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OXFORD

Barriers and facilitators of implementing proactive deprescribing within primary care: a systematic review

Daniel A. Okeowo[1,2,*], Syed Tabish R. Zaidi[1,2], Beth Fylan[2,3,4] and David P. Alldred[1,2]

[1]School of Healthcare, University of Leeds, Leeds, Yorkshire, UK,
[2]NIHR Yorkshire and Humber Patient Safety Translational Research Centre, Bradford, UK,
[3]School of Pharmacy and Medical Sciences, University of Bradford, Bradford, Yorkshire, UK, and
[4]Yorkshire Quality and Safety Research Group, Bradford Institute for Health Research, Bradford, Yorkshire, UK

[*]Correspondence: Daniel A. Okeowo, School of Healthcare, University of Leeds, Leeds, UK. Email: umdao@leeds.ac.uk

Abstract

Objective Proactive deprescribing – identifying and discontinuing medicines where harms outweigh benefits – can minimise problematic polypharmacy, but has yet to be implemented into routine practice. Normalisation process theory (NPT) can provide a theory-informed understanding of the evidence base on what impedes or facilitates the normalisation of routine and safe deprescribing in primary care. This study systematically reviews the literature to identify barriers and facilitators to implementing routine safe deprescribing in primary care and their effect on normalisation potential using NPT.

PubMed, MEDLINE, Embase, Web of Science, International Pharmaceutical Abstracts, CINAHL, PsycINFO and The Cochrane Library were searched (1996–2022). Studies of any design investigating the implementation of deprescribing in primary care were included. The Mixed Methods Appraisal Tool and the Quality Improvement Minimum Quality Criteria Set were used to appraise quality. Barriers and facilitators from included studies were extracted and mapped to the constructs of NPT.

Key findings A total of 12,027 articles were identified, 56 articles included. In total, 178 barriers and 178 facilitators were extracted and condensed into 14 barriers and 16 facilitators. Common barriers were negative deprescribing perceptions and suboptimal deprescribing environments, while common facilitators were structured education and training on proactive deprescribing and utilising patient-centred approaches. Very few barriers and facilitators were associated with reflexive monitoring, highlighting a paucity of evidence on how deprescribing interventions are appraised.

Summary Through NPT, multiple barriers and facilitators were identified that impede or facilitate the implementation and normalisation of deprescribing in primary care. However, more research is needed into the appraisal of deprescribing post-implementation.

Keywords: Inappropriate prescribing; adverse drug reactions; primary care; medicines management; medication review

Introduction

Problematic polypharmacy – instances where multiple medicines are prescribed inappropriately or the benefit is not realised – is prevalent and characterised by increased use of potentially inappropriate medicines (PIMs), adverse drug reactions (ADRs) and high care costs.[1–3] This compromises patient safety and the efficiency of medicine use, leading to negative patient outcomes and increased healthcare costs. As a result, worldwide efforts have focused on interventions to reduce problematic polypharmacy, including through deprescribing.

Deprescribing is a process of identifying and removing medicines where the risks to the patient outweigh the benefits.[4] It has been shown to be effective in withdrawing medicines of specific drug classes in patients within experimental studies in primary care.[5] Evidence also highlights deprescribing as being relatively safe, however, there is a risk of relapse of symptoms, and adverse drug withdrawal events (ADWEs) which should be acknowledged.[6] Proactive deprescribing aims to identify and stop problematic medicines before negative patient events can occur, such as ADRs. This differs from reactive deprescribing, where clinicians require a clear clinical or situational trigger to cease a medicine, for example, in response to ADRs.[7]

Much of the current evidence for deprescribing in primary care focuses on the process of stopping a medicine. Little work is done on how deprescribing should be routinely and safely implemented within current primary care systems. This is important as poor implementation planning has led to previous complex interventions failing to be established in primary care and could lead to the benefits of deprescribing not being realised.[8] Therefore, to maximise the patient gain from deprescribing, its optimal implementation within primary care needs to be addressed.

Normalisation process theory (NPT) is a theoretical framework focused on implementation that is used to explain why an intervention succeeds or cannot become normalised within the practice. NPT comprises of four constructs: coherence – sense-making of the intervention; cognitive participation – commitment and engagement to the intervention; collective action – the work needed to enable the intervention to happen; and reflexive monitoring

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– how participants reflect and appraise an intervention.[9] Each construct is further divided into four subconstructs providing a rich description of factors associated with intervention implementation. NPT has been applied to analyse complex interventions in primary care, including through systematic review.[10]

This review will address the initial stages of implementation planning, through identifying barriers and facilitators of safely implementing routine proactive deprescribing within primary care. This will be achieved through a systematic search of deprescribing literature, and the application of NPT to the extracted barriers and facilitators to implementation to provide the theoretical understanding of how they impede or enable deprescribing in primary care.

Methods

Research question

This systematic review was designed to answer the question "What are the barriers and facilitators to routinely implementing proactive deprescribing within primary care?". Deprescribing is defined as:

> '[A] *systematic process of identifying and discontinuing drugs where harms outweigh benefits within the context of an individual patient's care goals, and their current level of functioning*',[4] p. 827.]

This definition was selected as it was developed with reference to existing literature and in conjunction with subject experts and has been widely accepted.[4] Deprescribing was distinguished as proactive if conducted in the absence of a clear clinical or situational trigger.[7] Barriers and facilitators to implement deprescribing in primary care were defined as factors that either impede (barriers) or promote (facilitators) the routine incorporation of deprescribing or deprescribing interventions into daily primary care practice. Qualitative methodology is frequently used to explore barriers and facilitators to the implementation of healthcare interventions and therefore, the inclusion of qualitative studies was important. However, as this review was focused on deprescribing implementation, factors that impeded or promoted the implementation of deprescribing interventions in quantitative research, such as randomised controlled trials (RCTs), were also extracted. This included characteristics of the intervention that aided or hindered its delivery, such as teaching elements that aided in deprescribing implementation within a study. Barriers and facilitators were extracted from the results and discussion of the results within studies and therefore were based on empirical data. For the purpose of this review, primary care was considered as *the initial point of contact in a healthcare system, providing services to community-dwelling individuals*.[11] This typically includes general practices and community pharmacies.

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses 2020 (PRISMA) was used to report this systematic review, which was registered on PROSPERO (CRD42021164658).

Search strategy

Phase one – initial search

An initial search was performed in MEDLINE and EMBASE using keywords developed from a scoping review covering a similar topic conducted by the author along with knowledge of the field.[12] Additional relevant keywords were then

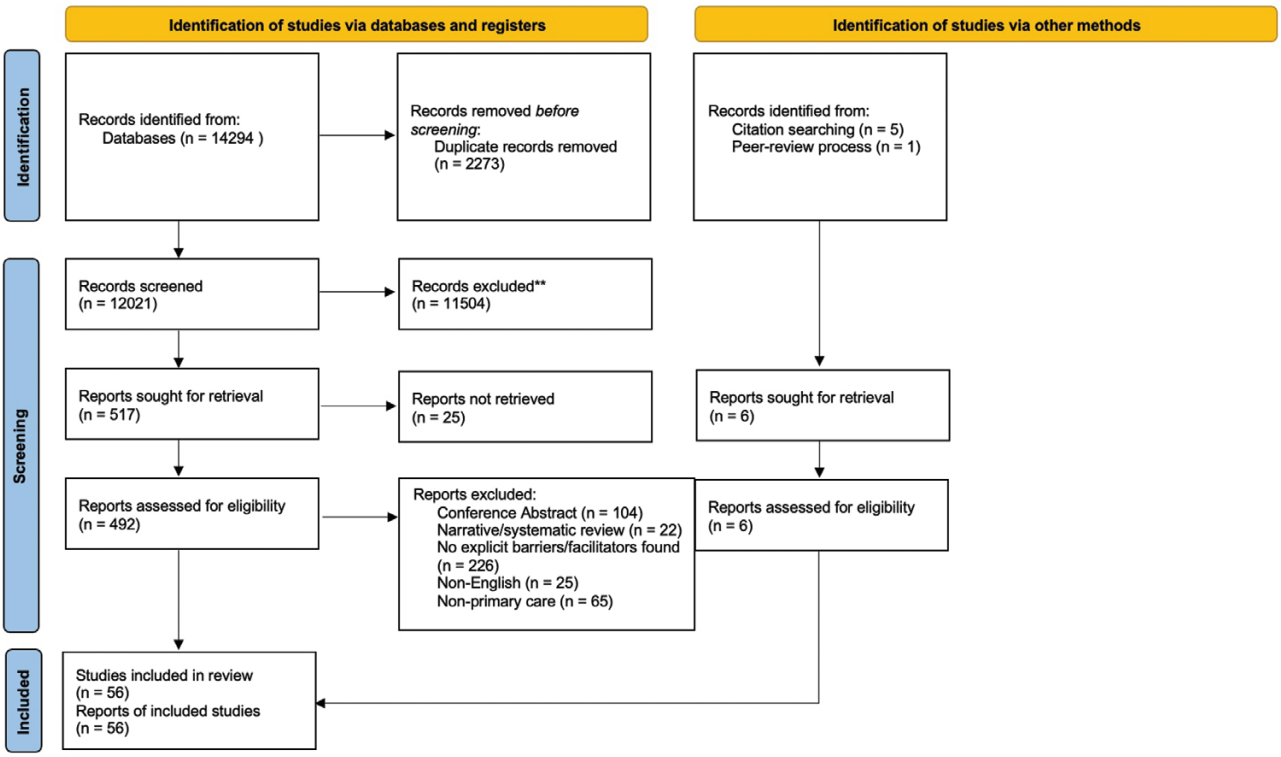

Figure 1 PRISMA flow diagram.

identified. A search strategy was constructed using these keywords, MESH terms and truncations, with expert input from a librarian at the University of Leeds. The full search strategy can be found in Supplementary Material S1.

Phase two – database search

A database search was conducted using search strategies developed for each database. The search was performed in MEDLINE, Embase, PubMed, CINAHL, PsychInfo, The Cochrane Library, Web of Science and International Pharmaceutical Abstracts. The search was conducted in September 2020 with a date range of 1 January 1996–2020. The lower time range of 1996 was chosen to include articles that may discuss the withdrawal of problematic medicines without the direct terminology 'deprescribing' or 'deprescribe' being used which was originally described by Woodward *et al.*[13] Articles dated before 1996 were not searched for because they were deemed unlikely to be relevant based on the author's previous experience conducting a scoping review on deprescribing.[12] The search was extended until May 2022 to identify any new and relevant literature.

Phase three – reference searching

The references of key studies, identified in a previous scoping review conducted by the research team, were assessed to identify relevant literature that was not identified through the database search.[12]

Eligibility screening

A two-stage screening process was used to identify studies meeting the inclusion criteria. The inclusion and exclusion criteria are presented in Table 1. The method sections of potentially relevant studies were assessed to ensure studies involved proactive deprescribing. If it was clear that the deprescribing or medicine withdrawal discussed or utilised was not a result of an acute clinical or situational trigger, it was potentially eligible. If this was not clear or deprescribing was in response to an acute clinical or situational trigger, the study was excluded. Stage one was conducted by one reviewer (DO) who screened the literature identified by title and abstract. To ensure the quality of this screening, two random 20% samples of the search results were independently screened by two additional reviewers (DPA and STRZ). Both reviewers were blinded to each other's and the original reviewer's (DO) screening decisions. Any disagreements between the two reviewers were resolved by a third reviewer (DPA or STRZ). There was a high level of agreement with only two disagreements being resolved by the third reviewer.

