A systematic review using the Theoretical Domains Framework to identify barriers and facilitators to the adoption of prescribing guidelines

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Abstract

Objectives Evidence-based guidelines have the potential to reduce variation and increase prescribing quality. Identifying the key determinants to their uptake, using a theory-based approach, may assist in the design of successful interventions to increase their adoption into practice. This systematic review investigated barriers and facilitators identified using the Theoretical Domains Framework (TDF) to the implementation of prescribing guidelines.

Methods Electronic databases (EMBASE, PubMed) were searched. Studies were included if they used the TDF to identify key determinants of guideline implementation. Only studies published in English were included.

Key findings Of the 407 studies identified, 15 were included. A range of patient populations and therapeutic categories were represented. Multiple determinants were identified that affected guideline implementation, with similarities and differences identified across studies. Barriers to guideline adoption included time restriction, lack of awareness, guideline complexity, lack of clinical evidence, social influences and disagreement. Facilitators included peer influence, guideline simplicity, confidence and belief about the positive consequences derived from guideline adoption, for examples improved care and patient outcomes.

Conclusions Multiple behavioural factors affect the adoption of prescribing guidelines. The results aided the understanding of factors that may be targeted to increase guideline compliance. However, barriers and facilitators can vary significantly in different environments; therefore, research that targets particular healthcare settings and patient populations may provide further evidence to increase the specificity and credibility of intervention strategies.

Background

Guidelines are 'systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances'.[1] Their purpose is to promote effective and cost-effective decision-making for patient care.[2] Guidelines are instrumental in translating complex scientific research into simplified recommendations that can increase healthcare quality and outcomes and reduce inappropriate variation in practice.[1,3] It has been estimated, however, that 30–40% of patients receive non-evidence-based treatment and 20–25% are prescribed medication that is not beneficial and

may even potentially cause harm.[4] These findings suggest that guidelines are not always implemented as intended. There has been extensive exploration of the challenges associated with guideline implementation leading to the development of intervention strategies to improve their adoption.[5,6] Several systematic reviews have identified that the majority of guideline implementation research does not address the key determinants of guideline uptake.[7–11] These determinants include 'barriers' and 'facilitators' that hinder or encourage implementation, respectively.[12] One review of 26 randomised controlled trials concluded that interventions that were tailored to address barriers were more likely to improve practice.[13]

A theoretical approach may be helpful in identifying behavioural factors that can be targeted by guideline implementation interventions.[7,14] The Theoretical Domains Framework (TDF) is one such theoretical approach.[15] It has been widely used to explore determinants of different behaviours including prescribing, but to date, these studies have not been synthesised to derive any additional learning from the application of this framework.[16]

The aim of this systematic review was to identify studies which had applied the TDF to identify barriers and facilitators to the adoption of prescribing guidelines, and to explore commonly occurring domains relevant to this behaviour. This review also explored whether domains varied by the prescribing behaviour targeted, that is prescribing for specific patient populations or therapeutic groups.

Method

Standard systematic review methods were applied. No ethical approval was required. A PRISMA checklist was completed for this review[17] (Appendix S1). Electronic databases (EMBASE, PubMed) were searched for the period 2005 to 13 November 2018. A total of four searches were conducted using different word combinations to find relevant studies. The first search combined the words 'TDF', 'Theoretical Domains Framework' or 'Theoretical Domain Framework'. The second search included 'Barrier', 'Barriers', 'Facilitators', 'Facilitate', 'Facilitates', 'Help', 'Helps', 'Hinder', 'Hinders', 'Behaviour Change' or 'Behavior Change'. The third search was undertaken using the words 'Guideline', 'Guidelines', 'Prescribing', 'Prescribe', 'Protocol', 'Protocol Compliance' or 'Prescription'. The fourth search combined all preceding searches to conclude studies eligible for screening (Appendix S2).

Duplicate independent screening of the titles and abstracts was undertaken by two pairs of assessors. The full texts of potentially eligible studies were retrieved and underwent duplicate independent assessment for suitability of inclusion. The reference list of each included study was checked for additional relevant studies. The search was repeated on 5 December 2018 to identify any additional studies and construct a PRISMA flow diagram (Figure 1).

