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Barriers to and facilitators of independent non-medical prescribing in clinical practice: a mixed-methods systematic review

Timothy Noblet [a,b], John Marriott [c], Emma Graham-Clarke [c], Alison Rushton [a]

[a] Centre of Precision Rehabilitation for Spinal Pain, School of Sport, Exercise and Rehabilitation Sciences, University of Birmingham, Birmingham, UK; [b] Department of Health Professions, Macquarie University, Sydney, Australia; [c] Institute of Clinical Sciences, University of Birmingham, Birmingham, UK

KEY WORDS

Barriers
Facilitators
Non-medical prescribing
Independent prescribing

CrossMark

ABSTRACT

Question: What are the factors that affect the implementation or utilisation of independent non-medical prescribing (iNMP)? **Design**: Mixed-methods systematic review. Two reviewers independently completed searches, eligibility and quality assessments. **Data sources**: Pre-defined search terms were utilised to search electronic databases. Reference lists, key journals and grey literature were searched alongside consultation with authors/experts. **Eligibility criteria for included studies**: Qualitative and quantitative studies investigating independent prescribing by any non-medical professional group. Study participants included any stakeholders involved in actual or proposed iNMP. Measurements reported on data describing stakeholders' perceptions and experiences of the barriers to/facilitators of iNMP. **Results**: A total of 43 qualitative and seven quantitative studies from three countries (n = 12, 117 participants) were included. Quality scores varied from 9 to 35 (Quality Assessment Tool for Studies with Diverse Designs, 0 to 48). Qualitative data were synthesised into four themes (and subthemes): systems (government and political, organisational, formulary); education and support (non-medical prescribing (NMP) courses/continuous professional development (CPD)); personal and professional (medical profession, NMP professions, service users); and financial factors. Quantitative data corroborated the qualitative themes. Integration of the qualitative themes and quantitative data enabled the development of a NMP implementation framework. **Conclusion**: Barriers to and facilitators of the implementation and utilisation of iNMP are evident, demonstrating multifactorial and context-specific variables within four explicit themes. Professional bodies, politicians, policy and healthcare managers and clinicians could use the resulting NMP implementation framework to ensure the safe and successful implementation and utilisation of NMP. Clinical physiotherapists and other clinicians should consider whether these variables have been adequately addressed prior to adopting NMP into their clinical practice. **Registration**: PROSPERO CRD42015017212. **[Noblet T, Marriott J, Graham-Clarke E, Rushton A (2017) Barriers to and facilitators of independent non-medical prescribing in clinical practice: a mixed-methods systematic review. _Journal of Physiotherapy_ 63: 221–234]**

Introduction

Non-medical prescribing (NMP) is utilised in a diversity of ways by a variety of health professions internationally.[1] In the UK the two types of NMP that are used by prescribers are supplementary non-medical prescribing (sNMP) and independent non-medical prescribing (iNMP).[2,3] Clinicians prescribing via sNMP use a clinical management plan in partnership with a medical or dental practitioner, whereas iNMP requires the clinician to be entirely autonomous, prescribing medicines based on their individual clinical reasoning and judgments.[2] Independent physiotherapy prescribing was introduced in the UK in 2012, with the first physiotherapists qualifying as independent prescribers in 2013.[4] Physiotherapists in Australia have now expressed an interest in NMP and commenced national processes to evaluate potential clinical need, quality and safety issues.[5] The implementation and legal utilisation of NMP will require healthcare policy modification

and legislative reform. Organisational objectives, professional issues and societal influence must be reflected in national and local policy if change is to occur.[6] However, robust research is required to guide the implementation of evidence-based NMP practice and the necessary changes in policy.

Pharmacist prescribing has demonstrated clinical effectiveness for the management of chronic pain in primary care and postoperative pain in a tertiary surgical unit, with statistically significant improvements in pain intensity ($p = 0.02$), anxiety and depression ($p = 0.022$),[7] and reduced prescribing errors ($p < 0.001$)[8] compared to traditional practices.[7–9] The effectiveness of prescribing in physiotherapy-specific settings has not yet been examined because the instigation of independent physiotherapy prescribing is recent. Physiotherapists must ensure that they learn from the evidence from other professions and their application of strategies to implement and utilise NMP.[10] The analysis and synthesis of this evidence is paramount to understand the factors

acting to enable or block iNMP[10,11] because successful implementation of innovations (such as iNMP) depend on exploiting facilitators and planning for potential barriers.[6,12]

Therefore, the specific research question for this systematic review was:

What are the factors that affect the implementation or utilisation of independent non-medical prescribing (iNMP)?

Method

A mixed-methods systematic review was conducted according to a pre-defined protocol that followed the Cochrane Handbook and was reported in accordance with the PRISMA statement.[13–15] The protocol was registered with PROSPERO (CRD42015017212).[16,17] A sequential exploratory approach harmonised the qualitative and quantitative literature.[18]

Identification and selection of studies

A comprehensive pre-determined search strategy of the databases outlined in Box 1 was developed in MEDLINE as shown in Appendix 1 (see eAddenda for Appendix 1), and customised for the other databases.[19] The other information sources outlined in Box 1 were also searched. Where eligible pilot studies were identified, the reviewers searched for the full studies. Authors were contacted if full studies were not retrieved, to confirm the existence of a full study and/or any other related (un)published literature. Reference lists of included studies were searched,[20,21] and subject experts were consulted to detect any further studies.[13,20–22]

Eligibility criteria were defined a priori. The inclusion criteria are presented in (Box 2). Studies not written in English were excluded once identified, in order to provide information on potential bias.[19] Descriptive papers, editorials and opinion papers were excluded due to their potential internal bias.[23] All studies satisfying the eligibility criteria were included.

Two investigators completed the literature searches (TN/EGC); each independently evaluated titles and abstracts for inclusion. A third reviewer (AR) mediated in cases of disagreement. Where exclusion was not possible based on title and abstract, the investigators independently reviewed the full text. All studies fulfilling eligibility criteria were included.

Data extraction

Qualitative data

One reviewer (TN) used commercial software[a] to extract data assessing stakeholders' experiences of the barriers to and

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Box 1. Information sources.

Databases
- CINAHL, EMBASE, MEDLINE, AMED, NICE, Medicines Complete, HMIC, ASSIA, Web of Science, Health and Safety Science Abstracts

Internet sites
- PUBMED, Turning Research into Practice, Google Scholar, Royal College of Nursing, Royal Pharmaceutical Society, King's Fund, National Institute of Clinical Excellence, Department of Health, National Prescribing Centre, Chartered Society of Physiotherapy, Society of Chiropodists and Podiatrists, American Association of Nurse Practitioners, Australian College of Nurse Practitioners, Canadian Pharmacists Association, Optometry Australia, British Optometry Association

National Research Register

Hand searching of key journals

System for Information on Grey Literature, unpublished research

Expert opinion

Reference lists of all included papers

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facilitators of iNMP.[20] A second reviewer (EGC) independently reviewed data extraction by ensuring that all relevant data were extracted. Differences in opinion were resolved at a consensus meeting.[22]

Quantitative data

Data pertaining to barriers and facilitators were extracted from the quantitative studies independently by the two reviewers (TN, EGC) using data extraction sheets specific to the study objectives.[20] The third reviewer (AR) checked for consistency, clarity and aided resolution throughout the process.

Assessment of study quality

The comprehensiveness of reporting and transparency was evaluated using the Quality Assessment Tool for Studies with Diverse Designs (QATSDD),[23] producing a quality rating score for each study. Good validity, inter-rater reliability and test-retest reliability have been established for the QATSSD across a diversity of study designs, demonstrating its value for consistent quality assessment in mixed-methods designs.[23,24] Two researchers (TN and EGC) independently assessed each study, with disagreements discussed and resolved.[22]

Box 2. Inclusion criteria.

