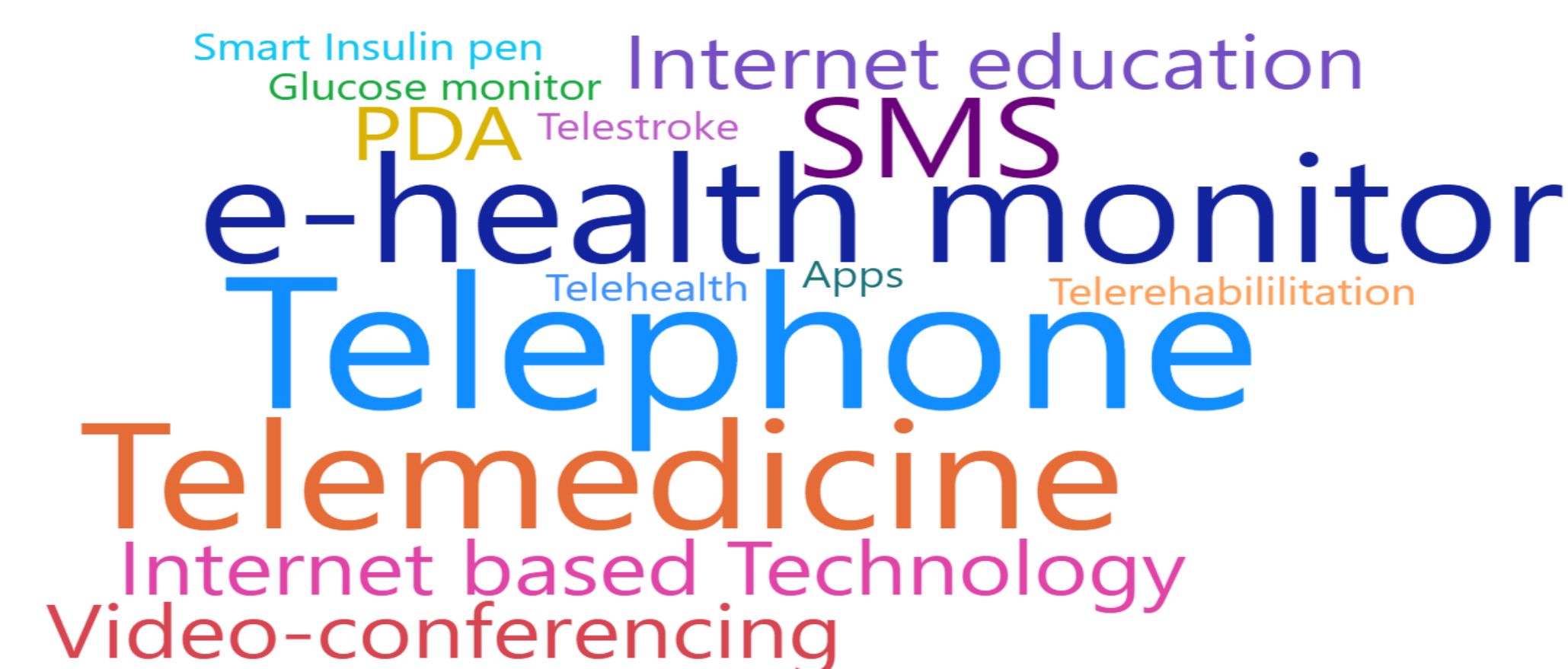


Figure 4. DHIs used in included studies across SLRs

Abbreviations: CVD = cardiovascular disease; DHIs = digital health interventions; PDA = personal digital assistant; SLRs = systematic literature reviews.

