A survey of nurses prescribing in diabetes care: Practices, barriers and facilitators in New Zealand and the United Kingdom.

Abstract

Aims and objectives: To compare diabetes-related prescribing practices, barriers and facilitators amongst nurse prescribers in New Zealand and the United Kingdom.

Background: Nurses have been prescribing in the United Kingdom for many years but nurse prescribing in New Zealand is relatively recent. It is unknown whether similar system factors act to facilitate or limit prescribing.

Design: A survey of 250 nurses prescribing in diabetes care in New Zealand (n=111) and the United Kingdom (n=139).

Methods: A SurveyMonkey questionnaire was used to survey nurses about the extent of their prescribing practices, and barriers and facilitators experienced. Quantitative data was explored descriptively, qualitative responses were grouped according to content, with quotes provided to exemplify thematic content**.** This study is reported following STROBE guidelines.

Results: Insulin, metformin and sulphonylureas are the drugs most frequently prescribed in both countries. Considerably more New Zealand than United Kingdom nurses reported prescribing for cardiovascular and renal disease. In both countries direct prescribing to the patient was most common, followed by remote prescribing in New Zealand and via recommendation to other prescribers in the United Kingdom. Most common barriers were lack of time and inadequate

mentoring. Most common facilitators were: good supervision; collegial relationships with specialists, pharmacists and peers; and ongoing education.

Conclusions:

These New Zealand and United Kingdom nurses are prescribing a broad range of diabetes-related medications. Similar barriers and facilitators were identified in both countries. Adequate supervision, support from multidisciplinary team colleagues and prescribing education and guidelines are paramount.

Relevance to clinical practice: Important insights on barriers and facilitators to implementation of nurse prescribing in two countries are highlighted and, despite a considerable difference in the longevity of prescribing practice, similar issues were identified.

Key words: Extent of nurse prescribing, nurse practitioner prescribing, registered nurse prescribing, prescribing facilitators, prescribing barriers, New Zealand, United Kingdom

Introduction

Diabetes presents a serious health challenge because it is a significant cause of ill health and premature death. The 2019 national Virtual Diabetes Register indicates that 263,938 people in Aotearoa New Zealand (NZ) have diabetes, with the prevalence rising by around 7.2% per annum (Ministry of Health, 2020). In the United Kingdom (UK) diabetes prevalence is 4.7 million, with one in ten aged over 40 years having type 2 diabetes (diabetes.org.uk). The

majority of people with diabetes use prescribed medications. Oral hypoglycaemic medication and/or insulin was used by 81.1% of people with diabetes in the United States in 2011 (Centre of Disease Control, 2013) and 2018 NZ figures suggested that 62% of people with diabetes were on metformin or insulin (Health Quality & Safety Commission, 2018). Diabetes medicines have traditionally been prescribed by medical practitioners. Extending prescriptive authority from medical to other health practitioners has occurred relatively recently (Lim et al., 2018) and enables patients to have better access to medications and increases efficiency and cost-effectiveness of care (Stenner & Courtenay, 2008). In this paper we start with a summary of the introduction of nurse prescribing in NZ and the UK and then present a comparison of experiences of nurse prescribers in diabetes care in these two countries.

Background

New Zealand context

The first nurses authorised to prescribe in NZ were Nurse Practitioners (NPs) and by April 2019 there were 373 NPs employed in a variety of practice areas (Health Central, 2019). Nurse Practitioners were first registered in NZ in 2000 within a separate scope of practice regulated by the Nursing Council of New Zealand (NCNZ). Following completion of a Master of Nursing degree and registration with the NCNZ, NPs are authorised to prescribe in the same way as medical practitioners under the Health Practitioners Competency Assurance Act 2005. They can independently provide the full episode of care including assessment, diagnosis, treatment planning, prescribing, referral and follow up without any requirement for supervision by medical practitioners.