Population
- Independent non-medical prescribers from any professional group with legal authorisation to prescribe medicines independently,[82] or stakeholders engaged with non-medical prescribers/NMP services.

Intervention
- NMP provided by a professional group with legal authorisation to prescribe medicines independently.[82]

Comparator(s)/control
- Not applicable

Qualitative study designs
- Any empirical qualitative study that describes the sampling strategy, data collection procedures, and type of data analysis.[83]

Qualitative outcomes
- Consumers', carers' and/or healthcare professionals' perceptions and experiences of the barriers to and/or facilitators of iNMP.[13]

Quantitative study designs
- Any design reporting quantitative data.[13]

Quantitative outcomes
- Quantitative survey questions assessing: the barriers to and/or facilitators of iNMP; economic comparisons; patient, staff and/or educational satisfaction/expectation; location comparisons; and health sector/specialty comparisons.[13]

iNMP = independent non-medical prescribing, NMP = non-medical prescribing.

Data analysis and synthesis of results

A three-step process of analysis synthesised the qualitative and quantitative data.

Qualitative component

Qualitative data were synthesised using a thematic analytical approach.[25] One reviewer (TN) undertook line-by-line coding of data relating to barriers and facilitators of iNMP. Data were grouped into descriptive themes and then developed into analytical themes/sub-themes.[25] Two reviewers reviewed preliminary themes/sub-themes; they re-read all included studies to ensure that the identification of all relevant data was complete.[25] The themes/sub-themes were then scrutinised by a panel of experts to agree upon the findings. Characteristics and outcomes of the included studies were tabulated.

Quantitative component

Data from quantitative survey questions assessing barriers and facilitators were extracted from the quantitative studies. Studies' characteristics and outcome data were tabulated. A narrative analysis of the quantitative evidence was undertaken independent of the qualitative literature analysis.[21]

Integration

The qualitative and quantitative data were compared through an integration process to determine agreement or disagreement within identified themes/sub-themes.[18,26] Data were tabulated into an integration matrix.[25–27] Whether qualitative and quantitative data corroborated and confirmed findings was observed and reported. To demonstrate the key factors that affect the implementation and utilisation of iNMP, the integrated data were used to develop an implementation framework.[25]

Results

Flow of studies through the review

As shown in Figure 1, 3247 (3244 from database searches, three from reference lists) potentially relevant studies were identified. No unpublished studies were identified. Following removal of duplicates (n = 247), 3000 citations remained. Screening by title and abstract excluded 2876 studies, with full texts of the remaining 124 studies examined in detail. This resulted in 43 qualitative studies and seven quantitative studies, totalling 50 included studies.

Characteristics of qualitative studies

Study characteristics

Characteristics of the qualitative studies are summarised in the first three columns of Table 1. More detailed characteristics are available in Table 2 (see the eAddenda for Table 2). Studies were undertaken in three countries: 39 (91%) in the UK, two (5%) in Canada and two (5%) in the USA.

Study methods

Of the 43 included studies, 24 (56%) used interviews, 11 (26%) used surveys, and one (2%) used focus groups as the primary research method. The remaining seven (16%) studies used a mixed-methods approach including surveys/interviews/focus groups/non-participant observation.

Participants

Across the 43 studies, 7344 participants were recruited. In two instances, data from one sample were reported across two studies. Where sample populations were duplicated across multiple studies reporting different data, participants were counted once.[28–31] Table 3 summarises the stakeholder groups engaged
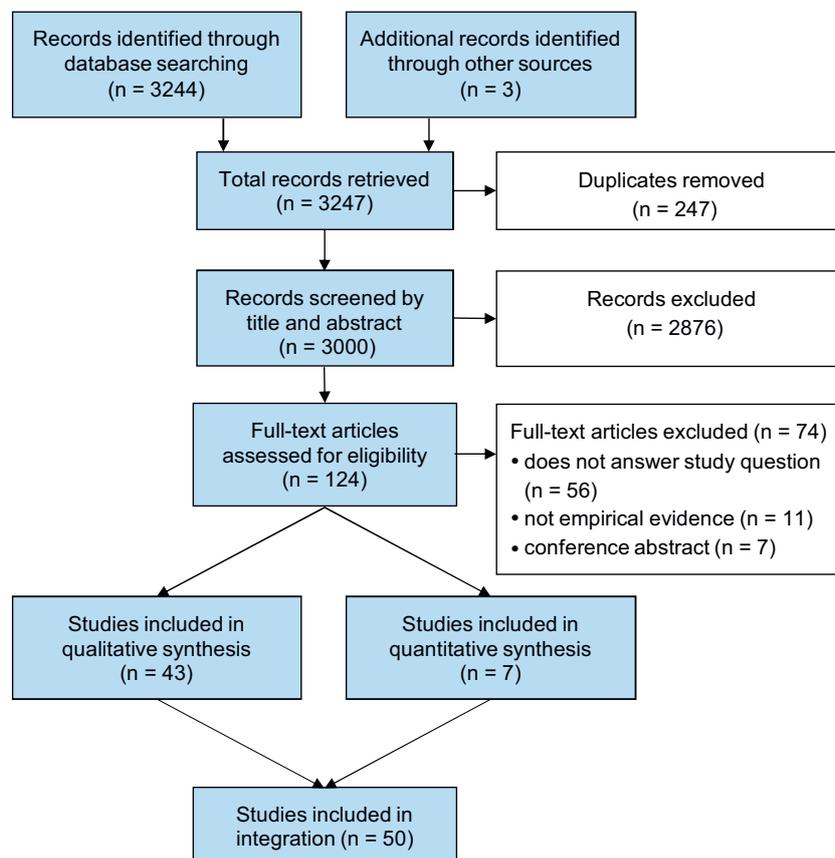

Figure 1. Flow of studies through the review (adapted from Moher et al).[19]

Table 1
Characteristics and quality of the included qualitative studies (n = 43).

