Predicting Chronic Kidney Disease Progression from Stage III to Stage V using Language Models

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Background: Polypharmacy (commonly defined as the cocurrent use of >5 medications) and potentially inappropriate prescribing (medication with more harms than benefit) adversely affect patients' health outcomes.(1,2) These issues are common in people with life-limiting conditions, including advanced cancer,(3) and dementia (4,5,) and those receiving palliative care.(6,7) While deprescribing - a structured approach to reducing or discontinuing medications - is one approach to address this, its impact in this population is not well understood.

Objective: To synthesise evidence on outcomes of deprescribing medication in people with life-limiting conditions.

Methods: A systematic search of MEDLINE, Embase, Scopus, PyscINFO and CINAHL was conducted to identify original studies reporting clinical-, medication-, and system-related outcomes of deprescribing. Studies published in English between January 2000 and December 2024 were eligible for inclusion. A narrative synthesis was undertaken due to heterogeneity in study designs and outcomes. JBI (Joanna Briggs Institute) Critical Appraisal Tools were used to assess the quality of included studies.

Results: In total, 17,457 hits were identified. Following a full paper check, 46 were eligible for inclusion. The majority of the included studies were pre-post interventional (n=14) and cohort studies (n=14), conducted in nursing homes/long-term care facilities (n=19) and hospitals (n =14). Most studies were conducted in the North America (n=20), Europe (n=14) and Australia (n=7). A broad range of outcomes were reported in the literature, predominantly those focused on clinical-related outcomes. Particularly, medication reduction, and mortality and survival outcomes were mostly reported in literature. All studies assessing the impact on the number of medications used reported either a reduction in overall medication burden or inappropriate medications (n = 15), or no significant change (n=3). Mortality and survival outcomes were reported in 16 studies: 4 each showed improved survival and reduced survival, and the remainder found no significant change. For other outcomes, the studies showed that deprescribing did not generally worsen the outcomes in the majority cases.

Conclusion: This systematic review suggests that deprescribing has several beneficial outcomes, including reducing medication burden and healthcare cost. While there is no strong evidence for harm, a small proportion of patients may face risks, so a careful monitoring is essential. Further studies exploring the deprescribing specific to disease conditions and medication groups are warranted.

Outcomes of Deprescribing for people with Life-Limiting Conditions: A Systematic Review

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1. Introduction

Polypharmacy and potentially inappropriate prescribing are common problem in people with life-limiting conditions.[1,2]

Deprescribing - a systematic process of reducing or discontinuing inappropriate medications - is one of potential way to reduce polypharmacy and use of inappropriate medication.

Shrestha *et al.* reviewed deprescribing outcomes amongst older people with life-limiting conditions utilising 9 and 5 studies in 2020[3] and 2021[4], respectively. They concluded there was evidence of improved medication appropriateness, but limited evidence for other outcomes.

2. Objective

To examine the evidence for outcomes of deprescribing for people with life limiting conditions.

3. Methods

Population: Life-limiting conditions – people with advanced or end stage diseases/conditions

Intervention: Deprescribing of medications

Comparison/Control: Usual care or non-deprescribing or no comparator

Outcome: Any clinical-, medication- and system-related outcomes

Study design: Both interventional and observational studies

Timeline: Published between January 2000 to December 2024

Data Synthesis

I. When studies reported multiple measures or subgroup-specific outcomes for the same domain, each was treated as a distinct data point in the synthesis.

II. Outcome variables of deprescribing were organised into common groups under three broad categories: clinical-, medication- and system-related outcomes.

III. Effects on each outcome were categorised in positive, negative and no effect.

4. Results

Characteristics of Included Studies

- A total of 17,457 studies were screened, of which 46 met the eligibility criteria.
- Most eligible studies were pre-post interventional (n=14) or cohort studies (n=14).
- Majority were conducted primarily in nursing homes or long-term care facilities (n=16) and hospitals (n=14).
- The majority originated from North America (n=20), Europe (n=14) and Australia (n=7).
- A wide range of outcome variables were examined, with a primary focus on clinical outcomes.

Table 1. Outcome of Deprescribing

	Outcome of Deprescribing	Effects based on number of studies	Effects based on total data points	Effects based on data points with statistical analysis for significance
Clinical-related outcome	Cognitive and Neuropsychiatric Outcomes (9 studies, 26 data points)	●●●●●●●●●●●●●●●→→→	●●●●●●●●●●●●●●●●●●●●●●→→→→	●●●●●●●●●●●●●●●●●●●●●●→→→→
	Functional and Physical health outcome (14 studies, 33 data points)	←←←←←●●●●●●●●●●●●●●●●●●●●●→→	←←←←←←●●●●●●●●●●●●●●●●●●●●●●●●●→→	←←←●●●●●●●●●●●●●●●●●●●●●●→→
	Behavioural and Mood Outcomes (5 studies, 12 data points)	●●●●→→→	●●●●●●→→→→→→	●●●●●●→→→→→→
	Mortality and survival outcome (16 studies, 23 data points)	←←←←●●●●●●●●●●●●→→→→→	←←←←●●●●●●●●●●●●●●→→→→→	←←●●●●●●●●●●●●●→→
	Quality of life outcome (9 studies, 19 data points)	←●●●●●●●●●●●●→	←●●●●●●●●●●●●●●●●●→	←●●●●●●●●●●●●●●●●●→
	Clinical events and complication outcomes (13 studies, 37 data points)	←←←●●●●●●●●●●●●●●●→→→→	←←←●●●●●●●●●●●●●●●●●●●●●●●●●●●→→→→→→→	←←←●●●●●●●●●●●●●●●●●●●●●●●●●●●→→→→→
Medication-related outcome	Medication reduction (17 studies, 24 data points)	←←←←←←←←←←←←←←←←←●●●●	←←←←←←←←←←←←←←←←←●●●●●●●●	←←←←←←←←←●●●●●●●●
	Medication appropriateness (10 studies, 15 data points)	←←←←←←←←←←←←●●●	←←←←←←←←←←←←●●●	←←←←←←←←●●●
	Adverse drug events (6 studies, 9 data points)	←←←●●●●	←←←●●●●●●	←●●●●●●
	Drug-Drug Interaction (1 study 1 data point)	●	●●	●●
System-related outcome	Healthcare Expense (13 studies, 13 data points)	←←←←←←←←←←●●●	←←←←←←←←←←●●●	←←←←●●●
	Patient Satisfaction (4 studies, 4 data points)	←←←●	←←←●	●
	Healthcare utilisation (13 studies, 22 data points)	←←←●●●●●●●●●●●●●→→→	←←←←●●●●●●●●●●●●●●●→→→	←←←●●●●●●●●●●●●●→→→

5. Conclusion

- Deprescribing has been linked to several benefits, including reduced medication burden and lower healthcare costs.
- While there is no strong evidence for harm, a small proportion of patients may face risks, so a careful monitoring is essential.
- Further research should explore how outcome vary by disease conditions and medication types.

6. References

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