1.0 Introduction

Non-medical prescribing is a relatively recent development in healthcare which allows non-medical healthcare professionals, mainly nurses and pharmacists but also others to prescribe for their patients. Prescribing decision-making can be complex and challenging; a scoping literature review identified a number of influences on medical prescribing decision-making but little appears to be known about this process in non-medical prescribers. This systematic review looking at prescribing decision-making will inform the development of a programme of doctoral study exploring non-medical prescribers’ experiences of and perspectives on ‘non-clinical’ influences on their prescribing decisions. The findings and subsequent programme of study will also contribute to the education, training and practice of non-medical prescribers.

1.1 Non-medical prescribing

Non-medical prescribing has developed according to different models across the world reflecting the very different healthcare systems (Kroezen et al. 2011, Bhanbhro et al. 2011, Tonna et al. 2010, Emmerton et al. 2005); the range and scope of non-medical prescribing varies widely between countries (Stewart, Maclure and George 2012). In the United States and Canada most pharmacists who prescribe do so according to some form of collaborative agreement with a physician; independent prescribing by pharmacists as happens in the United Kingdom (UK) is less common (Tonna, Stewart and McCaig 2008). Nurse prescribing has been implemented in the United States, Canada, Australia, New Zealand, the Republic of Ireland, Sweden and the UK; frameworks within which this occurs vary markedly between countries (Kroezen et al. 2011). Given the variation in practice, this review will focus only on supplementary and independent non-medical prescribing in the UK.

1.2 Supplementary and independent non-medical prescribing in the UK

In the UK, community practitioner nurse prescribing from a limited list of medicines and appliances was piloted in 1994 (The medicinal products: prescription by nurses, midwives and health visitors Act 1992) and implemented across the country in 1998 (Department of Health 1998). The final Crown report of 1999 recommended that non-medical prescribing, initially by pharmacists and nurses, should be implemented, driven by the need to improve patients’ access to medicines and to make the most appropriate use of healthcare professionals’ skills (Crown 1999).
A further driver was the change in working patterns of junior hospital doctors (Foster et al. 2002).

Two models of non-medical prescribing were defined and will be included in this review: dependent (later ‘supplementary’) and independent prescribing; prescribing by community practitioner nurse prescribers will not be included. In 2011 there were 2602 pharmacist prescribers in the UK (Hassell 2012) and in 2013, 26763 nurse independent/supplementary nurse prescribers and 1447 nurse independent prescribers (Nursing and Midwifery Council, personal communication, 25th March 2013)

Supplementary non-medical prescribers treat an already-diagnosed condition within the bounds of a patient-specific clinical management plan agreed by the patient, the supplementary prescriber and an independent prescriber ie a doctor or dentist (Department of Health 2002). Independent non-medical prescribers are responsible for the clinical management including prescribing of a patient’s diagnosed or previously undiagnosed condition and may thus be responsible for diagnosis (Department of Health 2005); this has been a contentious issue, particularly among medical prescribers (Day 2005). At present in the UK suitably qualified nurses, pharmacists and optometrists may practise as independent or supplementary prescribers while physiotherapists, diagnostic radiographers and podiatrists may practise as supplementary prescribers. There are plans to extend both the range and scope of non-medical prescribing still further.

1.3 Education and training for non-medical prescribers

Non-medical healthcare professionals wishing to train as prescribers must have been working in patient-facing practice for at least two or three years post-registration (depending on the profession) and must undertake a 200 hour degree/Masters level training course accredited by the relevant professional regulator. The curriculum is standardised across the UK and incorporates core competencies for all prescribers (National Prescribing Centre 2012). Clinical and non-clinical elements are included ie applied therapeutics, decision-making around prescribing, evidence-based practice and clinical governance, legal and professional aspects of prescribing and prescribing in a team and public health context. Material on decision-making around prescribing includes elements such as the patient’s clinical condition, health beliefs and health-related behaviour. A period of twelve days learning in practice is also required during which aspiring prescribers can continue to develop appropriate specialist knowledge and skills.

1.4 Contribution of non-medical prescribers to patient care

The contribution of non-medical prescribers to healthcare provision in the UK is expanding although thus far evidence of effectiveness with regard to patient safety and clinical outcomes is limited (Bhanbhro et al. 2011) Independent and supplementary nurse prescribers appear to have
integrated prescribing into their existing roles and prescribe across increasingly complex areas in primary and secondary care, for patients with multiple co-morbidities (Latter et al. 2010). Pharmacists too prescribe in primary and secondary care but tend to prescribe for discrete conditions such as hypertension and cardiovascular disease (Latter et al. 2010).