Stage two involved a full-text screen of the shortlisted studies. This was conducted independently by one reviewer (DO) using the eligibility criteria described in Table 1. To enhance rigour, a random 10% sample of the shortlisted studies was also independently screened by another reviewer (BF) who was blinded to the decisions of the original reviewer (DO). Any disagreements were resolved by a third reviewer (DPA), which was needed for one study. Both stages of screening were facilitated using EndNote X9 and Microsoft Excel.

Table 1 Eligibility criteria

Stage 1 screening – title and abstract	
Inclusion criteria: • Literature discussing implementation of deprescribing or deprescribing interventions in primary care	Exclusion criteria: • Palliative care/life-limiting illness • Patient self-discontinuation • Deprescribing of medicine in reaction to an adverse drug reaction • Substance misuse • Deprescribing within secondary and specialised care • Long-term care facilities • Non-English language studies • Conference abstracts • Grey literature
Stage 2 screening – full-text	
Inclusion criteria: • Literature discussing implementation of deprescribing or deprescribing interventions in primary care	Exclusion criteria: • No explicit barriers or facilitators to implementing deprescribing stated • Non-English language studies • Non-primary care • Conference abstracts • Unable to access full text • Narrative reviews • Non-empirical studies • Grey literature

Data collection

Data on the barriers and facilitators of implementing deprescribing or deprescribing interventions in primary care were extracted by DO using a standardised data collection form (Supplementary Material S2). The data collected included article name, authors, year of publication, country of publication, methodology (quantitative, qualitative, mixed methods or multimethods), study design, study population and study focus (qualitative discussion around the concept of deprescribing or use of a specific deprescribing intervention). For the purpose of this review, mixed methods studies were studies that collected and analysed both quantitative and qualitative data, either sequentially or concurrently, are given priority, and involved integration of the data within the research process.[14] Multimethod studies used quantitative and qualitative data but did not integrate the data.[15]

Before the systematic review, co-authors and supervisors BF and DA used the data capture form to extract barriers and facilitators which were then discussed as a team before the first author (DO) continued data extraction. Examples were also shared and discussed during the data extraction process. If the first author found it challenging to identify or extract barriers and facilitators, these examples would be sent to co-authors and discussed.

Data analysis

Once each barrier and facilitator was identified, they were tabulated and then mapped onto the constructs and subconstructs of NPT using a coding framework (Table 2) developed and adapted from a previous systematic review that used NPT to aid qualitative data analysis.[10] This coding framework was adapted so that the terminology of each subconstruct of NPT was considered in the context of deprescribing interventions instead of e-health interventions, which were the topic of the original review paper.[10] The framework provided theoretical context to each barrier and facilitator identified within the domain of NPT, providing

Table 2 NPT coding framework

Coherence (Sense-making work)	Cognitive participation (Relationship work)	Collective action (Enacting work)	Reflexive monitoring (Appraisal work)
Differentiation Is there a clear understanding of how a deprescribing service/intervention differs from existing practice?	**Enrolment** Do individuals 'buy into' the idea of the deprescribing service/intervention?	**Skill set workability** How does the innovation affect roles and responsibilities or training needs?	**Reconfiguration** Do individuals try to alter the new service?
Communal specification Do individuals have a shared understanding of the aims, objectives and expected benefits of the deprescribing service/intervention?	**Activation** Can individuals sustain involvement?	**Contextual Integration** Is there organisational support?	**Communal appraisal** How do groups judge the value of the deprescribing service/intervention?
Individual specification Do individuals have a clear understanding of their specific tasks and responsibilities in the implementation of a deprescribing service/intervention?	**Initiation** Are key individuals willing to drive the implementation?	**Interactional workability** Does the deprescribing service/intervention make people's work easier?	**Individual appraisal** How do individuals appraise the effects on them and their work environment?
Internalisation Do individuals understand the value, benefits and importance of the deprescribing service/intervention?	**Legitimation** Do individuals believe it is right for them to be involved?	**Relational integration** Do individuals have confidence in the new system?	**Systematisation** How are benefits or problems identified or measured?

insight into how each affects the normalisation potential of deprescribing in primary care. The coding process was conducted by DO. As numerous barriers and facilitators were extracted from the literature, the data were condensed to summarise the key barriers and facilitators while capturing the meaning of each barrier and facilitator. This was achieved through grouping individual barriers and facilitators into major categories, with each category being clearly defined to describe what they encompassed. This was conducted by DO, and then discussed and agreed upon with the wider research team.

Quality Appraisal

The quality of included studies was appraised using the Mixed Methods Appraisal Tool (MMAT) Version 2018 or The Quality Improvement Minimum Quality Criteria Set (QI-MQCS). The MMAT was designed to appraise and describe the methodological quality of qualitative, quantitative and mixed-methods research studies when conducting a systematic review.[16] It consists of questions relating to the methodology quality of the research article being investigated allowing for a descriptive analysis of its quality, providing a score out of 5. This process was conducted by one researcher (DO), however specific examples were shared and discussed with the research team. The QI-MQCS was chosen as a suitable tool to appraise quality improvement articles.[17] The QI-MQCS is a 16-domain appraisal tool for quality improvement intervention publications, particularly for projects within the discipline of healthcare research. This tool scores each QI article based on whether each domain is 'met' or 'not met', providing a minimal standard needed for a score to be given. It has previously been used in healthcare-related systematic reviews.[18]

Results

Study selection

A total of 56 articles met the inclusion criteria (Figure 1).[19-74]

Study characteristics

The characteristics of each study and extracted barriers and facilitators can be seen in Table 3. Of the 56 articles retrieved, 28 used quantitative methods,[19, 21, 23, 24, 26, 28, 30, 32, 33, 35, 37, 39, 41, 42, 45, 47, 49, 51, 54–58, 60–62, 67, 70] 21 used qualitative methods,[20, 22, 25, 27, 29, 34, 36, 38, 40, 43, 46, 52, 53, 59, 63, 64, 68, 71–74] 3 articles employed mixed methods[31, 48, 50] and 4 articles used multimethods.[44, 65, 66, 69] Most research articles originated from the Netherlands (n = 9), USA and Canada (n = 8) followed by Australia (n = 6), UK and Spain (n = 5), Germany and Denmark (n = 3), New Zealand and Italy (n = 2) and France, Switzerland, Norway, Malaysia and Slovenia (n = 1). The study designs included RCTs (n = 12), quasiexperimental studies (n = 12), QI studies (n = 3), interview studies (n = 18), surveys (n = 8) and observational studies (n = 3).

Quality appraisal

The MMAT was used for 53 research studies and the QI-MQCS for three quality improvement articles. Study quality varied significantly and is summarised in Supplementary Material S3. Qualitative studies did not provide a rationale for the qualitative approach and chosen methods.[44, 52, 53, 59, 63, 64] In seven of the RCTs, the outcome assessors were not blinded to the intervention allocation.[26, 30, 33, 37, 45, 57, 58] The non-randomised trials did not comment on the representativeness of the study sample to the target population, and survey studies did not comment on the non-response bias. From two mixed methods studies and one multimethod study, two lacked a rationale for using mixed methods, enough details regarding methods employed and were found to have a weak qualitative or quantitative method when appraised separately.[48, 50, 65]

All three quality improvement studies met most of the quality domains. However, two of the three quality improvement studies did not define the study design and describe adherence and sustainability of the intervention.[31, 69] Two of three studies did not report patient health-related outcomes and describe the reach of the intervention.[31, 66] None of the three studies described the potential spread of the intervention.[31, 66, 69] One study did not describe the timing of the intervention.[31] Also, one study did not describe at least one key

Table 3 Characteristics of included studies

Authors, country and title	Stated aim	Methodology, study design and sample	Study authors key findings	Barriers (B) and facilitators (F) extracted
Anderson, Freeman, Foster *et al.*, 2020 Australia GP-led deprescribing in community-living older Australians: an exploratory controlled trial	To assess feasibility, effectiveness and safety of a multifaceted general practitioner (GP) led intervention to reduce potentially inappropriate polypharmacy in community-living older people.	Quantitative Quasiexperimental GPs (n = 20), pharmacists (n = 2), and patients ≥65 years, taking ≥5 regularly prescribed medicines (n = 153)	The deprescribing intervention appeared feasible, was modestly effective and was not associated with any major safety events.	Deprescribing performed by patients' usual GPs whose tacit knowledge and ongoing therapeutic relationship was necessary for engaging patients in deprescribing (F) Involving GPs in co-designing elements of the intervention encouraged adoption of the intervention by other GPs (F)
Bosman, Huijbregts, Verhaak *et al.*, 2016 Netherlands Long-term antidepressant use: a qualitative study on the perspectives of patients and GPs in primary care	To unravel the motivations of patients and GPs causing long-term antidepressant use and to gain insight into possibilities to prevent unnecessary long-term use.	Qualitative Semistructured interviews GPs (n = 26) and patients ≥18 years, taking antidepressants >6 months (n = 38)	Although motives and barriers to antidepressant continuation or discontinuation were related to the same themes for patients and GPs, there were discrepancies in care needs between them. Discussion between patients and GPs about antidepressant use and continuation or discontinuation may help clarify mutual expectations and opinions.	Supportive guidance for patients during discontinuation (F) Discrepancies between patient and GP on ability of GPs to provide supportive guidance (B) Discrepancies between patient and GP on how to meet perceived need of care (B) Large variations between practices in patient-GP contact regarding antidepressants (B) Unawareness of the different expectations of patients and GPs on who is responsible for initiating discussions about antidepressant discontinuation (B)
Campbell, Robertson, Gardner *et al.*, 1999 New Zealand Psychotropic medication withdrawal and a home-based exercise program to prevent falls: a randomized, controlled trial	To assess the effectiveness of psychotropic medication withdrawal and a home-based exercise program in reducing falls in older people.	Quantitative RCT patients ≥65 years, taking psychotropic medicines (n = 93)	Withdrawal of psychotropic medication significantly reduced the risk of falling, but permanent withdrawal was very difficult to achieve.	Patients would discontinue intervention (medicine withdrawal) at times of stress or sleep disturbances (B)
Carrier, Zaytseva, Bocquier *et al.*, 2019 France GPs' management of polypharmacy and therapeutic dilemma in patients with multimorbidity: a cross-sectional survey of GPs in France	To understand GPs' attitudes about prescribing and/or deprescribing medicines for patients with multimorbidity and/or polypharmacy, and factors associated with their decisions.	Qualitative Surveys GPs (n = 1183)	In therapeutic dilemmas, some GPs chose to prioritise patients' requests over iatrogenic risks. GPs need pragmatic implementation tools for handling therapeutic dilemmas, and to improve their skills in medication management and patient engagement.	Majority of GPs considered that patients might perceive deprescribing as abandonment of care (B)
Clark, LaValley, Singh *et al.*, 2019 USA A pharmacist-led pilot program to facilitate deprescribing in a primary care clinic	To develop and pilot-test a model in which a community-based clinical pharmacist was incorporated as part of a Medicare Annual Wellness Visit (AWV) to make deprescribing recommendations targeted at PIMs in seniors.	Quantitative Quasiexperimental Patients > 65 years (n = 21)	Several barriers to integrating the pharmacist into the AWV workflow to deliver the intervention were encountered.	Provider education on proactive deprescribing (F) Targeting patients most likely to benefit from deprescribing (F) All parties being involved in the development and implementation of deprescribing intervention (F) Lack of awareness of all clinic staff to the roles and responsibilities of entire staff (B) Pharmacist had to physically locate providers to provide deprescribing recommendations (B) Medicines reconciliation normally performed by nurses who might've been reluctant to relinquish task to pharmacist (B) Lack of pharmacist access to EMR limited their ability to make deprescribing recommendations (B) Lack of documentation on patients chart may affecting providers ability to address recommendations (B) Providers unwilling to attempt deprescribing in situations which patients were not complaining of adverse effects (B)