Inclusion criteria

Primary research studies using data collection methods such as interviews, surveys or focus groups to explore prescribers' views were eligible for inclusion. Studies were included if the TDF was used to investigate the adoption of prescribing guidelines in a healthcare setting. Participants were medical or non-medical prescribers. The TDF was introduced in 2005; hence, the date range used for the search. No restrictions were imposed on country of origin; however, only studies written in the English language were included due to time and financial constraints. Only full publications were included.

Exclusion criteria

Studies that used the TDF to explore barriers and facilitators of prescribing but did not include guidelines were excluded. Studies exploring barriers and facilitators of guideline uptake but not involving prescribing of medication were excluded.

Data Extraction and Analysis

Duplicate independent data extraction was undertaken using a data extraction form (Appendix S3). Data were grouped by characteristics of prescribers, the target patients, setting and study design (Tables 1,2).

Results

A total of 407 studies were identified by the electronic searches. Thirty full texts were retrieved, and 15 fulfilled inclusion criteria. The majority of studies used a mixed-methods approach ($n = 6$) or interviews ($n = 6$) to obtain data. Focus groups ($n = 2$) and surveys ($n = 1$) were alternative methods used for data collection. The studies were conducted in Australia ($n = 6$), Canada ($n = 4$), the United Kingdom ($n = 2$), New Zealand ($n = 1$), the Netherlands ($n = 1$), Ireland ($n = 1$) and Lao People's Democratic Republic ($n = 1$). Five studies explored prescribing for the general population including three studies that examined prescribing in emergency care[18–20] and two studies of patients with co-morbidities in primary care.[21,22] Four studies investigated prescribing for children,[23–26] and three explored prescribing in pregnancy and preconception.[27–29] The three remaining studies investigated prescribing for the elderly.[30–32] Three of the included studies explored antibiotic prescribing.[20,23,30]