Study	Setting	Specialty	Total (n)	Mode of data collection: number of participants from each profession	Quality[a] (0 to 48)
Avery[32]	Community/Hospital	Various	110	Survey: 80 nurses, 3 midwives, 2 pharmacists. Interview: 16 nurses, 5 doctors, 1 pharmacist, 3 managers	18
Bennett[45]	Community	HIV	8	Survey: 8 nurses. Interview: 8 nurses	19
Bradley[51]	Community/Hospital	Various	45	Face-to-face interview: 31 nurses. Telephone interview: 14 nurses	19
Bradley[36]	Community/Hospital	Mental Health	15	15 nurses	9
Carey[37]	Hospital	Paediatrics	21	7 nurses, 11 doctors, 3 managers	20
Carey[38]	Community	Dermatology	40	11 prescribing nurses, 12 doctors, 11 admin staff, 6 non-prescribing nurses	19
Courtenay[39]	Hospital	Paediatrics	14	7 nurse prescribers, 4 consultant doctors, 3 managers	30
Courtenay[33]	Community/Hospital	Various	28	28 NMP leads	25
Cousins[62]	Community	General Practice	6	6 nurses	24
Downer[55]	Community	District nursing	8	8 district nurses	20
Earle[57]	Community	Mental Health	8	2 prescribing nurses, 6 service users	26
Glod[48]	Community/Hospital	Mental Health	1352	1352 advance practice nurses	27
Guirguis[74]	Community	Various	38	13 prescribing pharmacists, 25 non-prescribing pharmacists	32
Hales[56]	Community/Hospital	Mental Health	32	32 advanced practice nurses	9
Hall[75]	Community	Various	21	21 community nurses	9
Hall[40]	Community	Various	67	Interview: 11 district nurses, 10 health visitors, 2 practice nurses. Survey: 44 NMP leads	27
Hill[76]	Community	Addiction Services	97	86 service users, 5 prescribing pharmacists, 6 doctors	14
Hobson[49]	Community/Hospital	Various	18	18 service users	31
Jones[50]	Hospital	Various	196	Interview: 3 prescribers (profession n/s), 7 mentors/colleagues, 8 managers. Structured non-participant observation: 2 nurse prescribers, 2 doctors, 52 consultations. Survey: 122 service users	35
Kelly[54]	Community	General Practice	151	151 community practice nurses	17
Lewis-Evans[58]	Community	Various	7	7 nurses	28
Luker[77]	Community	Various	256	256 service users (157 pre-prescribing, 148 post prescribing)	5
Maclure[41]	Community/Hospital	Various	1855	1855 service users	18
Makowsky[59]	Community	Various	38	38 pharmacists	32
McCann[42]	Community/Hospital	Various	105	105 pharmacists	20
McCann[43]	Community/Hospital	Various	35	11 pharmacists, 11 doctors, 13 other stakeholders	25
Mulholland[65]	Hospital	Paediatrics	45	45 pharmacists	11
Nolan[53]	Community/Hospital	Mental Health	51	51 nurses	17
Page[64]	Hospital	Dementia	20	13 service users, 7 non-prescribing staff	19
Ross[34]	Community/Hospital	Mental Health	45	33 nurses. Focus group: 12 nurses	34
Ryan-Woolley[29]	Community/Hospital	Oncology/Palliation	2252	2252 nurses	15
Ryan-Woolley[28]	Community/Hospital	Oncology/Palliation	2252	2252 nurses	19
Scrafton[35]	Hospital	Various	6	6 nurses	29
Shannon[78]	Community/Hospital	Cardiology	21	Focus group: 21 doctors. Interview: 21 doctors	24
Stenner[61]	Community/Hospital	Dermatology	18	12 doctors, 6 non-prescribing nurses	22
Stenner[46]	Community/Hospital	Diabetes	31	10 prescribing nurses, 9 doctors, 9 admin staff, 3 non-prescribing nurses	21
Stenner[30]	Community/Hospital	Pain Management	26	26 prescribing nurses	22
Stenner[31]	Community/Hospital	Pain Management	26	26 prescribing nurses	28
Stenner[60]	Community	Diabetes	41	41 service users	23
Travers[44]	Community	Various	7	Focus group: 7 nurses. Interview: 7 nurses	10
While[52]	Community	Various	91	91 community nurses	20
Wix[79]	Community/Hospital	Mental Health	78	78 service users	10
Young[80]	Community	Various	5	5 community nurses	19

Admin = administrative, HIV = human immunodeficiency virus, NMP = non-medical prescribing, n/s = not stated.
[a] Quality Assessment Tool for Studies with Diverse Designs.[23]

with each data collection method. A few participants (0.4%) had no defined role, being described as general stakeholders.

Intervention

Most of the included studies investigated nurse iNMP (n = 33, 77%), with pharmacists being the only other professional group that was specifically investigated (n = 6, 14%). Two studies investigated both nurse and pharmacist iNMP together (5%), with a further two studies investigating iNMP from all potential professional groups (5%).

Setting

Study settings included both community healthcare (40%) and hospital settings (14%), with most studies conducted across both healthcare settings (47%). A total of 42% of included studies encompassed all healthcare specialties (n = 18). The remaining studies examined: mental health (16%), paediatrics (7%), dermatology (5%), general practice (5%), oncology and palliative care (5%), diabetes (5%), pain management (5%), human immunodeficiency virus (2%), district nursing (2%), addiction (2%), dementia (2%) and cardiology (2%).

Table 3
The number of stakeholders engaged with each data collection method.

Stakeholder	Surveys (n)	Interviews (n)	Focus groups (n)	Observation (n)	Total n (%)
Nurses	4053	222	42	2	4319 (59)
Service users	2055	420	0	52	2527 (34)
Pharmacists	152	93	0	0	245 (3)
Medical doctors	0	91	21	2	114 (2)
NMP leads	44	28	0	0	72 (1)
General	0	30	0	0	30 (<1)
Admin staff	0	20	0	0	20 (<1)
Managers	0	17	0	0	17 (<1)
Total	6304	921	63	56	7344 (100)

Admin = administrative, NMP = non-medical prescribing.

Quality assessment

Quality scores of the qualitative studies are summarised in Table 1 and ranged from 9 to 35. Detailed quality criteria information is provided in Table 4 (see eAddenda for Table 4).

Results and synthesis of qualitative studies

Identified factors were categorised into four major themes: systems factors; education and support factors; personal and professional factors; and financial factors. The major themes and their subthemes are described below. Each theme can be both a barrier and facilitator, depending on context. Table 5 lists the studies that reported or discussed each theme, providing illustrative quotations from participants or study authors for each subtheme. It is acknowledged that the themes interact with each other.

Systems factors

Participants in 32 (74%) of the included studies highlighted a range of system factors that may act as either barriers or facilitators to implementing NMP, including government and political factors, organisational factors and practices, and delivery in terms of formulary.

Government and political factors: Participants perceived that factors such as political motive, government funding availability for education, adequate and appropriate political drive, and strategic/cohesive planning at all government levels could facilitate or impede NMP use.[32–35] Specifically, participants recognised facilitators such as the importance of access to funding and the need for implementation pressure on health services from government.[32,35] Potential barriers were identified as the absence of political leadership, and politically driven promotion of NMP as a cheap alternative to medical prescribing, rather than promotion of non-medical prescribers with the knowledge and skills to enhance patient access to care.[33,34]

Organisational factors: Participants highlighted the importance of robust local clinical governance policies, pathways and procedures in place prior to training non-medical prescribers,[28,31–44] with standardised local policy to ensure quality of care and patient safety, and lines of authority and responsibility clearly defined.[32,34] Scope, parameters, boundaries and guidelines should be clearly documented and readily accessible to all stakeholders.[34] Adequate support mechanisms with time and funding for continuing professional development (CPD) activities should also be documented.[30,38] Further, participants deemed it essential that institutions ensure access to patients' medical records where required, with clear guidelines regarding clinical documentation, incident reporting and communication.[40,41,43] Clinicians must prescribe within their individual competency, with transparent policies to alleviate concerns from pressure to prescribe outside of scope from senior colleagues and managers.[35,42–44] Participants recommended that databases should be developed locally to: enable prescribing practice audit; ensure evidence-based clinical practice, transparency and accountability;[33] and showcase potential economic savings.[36]

Participants noted that financial processes enabling infrastructure, administration and logistics must be in place prior to implementation.[33,45] Excessive delays in access to prescription pads or electronic prescribing were a fundamental issue that prevented clinicians from utilising their prescribing skills.[33,34,40,46] Both local and national administrative processes required for prescriber authorisation and to start prescribing were seen as barriers.[40,42,47,48] Processes were described as long and arduous, resulting in many potential prescribers feeling that the outcome was not worth the stress and effort,[47,48] or loss of confidence by qualified prescribers by the time they were given the authority and facilities to prescribe.[47] The availability of appropriate clinical facilities was considered important.[49] Absence of a consultation room in some facilities may compromise assessment of patients' needs.[49]

Facilitation of NMP was recognised when a strategic, collaborative and consultative approach to develop and implement it into a service was adopted.[32,33,50] This reduced the risk of professional territorialism, and ensured that the focus remained on patient-centred care rather than a specific profession's interests.[51] A lack of vision regarding the benefits of commissioning innovative areas of practice was reported as a barrier.[33] It was recognised that for NMP to become embedded in practice, service development and implementation should reflect the needs of the local community and address issues such as workforce planning, CPD requirements and clinical frameworks development.[34,36,37,51] Long-term viability of NMP services was highlighted as a historical area of weakness. One study[36] recommended that if NMP were to develop in a health service, four or five non-medical prescribers should be trained to ensure support and succession planning. Participants recognised that well-defined selection criteria aimed at selecting the best candidates for NMP training was beneficial.[37,39] Conversely, others warned that overly restrictive criteria might be a barrier to NMP expansion into new areas of practice.[33] Another key barrier was a fragmented health service caused by the division of funding for service provision and prescription drugs, plus geographical restrictions due to law, regulation or organisational jurisdiction.[33,36,40] To counteract this, innovative service design alongside utilising an individual profession's skills, talents and mastery were recommended. Simply replacing medical staff in conventional clinical environments with non-medical prescribers, where budgets, or medical staff availability dictate practice, was perceived as short sighted.[33,38]