Table 3. Continued

Authors, country and title	Stated aim	Methodology, study design and sample	Study authors key findings	Barriers (B) and facilitators (F) extracted
Cole, Mathur & Hull, 2020 UK Reducing the use of inhaled corticosteroids (ICS) in mild-moderate COPD: an observational study in east London	The aim of this study is to evaluate a quality improvement programme to reduce ICS prescribing in primary care in east London.	Quantitative Observational study Patients with mild- moderate chronic obstructive pulmonary disease (COPD) (n = 3496)	The primary care-led programme comprising local education, financial incentivisation and consultant support led to a significant decrease in ICS prescribing.	Provision of clinical guidance and education (B) Provision EMR reminders for eligible patients (B)
Cook, Marshall, Masci *et al.*, 2007 USA Physicians' perspectives on prescribing benzodiazepines for older adults: a qualitative study	To understand factors influencing chronic use of benzodiazepines in older adults.	Qualitative Semistructured interviews Primary care physicians (n = 33)	Primary care physicians were unwilling to addressing the public health problem of benzodiazepine overuse in the elderly. Their attitudes generally conflict with practice guidelines and they complain of a lack of training in constructive strategies to address this problem.	Lack of discontinuation strategies/alternative treatments available perceived as harsh to patients (B) Previous experience failing to deprescribe (B) Anticipation that patients will resist deprescribing (B) Limited physician time (B)
Coronado-Vázquez, Gómez-Salgado, Cerezo-Espinosa de los Monteros *et al.*, 2019 Spain Shared decision-making in chronic patients with polypharmacy: an interventional study for assessing medication appropriateness	To evaluate how effective a decision-making support tool is for determining medication appropriateness in patients with one or more chronic diseases (hypertension, dyslipidaemia and/or diabetes) and polypharmacy in the primary care setting.	Quantitative RCT Patients ≥65 years, ≥1 chronic disease taking at least one potentially inappropriate medicine (n = 122)	The use of a decision support tool in patients with polypharmacy identified inappropriate medicines and enhanced the prevalence of appropriate prescribing compared to the usual practice. The proportion of patients whose medicine routine was successfully changed using the decision support tool was higher among those with better adherence to the treatment and those who do not take benzodiazepines or non-steroidal anti-inflammatory drugs.	Use of a shared decision-making tool allowed for a greater number of medicines withdrawn (F)
Dickinson, Knapp, House *et al.*, 2010 UK Long-term prescribing of antidepressants in the older population: a qualitative study	To explore the attitudes of older patients and their GPs to taking long-term antidepressant therapy, and their accounts of the influences on long-term antidepressant use.	Qualitative Semi-structured interviews GPs (n = 10) Patients ≥75 years prescribed antidepressants (n = 36)	No evidence was found of a drive for change either from the patients or the doctors interviewed regarding high rates of long-term antidepressant prescribing. Any apprehension was more than balanced by attitudes and behaviours supporting continuation.	Prewarning patients of the limited duration of prescription (F) Tapering doses with patient support (F) Timing any discontinuation around springtime (F) Pessimism – patients felt unable to plan to remove obstacles in life to achieve better condition so accept and internalise their condition seeing medicines as long-term solution (B) Patient reluctance to discontinue influenced by previous experience withdrawing medicines (B) Plans to withdraw medicine were seen as threatening to current stable condition with fear of distancing patients (B) Uncertainty regarding the consequences of long-term antidepressant use but in the absences of evidence of specific adverse effects there was little concern (B)
Djatche, Lee, Singer *et al.*, 2018 Italy How confident are physicians in deprescribing for the elderly and what barriers prevent deprescribing?	To assess the perceptions of primary care physicians on deprescribing for elderly patients and potential barriers to deprescribing that physicians experience in the Local Health Authority (LHA) of Parma, Emilia- Romagna, Italy.	Quantitative Surveys Primary care physicians (n = 160)	Physicians believed they are generally comfortable with deprescribing, although there are still several factors that hamper their ability to engage in the process.	Fear of the recurrence of previous conditions or adverse effects (B) Patient and/or caregiver belief in continuation of medicines (B) Medicine initially prescribed by another physician (B) Lack of evidence in discontinuing medications (B) Lack of time (B)

Table 3. Continued

Authors, country and title	Stated aim	Methodology, study design and sample	Study authors key findings	Barriers (B) and facilitators (F) extracted
Donald, Partanen, Sharman *et al.*, 2021 Australia Long-term antidepressant use in general practice: a qualitative study of GPs' views on discontinuation	To explore GPs' insights about long-term antidepressant prescribing and discontinuation.	Qualitative Semistructured interview GPs (n = 22)	GPs saw discontinuation of long-term antidepressant use as a complex deprescribing decision. It consists of considering a patient's social and relational context, and requires careful preparation, tailored care and regular review. This suggest interventions to address long-term use need to take these considerations into account and be placed in a wider discussion about the use of antidepressants.	Reassuring patients that they are not alone in their discontinuation journey (F) Reflecting on why medicine initially initiated with patient (F) Strong patient and GP relationship (F) Use of tools for identifying symptom changes to aid discussions (F) Gradual discontinuing of medicine (F) Being proactive in relapse planning (F) Regular reviews during discontinuation (F) Highlighting limited duration of script on commencement (F) Decision to deprescribe is complex (B) Patient reluctance to deprescribing (B) Poor Patient and GP relationship (B) Prescribing and repeat prescribing seen as easier than deprescribing (B) Lack of evidence to support deprescribing (B)
Duncan, Cabral, McCahon *et al.*, 2019 UK Efficiency versus thoroughness in medication review: a qualitative interview study in UK primary care	To explore GP and pharmacist perspectives on how medication reviews were conducted in general practice in the UK.	Qualitative Semistructured Interviews GPs (n = 13) Pharmacists (n = 10)	Practices prioritised getting the work done rather than doing it well, so that most medication reviews were carried out with little or no patient involvement, and medicines were rarely stopped or reduced.	Deprescribing required patient involvement and generates work so it's easier to continue medicines than stop (B) Fear of causing problems (B) Not wanting to stop medicines started by a hospital specialist (B) Lack of evidence and guidelines on stopping medicines (B) Patients were reluctant or have no incentive to stop a medicine (B)
Eveleigh, Muskens, Lucassen *et al.*, 2017 Netherlands Withdrawal of unnecessary antidepressant medication: a randomised controlled trial in primary care	To assess the effectiveness of a tailored recommendation to withdraw antidepressant treatment	Quantitative RCT Patients, antidepressant use ≥9 months (n = 146)	This study demonstrated the difficulty of correcting unnecessary long-term antidepressant use, influenced by apprehensiveness regarding change by both patient and GP	Many patients rejected the deprescribing recommendation or accepted and did not following through (B) GPs apprehensive to discontinue medicines (B)
Farrell, Clarkin, Conklin *et al.*, 2020 Canada Community pharmacists as catalysts for deprescribing: an exploratory study using quality improvement processes	To build community pharmacists' capacity to integrate deprescribing into their daily practices through training and workflow strategies	Mixed methods QI project Community pharmacies (N = 4)	Deprescribing appeared feasible in community pharmacies. Data derived to populate a business model canvas informed the development of an in-depth business model for deprescribing.	Deprescribing discussions best initiated in person (F) Deprescribing had to be conceptualised as part of routine practice rather than extra service (F) Access to deprescribing resources and supports workload (F) Enhancing patient's awareness and education regarding risks and options to reassess (F) Standard templates to reduce time spent on each pharmaceutical opinion (F) Approaches to draw patients into the pharmacy and having all staff trained for field questions (F) A lower number of completed medicine reviews than expected (B) Mixed reception to deprescribing by patients (B) Prescribers unresponsive to deprescription pharmaceutical opinion (B) Time constraints and competing workload (B) Limited understanding of pharmacists role in medicine management (B) Staff turnover and new staff training (B) Inadequate compensation models for the time required in deprescribing events (B) Workspace limitations for deprescribing discussions (B)

Table 3. Continued

Authors, country and title	Stated aim	Methodology, study design and sample	Study authors key findings	Barriers (B) and facilitators (F) extracted
Gillespie, Mullan & Harrison, 2018 Australia Deprescribing for older adults in Australia: factors influencing GPs	To explore factors that influence GPs' attitudes and practices towards deprescribing in the context of care for older adults living independently in the community.	Quantitative Surveys GPs (n = 85)	Despite GPs reporting numerous supportive factors for deprescribing, the influence of unsupportive factors appeared to remain strong, as deprescribing was not routinely considered in practice.	GPs were confident they had enough information on the risks/benefits of medicines use and could explain these to guide deprescribing decisions (F) GPs were confident they could determine when a patient was having difficulty understanding information regarding deprescribing (F) Conducting medicine reviews by themselves or via pharmacists (F) Arranging longer consultations (F) Conducting annual health assessments (F) Seeking support for deprescribing decisions from others, such as geriatricians or specialists (F) GPs less certain other prescribers respect deprescribing decisions and communication with other prescribers is poor (B) Lack of time to review medicines during consultation (B)
Heser, Scherer, Loffler *et al.*, 2018 Germany Perspective of elderly patients on chronic use of potentially inappropriate medication – results of the qualitative cim-triad study	To gain insight into contextual factors that might lead to chronic PIM use	Qualitative Semistructured interviews Patients ≥75 years (n = 52)	Restrictive prescription and the sensitisation of the patient for the risks of these drugs might be needed to avoid long-term PIM use. It might be helpful to inform patients more about adverse effects of PIMs and to ask about adverse effects routinely. Test phases for newly prescribed medicines and a routine follow-up appointment to discuss potential side effects should be arranged.	Patient resistance against the cessation of the medicine or alternative treatments (B) Fear of relapse or withdrawal symptoms (B) Previous failed discontinuation of a medicine (B) Ageism by patients – different medication-based efforts or alternations we not worthwhile due to their own age or due to impairments (B) PIM is not rated as problematic medication (B) Patient does not care about side effects of PIM (B)
Jordan, Young-Whitford, Mullan *et al.*, 2021 Australia A pharmacist-led intervention to improve the management of opioids in a general practice: a qualitative evaluation of participant interviews	To explore enablers, barriers and outcomes of a pharmacist-led intervention to improve opioid management in general practice, from the perspectives of general practitioners (GPs) and practice personnel.	Qualitative Semistructured interviews GPs (n = 10), general practice personnel (n = 3)	Improved opioid management was enabled through pharmacist-led coordinated stewardship.	Pharmacist involvement in medicine management (F) Endorsement of practice-wide policy supported by education, resources and pharmacists (F) Influential individuals to influence practice of others (F) Engagement of patients through by delivering education (F) Encouraging a patient-centred approach in medicine management (F) Ineffective communication regarding intervention specifics (B)
Keith, Maio, Dudash *et al.*, 2013 Italy A physician-focused intervention to reduce potentially inappropriate medication prescribing in older people: a 3-year, Italian, prospective, proof-of-concept study	To assess the effect of a physician-focused, multifactorial, quality – improvement intervention on PIM prescribing in older patients in primary care.	Quantitative Quasi-experimental GPs (n = 303)	The quality intervention appeared to have positively impacted physicians' awareness and prescribing behaviour, leading to significant reductions in PIM use.	The mixture of educational strategies, including material dissemination, and reminders, group educational outreach and peer-to-peer interactions in combination with a non-punitive approach, was effective in engaging physicians (F) Characteristics of the list of PIMs may have helped physicians to focus on particular PIMs and overcome barriers and inertia towards following recommendations (F) Overall, the whole intervention was effective in improving GPs drug prescribing (F) The intervention did not place substantial burdens on participating GPs (F)