Multiple determinants were identified that affected guideline implementation, with similarities and differences identified across studies. The most commonly occurring barriers were 'Environmental context and resources' ($n = 14$), 'Social influences' ($n = 13$), 'Beliefs about consequences' ($n = 11$), 'Knowledge' ($n = 11$) and 'Social professional role and identity' ($n = 9$). The most commonly occurring facilitators were 'Beliefs about consequences' ($n = 11$), 'Social professional role and identity' ($n = 8$), 'Knowledge' ($n = 8$) and 'Social influences' ($n = 7$). Many TDF domains were identified as both barriers and facilitators within the same studies. 'Beliefs about consequences' ($n = 9$), 'Knowledge' ($n = 7$) and 'Social influences' ($n = 7$) were most frequently identified
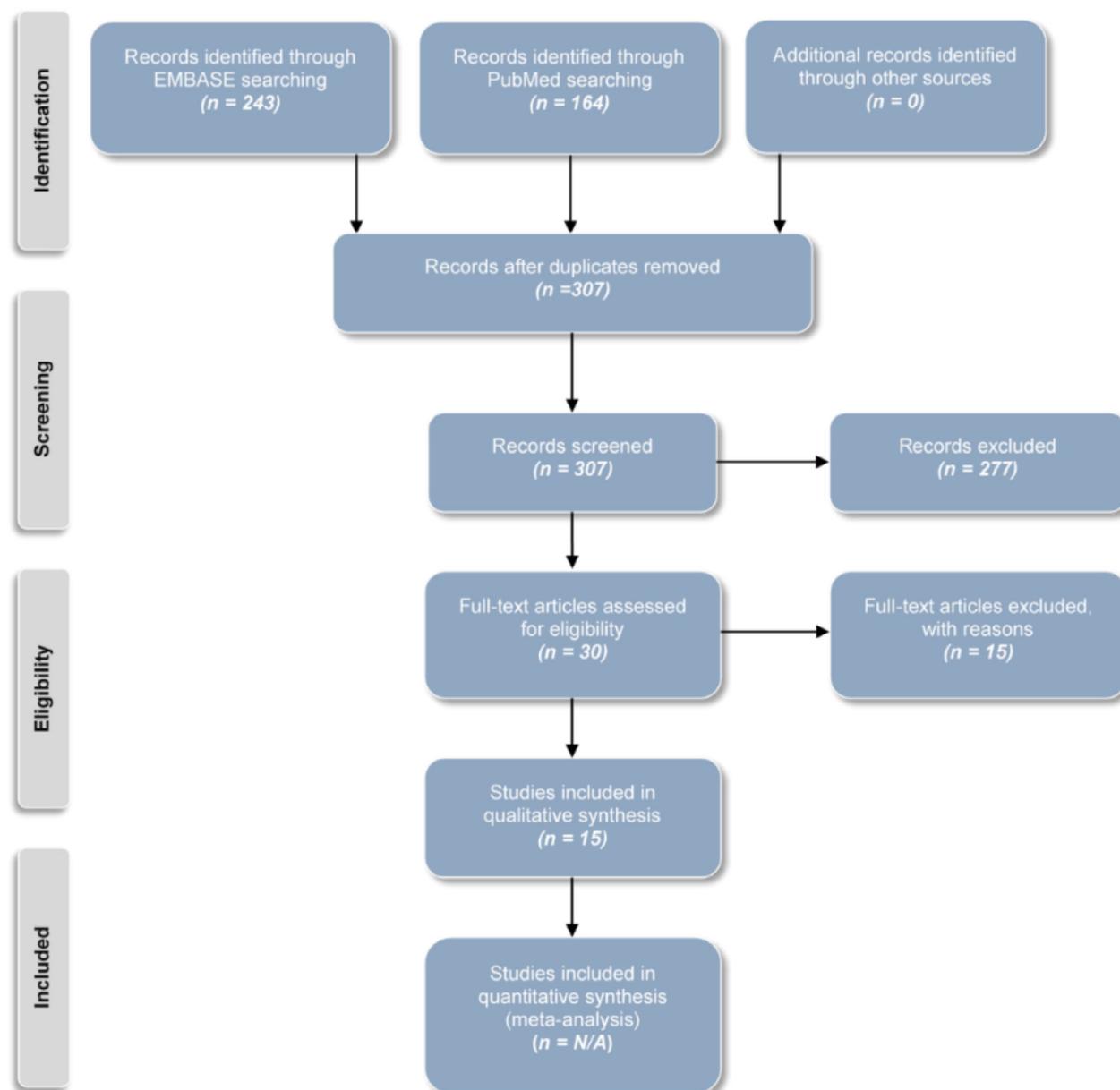
Figure 1 PRISMA flow diagram.

as both barriers and facilitators. The frequency of each TDF domain occurrence is illustrated in Figure 2.

Due to the heterogeneity of the studies, a narrative analysis was undertaken. Studies were grouped and reported by patient type or prescribing topic. The TDF domains identified by each study as barriers and facilitators to guideline adoption are presented in Table 2.

Paediatrics

Four studies investigated prescribing in children and infants.[23–26] 'Social influences' was reported as a barrier in all four studies.[23–26] Parental pressures imposed difficulties in guideline adherence as most prescribers were afraid of parents losing trust and seeking a prescription elsewhere. Peer influences also acted as a barrier due to differences in colleagues' opinions[26] and senior influences.[24] Lack of knowledge ('Knowledge') was also significant in three studies[23,25,26] as prescribers lacked awareness of guidelines and acknowledged the specificity and complexity of those already in use. 'Environmental context and resources' was identified as a barrier in terms of time constraints which limited prescribers' ability to educate parents and the rationale for following

Table 1 Summary of study characteristics (chronological order, primary, secondary and tertiary care)