Formulary: Most participants identified a 'limited formulary' as a potential barrier. Due to the dynamic nature of drug availability, and constantly evolving evidence-based practice, frustrations were frequently felt because of practice limitations secondary to formulary restrictions.[31,44,52,53] Participants reported situations when they could not prescribe appropriate medication because it was outside an out-dated formulary governing their practice.[44,53] Some UK clinicians had waited to become non-medical prescribers until national prescribing restrictions had been removed, as prior to this their practice would have been too limited to be worthwhile.[54] Conversely, one study[31] acknowledged that a 'limited formulary' might facilitate NMP, as defined limits of practice enable new prescribers to resist pressure from patients, managers and clinical colleagues to prescribe outside scope.[31] Open formularies were reported to actively facilitate successful NMP implementation, allowing competent clinicians to prescribe within their professional code of conduct; reducing patient waiting times and further easing the workloads of medical prescribers, who would previously have had to prescribe if the required drug was absent from the NMP restricted formulary.

Education and support factors

Participants in 27 (63%) of the included studies reported that the educational processes related to the application of NMP, and the level and type of support offered to non-medical prescribers by stakeholders can act as either barriers to or facilitators of successful implementation of iNMP.

Education: Participants reported that NMP course attendance was often influenced by their employers' willingness to provide financial support for tuition and relief from duties.[54] Many clinicians were unwilling to undertake NMP courses because of limited incentives, with no financial gain following qualification, and pre-existing busy clinical caseloads.[54] The cost and time related to completing course prerequisites such as numeracy, pharmacology and assessment/diagnostic training were also barriers.[33] Nevertheless, other participants recognised the prerequisites as imperative to maintaining quality standards and ensuring academic ability.[33] Many participants felt that the generic, interdisciplinary nature of NMP courses did not adequately prepare them to prescribe, with pharmacology content frequently described as lacking.[34,35,44,55] Despite this, courses were perceived to facilitate NMP by providing access to all

Table 5
Themes and sub-themes from the included studies, with illustrative quotations from the studies' participants or authors.

Theme Sub-theme	Example quotations from included studies	n (%)	Key elements	Studies
Systems Factors		32 (74)		
Government and political factors		4 (9)		
	The introduction of this initiative was accompanied by a lot of pressure from the Department of Health on the trusts to push through as many nurses as quickly as possible.[32] p3	1 (2)	Drivers	[32]
	The Government had given these free places for training and there was this sort of scrabble for all of us to be put into doing it whether or not we needed it.[35] p2046	1 (2)	Funding sources	[35]
	. . . a lack of leadership at both a national and strategic health authority level.[33] p8	1 (2)	Cohesive thinking and strategy	[33]
	Participants believed that patient benefit rather than doctor shortage should be the motivation behind nurses prescribing.[35] p2049	2 (5)	Motives	[34,35]
Organisational factors	. . . an institutional strategy is required if non-medical prescribing is to be successful in these settings.[32] p3	31 (72)		
	Ensuring that clinical governance systems were in place and up-to-date was felt to be a critical part . . .[33] p5 It is particularly important that pharmacists develop a culture of safety, do not prescribe outside their areas of competency and are supported in their prescribing role. Rigorous and robust governance procedures should be in place where pharmacist prescribers operate . . .[42] p830	15 (35)	Clinical governance policy and audit	[28,31–35,37–44,51]
	Logistical barriers to implementation identified such as information technology issues (lack of access to patient notes in primary care).[42] p830	16 (37)	Practicalities and logistics	[28–30,33–35,40–43, 45,46,48,49,52,74]
	A colleague completed a course 12 months ago and still no policy is in place to enable her to prescribe. This discourages others from making the effort and attending the course.[29] p175	26 (60)	Policy development and implementation	[28,29,31–45,49–51, 53,54,56,59,61]
Formulary	I wanted to do the nurse prescribing course for 2 years – until the BNF was opened fully, it was not worth my while.[54] p23 Local formulary restrictions and formal agreements (such as an 'intent to prescribe') were helpful in defining the limits of practice and assisting nurses to resist pressure from patients or professionals to prescribe outside of their area of competence . . .[31] p28 The participants were very positive about prescribing and the improvements it had brought to their roles in providing holistic care. However, they all stated that the limitations of the formulary severely restricted its usefulness.[44] p165 It really does frustrate me, especially when I know exactly what I'm looking at and I know exactly what I need to prescribe, but I have to ask the patient to come back later because I can't prescribe off the [formulary] . . .[44] p165	10 (23)		[31–33,35,44,45,52–54,58]
Education and support factors		27 (63)		
Education	. . . created a feeling of dissatisfaction with my work, as I feel underpaid for the responsibility I have now undertaken in practice. This does not encourage me to undertake an onerous course for little financial recompense.[54] p2	18 (42)		
	. . . access to CPD and formal feedback are areas that need to be developed by education providers and more formally embraced by managers within each organisation.[38] p505 . . . haphazard approach and lack of a formal national infrastructure to guide CPD activity was viewed negatively and appeared to be the cause of some frustration.[35] p2047	11 (26)	Continuous professional development	[31,33–35,38,44,54–58]
	Undertaking any course can be stressful and can generate anxiety. There is anecdotal evidence that the prescribing course, including a mathematics test that requires a 100% mark to pass, has generated a lot of anxiety among participants.[54] p23 GP employers are often unwilling to support courses when they are expected to absorb the cost of locum practice nurse cover.[54] p23 As nurses are unable to undertake the prescribing course without the support of a medical supervisor, they are dependent on a doctor agreeing to supervise.[34] p930 . . . the majority of prescribers . . . thought that the prescribing course did not adequately prepare them to prescribe.[34] p927	11 (26)	NMP course	[28,30,34,35,37,44, 52–55,65]
Support	Participants accessed support from clinicians and peers, non-medical prescribing groups, specialist networks . . .[38] p504 Team processes and communication between the different disciplines within the team impacted on the success of a pharmacist prescriber.[43] p130 A number of respondents perceived a lack of medical support as their main reason for not wishing to undertake nurse prescribing training.[29] p175 There is a lack of understanding by medical staff. I know nurses who have undertaken the course and are unable to use their skills. It seems pointless to do nurse prescribing training unless it can be used effectively.[29] p175 Lack of support included lack of supervision, lack of support in the prescribing role, and lack of support from all professionals involved. The lack of support from management in permitting the implementation of nurse prescribing when the prescriber has qualified.[34] p927 The significant contribution that NMP leads play in embedding NMP within organisations should be acknowledged by clearer national guidance for the role, its responsibilities and workload.[33] p9	23 (53)		[28–35,37–41,43,49, 54–59,65,81]

Table 5 (*Continued*)