Table 3. Continued

Authors, country and title	Stated aim	Methodology, study design and sample	Study authors key findings	Barriers (B) and facilitators (F) extracted
Kennie-Kaulbach, Cormier, Kits *et al.*, 2020 Canada Influencers on deprescribing practice of primary healthcare providers in Nova Scotia: an examination using behavior change frameworks	To describe the knowledge, attitudes, beliefs and behaviours that influence deprescribing for primary healthcare providers (family physicians, nurse practitioners (NPs) and pharmacists) within Nova Scotia using the Theoretical Domains Framework version 2 (TDF(v2)) and the behaviour change wheel.	Qualitative Semi-structured interviews and focus groups Primary care physicians (n = 6), nurse practitioners (n = 7) and pharmacists (n = 6)	The results suggest a systematic approach to deprescribing in primary care should be supported by opportunities for patient and healthcare provider collaborations, as well as practice and system level changes to support sustainability of deprescribing practices.	Use of a systematic process of deprescribing ensured deprescribing is consistent (F) Patients could be a positive effect due to wanting to be on fewer medicines (F) Colleagues when they have the same mindset towards deprescribing (F) Available deprescribing resources (F) Having prompts built into EMR systems (F) Access to updated and accurate patient and medication information (F) Optimal use of staff e.g. pharmacy technicians in community pharmacy or access to a pharmacist in collaborative practices (F) Practice standards for routine medicine reviews (F) Dedicated remuneration for deprescribing would be an incentive (F) Participants reporting deprescribing is part of their scope of practice (F) Building trusting relationships with their patients (F) Belief about consequences of taking medicines and that some medicines may be inappropriate (F) Lack of consistent process for deprescribing (B) Patient attitude as some patients reluctant to accept deprescribing especially for certain medicines or if medication was prescribed by another specialist (B) Colleagues when they have a different mindset towards deprescribing (B) Working with multiple prescribers (B) Inheriting patients with multiple prescriptions (B) Lack of collaboration between organisations (i.e. lack of communication systems) (B) Lack of deprescribing tools for younger patients (B) Pharmacists having a lack of access to updated, accurate patient information limits their ability to support deprescribing (B) Lack of adequate staffing (B) Lack of deprescribing workflow (B) Lack of time, including the limited patient visit time and time required for reviewing medical records and monitoring and follow-up appointments (B) Lack of reimbursement for pharmacists (B) Awareness of other prescribers' practice territory and not wanting to step on toes (B)
Korenvain, MacKeigana, Dainty *et al.*, 2020 Canada Exploring deprescribing opportunities for community pharmacists using the behaviour change wheel	To explore community pharmacists' involvement with deprescribing, and identify strategies for enhancing this involvement.	Qualitative Semistructured interviews Community pharmacists (n = 17)	This study connected community pharmacists' real-world deprescribing challenges with theory-informed recommendations for enhancing their contributions to deprescribing.	Medicine expertise to identify PIMs and advise patient to stop (F) Patient sharing information with pharmacists due to trust in medicine expertise (F) Adequately compensating pharmacies for deprescribing (F) Education to expand pharmacists understanding of deprescribing (F) Contributing to steps in deprescribing process e.g. identifying PIMs of motoring (F) Define community pharmacists role in deprescribing (F) Uncertainty on what deprescribing entails (B) Lack of belief that it's not pharmacist responsibility (B) Gaps in deprescribing knowledge and available resources (B) Lack of information regarding medicine use (B) Competing priorities within community pharmacy (B) Loss of revenue to community pharmacies (B)

Table 3. Continued

Authors, country and title	Stated aim	Methodology, study design and sample	Study authors key findings	Barriers (B) and facilitators (F) extracted
Kuntz, Kouch, Christian *et al.*, 2019 USA Patient education and pharmacist consultation influence on nonbenzodiazepine sedative medication deprescribing success for older adults	To evaluate the impact of direct-to-patient education, with or without a pharmacist consultation, on Z-drug discontinuation among Kaiser Permanente Northwest members age 64 years and older.	Quantitative RCT Patients ≥64 years, taking 2 to 3 Z-drugs (n = 149)	Patients who received direct-to-patient education with or without a pharmacist consultation were significantly more likely to discontinue Z-drug use than patients receiving usual care. Providing evidence-based information about Z-drug use is an effective and low-resource method to encourage drug discontinuation.	Patients receiving deprescribing education materials (F) Intervention did not require a large amount of resources to implement (F) Pharmacist able to switch patients to safer medicines where appropriate saving time and effort (F)
Linsky, Meterko, Stolzmann *et al.*, 2017 USA Supporting medication discontinuation: provider preferences for interventions to facilitate deprescribing	To determine clinical prescribers' preferences for interventions that would improve their ability to appropriately and proactively discontinue medications	Quantitative Surveys Clinical prescribers (n = 326)	Continued efforts to improve clinicians' ability to make prescribing decisions, especially around deprescribing, have many potential benefits, including decreased pharmaceutical and healthcare costs, fewer adverse drug events and complications and improved patient involvement and satisfaction with their care.	Requiring all medicine prescriptions to have an associated indication for use (F) Assistance with follow-up of patients as they taper or discontinue medications is performed by another member of the Patient Aligned Care Team (F) Increased patient involvement in prescribing decisions (F)
Linsky, Meterko, Bokhour *et al.*, 2019 USA Deprescribing in the context of multiple providers: understanding patient preferences	To characterise patients' acceptance of deprescribing recommendations from pharmacists, primary care providers and specialists relative to the original prescriber's professional background	Qualitative Surveys Veterans Affairs (VA) primary care patients, taking ≥5 medicines (n = 803)	Understanding patient preferences for receiving deprescribing advice may facilitate effective design and implementation of deprescribing interventions.	Majority of respondents would not want a medicine prescribed by a specialist to be deprescribed by a pharmacist or primary care provider (F)
Linsky, Simon & Bokhour, 2015 USA Patient perceptions of proactive medication discontinuation	To identify patient perspectives on intentional medication discontinuation to optimise medication use	Qualitative Semistructured interviews and focus groups Patients taking ≥5 medicines (n = 803)	Many patients who had a preference to take fewer medicines did not share their beliefs with providers and recall few instances of provider-initiated medication discontinuation.	Strengthening patient-provider relationships to encourage patients to speak up on their interests to deprescribe (F) Patient desire to take fewer medicines (F) Limited patient experience with medicine discontinuation (B)
Lopez-Peig, Mundet, Casabella *et al.*, 2012 Spain Analysis of benzodiazepine withdrawal program managed by primary care nurses in Spain	To demonstrate that those patients who volunteered to participate would cease benzodiazepine consumption after 6 months, and that abstinence would be maintained for at least a further 6 months, and reduction of benzodiazepine was not harmful for the patient.	Quantitative Quasiexperimental Primary care nurses (n = 5), patients ≥44 years, who had used benzodiazepines daily for more than 6 months (n = 51)	At one year approximately 2/3 of the patients had ceased taking benzodiazepines. They showed an overall improvement in depression and anxiety scales, and in the mental component of the quality of life scale.	Nurse provision of education to patients on the risks and benefits of long-term benzodiazepine consumption, side effects and possible dependence (F)

Table 3. Continued

Authors, country and title	Stated aim	Methodology, study design and sample	Study authors key findings	Barriers (B) and facilitators (F) extracted
López-Sepúlveda, Lirola, García *et al.*, 2017 Spain Effects of a primary care intervention to improve the quality of zolpidem prescriptions in elderly patients	To measure the impact of an intervention on the prescription habits of GPs to improve the quality of zolpidem prescriptions in patients aged 75 or older	Quantitative Quasi-experimental Patients ≥ 75 years	The quality prescribing indicator in was improved by the intervention developed.	Provision of education to GPs on proper use of benzodiazepines and Z-drugs (F) Individualised feedback on prescribing for GPs (F) Financial incentive to reduce hazardous prescribing (F)
Luymes, van der Kleij, Poortvliet *et al.*, 2016 Netherlands Deprescribing potentially inappropriate preventive cardiovascular medication: barriers and enablers for patients and general practitioners	To identify barriers to and enablers of deprescribing potentially inappropriate preventive cardiovascular medication experienced by patients and GP	Qualitative Observational study GPs (n = 10) and patients without cardiovascular disease, using potentially inappropriate antihypertensive and/or lipid-lowering drugs (n = 49)	Patients appreciated discussing their doubts regarding deprescribing potentially inappropriate preventive cardiovascular medication. Patients acknowledged their GP's expertise and took their opinion towards deprescribing into consideration. The GPs' decisions to deprescribe were influenced by the low cardiovascular disease risk of the patients, additional risk factors and the alleged specialist's opinion towards deprescribing.	Patient knowing follow-up care is available (F) Patient knowing the medicine can be restarted (F) GP knowledge that there possibilities to handle side effects (F) Other support available for patients (family or processes) (F) Step by step withdrawal of medicine (F) Lack of fear of deprescribing consequences from GPs (F) Deprescribing consultations not necessarily time consuming (F) Patient-centred discussion (F) Lack of primary care physician support/time (B) Unknown how to cease/conflicting information (B) Need for appropriate timing for cessation (B) Patient fear associated with return of condition or withdrawal effects (B) Previous bad experience with stopping medicine (B)
Luymes, Boelhouwer, Poortvliet *et al.*, 2017 Netherlands Understanding deprescribing of preventive cardiovascular medication: a Q-methodology study in patients	To identify various viewpoints and beliefs concerning the preventive cardiovascular disease management of patients with low cardiovascular disease risk using preventive cardiovascular medication and whether certain viewpoints were related to a preference for deprescription or the continuation of preventive cardiovascular medication.	Multimethods Quasiexperimental Patients aged 40–70 years, using antihypertensive and/or lipid-lowering drugs (n = 33)	Three well-discriminating viewpoints about preventive cardiovascular disease management were determined. Knowing and recognising these viewpoints is effective for general practitioners when discussing the deprescribing of preventive cardiovascular medications with patients and may be used to promote implementation of deprescription	Start deprescribing implementation with patients with an autonomous view point – these are patients that know a lot about medication and healthy lifestyles, little fear for cardiovascular disease and negative towards medication use (F)
Luymes, Poortvliet, Geloven *et al.*, 2018 Netherlands Deprescribing preventive cardiovascular medication in patients with predicted low cardiovascular disease risk in general practice – the ECSTATIC study: a cluster randomised non-inferiority trial	To evaluate whether an attempt to deprescribe preventive cardiovascular medication in low cardiovascular disease-risk patients using these medications without indications according to current guidelines is safe and cost-effective.	Quantitative RCT Patients aged 40–70 years, using antihypertensive and/or lipid-lowering drugs (n = 1067)	This study showed that an attempt to deprescribe preventive cardiovascular medicines in low- cardiovascular disease-risk patients is safe in the short term when blood pressure and cholesterol levels are monitored after stopping.	Continuous monitoring of patients' blood pressure and cholesterol during and after stopping medicine (F) Unexplained low adherence to deprescribing recommendation by patients (B)
Magin, Goode, Pond, 2015 Australia GPs, medications and older people: a qualitative study of general practitioners' approaches to potentially inappropriate medications in older people	To explore the prescribing, and the rationale for this prescribing, of PIMs in older persons by Australian GPs	Qualitative Semistructured interviews GPs (n = 22)	The concept of 'appropriate' versus 'inappropriate' medicines is at odds with complex considerations informing decision-making in prescribing PIMs in older patients.	GPs felt it was difficult to stop a medicine prescribed by a specialist (B) Perceived clinical problems in medicine cessation, e.g. difficulty deprescribing benzodiazepines (B)