1.5 Prescribing decision-making

A scoping literature search recently undertaken revealed that most research thus far has been carried out among medical prescribers in primary care, where indeed most prescribing occurs. General practitioners’ prescribing behaviour was first surveyed in 1949 (Dunlop 1952); since that time a wealth of research has been carried out. In 1992 Bradley published a study on ‘uncomfortable prescribing decisions’ among GPs in England and showed that their decisions were based on a variety of clinical and non-clinical factors including patient expectations, the doctor-patient relationship and the doctor's previous behaviour (Bradley 1992). GPs' discomfort around some of their prescribing decisions was multifactorial. Appropriate prescribing has been defined as a balance between the right technical properties, what patients want and the greater good (Cribb and Barber 1997). Decision-making around prescribing is complex and challenging; it is likely to be informed by a variety of influences including clinical guidelines but also including factors relating to social cognitive models of behaviour (Ogden 2007) and culture (Egede 2006).

The evidence regarding non-medical prescribing is limited and equivocal; non-medical prescribers assert that they adhere strictly to evidence-based practice yet this may not always be the case (Maddox 2011, Rowbotham et al. 2012). Non-medical prescribers come from a variety of professional backgrounds but unlike doctors, none comes from a tradition of paternalistic relationships with patients or from a position at the top of the healthcare hierarchy (Weiss and Fitzpatrick 1997, Weiss and Sutton 2009). It may be that their prescribing decisions are informed by different or additional influences to those of doctors and this is the proposed area of research.

The following databases were searched in an effort to identify any systematic review in this area but none had been found at the time of writing:
The Centre for Reviews and Dissemination, the Cochrane database of systematic reviews, the National Institute for Health and Clinical Excellence, Science Direct, Medline, International Pharmaceutical Abstracts, Web of Knowledge and Google Scholar (Gehanno, Rollin and Darmoni 2013).

Non-medical prescribing is an integral part of healthcare provision in the UK and these prescribers are likely to make an increasingly important contribution to patient care. As with all healthcare professionals it is important that their education, training and practice are informed by
research-derived evidence. The hope is that the results of this review and subsequent programme of research will inform education and training of non-medical and perhaps medical prescribers, improving professional competence and confidence and thereby patient care.

2.0 Review objectives

The first objective of this review is to determine the social and cognitive influences on prescribing decision-making among supplementary and independent non-medical prescribers in the UK. The second objective is to report on the methodologies and methods, and quality of peer-reviewed published studies in this area.

The approach taken in meeting these objectives will be that of narrative synthesis, facilitating analysis of relationships between and within studies of perhaps very different designs (Centre for Reviews and Dissemination 2009). The review will include the best available qualitative and quantitative peer reviewed primary research and data generated from secondary research such as systematic reviews and meta-analyses, should any be identified. Methodologies will include but not be limited to studies taking a phenomenological approach.

3.0 Literature search strategy

The search strategy has been developed iteratively through discussion with the research team and with subject-specific librarians. In addition the search strategies of several key systematic reviews in the separate areas of prescribing decision-making and non-medical prescribing were examined and relevant elements incorporated.

3.1 Inclusion criteria

- Studies including supplementary and independent non-medical prescribers practising in the UK.
- Studies focussing on the prescribing decision-making of these non-medical prescribers.
- Peer-reviewed published studies reporting primary research and data generated from secondary research such as systematic reviews and meta-analyses, should any be identified during the review process.
- All study designs.
- Papers published in English; since the focus is on studies carried out among participants in the UK this should not introduce publication bias.
• Studies undertaken from 2003 onwards (date of implementation of supplementary and independent non-medical prescribing in the UK).

3.2 Exclusion criteria
• Studies including data from prescribers other than supplementary and independent non-medical prescribers where data are not reported according to profession of prescriber.
• Studies focussing on the administration of medicines via Patient Group Directions.
• Letters, opinions, editorials, descriptions of clinical practice.

3.3 Databases
The following databases will be searched:
MEDLINE, PsycARTICLES, Cumulative Index to Nursing and Allied Health Literature (CINAHL), International Pharmaceutical Abstracts (IPA), Education Resources Information Centre (ERIC), The Cochrane Library, Google Scholar.

3.4 Search terms
Search terms including the following will be used to identify studies which explore social and cognitive influences on prescribing decision-making among non-medical prescribers:
• Prescib* 
and
• Pharmacist* or nurse* or physiotherapist* or podiatrist* or radiographer* or optometrist*

and
• Influenc* or decision* or decid* or judge* or factor*.