Theme Sub-theme	Example quotations from included studies	*n* (%)	Key elements	Studies
Personal and professional factors[a]		34 (79)		
Medical profession	I think it's useful because a lot of the junior doctors obviously rotate through every 3 to 6 months and actually if anything someone who's a permanent team member is probably more familiar with the drugs and protocols and the dose ranges.[39] p2672 When I have a patient that I know can be followed up by a nurse practitioner I am thrilled because I have got no room in my follow-up clinics . . . What I have actually done is become dependent. I mean if the nurse practitioner in this department was withdrawn I would not be able to look after the patients under my care.[38] p502 Junior doctors . . . they said that I was taking over their role . . . they were saying, 'Oh yeah and you're taking over our role and they won't need us.'[51]p125 I am the doctor; I am supposed to be in charge.[39] p2673 Nurses described a lack of support from GP colleagues and in some cases this extended to GPs specifically instructing nurses not to prescribe for their patients.[40] p407	26 (60)		29,32,34–40,44,48, 50–56,59,61,76–80
NMP professions	I get more job satisfaction now because I can instigate treatment or first pills. If the patient is coming for the pill, I can prescribe it and see them again. It has given me more autonomy.[62] p225 I'm not sure that the qualification would improve my level of patient care. [Doctors] sign scripts as required.[54] p83 There is absolutely no financial incentive for taking on the huge responsibility of prescribing . . . [34] p927 In the area that I work I have pockets of deprivation. I know if I am going into those areas I tend not to take my prescription pad with me. I keep it locked up in the office and if they need prescriptions I either ask somebody to come to clinic to collect it or I ask them to get it from the GP just because I'd feel vulnerable carrying a pad about with me at that time.[40] p407	15 (35)		29,34,40,42,53–59, 62,74,76
Service users	I would be very happy for pharmacist to prescribe medicines which I take on a regular basis, for example, my inhalers or tablets for reflux . . . [41]p706 Service users felt that the nurse prescriber knew what she was talking about and had a good understanding of their circumstances and their illness . . . [64] p146 As far as I'm concerned, I am extremely worried about anyone other than a doctor prescribing any medicines . . . [41] p705 . . . also I think there is no privacy in a pharmacy is there? I don't think there is anyway . . . You kind of chat over the counter for all and sundry to hear.[49] p116	4 (9)		41,49,60,64
Financial factors		11 (26)		
Education and support	Nurse prescribing education was offered by line managers to the nurses . . . The reason behind this, some suggested, was that there was no direct cost incurred by the employer at that time. The availability of centrally funded prescribing education therefore appears to have been a significant factor in the uptake of training.[35] p2046 The Trust will not allow me to undertake nurse prescribing training. There is no management support – no time or funding[29] p174	4 (9)		29,35,42,65
Infrastructure, practicalities and logistics	. . . barriers such as cost and access to patient records are preventing benefits from occurring for outpatients in chronic pain[30] p33 . . . financial pressures, both organisational and personal (eg, cost of indemnity insurance) as barriers to expanding the services offered by prescribing pharmacists.[42] p830	3 (7)		29,30,42
Remuneration	Recognition in terms of status and pay for the increased responsibility of prescribing aroused the most emotion and sense of unfairness, and was found to be a major barrier in the study. Many believed the prescribing role would not be taken seriously until it was remunerated.[34] p930	3 (7)		34,56,62
Time and backfill Drugs	I believe it is impossible to carry a large caseload with no one covering it to go on this course (nurse prescribing training) . . . [29] p174 Reducing prescribing costs in secondary care meant that only onsite treatment and emergency medication are financed, and all other prescribing has to go through primary care via the General Practitioner.[35] p2048 Another frustration was their inability to prescribe for patients attending their clinic if the patient's GP was located in another Trust.[40] p407	3 (7) 4 (9)		29,40,42 32,35,40,75

CPD = continuing professional development, GP = general practitioner, NMP = non-medical prescribing.

[a] Includes thoughts and perceptions regarding the acceptability and value of NMP.

Research

associated professions, whereas small uni-professional cohorts would limit a university's capacity to offer and deliver.[34,35] Accessing a medical mentor to complete the course was perceived as a barrier, with variability of medical professionals' willingness to undertake this role, and a perception that medical mentorship was frequently inadequate.[28,34,53]

Participants reported that a formal national infrastructure to guide CPD would be beneficial, as support from managers, availability of specialty courses, funding and time were highlighted as barriers to appropriate CPD activities and courses.[33,35,38,54] This in turn limited a prescriber's ability to maintain awareness of the current evidence base, directly influencing NMP utilisation in practice.[33,35,38,56] The introduction of 'buddy systems' alongside regular in-house multidisciplinary CPD were positive and economical in maintaining evidence-based medicines use.[44,57]

Support: Type and level of support to implement, maintain and develop NMP were reported to depend on the participant's reasons for commencing NMP and their role within the health service.[29,33,34,58] Engagement and support from all parties, especially medical staff and health managers, were essential for planning and successful implementation.[34,55,59] Support from medical professionals as mentors during training and post-qualification was strongly emphasised as important, and an NMP facilitator. However, time to undertake mentored activities was recognised as a potential barrier.[34,37] Support from healthcare managers and government were reported as key to ensuring provision of policy and funding, overcoming barriers presented by other groups, and facilitating organisational pressure to enable implementation of NMP.[29,32,35,55,59] Support from within the NMP professions was reported as fundamental to: advocate for colleagues to be trained to prescribe; act as buddies to reduce feelings of isolation; and develop services.[34,37,56,57] The adoption of NMP lead roles was reported as crucial for coordination and promoting the benefits of NMP, ensuring that organisations provide safe practice environments and liaison with higher education providers.[33,39] Service users' poor knowledge and understanding of the level of education and experience required by non-medical prescribers were acknowledged as potential barriers.[49,60] Participants accepted that support from service users was vital,[49,60] with service user consultation recognised as fundamental when contemplating health service redesign.[41,49,60]

Personal and professional factors

Participants in 34 (79%) studies reported that the thoughts and perceptions relating to acceptability and value of NMP had significant impact on its implementation and utilisation.

Medical profession: Negative thoughts and perceptions held by medical professionals were widely perceived to result from a lack of understanding of NMP roles and responsibilities, causing fear of deskilling or loss of power and/or control.[29,32,39] Medical practitioners reported confusion about autonomy, responsibility and insurance, which in turn led to a lack of support for NMP.[32] Practitioners working in private practice acknowledged the threat of NMP competing for business with medical colleagues,[56] and junior doctors felt that NMP threatened their roles.[51] Some general practitioners wanted to maintain ownership of patients in health systems in which general practices have responsibility for direct funding of medicines.[32,35]

Conversely, medical professionals with positive feelings towards NMP acknowledged the benefits to service users, healthcare staff and the health economy.[36,38] They reported enhancement in service provision, efficiency and patient care.[38] Doctors acknowledged that non-medical prescribers who had a strong and established relationship with the medical team had the experience and knowledge to prescribe successfully.[39,44,61] NMP was reported to be extremely helpful in reducing and avoiding waiting lists, especially in specialties where long-term drug monitoring is prevalent.[32,36,38] When doctors were unable to see patients in a timely manner, a non-medical prescribers' ability to initiate, titrate and modify treatments had a positive effect on patients' access to medicines.[32,36–39] It was also highlighted that non-medical prescribers, unlike junior doctors, are permanent team members, and therefore become more familiar with drugs, protocols and dose ranges.[39] Recognition of these benefits was reported to drive medical professionals to advocate for the inclusion of NMP into local healthcare systems.[32,36–39]

NMP professions: The main facilitator observed by participants was job satisfaction.[54,55,62] Some participants reported that the inclusion of NMP into their roles gave them more autonomy, improving the level of patient care they offered.[54,55,62] In contrast, some participants reported that the risk and responsibilities associated with NMP increased stress and anxiety, restricting time spent on traditional areas of practice.[29,54] Many participants, although supportive, recognised that NMP would not enhance their individual roles within interdisciplinary teams, as medical prescribers are readily available to prescribe.[29,53,54,63]

The phase of an individual's career was perceived to affect the uptake of NMP into practice. Many clinicians with the high level of experience required prior to NMP training might prioritise non-clinical job roles, pursue other areas of study or be nearing retirement, and not motivated to undertake NMP.[54,56] Participants acknowledged the lack of additional remuneration offered to non-medical prescribers as a barrier.[34,56,62] Specifically, the enhanced responsibility and associated safety risks, with no reward (financial or otherwise), was reported to deter many.[40,53,54]