Study Year of publication Country	Relevant guidelines	Target behaviour	Setting	Prescriber type	Patient	Number of participants	Study design
Walsh 2018[32] Ireland	National Institute for Health and Care Excellence (NICE) Guidelines	Antipsychotic prescribing in agitation and psychosis in dementia patients	Primary care	Consultant psychiatrists GPs Consultant geriatricians (medical) Nurses Pharmacists Healthcare assistants (non-medical)	Elderly	27	Interviews
Chambers 2018[30] Canada	Antibiotic Guidelines for Bacteriuria	Antibiotic prescribing for asymptomatic bacteriuria	Primary care	Physicians (medical) Registered nurses Registered practical nurses Nurse practitioners (non-medical)	Elderly	381	Questionnaires Focus groups
Goodarzi 2018[21] Canada	Canadian Clinical Practice Guidelines for Depression and Anxiety in Patients with Dementia or Parkinson's Disease	Antidepressant prescribing for depression and anxiety in dementia and Parkinson's disease	Primary care	Family practitioners Geriatricians Geriatric psychiatrists Neurologists Psychiatrists (medical)	General	40	Focus groups Interviews
Biezen 2017[23] Australia	Therapeutic Guidelines: Respiratory Version 5	Management of respiratory tract infections in young children	Primary care	GPs (medical) Practice nurse Maternal child health nurses Pharmacists (non-medical)	Children	30	Interviews
McBain 2016[22] United Kingdom	National Institute for Health and Care Excellence (NICE) Guidelines	Management of type 2 diabetes in people with severe mental illness	Primary care	Psychiatrists GPs (medical) Community mental health nurses Diabetes specialist nurses Diabetologist Practice nurse Primary care liaison nurse (non-medical)	General	16	Interviews
Van Peet 2015[31] Netherlands	Secondary Cardiovascular Prevention Guidelines	Prescribing for secondary cardiovascular prevention	Primary care	Young GPs GPs GP teachers (medical)	Elderly	27	Focus groups Questionnaires
Newlands 2015[20] Scotland	Scottish Dental Clinical Effectiveness Programme guidance on antibiotic prescribing	Managing antibiotic prescribing in dental bacterial infections	Primary care	Dentists (medical)	General	30	Telephone Interviews

Table -0001 Continued

| Study Year of publication Country	Relevant guidelines	Target behaviour	Setting	Prescriber type	Patient	Number of participants	Study design
Mazza 2013[28] Australia	Guidelines for Preventive Activities in General Practice – Activities Before Pregnancy section	Preconception interventions for improving pregnancy outcomes	Primary care	GPs (medical)	Women at preconception or pregnant women	22	Questionnaires
Focus groups							
Curtis 2017[19] Australia	Chest Injury Protocol	Improving blunt chest injury management	Secondary care	Emergency and trauma department staff (medical/non-medical) Specialist registrar (medical) Physiotherapists Nurse consultants Nurses (non-medical)	General	99	Questionnaires
Gray 2017[24] Lao People's Democratic Republic	The World Health Organization Pocketbook of Hospital Care for Children	Paediatric prescribing of various conditions	Secondary care	Paediatricians Paediatric residents (medical) Nurses (non-medical)	Children	70	Focus groups Interviews
McGoldrick 2016[29] New Zealand and Australia	New Zealand and Australian Antenatal Corticosteroid Clinical Practice Guidelines	Antenatal corticosteroid prescribing	Secondary care	Obstetricians Neonatologists Paediatricians (medical) Midwives (non-medical)	Pregnant women	73	Interviews Questionnaires
Brassard 2018[18] Canada	High-Dose Insulin Euglycaemia Therapy (HIET) from Poison Centre Treatment Recommendations for Calcium Channel Blocker and Beta-Blocker Poisoning	Adherence to hyperinsulinemia–euglycemia therapy for calcium channel blocker poisoning	Tertiary care	Critical care specialists (medical)	General	18	Telephone interviews
McGann 2018[25] Australia	Tertiary Paediatric Hospitals Clinical Practice Guidelines	Infant colic diagnosis and treatment and the inappropriate prescribing of anti-reflux medication	Tertiary care	Emergency department doctors (medical) Maternal and child nurses (non-medical)	Infants	78	Focus groups Questionnaires
Bain 2015[27] Australia	2010 Australian and New Zealand Foetal Neuroprotection Clinical Practice Guidelines	Antenatal magnesium sulfate prescribing for foetal neuroprotection	Tertiary care	Obstetric consultants Neonatal consultants Trainee medical officers (medical) Midwives (non-medical)	Pregnant women	45	Interviews