Medical index subject headings (MESH terms) will also be used where appropriate.

Citation searching, author searching and RSS feeds will be used to expand the search. In addition, electronic current awareness alerts have been set up with NHS Evidence, Google Scholar and with the British Library (‘Zetoc’ alerts).
3.5 Study selection

Search strategy

A three-phase search will be carried out; search terms and MESH terms where appropriate will be looked for in the abstract using MEDLINE, PsycARTICLES, Cumulative Index to Nursing and Allied Health Literature (CINAHL) and International Pharmaceutical Abstracts (IPA). In searches carried out within ERIC the search terms will be looked for in keywords. A similar approach will be taken when searching in The Cochrane Library and Google Scholar. This will be done so as not to miss any potentially relevant studies.

1) Databases as above will be searched and inclusion and exclusion criteria applied to papers retrieved.

2) References from included papers will be hand searched.

3) Key journals identified from included papers will be hand searched, as will the publications of key authors.

3.6 Recording the search and managing results

All documentation will be stored in a folder on the University shared drive to which all research team members have access. Terminology will be agreed for use when recording searches, results and subsequent decisions about inclusion or otherwise. Searches and results will be recorded using Microsoft Word® and references managed using Refworks® bibliographic software.

3.7 Process for study selection

Duplicate studies retrieved from more than one database search will be removed. Study selection will then be a three stage process; reasons for exclusion will be documented at each stage. Decisions will be made independently by two members of the research team (the principal researcher plus one of three others); where there is disagreement this will be resolved by discussion and if necessary by consulting a third team member.

The selection process will be piloted on 50 studies and the results of the pilot discussed with the research team. Any adjustments deemed necessary will be made and the selection process re-started if necessary. A flow chart summarising the study selection process including reasons for inclusion/ exclusion will be prepared.

Stage 1: titles of all retrieved studies will be considered alongside inclusion and exclusion criteria. Studies which are clearly not relevant will be excluded, as will those which are relevant but which are excluded on the basis of inclusion and exclusion criteria. Where there is any doubt, studies will be included at this stage.
Stage 2: abstracts of retained studies will be accessed and their relevance assessed according to the inclusion and exclusion criteria. Again where there is any doubt, studies will be included.

Stage 3: full text of all studies retained at stage 2 above will be obtained and their relevance assessed according to the inclusion and exclusion criteria.

3.8 Data extraction
Electronic data extraction forms will be prepared based on the review question and objectives and in consultation with research team members. Guidelines for their use will be prepared and the forms will be piloted before use. It is likely that fields will include:

- Study title and author/s, participants (professions and numbers), setting, study design, response rate if appropriate and outcome of significance to the review question and objectives.
- Qualitative data will be extracted from papers included in the review using the standardised data and conclusions.

Data extraction will be carried out by two members of the research team independently and results compared; where there is disagreement this will be resolved by discussion and if necessary by consulting a third team member.

3.9 Quality assessment
Studies will be assessed using the relevant Critical Appraisal Skills Programme tool (CASP-UK, 2012) or the Strengthening the Reporting of Observational studies in Epidemiology (STROBE) checklist for cross-sectional studies (Institute of Social and Preventive Medicine 2009); all include clear guidelines for their use (Katrak et al. 2004). Again, decisions will be made independently by two researchers; where there is disagreement this will be resolved by discussion and if necessary by consulting a third researcher.

4.0 Data synthesis
Analysis will depend on data available but is likely to involve a form of narrative synthesis; the appropriate method will be determined by the studies included (Centre for Reviews and Dissemination 2009). First a descriptive summary of studies will be presented in table form supported by narrative description; qualitative and quantitative studies will be reported separately at this stage. The tables will include details of study type, setting, numbers of participants and their professions, phenomena of interest, findings and an indication of study quality.

Next studies will be grouped together according to elements derived from the review objectives. Analysis will identify themes across studies, comparing and contrasting them to allow synthesis of findings. Finally the
review processes will be subjected to critical reflection (Centre for Reviews and Dissemination 2009) and recommendations made for future work.

References


GEHANNO, J., ROLLIN, L. and DARMONI, S., 2013. Is the coverage of Google Scholar enough to be used alone for systematic reviews? *BMC Medical Informatics and Decision Making*, 13(1), pp. 7-12.


INSTITUTE OF SOCIAL AND PREVENTIVE MEDICINE, 2009. STROBE Statement—checklist of items that should be included in reports of cross-sectional studies. Bern, Switzerland: University of Bern.


*The medicinal products: prescription by nurses, midwives and health visitors Act 1992. c. 28.*