Service users: Most participants were happy with NMP services, citing closer relationships with non-medical prescribers than doctors, due to the time limitations within medical clinics. NMP services were often more convenient, providing faster access to required treatment compared to traditional medical care.[60,64] Conversely, participants in two studies reported that they felt prescribing responsibilities belong to medical professionals and were unsure about the qualifications possessed by non-medical prescribers.[41,49] A final subgroup reported that they were happy for non-medical prescribers to monitor long-term medication use; however, assessment of a new medical condition was felt to be the job of the medical practitioner.[41] To avoid poor uptake of NMP services, participants recommended that service users be consulted at all levels and phases of service planning, with education of service users essential if these key stakeholders were not to be a barrier to successful implementation.[41,49,60,64]

Financial factors

Participants in 11 (26%) studies reported financial factors to be key facilitators or barriers to NMP. Financial factors underpinned all themes/sub-themes, with inadequate funding creating and reinforcing significant barriers to successful implementation.[32,35,62,65] Funding for time and education should include financial support for both completion of the NMP course and CPD.[29,35,42,65] Further, appropriate financial resources were required to backfill roles previously undertaken by non-medical prescribers whilst training and post implementation of NMP into their roles.[29,35,40,42] Participants advised when planning, implementing and developing any NMP services, organisations must ensure they have sufficient financial resources for the necessary infrastructure, logistics, remuneration of staff and other practical implications of NMP such as administrative support and insurance.[30,34,42,56] Participants also highlighted the funding of drugs themselves as a possible barrier. Issues related to equity and equality of patient care, especially where patient care crosses borders, organisational boundaries and/or funding pools, were considered immoral, frustrating, and a barrier to good practice and successful implementation.[32,35,40]

Characteristics of quantitative studies

Study characteristics

Seven quantitative studies were included in the systematic review;[63,66–71] their characteristics are summarised in

Table 6
Characteristics and quality of the included qualitative studies (n = 7).

Study	Survey method	Year of data collection	Specialty	Total (n)	Number of participants from each profession	Quality[a] (0 to 48)
Courtenay[66]	Postal questionnaire	2006	Various	1992	1992 nurses	21
Courtenay[71]	Online questionnaire	2010 to 2011	Various	883	793 nurses, 33 managers, 36 pharmacist, 9 allied health and optometrists, 12 n/s	22
Farrell[67]	Online or postal questionnaire	n/s	Oncology	103	103 nurses	17
Gumber[70]	Postal questionnaire	2010	Various	20	18 nurses, 2 pharmacists	14
Hutchison[63]	Online questionnaire	2010	Various	342	342 pharmacists	19
Kaplan[68]	Postal questionnaire	2001	Various	1241	1241 nurses	20
Larsen[69]	Postal questionnaire	2003	Emergency/urgent care	192	192 managers	14

n/s = not stated.
[a] Quality Assessment Tool for Studies with Diverse Designs.[23]

Table 6. More detailed characteristics are available in Table 7 (see eAddenda for Table 7).

Study methods

All seven included studies used survey methodology.[63,66–71] Distribution of questionnaires was varied, with four (57%) studies using postal questionnaires,[66,68–70] two (29%) using online questionnaires,[63,71] and one (14%) providing participants with a choice of both methods.[67] The studies were undertaken in three countries from 2001 to 2011, with five (71%) in the UK, one (14%) in Canada and one (14%) in USA.

Participants

A total of 4773 participants were recruited across the seven studies.[63,66–71] The key stakeholders that were recruited were nurses (87%), pharmacists (8%), health service managers (5%) and allied health/optometrists (<1%). A small percentage of participants (<1%) did not disclose their job roles or profession.

Intervention

Most of the included studies investigated nurse iNMP (n = 4, 57%).[66–69] Pharmacists were the only other profession individually investigated (n = 1, 14%).[63] One study investigated both nurse and pharmacist iNMP (14%),[70] with one further study investigating iNMP as a whole, including all potential professionals (14%).[71] Six (86%) studies included participants working across community and hospital settings,[66–70] with one (16%) focusing on hospital care.[63] Five (71%) studies encompassed all healthcare specialties;[63,66,68,70,71] the remaining studies focused on individual specialties including oncology (14%) and emergency/urgent care (14%).[67,69]

Outcomes

All seven studies contained at least one quantitative survey question relating to barriers or facilitators of NMP.[63,66–71] Data supported three (75%) of the four themes synthesised from the qualitative studies. Four (57%) studies contained data relating to 'systems factors',[66–68,71] five (71%) studies 'education and support',[66,68–71] and five (71%) studies 'personal and professional factors'.[63,66–68,70] No studies contained data directly relating to 'financial factors'.

Quality assessment

Quality scores of the quantitative studies are summarised in Table 6 and ranged from 14 to 22 (mean 18). The individual quality criteria met by the studies are presented in Table 8 (see eAddenda for Table 8).

Results and synthesis of quantitative studies

Table 9 summarises the results of individual studies.

Systems factors

Four studies investigated systems factors.[66–68,71] Results highlighted local policy and lack of access to computer-generated prescriptions as key barriers.[66,68] One study[67] assessed barriers due to time, capacity and resources, finding that whole health organisations, rather than individual directorates, were responsible for limiting use of iNMP due to these factors.[67] One study[71] reported that 86% of employers had up-to-date policies in place, facilitating quality and safe use of NMP. Key elements of these policies were: agreed and documented scope of practice; regular clinical services audit; and standardised procedures for communicating updates regarding safety warning and drug alerts.[66]

Education and support factors

Two studies investigated education and support factors.[68,71] Results revealed that NMP course content, support following qualification, and adequate access to CPD were key factors.[71] Barriers were examined across three studies.[66,68,70] Results identified a lack of support from medical professionals and peers, and deficiency of adequate supervision when training to prescribe.[66,68,70] One study investigated factors influencing healthcare managers' decisions to send clinicians on the NMP course.[69] Facilitating factors that were identified were: increasing autonomy; improvements in patient care; improvements in clinicians' pharmacology knowledge; and improved accountability. Barriers were: time; factors related to the backfill of course candidates; medical supervisor requirements; and a limited formulary being too restrictive to be beneficial.[69]

Personal and professional factors

Three studies[66,68,70] investigated personal and professional factors. Objections and concerns by medical professionals and pharmacists regarding competency, liability and competition were found to be important external factors.[68] Internal factors such as a professional's caseload and fear of litigation were also demonstrated.[70] One study[67] found that time, capacity and resources were barriers, which were reported in some cases as being induced by nursing and medical directorates, with further reasoning not reported. One study[63] investigated the level of influence of factors affecting an individual's decision to seek or not seek NMP authorisation. Those that had chosen to seek authorisation reported a high relevance to practice and increased efficiency/job satisfaction as key motivators. Clinicians who decided not to seek authorisation reported concerns regarding increased liability and poor relevance to their practice as key factors not to prescribe.[63]

Integration of qualitative and quantitative data

Data from 12 117 participants (combined from the qualitative and quantitative studies) were integrated. Table 10 shows the total number of participants from each stakeholder group involved in iNMP included in the integration.

Data from the qualitative and quantitative components of the systematic review were brought together in the integration matrix (Table 11) and used to construct the resultant 'NMP Implementation Framework' (Figure 2). Data extracted from the quantitative studies corroborated the existence and importance of the subthemes identified in three themes developed from the qualitative studies. Integration was undertaken for six (75%)

Table 9
Findings from quantitative studies categorised under the themes generated by the analysis of the qualitative studies.