GP, general practitioner.
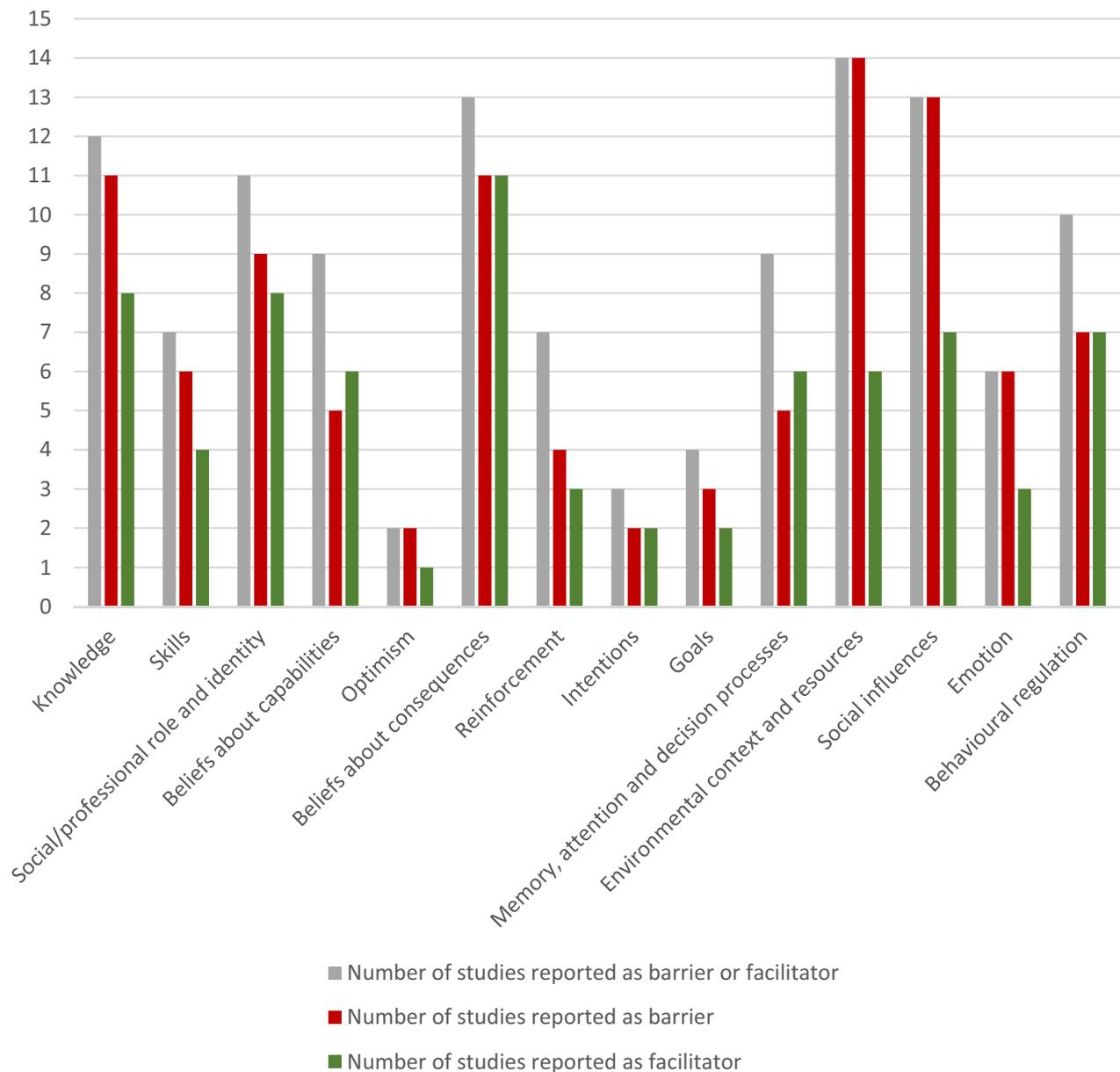
Figure 2 Frequency of barriers and facilitators reported in studies.