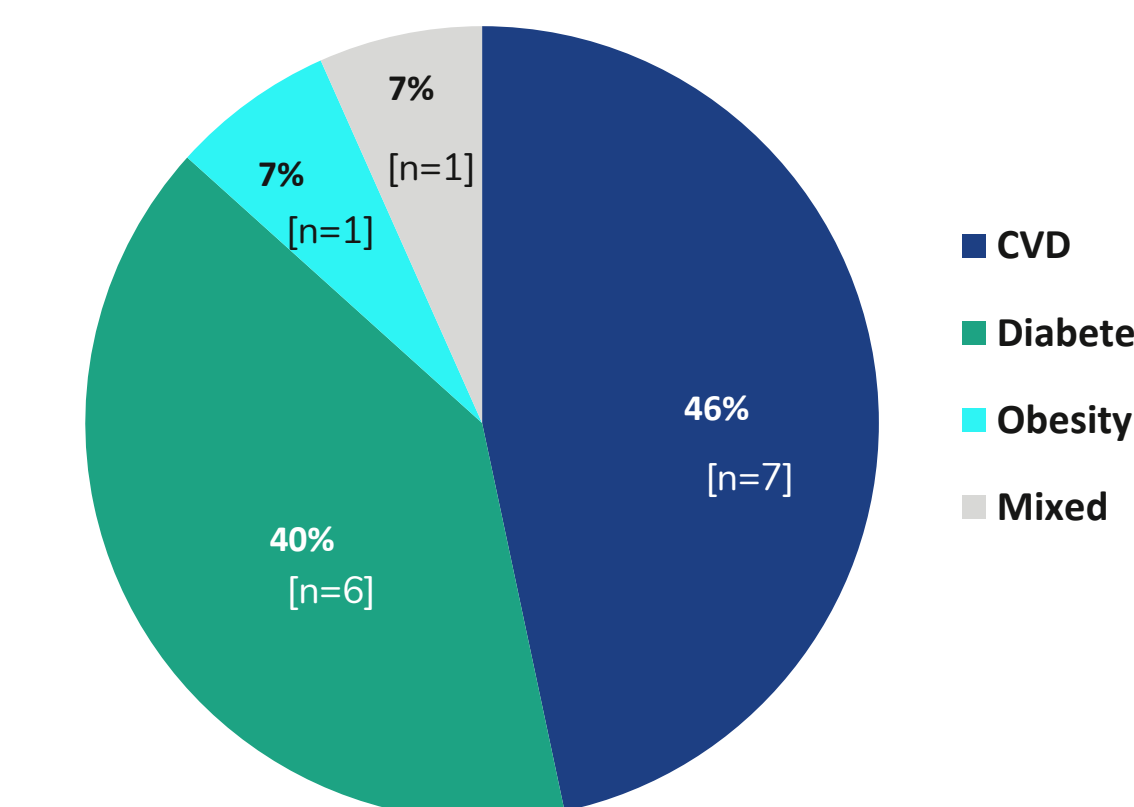


Figure 3. Populations in the SLRs

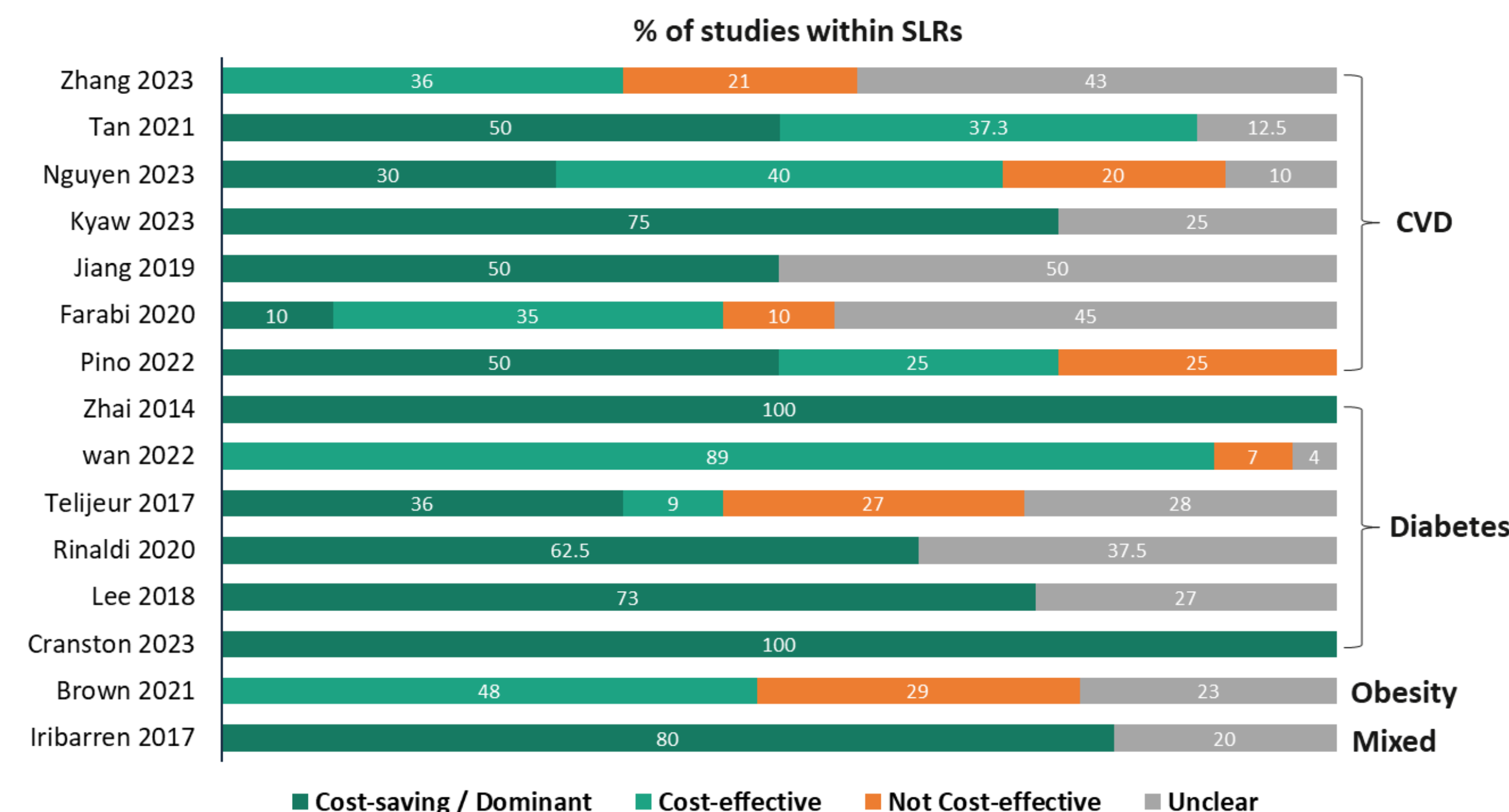


Figure 5. Cost-effectiveness of DHIs reported in studies in SLRs

RESULTS

- Of the 118 articles retrieved from searches, 15 SLRs were eligible and included for analysis. (Figure 1)
- Ten of 15 SLRs (67%) were published in the year 2020 and onwards. (Figure 2)
- Chronic diseases included in these SLRs were CVD (46%), diabetes (40%), obesity (7%), and combination of the three (7%). (Figure 3)
- Among the 7 SLRs reporting on population type, 3 focused on primary prevention, 2 on secondary prevention, and 2 on a mix of both.
- The number of studies included in SLRs varied (5–20 CVDs; 2–37 diabetes; 2–20 obesity). Eight SLRs had 20 or more studies.
- Of the several DHIs across SLRs, the most common ones were telephone, e-health monitor, and telemedicine. (Figure 4)
- In most SLRs, the DHIs were reported to be either cost-saving or cost-effective across population with CVD, diabetes, and obesity. (Figure 5)
- In six SLRs reporting clear information about modelling approaches used in studies, Markov models (10%-64%) or decision-trees (15%-37%) were common.

DISCUSSION

The evidence from this meta-review shows that DHIs offer emerging opportunities to improve clinical outcomes in a cost-effective way for the long-term management of chronic diseases. Future application of machine learning and artificial intelligence to chronic disease care could see DHIs become increasingly automated and personalized.

References:

1. Murray E, et al. Am J Prev Med. 2016;51(5): 843-51.
2. Oldenburg B, et al. Annu Rev Public Health. 2015;36: 483-505.
3. Verweel L, et al. Int J Med Inform. 2023;177:105114.

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