Theme Study	General focus of the study	Specific findings of the study, reported by n (%) participants	Quality[a] (0 to 48)
Systems Factors			Mean 20
Courtenay[66]	Barriers to iNMP:	local policy, 619 (66%)	21
		national policy, 87 (9%)	
		unable to use computer-generated prescriptions, 575 (61%)	
		access to medical records, 26 (3%)	
Kaplan[68]	Barriers to iNMP:	restricted formularies, 183 (24%)	20
Farrell[67]	Time, capacity and resources were reported to be barriers induced by:	the health organisation, 41 (41%)	17
		nursing directorate, 14 (14%)	
		medical directorate, 22 (22%)	
Courtenay[71]	89% of employers had up-to-date NMP policies in place. Policies dictated:	regular audit and review of clinical services, 561 (74%)	22
		regular feedback data re prescribing practice, 328 (44%)	
		access own prescribing practice data, 281 (37%)	
		agreed scope of practice with employers, 642 (85%)	
		supplied with safety warnings, drug alerts, etc, 678 (90%)	
		NMPs involved in the development of local formularies/guidelines, 357 (48%)	
Education and support factors			Mean 18
Courtenay[71]	Facilitators of iNMP:	adequate support following qualification to undertake iNMP, 304 (47%)	22
		adequate access to support prescribing role, 561 (74%)	
Courtenay[66]	Barriers to iNMP:	lack of peer support, 126 (13%)	21
Kaplan[68]	Barriers to iNMP:	medical professional availability to support, 33 (4%)	20
Gumber[70]	Barriers to iNMP:	adequate supervision: strongly agree, 4 (20%); agree, 10 (50%); undecided, 4 (20%); disagree 2 (10%)	14
	Facilitators of iNMP:	prescribing course content: strongly agree, 4 (20%); agree, 12 (60%); undecided, 2 (10%); disagree 2 (10%)	
		support and guidance from medical professional: strongly agree, 11 (55%); agree, 9 (45%)	
Larsen[69]	Facilitators of manager's decision to send clinicians to a NMP course:	autonomy, (44%); patient care, (37%); improve clinicians' pharmacology, (38%); improve knowledge of accountability, (34%); requested by staff, (18%); recruitment/retention, (11%); organisational drivers, (14%)	14
	Barriers to manager's decision to send clinicians to a NMP course:	time, (11%); backfill, (17%); formulary too limited to be beneficial, (29%); finding medical supervisor, (11%); poor medical support, (2%); funding of drugs, (<1%); poor intra-professional support, (2%)	
Personal and professional factors			Mean 18
Courtenay[66]	Barriers to iNMP:	objections by medical professionals/pharmacists, 153 (16%)	21
Kaplan[68]	Barriers to iNMP:	medical professionals' concerns regarding liability, 183 (24%)	20
		competition between medical and non-medical prescribers, 33 (4%)	
Gumber[70]	Barriers to iNMP:	conflicts with medical staff: agree, 9 (45%); undecided, n (5%); disagree, 4 (20%); strongly disagree, 6 (30%)	14
		significant increases in caseload: strongly agree, 2 (10%); agree, 11 (55%); undecided, 5 (25%); disagree, 1 (5%); strongly disagree, 1 (5%)	
		fear of litigation; agree, 7 (35%); undecided, 7 (35%); disagree, 5 (25%); strongly disagree, 1 (5%)	
Farrell[67]	Time, capacity and resources were reported to be barriers induced by:	nursing directorate, 14 (14%)	17
		medical directorate, 22 (22%)	
Hutchison[63]	Level of influence on individual's decision to seek NMP authorisation, as rated by clinicians who had applied for authorisation to prescribe:[b]	relevance to practice: strongly (70%); moderately (22%); somewhat (5%); slightly (3%); not at all (0%)	19
		increased efficiency: strongly (62%); moderately (22%); somewhat (3%); slightly (11%); not at all (3%)	
		importance to the profession: strongly (56%); moderately (22%); somewhat (11%); slightly (3%); not at all (8%)	
		time: strongly (8%); moderately (19%); somewhat (6%); slightly (11%); not at all (56%)	
		job satisfaction: strongly (37%); moderately (29%); somewhat (11%); slightly (9%); not at all (14%)	
		concerns, increased liability: strongly (17%); moderately (17%); somewhat (17%); slightly (34%); not at all (14%)	
	Level of influence on individual's decision to seek NMP authorisation, as rated by clinicians who decided not to apply for authorisation to prescribe: [b]	relevance to practice: strongly (37%); moderately (26%); somewhat (17%); slightly (6%); not at all (15%)	
		increased efficiency: strongly (16%); moderately (16%); somewhat (17%); slightly (14%); not at all (36%)	
		importance to the profession: strongly (14%); moderately (13%); somewhat (21%); slightly (11%); not at all (41%)	
		time: strongly (18%); moderately (18%); somewhat (17%); slightly (9%); not at all (39%)	
		job satisfaction: strongly (7%); moderately (15%); somewhat (16%); slightly (18%); not at all (45%)	
		concerns, increased liability: strongly (23%); moderately (23%); somewhat (23%); slightly (16%); not at all (15%)	

CPD = continuing professional development, GP = general practitioner, NMP = non-medical prescribing.
[a] Includes thoughts and perceptions regarding the acceptability and value of NMP.
[b] Scale: not at all, slightly, somewhat, moderately, strongly.

Table 10
Total number of participants included in the systematic review.

Stakeholder group	Total n (%)
Nurses	8466 (70)
Service users	2527 (21)
Pharmacists	625 (5)
Managers	242 (2)
Medical doctors	114 (<1)
NMP leads	72 (<1)
Others	42 (<1)
Administrative staff	20 (<1)
Allied health professionals	9 (<1)
Total	12 117 (100)

NMP = non-medical prescribing.

subthemes within these themes. No data from the quantitative studies disagreed with the thematic synthesis. Integration was not possible for financial factors, government and political factors and service users sub-themes, as no data relating to these themes/sub-themes were retrieved from the quantitative studies.

Discussion

The evidence from this systematic review suggests that successful implementation of iNMP requires a coordinated, transparent and inclusive approach at all systems levels.[32,33,50] From governments to local clinical departments or businesses, the development of laws, regulations, guidelines, policies and procedures must be created with consistency, and involve consultation with all key stakeholders. A strategic, collaborative and consultative implementation process is fundamental to manage potential barriers, including personal and professional self-interest, professional territorialism, fear of change, and poor quality or unsafe clinical practice.[51,56] These findings confirm results from a large study evaluating nurse and pharmacist prescribing in the UK,[72] which highlighted that a lack of local planning and strategic vision had previously been a key barrier to NMP.[72] With economic savings driving implementation, it is paramount that robust local clinical governance policy exists to protect both those using NMP services and non-medical pre-scribers themselves.[32,33,66,71] Policy should be locally defined within a national framework, as different clinical settings will require unique procedures and safeguards, depending on locality, availability of immediate clinical support and professional specialty.[34] NMP should be integrated as an additional clinical skill, complementing traditional expertise and scope of practice, to enhance patient care.[33,34] It is essential to clearly define scope, parameters, boundaries, accountability and lines of responsibility, in order to avoid risks associated with potential confusion and ambiguity,[34] alongside communication and documentation poli-cies, incident reporting processes, and CPD requirements to embed a culture of quality and safety.[34,35,42,43] Health organisations should work together to ensure that bureaucracy does not limit clinicians' abilities to provide quality patient-centred care by adopting innovative service designs.[33,36,40] To ensure the longevity and future expansion of NMP, health organisations should aim to

Table 11
Integration matrix. The rows of the matrix represent the subthemes developed from synthesis of the qualitative studies, and the columns contain citations of the quantitative studies.