guidelines.[23,26] 'Beliefs about consequences' was recognised as the most important facilitator identified in three studies.[23–25] In one study, prescribers were aware that guidelines improved rationale for prescribing and standardised care.[24]

Pregnancy and preconception

Three studies examined guideline use in pregnancy and preconception.[27–29] Time constraints and limited resources were particularly evident in two studies ('Environmental context and resources').[27,29] The former also placed a burden on clinics if more time was needed to achieve guideline implementation. Lack of awareness of guidelines ('Knowledge') was also mentioned, as well as conflicting or lack of evidence of the medication prescribed ('Beliefs about consequences').[27,29] Contrastingly, two studies reported that prescribers believed guidelines ensured the best outcomes for patients ('Beliefs about consequences').[27,29] 'Social influences' was also an important factor in the studies with the influence of colleagues acting as both barriers and facilitators depending upon circumstances.[27,29]

Table 2 Barriers and facilitators identified in all studies (X – barrier, ✓ – facilitator, [study reference])

	Children and infants				Pregnancy and preconception			Elderly		Co-morbidity		Emergency		
	[26]	[23]	[24]	[25]	[29]	[27]	[28]	[31]	[32]	[22]	[21]	[18]	[19]	[20]
Knowledge	X	X	✓	X	X	X		X	✓	X	X	X	X	✓
Skills		X			X	X		X		X	X	X	X	
Social/professional role and identity		X	✓	X	X	X			✓	X	X	X		✓
Beliefs about capabilities	✓	✓	✓		✓		X	✓	✓	✓	X	X	✓	X
Optimism										X				X
Beliefs about consequences	X	X	✓	X	X	X		X	X	✓	X	X	X	✓
Reinforcement			✓			X						X		✓
Intentions								X		X	X			
Goals							X			X	X			
Memory, attention and decision					✓		✓	✓	✓		X	✓	X	✓
Environmental context and resources	X	X	X	X	✓	X	X	X	✓	X	X	✓	X	✓
Social influences	X	X	✓	X	X	X		✓	✓	✓	X	✓	X	✓
Emotion		X							X	X	X		X	X
Behavioural regulation	X		✓	✓		✓			✓	✓	X	✓	X	✓

Elderly

Three studies examined prescribing for elderly patients in primary care, two of which explored de-prescribing and inappropriate prescribing.[30–32] The 'Beliefs about consequences' domain was reported in all studies as a barrier.[30–32] Some practitioners believed, for example, that prescribing antipsychotics to elderly patients would have negative consequences and, therefore, did not follow guidelines.[32] Other prescribers chose not to follow guidelines because of their uncertainty regarding whether the patient would live long enough to benefit from treatment but also because they were concerned about side effects and negative impacts on quality of life.[31] All three studies identified a need for improved communication, resources and time management for pursuing better practice and care ('Environmental context and resources').[30–32]

Co-morbidity

Two studies explored the use of guidelines in patients with co-morbidities.[21,22] Participants identified that guidelines were difficult to understand and utilise in practice (especially by generalist prescribers) ('Environmental context and resources' and 'Knowledge').[21,22] Prescribers reported feeling a lack of competence because they were prescribing outside their professional role ('Social professional role and identity' and 'Beliefs about capabilities').[21,22] This may have been due to inadequate training and experience within the area. Both studies acknowledged that patient engagement and preferences were substantial barriers to guideline compliance as patients wanted specific medicines prescribed ('Social influences').[21,22] Both studies identified awareness of guidelines ('Knowledge') as a facilitator for guideline compliance.[21,22] An additional facilitator was the ability of healthcare professionals to work collaboratively and access help and support when managing patients with co-morbidities ('Social professional role and identity' and 'Social influences').[21,22]