Table 3. Continued

Authors, country and title	Stated aim	Methodology, study design and sample	Study authors key findings	Barriers (B) and facilitators (F) extracted
Mantelli, Jungo, Rozsnyai *et al.*, 2018 Switzerland How general practitioners would deprescribe in frail oldest-old with polypharmacy – the LESS study	To determine whether, how and why GPs deprescribe in frail oldest-old patients with multimorbidity and polypharmacy, and to identify factors that influenced their decision to deprescribe	Quantitative Surveys GPs (n = 157)	Swiss GPs were willing to deprescribe cardiovascular preventive medication when it lacked indication but tended to retain pain medication.	High willingness to deprescribe preventative cardiovascular disease medicine by GPs (F) When considering deprescribing, expenditure of time for deprescribing and self-dispensation of medicines in GP office were considered less important (F)
Martin & Tannenbaum, 2017 Canada A realist evaluation of patients' decisions to deprescribe in the EMPOWER trial	The realist evaluation tests the following mechanisms: (1) whether the EMPOWER intervention triggered patients' motivation to deprescribe by increasing knowledge and concern about benzodiazepines; (2) augmented patients' capacity and self-efficacy to taper benzodiazepines and (3) created opportunities for the patient to discuss and receive support from a healthcare provider to engage in the deprescribing process. Also determined in which contexts successful and failed deprescribing outcomes occurred.	Mixed methods Realist evaluation of Empower RCT Patients, chronic benzodiazepines use (n = 261)	Deprescribing mechanisms that target patient motivation and capacity to deprescribe yield successful outcomes in contexts where healthcare providers are supportive, and patients do not have internal competing desires to remain on drug therapy.	Provision of new knowledge on medicine harms improving patient motivation and intent to deprescribe (F) Use of a tapering tool (F) Stable patient health status (F) Support or encouragement from a healthcare provider (F) Certainty and confidence about tapering (postintervention) (F) Patient positive outlook on ageing (F) Increased patient self-efficacy to reduce medicine (F) Reduced patient belief in the necessity of benzodiazepines (F) Increased patient concerns about taking benzodiazepines (F) High concerns (including greater perception of risk (F) Lack of support from HCP including undermining of attempt to deprescribe (B) Being in poor health (B) Previous reassurance about the safety of benzodiazepines (B) Psychological attachment to medicine (B) Loss of confidence to complete the tapering process (B) Intolerance to recurrence of symptoms/withdrawal effects (B) Lack of perception of personal risk (B) Unquestioning patient belief in their physician (B)

Table 3. Continued

Authors, country and title	Stated aim	Methodology, study design and sample	Study authors key findings	Barriers (B) and facilitators (F) extracted
Martin, Philippe, Tamblyn *et al.*, 2018 Canada effect of a pharmacist-led educational intervention on inappropriate medication prescriptions in older adults: the D-PRESCRIBE randomized clinical trial	To compare the effectiveness of a consumer-targeted, pharmacist-led educational intervention vs usual care on discontinuation of inappropriate medication among community-dwelling older adults.	Quantitative RCT Patients ≥65 years taking 1 of 4 Beers Criteria medicines (n = 489)	Among older adults, a pharmacist-led educational intervention compared with usual care resulted in greater discontinuation of prescriptions for inappropriate medicines after 6 months.	Pre-set computer algorithms allowing for time efficient identification of at risk patients with one simple recommendations (F) Educational brochure leading to initiation of deprescribing conversation with doctor (F) Pharmacist providing pharmaceutical opinion on deprescribing (F) Pharmacist-led educational intervention (F) Pharmacist exposure to the evidenced-based template (F) Provision of financial incentives for pharmacists (F) Significant number of pharmacies excluded due to competing priorities or not interested (B) Intolerance to ADWE (B) Lack of concerns of harms of medicine (B) Medicine dependence (B) HCP discouragement for initiating tapering (B) Patient comfortable with taking small dose (B)
Mulder-Wildemors, Heringa, Floor-Schreudering *et al.*, 2020 Netherlands Reducing inappropriate drug use in older patients by use of clinical decision support in community pharmacy: a mixed-methods evaluation	To investigated (persistent) drug therapy changes and its determinants to reduce PIM in older patients based on clinical decision support systems alerts and to investigate barriers and facilitators for implementation of drug therapy changes based on these clinical decision support systems alerts	Mixed methods Database analysis and semistructured interviews Community pharmacies (n = 31)	This study found that clinical rules can be used to detect inappropriate medicine use in older patients and that medicine therapy can change based on the alerts.	Good relationship between pharmacist and GP (F) Good accessibility of the prescriber (F) Prior agreement on the clinical decision rules (F) Patient trusts pharmacists and/or GP (F) Agreement of the healthcare professional with the PIM guideline underlying the clinical decision rule (F) Medicine alert not relevant as medicine being used for different indication (B) Prescriber being a specialist and not a GP (B) Lack of collaboration between pharmacist and GP (B) Lack of time (B) Patient anxious about medicine changes (B) Patient used to current medicine (B) Presence of many prescribers and prescribers who had not previously been receptive to pharmacists advice (B) Difficulty integrating clinical decision rules into current work flow (B)

Table 3. Continued

Authors, country and title	Stated aim	Methodology, study design and sample	Study authors key findings	Barriers (B) and facilitators (F) extracted
Murie, Allen, Simmonds *et al.*, 2012 UK Glad you brought it up: a patient-centred programme to reduce proton-pump inhibitor prescribing in general medical practice	To implement a programme to reduce inappropriate PPI prescribing.	Quantitative Quasiexperimental patients ≥ 18 years taking a PPI ≥ 2 months with a diagnosis of gastro-oesophageal reflux disease or non-ulcerative dyspepsia (n = 166)	This programme, delivered by a specialist nurse, significantly reduced PPI prescribing with financial and therapeutic benefits. The vast majority of eligible patients were able to 'step down and off' or 'step off' PPI use after 12 months without any complications or deteriorating symptom control.	Provision of formal patient education on patients conditions, therapeutic management options and potential lifestyle modifications (F) Empowering patients to self-manage their symptoms with alginates (F) Use of at least one face-to-face follow-up appointment within 3 months (F) The availability of flexible support offered to patients during the initial vulnerable period (F) Involving patients with a patient centred approach (F)
Nixon & Kousgaard, 2016 Denmark Organising medication discontinuation: a qualitative study exploring the views of general practitioners toward discontinuing statins	Three research questions were examined in this study: when does medication discontinuation occur in general practice, how is discontinuing medication handled in the GP's practice and how do GPs make decisions about discontinuing medication?	Qualitative Semi-structured interviews and observations GPs (n = 24)	This research concluded that the practice of discontinuation should be conceptualised as a continually evaluative process and one that requires sustained reflection through a culture of systematically scheduled check-ups, routinely eliciting the patient's experience of taking medicines and trialling discontinuation.	Discontinuation conversations happened more often in certain situations e.g. check-up consultations or consultations with new patients (F) Patient-based or record-based cues for medicine discontinuation (F) GP proactively identifying patient's medicine needs and examining the necessity of new prescriptions (F) Patient being present for scheduled medicine check-ups (F) Use of a risk score tool to reduce ambiguity around deprescribing (F) Ambiguity seen as reason to trial discontinuation (F) Trialling discontinuation rather than committing to the process indefinitely (F) Discontinuing medicine is more likely to occur when organised proactively, rather than reactively (F) Eliciting patients experiences with taking medicines (patient-based cues) (F) Discontinuing of medicine perceived as not a very organised practice (B) Routine of prescribing is strong meaning a lot of effort needed to raise the possibility of stopping a medicine (B) GP forget to mention about discontinuing medicine, especially if patient doesn't mention it (B) GPs found it difficult to find the right time to discuss stopping a medicine (B) Lack of proactively inviting patients for check-ups makes it harder to identify and monitor patients who would benefit from medicine discontinuation (B) Renewal of repeat prescriptions without the patient knowing (B) Lack of agreement and conflicting information about when to prescribe or deprescribe (B) Ambiguity seen as reason to continue treatment (B)

Table 3. Continued

Authors, country and title	Stated aim	Methodology, study design and sample	Study authors key findings	Barriers (B) and facilitators (F) extracted
Nixon & Vendelø, 2016 Denmark General practitioners' decisions about discontinuation of medication: an explorative study	To investigate how GPs decisions about discontinuation of medication are influenced by their institutional context.	Qualitative Semistructured interviews and observations GPs (n = 24)	Many GPs decided to continue with the medicines, even after actively considering discontinuing it. This is primarily due to a weak discontinuation frame which in three ways is shaped by the institutional context that GPs are situated in: dominating triggers for prescribing, weak priming for discontinuation and cognitive constraint against discontinuation.	Institutional Dominating triggers in the form of a prescribing imperative (B) Clinical guidelines focus GP attention on patient risks and possible treatments rather than patient experience and possibility of discontinuation (B) Clinical guidelines only suggest discontinuation in the most obvious cases (B) GPs unaware of deprescribing cue so not guided towards an alternative to the prescription imperative (B) Difficulty justifying deprescribing in the face of ambiguity (B)
Ocampo, Garcia-Cardenas, Martinez-Martinez *et al.*, 2015 Spain Implementation of medication review with follow-up in a Spanish community pharmacy and its achieved outcomes	To evaluate the clinical, economic and humanistic impact of a pharmacist-conducted medication review with follow-up following 18 months implementation	Quantitative Quasiexperimental Patients taking ≥1 medicines (n = 132)	A community pharmacy-based medicine review with follow-up service delivered by a trained pharmacist, has positive effects across clinical, economic and humanistic outcomes. These results were consistent with previous studies.	Provision of medicine review with follow up allowed for deprescribing problematic medicine (F) Intervention focused on patient outcomes rather than medicine use (F)
Odenthal, Philbrick, Harris, 2020 USA Successful deprescribing of unnecessary proton pump inhibitors in a primary care clinic	To determine the rate of successful deprescribing of unnecessary PPIs after implementation of a clinical pharmacist-managed program that included detailed tapering instructions, patient education and follow-up.	Quantitative Quasiexperimental Patients ≥18 years, using PPI for longer than 8 weeks (n = 22)	Deprescribing long-term PPI therapy can be successful in a family medicine clinic when implementing a clinical pharmacist-managed program that includes detailed tapering instructions, patient education and follow-up.	Pharmacists seeing each patient (F) Pharmacist providing education on ADRs and why to taper (F) Pharmacist providing written tapering protocol (F) Pharmacist calling patients for a follow up (F) Lack of staff availability (B) Time constraints (B) Other appointment priorities (B)
Rieckert, Teichmann, Drewelow *et al.*, 2019 Germany Reduction of inappropriate medication in older populations by electronic decision support (the PRIMA-eDS project): a survey of general practitioners' experiences	To investigate the experiences of GPs with an electronic decision support tool to reduce inappropriate polypharmacy in older patients in a multinational sample of GPs and to quantify the findings from a prior qualitative study on the PRIMA-eDS-tool.	Quantitative Surveys GPs (n = 160)	GPs viewed the PRIMA-eDS medicine check as useful and informative. Recommendations were not always followed due to various reasons. Many GPs would use the medication check if integrated into the electronic health record.	Discussing discontinuation recommendation with the patient (patient involvement) (F) Perceived necessity of the medicine for the GP (B) Prior trial of suggested alternative medicine (B) Specialist being involved in prescribing the medicine (B) The perceived deviation from standard therapy (B) Time requirements to perform comprehensive medicine review for UK GPs (B) GPs deem recommendations as unpracticable (B) The effort required to make changes to medicines (B)
Rieckert, Reeves, Altiner *et al.*, 2020 Germany Use of an electronic decision support tool to reduce polypharmacy in elderly people with chronic diseases: cluster randomised controlled trial	To evaluate the effects of a computerised decision support tool for comprehensive drug review in elderly people with polypharmacy.	Quantitative RCT Patients ≥75 years, using ≥ 8 medicines (n = 3904)	A computerised decision support tool for comprehensive medicine review of older patients with polypharmacy showed no conclusive effects on the composite of unplanned hospital admission or death by 24 months. Nevertheless, a reduction in drugs was achieved without detriment to patient outcomes.	Use of an electronic decision support tool for comprehensive medicine review (F) The electronic support tool not always being used as intended (B)