Theme Sub-theme	Quantitative studies (n = 7)						
	Courtenay[66]	Courtenay[71]	Farrell[67]	Gumber[70]	Hutchison[63]	Kaplan[68]	Larsen[69]
Systems factors							
Government and political factors	N	N	N	N	N	N	N
Organisational factors	Y	Y	Y	N	N	N	N
Restricted formulary	N	N	N	N	N	Y	N
Education and support							
Education	N	Y	N	Y	N	N	Y
Support	Y	Y	N	Y	N	Y	Y
Personal and professional factors							
Members of the medical profession	Y	N	Y	Y	N	Y	N
Members of the NMP professions	Y	N	Y	Y	Y	N	N
Service users	N	N	N	N	N	N	N
Financial factors[a]	–	–	–	–	–	–	–

N = not identified as a relevant factor in the quantitative studies, Y = identified as a relevant factor in the quantitative studies.
NMP = non-medical prescribing.
[a] Financial factors were not assessed in any of the quantitative studies.
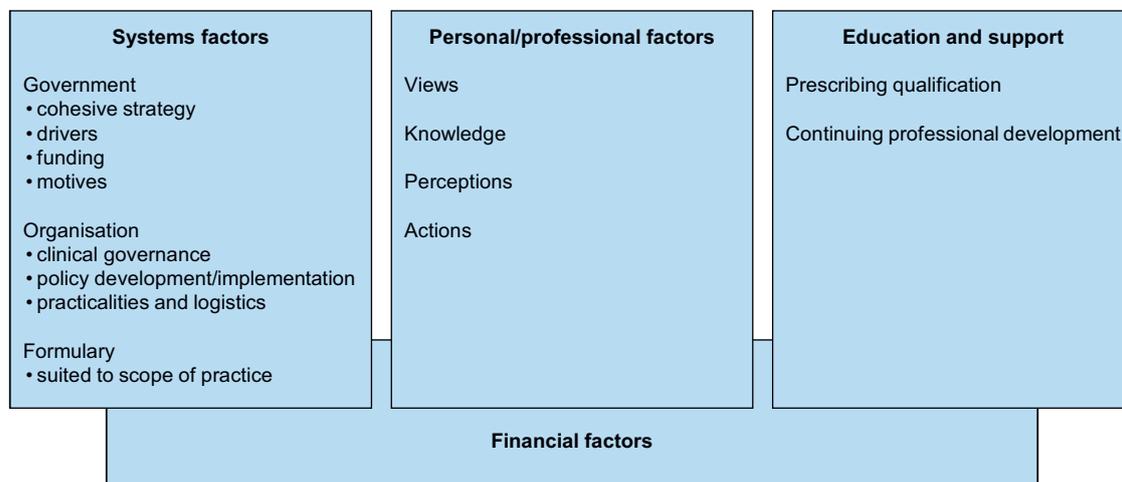

Figure 2. NMP Implementation Framework. Factors to consider when implementing independent NMP.
CPD = continual professional development

future-proof services through workforce and succession planning, alongside clinical outcome and cost-effectiveness audits to ensure ongoing quality, effectiveness and funding.

Owing to innovations in medical science, clinicians, health organisations and authorities have recognised that legally restricted formularies may quickly become outdated.[31,44,52,53] Restrictions within scope of practice are thought to deter potential non-medical prescribers from training, and lead to professional frustration and low levels of engagement for those who are qualified.[54] Risk may be managed via local formulary defined in organisational policy. This method has the benefit of flexibility without restrictions in law, whilst protecting the local prescribers and service users.[32,54] Selection criteria alongside academic and professional prerequisites are currently utilised by health organisations and higher education institutions to ensure academic ability, safeguard quality and select suitable NMP training course candidates.[33] Although courses fulfil nationally agreed standards, the evidence suggests that a lack of profession-specific content may lead to candidates feeling underprepared.[34,35,55] Further, lack of access to a medical mentor may impede qualification, with inconsistencies in mentorship quality affecting a clinician's confidence to prescribe.[28,34,68] It has been suggested that national frameworks be developed that govern CPD activity and facilitate access time and funding.[33,35,38,54] These factors therefore require further investigation to ensure high-quality education and resource optimisation.

The positive or negative thoughts and perceptions of both individual stakeholders and their wider professions appear intimately related to the level of support offered to non-medical prescribers, their educational activities and NMP services. Improved job satisfaction due to increased autonomy and the ability to provide improved patient care are key drivers for clinicians undertaking NMP roles.[54,55,62] Conversely, increased job stress and anxiety, associated safety risks and restricted time to complete traditional roles, with no increase in remuneration for the increased responsibility, are key barriers.[29,54] The engagement of medical professionals in consultative, planning and governance roles, and as clinical mentors[34,55,59,68] may minimise barriers associated with the medical profession, due to fears of: deskilling, loss of power and job roles, competition to earnings and confusion regarding autonomy, responsibility, liability and insurance.[29,32,39] Consistent with the findings of previous research,[73] this review emphasises the benefits of adopting NMP lead roles within health organisations to aid in overcoming systems, personal and professional barriers,[33,39] and reducing feelings of professional isolation, where the number of prescribers are limited.

To promote NMP implementation and practice, health organisations should undertake a thorough economic evaluation as part of planning and development, securing the appropriate finances required for success.[30,34,42] To ensure no detrimental effects to patient care or clinician job satisfaction it is recommended that complexities related to funding streams crossing organisational boundaries or fragmented health systems should be resolved prior to offering NMP services.[32,35,40] Whilst the potential economic savings act to engage many individuals or professions with the benefits of utilising NMP, some financial factors act to resist NMP through difficulties in modernising funding streams and increased clinical responsibility with potentially no increase in remuneration. If NMP is to further grow and develop, these barriers must be acknowledged, planned for and resolved across all aspects of the health economy.

This review used rigorous systematic methods with a synthesis strengthened by the engagement of a multidisciplinary research team, including both registered non-medical prescribers and non-prescribers. This combination ensured specialist knowledge of iNMP alongside specific disciplinary perspectives, facilitating a rigorous analytical process. Most included studies were limited to nursing and a small range of Western countries, potentially limiting transferability of the results across all clinical and professional specialties internationally. No temporal or spatial analysis was undertaken within the review; therefore, caution is recommended when interpreting the contemporary nature of the barriers or facilitators into individualised contexts.

This is the first mixed-methods systematic review to investigate the barriers to and facilitators of iNMP. Integration of the quantitative and qualitative data demonstrates, with strong agreement, multifactorial and context-specific variables existing within four explicit themes. The evidence supports that when factors are acknowledged and accommodated, they become facilitators, but may become barriers when they are not. Clinical physiotherapists and other clinicians should consider whether these factors have been adequately addressed before training to become non-medical prescribers. Politicians, policy and healthcare managers and clinicians should use the resulting NMP implementation framework to ensure the safe and successful adoption, implementation and utilisation of physiotherapist prescribing. Where physiotherapist prescribing is currently outside the legal scope of practice, the resulting NMP Implementation Framework, and this review's evidence, should be core to the implementation strategy of physiotherapy professional bodies wishing to adopt NMP practice. There is a clear need for future research to evaluate the personal and professional motivations for physiotherapy prescribing internationally, implementation strategies, and the efficacy in terms of clinical and cost-effectiveness of services employing iNMP. To fully understand the long-term uses of NMP it is paramount that variables such as profession, specialty, geographic location, clinical indications and funding models are assessed alongside the needs of service users, communities and the impact on all stakeholders.

What is already known on this topic: Non-medical prescribing is undertaken by various professions internationally. Non-medical prescribing may be supplementary (ie, via a clinical management plan in partnership with a medical practitioner) or independent (ie, the non-medical professional prescribes autonomously).

What this study adds: Qualitative studies have identified barriers and facilitators to non-medical prescribing in: political/organisational factors; whether a formulary is used; education and support; personal and professional factors among the medical profession, other professions, and service users; and financial factors. Quantitative studies confirm these factors. Based on this evidence, an implementation framework is proposed to assist professional bodies, politicians, policymakers, healthcare managers and clinicians to ensure that a non-medical prescribing system would be introduced safely and successfully.

Correspondence: Alison Rushton, Centre of Precision Rehabilitation for Spinal Pain, School of Sport, Exercise and Rehabilitation Sciences, University of Birmingham, Birmingham, UK. Email: a.b.rushton@bham.ac.uk

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