Emergency care

Two studies explored compliance with prescribing guidelines in emergency settings in secondary and tertiary care.[18,19] Peer influences ('Social influences') were apparent in both as barriers and facilitators.[18,19] It was also noted that guidelines were not relevant to certain patients ('Social professional role and identity' and 'Beliefs about consequences') as recommendations were not sufficiently inclusive.[18,19] Both studies also identified time limitations as a frequent barrier to guideline compliance

('Environmental context and resources').[18,19] Lack of training was a barrier; that is, staff had not received training about the protocol/guidelines ('Knowledge' and 'Behavioural regulation').[18,19] This made guidelines difficult to use in a highly time-pressured environment. In both studies, it was established that guidelines aided prescribers in being sure of what their role was, and what was expected of them ('Social professional role and identity').[18,19] The use of guidelines to improve recovery times and outcomes was identified as facilitators ('Beliefs about consequences').[19]

An additional study explored prescribing in dental emergencies within primary care.[20] A lack of understanding of emergency care guidelines ('Behavioural regulation') was consistent with other emergency care studies.[18,19] The study also emphasised the need for additional training.[20]

Antibiotics

Three studies (reported above) investigated antibiotic prescribing.[20,23,30] One of the most dominant barriers observed in all studies involved time restrictions ('Environmental context and resources').[20,23,30] This led to clinicians prescribing antibiotics instead of complying with guideline recommendations. The 'Social influences' domain was also evident in all studies.[20,23,30] Patient and family fears influenced clinicians' decision to prescribe antibiotics contrary to guideline recommendations. Two studies[20,30] mentioned fear of infection being missed or exacerbation as a consequence of not providing antibiotic relief ('Emotion' and 'Beliefs about consequences'). A further finding in relation to the latter domain was that guideline compliance was facilitated if clinicians believed that antibiotics were not indicated and would not achieve the desired outcomes.[20,23]

Quality of included studies

No formal assessment was undertaken of the quality of the included studies; however, from the narrative analysis it was clear that there was substantial variation in study quality. For example, the frequency of each behavioural domain was not always specified. An expressed belief may have been held by one participant or the majority. The use of interviewer blinding varied with one study reporting interviewee blinding to the type of prescriber,[20] whereas no blinding was used with the single interviewer in the study by Gray et al.[24] The sample size varied across studies, often with small sample sizes being reported. One study indicated that, despite the sample size, data saturation was presumed to have been achieved.[27]

Discussion

To our knowledge, this is the first systematic review of studies which have used the TDF to explore the key determinants of the adoption of prescribing guidelines. Whilst the 15 included studies explored a wide range of patient populations and health settings, similar domains were often identified as influencing guideline-compliant behaviour.

Strengths and limitations

The use of duplicate independent screening and data extraction reduced the risk of selection bias. Whilst there was no formal assessment of study quality, it was evident that quality varied across the included studies. No formal critical appraisal was undertaken; however, specific limitations of studies were highlighted, such as unspecified behavioural domain occurrence, variations in interviewer blinding and differences in sample sizes. No studies were excluded for quality reasons.

General findings

One of the dominant barriers was lack of time, identified in more than half of the studies.[19,20,22,23,26–29] Time restrictions impeded full engagement with patients and the use of consultation time appropriately hindering guideline use. This barrier has been acknowledged frequently in previous systematic reviews of barriers to guideline implementation[12,14] but one which could potentially be overcome by standing orders and financial incentives.[33]

Lack of awareness and understanding of guidelines was also a barrier identified in many of the included studies.[18–20,22,26,27,29,30] A systematic review by Francke et al.[12] suggested that it is not sufficient to merely disseminate a guideline by policy makers and implementers, but that practitioners should be directed and actively involved in implementation strategies that increase awareness and familiarity with the guidelines.[12]

Guideline complexity was previously identified as the most frequent barrier to guideline use.[12] Several studies in the current review reflect this finding.[18–20,24,27] This was particularly evident in this review in terms of studies undertaken in emergency care, all of which mentioned guideline complexity as a major barrier in a highly time-pressured environment.[18,19] Similarly, the included studies that explored prescribing in co-morbidity also identified complexity as a barrier and suggested that guideline simplification was necessary for generalist use.[21,22]