Table 3. Continued

Authors, country and title	Stated aim	Methodology, study design and sample	Study authors key findings	Barriers (B) and facilitators (F) extracted
Rognstad, Brekke, Fetveit *et al.*, 2013 Norway Prescription peer academic detailing to reduce inappropriate prescribing for older patients: a cluster randomised controlled trial	To study the effects of a multifaceted educational intervention on GPs' potentially inappropriate prescribing for older patients.	Quantitative RCT GPs (n = 465)	Educational outreach visits with feedback and audit, using GPs as academic detailers in GPs' CME groups, reduced potentially inappropriate prescribing for older patients aged ≥70 years in general practice.	Use of a multifaceted educational intervention focused on teaching GPs on PIPs (F) Use of a GP to teach other GPs possible positively affected participation and perception of relevance of the intervention (F)
Schuling, Gebben, Veehof *et al.*, 2012 Netherlands Deprescribing medication in very elderly patients with multimorbidity: the view of Dutch GPs. A qualitative study	To explore how experienced GPs feel about deprescribing medication in older patients with multimorbidity and to what extent they involve patients in these decisions	Qualitative Focus Groups GPs (n = 29)	GPs' beliefs concerning older patients were a barrier to explore patient preferences when reviewing preventive medication. GPs would welcome decision support when dealing with several guidelines for one patient. Explicit rules for collaborating with medical specialists in this field are required. Training in shared decision making could help GPs to elicit patient preferences.	Taking a positive approach to stopping preventative medicine (F) Lack of benefit/risk information concerning deprescribing preventative medicines (B) Lack of evidence of the effects of preventative medicine in the very elderly (B) Lack confidence communicating risk and information not helpful for shared decision making (B) GPs consider patients to have no problem with polypharmacy or medicine burden (B) GPs unaware of patient treatment goals and preferences (B) Patients appear to cling to their extensive medicine list (B) In the GPs view, patients underreport ADE's so difficult to be aware of issues (B) GPs reluctant to initiate deprescribing discussion because fear this may be interpreted as a sign of giving up (B) GPs feel forced by current guidelines to prescribe many different medicines (B) GPs feel guilty if they are not adherent to guidelines (B) Inadequate overview of new patients medicines (B)
Stuhec, Gorenc & Zelko, 2019 Slovenia Evaluation of a collaborative care approach between general practitioners and clinical pharmacists in primary care community settings in elderly patients on polypharmacy in Slovenia: a cohort retrospective study reveals positive evidence for implementation	To determinate whether a clinical pharmacists medicine review service can improve the quality of drug prescribing in elderly patients treated with polypharmacy in primary care	Quantitative Observational study Patients ≥ 65 years (n = 91)	A collaborative care approach offering a clinical pharmacist medicine review service significantly improved the quality of pharmacotherapy by reducing the total number of medications and PIMs.	Use of a clinical pharmacist to provide medicine reviews and recommendations to GP (F)
Tangiisuran, Rajendran, Sha'aban *et al.*, 2022 Malaysia Physicians' perceived barriers and enablers for deprescribing among older patients at public primary care clinics: a qualitative study	To explore physicians' perceived barriers and enablers of deprescribing among older patients in the public primary healthcare setting.	Qualitative Semistructured interviews Primary care physicians (n = 11)	Patient-specific barriers were identified as a significant challenge for deprescribing. Improving competencies on deprescribing was the repeated enabler for physicians. The development of targeted educational training can help to reduce the obstacles faced by prescribers.	Conducting medicine reviews regularly (F) Effect patient-physician communication (F) Availability of empirical evidence to guide deprescribing (F) Pharmacist provision of information to patients (F) Involvement of pharmacists in multiple areas of medicines management (F) Fear of litigation (B) Fear of clinical consequences (B) Lack of confidence (B) Lack of time (B) Fragmented care (B) Patient belief in continuation of medicine (B)

Table 3. Continued

Authors, country and title	Stated aim	Methodology, study design and sample	Study authors key findings	Barriers (B) and facilitators (F) extracted
Tannenbaum, Martin, Tamblyn *et al.*, 2014 Canada Reduction of inappropriate benzodiazepine prescriptions among older adults through direct patient education: the EMPOWER cluster randomized trial	To compare the effect of a direct-to-consumer educational intervention against usual care on benzodiazepine therapy discontinuation in community-dwelling older adults.	Quantitative RCT Patients 65–95 years, long-term benzodiazepine using (n = 303)	Direct-to-consumer education effectively elicited shared decision-making around the overuse of medicines that increase the risk of harm in older adults.	Direct-to-consumer education promoting patient buy-in for discontinuation at an early stage (F) Patient empowerment to initiate deprescribing conversation (F) Physician discouraged benzodiazepine deprescribing due to perceived absence of benzodiazepine side effects (B) Substitution of deprescribed medicine with equally harmful drug (B) Patient fear of withdrawal symptoms (B) Lack of patient concern regarding benzodiazepine consumption (B) Common reasons for nonparticipation of community pharmacists was lack of interest in participating and competing priorities (B)
Teal, Ricketts, Belton *et al.*, 2002 UK How effective are pharmacists who work with medical practitioners? A study of interventions intended to influence prescribing	To describe the interventions made by pharmacists working within different therapeutic areas in medical practices in primary care and to estimate the effects on prescribing	Quantitative Quasiexperimental Pharmacists (n = 27) and medical practices (n = 39)	Accurate recording of individual interventions with reasons, outcomes and direct cost consequences allows purchasers to make more informed decisions about the potential benefits of practice pharmacists. This method may, however, underestimate the pharmacist's indirect impact on prescribing since it does not take into account any educational effect on prescribers.	Incorporation of a pharmacist into GP actions: audit, individual patient review via paper or face-to-face interview, patient letters, therapeutic review, protocol development and implementation, patient information packs, specific clinics and prescriber education (F) Pharmacists provided better identification of PIMs and medicine duplication/compliance issues (F) GPs happy to make dose changes and review patients (F) Pharmacist interventions led to additional reviews that would have increased GP workload (B) GPs less willing to discontinue sedative medicine (B)
Thompson, Le, Haastrup *et al.*, 2020 Denmark Exploring how GPs discuss statin deprescribing with older people: a qualitative study	To explore how GPs discuss deprescribing of statins with their older patients.	Qualitative Semistructured interviews GPs (n = 11)	GPs identified a range of topics that could be discussed with patients surrounding statin deprescribing. The depth and content of discussions varied according to the situation, and between GPs. Challenges may exist in communicating around certain topics, such as uncertainty and life expectancy.	GP initiating deprescribing conversation when reviewing medicines (F) Patient related ques to initiate conversation e.g. patient taking many meds or trouble swallowing (F) Discussing lack of evidence for medicine continuation for eldest adults (F) GP unlikely to initiate conversation if patient fit and healthy (B) Uncertainty regarding the effect of taking action vs not taking action (B)
Turner, Richard, Lussier *et al.*, 2018 Canada Deprescribing conversations: a closer look at prescriber-patient communication	To describe patterns of deprescribing conversations in terms of initiation, style and content between patients and healthcare providers when a patient-targeted educational intervention on PPIs or benzodiazepines is delivered before or after a primary care encounter.	Qualitative Quasi-experimental Patients ≥65 years with chronic use of PPI or benzodiazepines (n = 24)	The initiation, style and content of the conversations varied between PPI and benzodiazepine users, suggesting that healthcare providers will need to tailor deprescribing conversations accordingly.	Greater proportion of conversation themes initiated by PPI patients when they received prior PPI education (B) Higher proportion of conversations were dialogue (rather than healthcare professional monologue) for PPI patients that received education (B)

Table 3. Continued

Authors, country and title	Stated aim	Methodology, study design and sample	Study authors key findings	Barriers (B) and facilitators (F) extracted
Van de Steeg-van Gompel, Wensing & De Smet, 2009 Netherlands Implementation of a discontinuation letter to reduce long-term benzodiazepine use – a cluster randomized trial	To determine the effectiveness of an intensive support programme for community pharmacies to send discontinuation letters to patients in cooperation with GPs.	Quantitative RCT Community pharmacies (n = 90)	About one third of the pharmacies in the control group and two thirds of the pharmacies in the intervention group implemented the discontinuation letter. However, this difference was not apparent in the primary outcome measures. Involving GPs appeared crucial to effectively in implement discontinuation letters.	Feeling forced by the health insurance to participate in the study (F) Participation in a pharmacy chain (B) Prior focus on benzodiazepine use by the pharmacy (B) Sufficient personnel to accomplish standard task (B) Encouragement of technicians to attend pharmaceutical care classes (B)
Van der Meer, Wouters, Teichert *et al.*, 2018 Netherlands Feasibility, acceptability and potential effectiveness of an information technology-based, pharmacist-led intervention to prevent an increase in anticholinergic and sedative load among older community-dwelling individuals	To explore the feasibility, acceptability and potential effectiveness of an innovative information technology (IT)-based intervention to prevent an increase in anticholinergic/sedative load in older people	Multimethods Quasiexperimental Patients ≥65 years received a newly prescribed potentially inappropriate anticholinergic/sedative medication in the past month (n = 305)	This innovative IT-based intervention was feasible, acceptable and potentially effective. In one-third of patients an increase in anticholinergic/sedative load was prevented within reasonable time investment.	Pharmacists able to identify a considerable number of older patients in need of medicine optimisation with the IT-based tool (F) Intervention tool (IT based) seen as meaningful, practical, clear and educational (F) Targeting newly initiated anticholinergic/sedative medicines (F) Intervention designed for the convenience of the pharmacist who could adapt as they see fit (F)
Vandenberg, Echt, Kemp *et al.*, 2018 USA Academic detailing with provider audit and feedback improve prescribing quality for older veterans	To adapt a successful medication management model, Integrated Management and Polypharmacy Review of Vulnerable Elders (IMPROVE), from an urban geriatric specialty clinic to rural community-based clinics that deliver primary care.	Multi-methods QI project Primary care providers (n = 20)	A medicine management model to promote quality prescribing for older adults was successfully adapted from an urban specialty geriatric clinic to the rural general primary care setting. Although individualised pharmacist-led medicine management visits were effective in reducing polypharmacy in this setting, expanding this component of the model would require allocating time for pharmacist consultation.	Pharmacist and patient-aligned care teams seen as valued clinic resources that could facilitate intervention (F) Education to PCP's and pharmacists raising awareness of PIMS (F) Provision of patient education material (F) Individualised audit and prescribing feedback (F) Patients referred to pharmacist for structured medicine reviews (F) Incomplete medicine lists (B) Hesitancy to discontinue medicines started by a specialist (B) Absence of routine pharmacy review (B) Low awareness of tools to improve safe prescribing (B) Time investment needed for a comprehensive medicine review and education (B)
Vicens, Bejarano, Sempere *et al.*, 2018 Spain Comparative efficacy of two interventions to discontinue long-term benzodiazepine use: cluster randomised controlled trial in primary care	To analyse the efficacy of two structured interventions in primary care to enable patients to discontinue long-term benzodiazepine use.	Quantitative RCT Patients 18–80 years, taking benzodiazepines daily for ≥ 6 months (n = 532)	Both interventions led to significant reductions in long-term benzodiazepine use in patients without severe comorbidity. A structured intervention with a written individualised stepped-dose reduction is less time-consuming and as effective in primary care as a more complex intervention involving follow-up visits.	GP proposal of deprescribing to patients (F) Structured education and training on benzodiazepine deprescribing (F)

Table 3. Continued

Authors, country and title	Stated aim	Methodology, study design and sample	Study authors key findings	Barriers (B) and facilitators (F) extracted
Wallis, Andrews & Henderson, 2017 New Zealand Swimming against the tide: primary care physicians' views on deprescribing in everyday practice	To explore the views of primary care physicians on the barriers and facilitators to deprescribing in everyday practice to inform the development of an intervention to support safer prescribing.	Qualitative Semistructured interviews Primary care physicians (n = 24)	Interventions to support safer prescribing in everyday practice should consider the sociocultural, personal, relational and organizational constraints on deprescribing. Regulations and policies should be designed to support physicians in practicing according to their professional ethical values.	Only incentive to deprescribe is the duty to do what is right – beneficence (F) Computer alerts to prompt physician memories (F) Targeted funding for annual medicine reviews (F) Computer systems to improve information sharing between prescribers (F) Improved access to non-pharmaceutical therapies (F) Education and training (F) Ready access to expert advice and user friendly decision support (F) Updating guidelines to include advice on when to consider deprescribing (F) Guidelines for management of common co-morbidities (F) Tools and resources to assist in communicating risks to patients (F) Activating patients to become more involved in medicine management and alert to the possibility that less might be better (F) Patient expectations 'Pill for every ill' (B) Medical culture of prescribing (B) Prescribing seen as easy option while deprescribing is time consuming (B) Uncertainty around which medicines patients are taking and why because of poor information sharing (B) Uncertainty and lack of evidence regarding best prescribing practices (B) Uncertainty lead to fear of preventable adverse outcomes following deprescribing (B) Fear deprescribing seen as sign of abandonment and money saving exercise (B) Professional etiquette leaving physicians reluctant to stop medicines initiated by others (B) Fast pace and competing demands of practice (B) Fragmentation of care and poor flow of information (B) Single disease specific guidelines promote prescribing not deprescribing (B)
Walsh, Kwan, Marr *et al.*, 2016 Canada Deprescribing in a family health team: a study of chronic proton pump inhibitor use	To reduce inappropriate drug use by developing and implementing a PPI deprescribing tool and process in a family medicine unit	Multimethods QI project Patients ≥18 years, taking a PPI for 8 weeks (n = 46)	Reassessment and deprescribing of PPIs was supported by implementing a standardised process and use of guidance tools for clinicians. Providers found the timely and selective reminder message to deprescribe the most useful component of the intervention.	EMR reminders that an upcoming appointment would be an opportunity to reassess therapy (F) PPI deprescribing tool in the EMR to as a reminder during the appointment and to support reassessment and deprescribing and the tapering (F) Deprescribing tool helped guide discussions with patients and implement recommendations (F) Tool helped guide reassessment of medicines and taper process (F) Lack of time (B) Patient unwillingness to stop PPI (B)

Table 3. Continued

Authors, country and title	Stated aim	Methodology, study design and sample	Study authors key findings	Barriers (B) and facilitators (F) extracted
White, Hayes, Boyes *et al.*, 2019 Australia General practitioners and management of chronic noncancer pain: a cross-sectional survey of influences on opioid deprescribing	To determine the proportion of GPs who hold attitudes congruent with local pain stewardship, describe their deprescribing decisions and determine whether type of prescription opioid analgesics influences deprescribing	Quantitative Surveys GPs ($n = 681$)	Many GPs held attitudes at odds with local guidance that opioids are a non-superior treatment for chronic non-cancer pain. Attitudinal barriers to deprescribing included: a lack of consistent approach to deprescribing opioids as a class of drugs, perceived lack of effective treatment alternatives and patient fear of deprescribing.	Patient having poor psychological health (F) Ongoing requests for opioids (F) Lack of therapeutic response to opioids (F) Lack of effective alternate treatment would make them less likely to deprescribe (B) Patient preference to stay on opioid or fear of the process or outcome of weaning (B)

Table 4 Distribution of all barriers and facilitators within NPT

Construct of NPT	Number of barriers	Number of facilitators
Coherence	29	26
Cognitive participation	35	37
Collective action	49	62
Reflexive monitoring	3	1

care process as a comparator and report any limitations with its study design/evaluation.[69]

Distribution within NPT

A total of 178 barriers and 178 facilitators were extracted from the included articles. When coded with NPT, the number of barriers and facilitators within each construct is shown in Table 4. Collective action accounted for the most barriers and facilitators, followed by cognitive participation and coherence, respectfully. There were very few barriers or facilitators associated with reflexive monitoring.

Main barriers and facilitators

Once the barriers and facilitators had been grouped and summarised by their characteristics, 14 barriers and 16 facilitators remained (see Table 5).

Coherence

Barriers

Where there were negative perceptions concerning deprescribing, intervention implementation was challenging. These were broad but included deprescribing being perceived as an abandonment of care, a money-saving exercise, threatening to current stable conditions with a fear of alienating patients, deviation from standard therapy, and the perceived negative consequences of deprescribing.

Scenarios where patients and healthcare professionals (HCPs) strongly believed in the continuation of a medicine negatively affected deprescribing implementation. Such reasons included PIMs not being seen as problematic because of an absence of side effects, lack of concerns for medicine harms, previous reassurance about the safety of a medicine, a negative outlook to ageing by patients who had an expectation of 'pill for every ill', psychological attachment to medicines, and the ambiguity associated with the potential effects of deprescribing being a reason to continue medicines.

Similarly, where there was a lack of coherence regarding how to deprescribe or the roles of HCPs during deprescribing, this negatively impacted successful implementation. This encompassed lack of agreement and evidence on deprescribing indications, uncertainty regarding taking action (deprescribing) or not, lack of benefit/risk information concerning deprescribing preventative medicines, low awareness of tools to improve prescribing, and limited understanding of the role of pharmacists in deprescribing and medicines management.

Facilitators

Patients receiving deprescribing education and HCPs receiving structured education and training on proactive

Table 5 Main barriers and facilitators to implementing proactive deprescribing in primary care

Construct of NPT	Barriers of implementation	Facilitators of implementation
Coherence	• Negative deprescribing perceptions • Patient and HCP strong belief in continuation of medicines • Limited understanding of HCP roles in deprescribing • Uncertainty and lack of information about how to deprescribe • Lack of interest in deprescribing	• Patients receiving deprescribing education • Structured education and training for HCPs on proactive deprescribing • Belief in the consequences of PIMs and ADRs • Deprescribing accepted as scope of practice • Prior agreement on deprescribing clinical decision rules
Cognitive participation	• HCPs apprehensive to discontinue medicines • Patient resistance to deprescribing recommendations • Lack of internal and external collaboration • Lack of proactively identifying patient needs	• Engagement of HCPs and patients • Positive relationships between HCPs and patients • MDT Involvement • Patient-centred approach
Collective action	• Sub-optimal deprescribing environment • Strong prescribing culture • Poor communication and information sharing • Lack of confidence to deprescribe	• Availability of deprescribing resources and support for HCPs • Supportive guidance for patients • Collaborative MDT sharing workload • Presence of predefined deprescribing process • Confidence in deprescribing • Requiring medicines to have an associated indication for use
Reflexive Monitoring	• Deprescribing tools not used as initially intended	• Individualised feedback on prescribing for GPs

HCP, healthcare professional; PIMs, potentially inappropriate medicines; ADRs, adverse drug reactions; MDT, multidisciplinary team

deprescribing aided the implementation of deprescribing interventions. The nature of patient education typically focused on the patient's medical condition, risks associated with their medicine (including long-term use and side effects), a lack of evidence for medicine continuation with the oldest of adults, alternative treatment options and lifestyle modifications. Education and training for HCPs involved training on the rationale for proactive deprescribing, clinical guidance on deprescribing, the consequences of PIMs and ADRs and the appropriate indications for medicines. Unsurprisingly, patients and HCPs believing in the negative consequences of continued use of PIMs and the risk of ADRs positively affected the coherence of deprescribing interventions. Lastly, when HCPs accepted deprescribing as within their scope of practice, and prior agreements regarding clinical deprescribing decisions were in place, this aided deprescribing intervention implementation through improving HCPs' coherence.

Cognitive participation

Barriers

Patients often had low adherence to deprescribing recommendations and were reluctant to stop a medicine prescribed by a different HCP. Scenarios where HCPs were unaware of patients' treatment goals and preferences, and a lack of proactively inviting patients for discussions about deprescribing, contributed to this.

There was a lack of collaboration between pharmacists and general practitioners (GPs), between different healthcare organisations, and between HCPs with different mindsets towards deprescribing, impeding implementation. HCPs being apprehensive to deprescribe was a broad barrier which included when a medicine was previously prescribed by a different doctor or specialist, other HCPs undermining attempts to deprescribe, HCPs reluctant to start deprescribing discussions with healthy patients or assuming patients have no issue with polypharmacy or medicine burden, and anticipation that patients will resist deprescribing.

Facilitators

The engagement of HCPs and patients to deprescribing encompassed the specific involvement of GPs to engage other HCPs and patients in deprescribing, as well as HCPs encouraging deprescribing with patients. Multidisciplinary team (MDT) involvement is related to the planning of implementation and the actioning of deprescribing interventions, with particular emphasis on pharmacists. Positive relationships between HCPs and patients allowed patients to initiate deprescribing conversations and aided HCPs to effectively action deprescribing.

A patient-centred approach was another broad facilitator identified. This involved actively identifying patient needs, allowing patient involvement in deprescribing discussions and activating patients to be more involved in their medicines use. In addition, this involved HCPs harnessing patients' motivations to deprescribe and improving their self-efficacy to be involved in deprescribing.

Collective action

Barriers

Suboptimal deprescribing environment was a broad barrier that included multiple well-established barriers to deprescribing: lack of clinician time to deprescribe, competing workloads, lack of adequate staffing, lack of a consistent deprescribing workflow, lack of financial support, workspace limitations for deprescribing discussions, working with multiple prescribers and absence of routine medicines reviews. These well-known barriers continued with the theme of a strong prescribing culture. This encapsulated deprescribing being seen as additional work, so continuation of medicines was perceived as the easier option, clinical guidelines that promoted prescribing but rarely deprescribing, and HCP guilt due to not adhering to clinical guidelines.

Poor communication and information sharing concerned not only how clinical information is documented but also how it is communicated to different areas of care. This included poor documentation in patient medical notes, lack

of access to updated and accurate medical records (particularly for pharmacists), fragmentation of care and the poor flow of information, poor communication between GPs and pharmacists and inadequate overview of patient medicines when registering at a new GP practice. In addition, GPs being unsure that other prescribers respect their deprescribing decisions was evident in this group.

The final barrier was the lack of confidence to deprescribe, including a lack of HCP confidence in communicating risks related to deprescribing to patients, and the fear of causing problems through deprescribing. From a patient perspective, this involved patients losing confidence in deprescribing before completely stopping medicines.

Facilitators

The availability of deprescribing resources and support for HCPs was the largest group compared to other facilitators and included interventions typically described in many deprescribing studies. This included: financial incentives to deprescribe, electronic medical record (EMR) reminders, tools to help identify and communicate medicine risks to patients, shared decision-making tools, PIMs lists, updated clinical guidelines to include deprescribing and managing co-morbidities, access to deprescribing advice from other HCPs, electronic decision support tools for comprehensive medicines reviews and templates to aid communicating deprescribing recommendations from pharmacists to GPs.

A collaborative MDT sharing deprescribing workload involved effective sharing of information between prescribers, access to accurate patient records and receiving support with patient follow-ups. Pharmacist involvement in deprescribing contributed to this group through identifying PIMs or patients in need of medicines optimisation, conducting structured medicine reviews, providing deprescribing recommendations to GPs, autonomy to switch patients to safer medicine alternatives, providing education to patients and prescribers and conducting deprescribing audits.