Social influences were frequently identified as barriers.[20–26,30] Family anxiety was especially apparent in studies of paediatric[23,26] and elderly[30] patients. Healthcare professionals were unable to comply with recommendations due to the fear of family members losing trust or seeking prescriptions elsewhere.[23] Moreover, patients refused treatment[22] or arrived in the consultation room expecting specific medicines to be prescribed.[20]

Lack of evidence was a barrier in multiple studies.[18,21,27–29,31] Clinicians preferred to use their clinical expertise in preference to guidelines that lacked sufficient evidence. Interestingly, all studies concerning pregnancy and preconception identified this barrier.[27–29] However, some studies also recognised a lack of clarity regarding how to use the evidence in specific populations.[18,19,29] Van Peet *et al.*[31] acknowledged that guidelines were not applicable for the older population leading to uncertainty in prescribing. Previous findings have established that most clinical guidelines today are disease-specific and fail to address the intricacies and heterogeneity of managing older patients.[34] This suggests the need for more individualised guidelines that prioritise therapies and goals of more complex patients.[34]

Our review found that some clinicians disagreed with guidelines and simply chose not to use them in practice.[18,21,28] Discrepancies in colleagues' opinions had an impact on guideline adoption.[18,19,27,29] Brassard *et al.*[18] highlighted the need for improvement in inter-professional communication to increase awareness of existing guidelines. The influence of colleagues, however, also acted as a facilitator in several secondary and tertiary care studies.[18,19,24,25,27,29] The acceptance of guideline-based therapy by peers reassured practitioners and, therefore, promoted guideline use.[18]

Simple and easy-to-use guidelines facilitated prescribing emphasising the need for guideline simplification.[27,19,29,20] Some studies also acknowledged that guidelines provided confidence within prescribers and were viewed as instrumental in standardising care.[18,22,24,26] Several studies identified that guidelines improved patient outcomes which facilitated their use.[19,27,31] The use of checklists and action plans ensured that guidelines were utilised in primary care patient consultations.[22,26,28]

Future research, policy and practice

The barriers to guideline compliant prescribing most frequently identified in this systematic review were time constraints, lack of understanding and/or awareness, lack of clinical evidence, and social influences. Policymakers who invest in the development of guidelines need to plan and adopt effective implementation strategies to achieve their desired objectives. Guidelines that are succinct and easy-to-use may improve their adoption. Training programmes and resources to promote dissemination and understanding of guidelines should be considered. Transparency is needed regarding the evidence from which guidelines are derived.

Guideline implementation strategies that are successful in one setting may fail in others because barriers may differ.[14] For example, this review demonstrated the importance of social influences in prescribing associated with paediatric populations. Where social influences are likely to be key determinants for the uptake of guideline recommendations, interventions might be required to influence patient and public behaviour in addition to prescribing behaviours. As such, research that targets identified healthcare settings and patient populations may provide further evidence to increase the specificity and credibility of intervention strategies.

Conclusion

Multiple behavioural factors affect the adoption of prescribing guidelines. Interventions that fail to address the most commonly encountered barriers are less likely to influence guideline adoption and achieve the desired improvements in patient outcome. This review investigated barriers and facilitators that affect guideline implementation from a theoretical perspective. It aided the understanding of influencing factors that may be targeted to increase guideline compliance.

Declarations

Conflict of interest

The Author(s) declare(s) that they have no conflicts of interest to disclose.

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Author contributions

All authors had access to study data. All authors contributed to searching, assessing and analysing research studies included in the systematic review. Paulina Paksaite and Margaret Watson revised the manuscript to display the findings of this research.

Ethical approval

No ethical approval was required for this systematic review. Analysis was undertaken of existing research available in the public domain. No additional human participation or handling of personal data was used to conduct this research.

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Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Appendix S1. PRISMA checklist.
Appendix S2. EMBASE search strategy.
Appendix S3. Data extraction form.