The presence of a predefined deprescribing process aided in implementing deprescribing interventions. The beneficial attributes of such a process included being systematic, consistent and convenient and adaptable to HCPs' needs. It was important that implementation was not resource-heavy and that there was flexible support offered to patients afterwards. One article also highlighted the importance of at least one face-to-face follow-up appointment within 3 months of deprescribing.[51]

Confidence in deprescribing was associated with different stages within the deprescribing process. This encompassed confidence in knowing when patients cannot understand deprescribing teaching material, GP confidence in handling adverse effects of deprescribing, lack of fear in deprescribing consequences and confidence in patient knowledge of deprescribing.

The final facilitators were supportive guidance for patients during deprescribing by HCPs or from their social environments and requiring all medicines to have a documented indication.

Reflexive monitoring

There was a paucity of barriers or facilitators to implementing deprescribing that were associated with appraisal work. The only barrier within this construct was instances where deprescribing tools were not used as initially intended. The only facilitator within this construct was individualised feedback on prescribing provided for GPs post-deprescribing.

Discussion

Summary

This is the first systematic review to focus on the barriers and facilitators to implementing proactive deprescribing interventions in primary care through the theoretical lens of NPT. A total of 178 barriers and 178 facilitators were identified and condensed into 14 barriers and 16 facilitators. Collective action was the most prevalent construct, while there was a lack of barriers and facilitators associated with reflexive monitoring. This review provides novel insight into implementing deprescribing through the extraction of barriers and facilitators, with a theoretical connection to how these factors may affect the normalisation potential of deprescribing through the constructs of NPT. It also highlights the lack of evidence around the appraisal of deprescribing interventions, and how little deprescribing implementation barriers and facilitators have been discussed. Such evidence has been called for to better aid the implementation of safe and routine deprescribing in primary care.[75]

Strength and limitations

A key strength of this review is its use of theory focused on intervention implementation, to provide theoretical context to implementation barriers and facilitators. This application of theory provides a clearer understanding as to why the implementation of interventions in health care may succeed or fail.[76] The application of NPT provided rich insight into barriers and facilitators through its constructs and subconstructs.

A limitation is that only articles in the English language were included, and relevant studies in other languages may have been missed. In addition, although multiple authors took part in the screening process, only one author (DO) was involved in screening all identified articles, and only one author (DO) mapped barriers and facilitators to NPT constructs. However, examples were discussed with the research team and the search strategy was rigorously constructed and comprehensive to minimise this limitation. Another limitation was that, as some barriers and facilitators were extracted from discussions within studies, for example, RCTs, they may have been the views of authors (based on the findings). However, we deemed it valuable and important to identify authors' views on the empirical findings, particularly as this was sometimes the only instance where they would comment on the implementation of the intervention.

Although this review was focused on deprescribing in primary care, research focused on long-term care facilities, such as care homes, was excluded. This was because of the different contexts, systems and processes involved regarding medicines management, including deprescribing, within long-term care facilities.

Key findings

When looking at the distribution of barriers and facilitators within NPT, it was unsurprising that collective action was most prevalent. Much of the current evidence on deprescribing is focused on the process of conducting deprescribing and,

subsequently, the work needed for deprescribing to happen. Scott *et al.*'s influential article discussing the process of deprescribing led to research applying such principles within different healthcare contexts.[4, 77–79] The resultant effect is developed knowledge about the work, that is, collective action needed to action deprescribing, for example, through the five-step protocol proposed by Scott *et al.*[4]

A key finding was the lack of barriers and facilitators associated with reflexive monitoring, highlighting a gap in deprescribing research about how deprescribing should be appraised. Using NPT's reflexive monitoring subconstructs would include understanding how individuals try to alter their practice, how groups and individuals judge the value of deprescribing interventions and how the benefits or problems with deprescribing interventions are measured. Much of the deprescribing literature included in this review involved limited patient follow-up, ranging from 6 months to 2 years, with minimal discussion on how the effects of deprescribing may be reflected on and appraised by patients and HCPs. The appraisal work that was found in a minority of studies comprised of individualised prescribing feedback for GPs. Providing feedback is important to identify a change in prescribing patterns resulting from deprescribing, but does not provide in-depth detail on the effect deprescribing implementation has on practice culture and cross-organisational system work and culture. Previous research has also highlighted this lack of evidence on how the downstream effects of deprescribing are evaluated, with a call to address this research need.[75]

Extracting barriers and facilitators to implementation from the literature was challenging. Most included studies did not explicitly discuss factors that aided or impeded intervention delivery, with brief detail provided when discussing study design limitations. More detailed research and reporting on the barriers and facilitators affecting the implementation of deprescribing in primary care is needed. Most intervention studies fail in reporting implementation aspects, leading to an inadequate understanding of the effective mechanisms of the intervention or difficulties replicating studies.[80] Tools, such as the Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide, may help authors in their reporting of deprescribing research to aid future replication and implementation.[81] Deprescribing implementation evidence would better inform its implementation and diffusion within healthcare systems.

The overall quality of studies varied significantly and there is a need for higher quality research to better inform its implementation in primary care.[82]

Comparison with existing literature

A previous systematic review by Reeve *et al.* highlighted patient barriers and enablers to deprescribing.[83] While it focused on patients' perspectives of deprescribing, rather than its implementation, and it was not guided by theory, there are commonalities between both reviews. Disagreement with the appropriateness of deprescribing, issues with the process of deprescribing, negative influences from family/HCPs and the fears associated with deprescribing, such as potential negative consequences, were key patient barriers.[83] These are comparable to the coherence barriers, negative deprescribing perceptions and patient belief in a continuation of medicines and the collective action barrier suboptimal deprescribing environment.

Reeve *et al.* identified agreement with the appropriateness of deprescribing, aspects of the process of deprescribing such as follow-up care available, positive influences and a dislike for medicines as patient enablers to deprescribing.[83] Again, these enablers closely matched the coherence facilitator 'belief in the consequences of PIMs and ADRs', cognitive participation facilitators 'positive relationships between HCPs and patients', 'taking a patient-centred approach' and collective action facilitators 'supportive guidance for patients' and 'presence of a predefined deprescribing process'. In summary, Reeve *et al.* advocated the need for a patient-centred deprescribing process that involved patient education and included support, monitoring and follow-up.[83] This review reiterates the need for a patient-centred approach to deprescribing but provides a deeper theoretical understanding of why such relationship and engagement work (cognitive participation) is needed to normalise deprescribing in primary care. Focusing on such factors, through promoting the facilitators and limiting the barriers identified in this review, would improve deprescribing implementation for the future.

Another systematic review investigated the barriers and facilitators of deprescribing in primary care, including residential care homes. This study separated barriers and facilitators by socioecological levels: individual, interpersonal, organisational and cultural. Cultural barriers related to a prevailing culture of prescribing medicines, with little financial incentive to address polypharmacy, similar to the collective action barriers identified in our review.[84] Interpersonal barriers were broad but related to fragmentation of care, poor collaboration between prescribers, uncertainties and lack of knowledge and GPs' reluctance to stop medicines stopped by a specialist. These barriers were identified in this review. However, they were associated with multiple constructs of NPT, explaining how these barriers may impede implementation through their effect on coherence, cognitive participation and collective action. Individual barriers related to patients not knowing why they were taking a medicine, lack of knowledge of or concern for medicine harms, and patients and HCPs less inclined to stop a medicine (particularly if taken over many years).[84] These barriers were attributed to how patients and HCP make sense of deprescribing, and therefore coherence, in this review.

Organisational facilitators, identified by Doherty *et al.*, called for better clinical guidelines addressing multimorbidity and deprescribing, and guidance to improve skills, tools and knowledge of HCPs to deprescribing. In this review, this was identified as structured education and training for HCPs on proactive deprescribing within coherence and availability of deprescribing resources and support for HCPs within collective action. Similar to barriers, interpersonal facilitators were broad but involved improved communication between HCPs, positive relationships between HCPs and patients, the importance of continuity of care, provision of education to patients and the involvement of a wider MDT – especially community pharmacists.[84] The individual facilitators were 'improved information and guidance on deprescribing for GPs' and the 'ability to seek guidance from experienced colleagues', 'a patient-centred approach to deprescribing' and 'patient trust in their GP'.[84] Again, these facilitators emerged within this review and were attributed to affect the normalisation of deprescribing through coherence, cognitive participation and collective action.

One way to improve the implementation of evidence-based interventions, such as deprescribing, into practice is through behaviour change.[85] One review identified and characterised strategies for deprescribing in primary care and mapped them through behaviour change theory, the behaviour change wheel (BCW).[86] The review by Isenor *et al.* found many studies used the intervention function of environmental restructuring, which aims to change the environment to support a change in behaviour. Common examples included adding objects to the environment such as evidence-based medicine lists for assessing the appropriateness of medicines and deprescribing algorithms. The authors theorised such interventions can overcome barriers to deprescribing including lack of knowledge of deprescribing and knowing when to deprescribe.[86] Through the lens of NPT, these intervention strategies improved the understanding of deprescribing interventions (coherence) and supported the work needed for deprescribing to occur (collective action). As such, the facilitators highlighted in this review may influence behaviour change in individuals involved in deprescribing, affecting implementation success. The use of different theoretical frameworks, such as BCW and NPT, provide further depth of understanding for complex interventions such as deprescribing and are valuable in conceptualising and optimising implementation.

The approach taken in this review allows for further understanding of why these barriers and facilitators influence deprescribing implementation and normalisation, through their effect on the constructs of NPT. This approach, and NPT's implementation focus, has allowed for deep exploration of implementation barriers and facilitators, identify gaps in the deprescribing evidence base and identify future research directions. Such evidence is needed to implement safe and routine deprescribing in primary care.

Implications for research and practice

Proactive deprescribing is an essential part of good prescribing practice and is needed to combat problematic polypharmacy. However, its safe implementation into routine practice is complex, involving understanding how patients and HCPs make sense of, engage with, conduct and reflect on deprescribing. This review highlights several future research gaps that need to be addressed to ensure effective deprescribing implementation:

- Future research should identify and explore factors that impede or facilitate the routine implementation of deprescribing interventions in primary care to further build on this evidence base.
- There is a paucity of deprescribing research into the reflexive monitoring of deprescribing interventions in primary care. Future research should investigate how different stakeholders appraise the effects of deprescribing and how deprescribing interventions are adapted once implemented into practice. This would enhance the deprescribing literature, through highlighting how stakeholders reflect on deprescribing and how this can be augmented to optimise implementation approaches.
- Deprescribing is being implemented in UK primary care through the use of structured medication reviews (SMRs). Post-implementation research of deprescribing, through theoretical lenses, will be important to ensure deprescribing is conducted safely and routinely. The use of theoretical approaches when considering implementation, such as the use of NPT in this review, can provide a clearer understanding of how and why the implementation of a healthcare service succeeds and aid future replication.[76]

Conclusion

Safe and routine deprescribing is needed to combat problematic polypharmacy, but its implementation into primary care is complex with limited supporting evidence. This review has identified barriers and facilitators to deprescribing implementation and provides a novel understanding of how they affect the normalisation of proactive deprescribing. It has also recognised the need for greater appraisal of deprescribing and its impact on patients and HCPs. This review supports the need for improved focus and reporting on implementation factors within deprescribing research. Such evidence is needed to better replicate safe and routine deprescribing implementation across healthcare settings.

Supplementary Material

Supplementary data are available at *International journal of Pharmacy Practice* online.

Author Contributions

D.O. designed the research, conducted the systematic review and drafted the manuscript. D.P.A., S.T.R.Z. and B.F. also designed the researched, screened articles, provided writing support and edited and approved the final manuscript.

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Conflict of Interest

The author(s) declare that there are no conflicts of interest.

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