In 2011, the New Zealand Society for the Study of Diabetes (NZSSD), in conjunction with Health Workforce New Zealand and NCNZ, led the development and implementation of a new regulation enabling registered nurses (RNs) practising in diabetes care to be able to prescribe a limited range of diabetes-related medicines. These RNs were authorised by NCNZ as Designated Prescribers, requiring indirect supervision by a medical practitioner. An evaluation was undertaken during the implementation phase (Wilkinson et al., 2014) and a second one followed six months later (Budge & Snell, 2013). Both provided evidence that RN prescribing in diabetes care was safe and effective. As a result of the success of RN prescribing in diabetes care, the diabetes specific regulation was replaced in September 2016 with a more generic regulation to enable nurses practising in primary health and specialty teams to prescribe more broadly for their population groups under indirect supervision of an authorised prescriber. Registered nurses are required to have completed a Council-approved postgraduate diploma in registered nurse prescribing for long-term and common conditions or equivalent as assessed by the NCNZ (Nursing Council NZ, 2020). Once authorised to prescribe, NCNZ requires nurses with prescriptive authority to have a minimum of 40 days (or 320 hours) prescribing practice each year. Prescribing practice is defined as participation in patient consultations that include a comprehensive medicines assessment and consideration of the patient's treatment plan inclusive of prescribed medicines. It encompasses the assessment, clinical decision-making and monitoring skills outlined in the *Competencies for Nurse Prescribers* (Nursing Council of New Zealand, 2020). At the time of the current study (May, 2018) there were 192 RNs prescribing in primary and secondary care services, with 85 specifically authorised to prescribe within diabetes care.

United Kingdom Context

The UK was one of the first countries to introduce nurse prescribing. It was recognised that enabling nurses to prescribe would increase patient access to medicines, use resources (including nurses' knowledge and skills) more effectively, and legitimise practice already being undertaken. In the UK, legislation enabling community nurses to prescribe from a limited list of medicines was first passed in 1992 and around 40,000 community nurses are now able to prescribe from this list. Between 2002 and 2005, prescribing legislation was extended to include any appropriately qualified first level registered nurse, pharmacist and allied health professional. Successful completion of a Nursing and Midwifery Council approved prescribing programme results in both the independent and supplementary prescribing qualification (Courtenay & Carey, 2008a, Nursing & Midwifery Council, 2019). Unlike the NZ situation where a prerequisite for gaining authorisation to prescribe is a Masters degree, the education for nurse prescribing in the UK is at the Bachelor's degree level (Kroezen et al., 2011) but many hold a Masters qualification. There are now around 50,000 'non-medical' health care professionals qualified to prescribe medicines as either an independent and/or a supplementary prescriber. Nurse Independent Prescribers (NIPs) are able to assess, diagnose and prescribe independently and can prescribe any medicine within their scope of practice. Nurse Supplementary Prescribing (NSP) follows the assessment and diagnosis of a patient's condition by a doctor and the formulation of a clinical management plan (CMP) which has to be agreed by the supplementary prescriber, a doctor and the patient. The CMP contains a list of medicines able to be prescribed for a named patient within the nurse's scope of practice.

Nurse prescribing

The introduction of prescribing by non-medical practitioners has not had an entirely smooth history due to the need to renegotiate boundaries and professional relationships (Lim et al., 2017; Bowskill et al., 2013). International research on the implementation of nurse prescribing has identified advantages for patients including quicker access to medicines (Bowskill et al., 2013; Bradley & Nolan, 2007; Courtenay et al., 2010), improved care quality (Courtenay & Berry, 2007), and better nurse-patient communication (Bowskill et al., 2013; Courtenay et al., 2010; Courtenay & Berry, 2007). A recent meta-analysis concluded that in comparison with standard diabetes care, nurse-led clinics positively influence glycaemic control and nurse prescribing produced similar HbA1c outcomes to doctor prescribing (Wang et al., 2019). For nurses themselves, benefits include increased autonomy (Bowskill et al., 2013; Bradley & Nolan, 2007; Courtenay & Berry, 2007; Lewis-Evans & Jester, 2004) further educational/professional development (Bowskill et al., 2013; Lewis-Evans & Jester, 2004) and team support (Bowskill et al., 2013; Creedon et al., 2015). However, barriers to prescribing have also been identified limiting the full use of prescriptive authority. A study of NIP in the UK from 2006 to 2010 using a national primary care prescription database (ePACT) identified that between 28% and 35% of nurse prescribers were not actively prescribing (Drennan et al., 2014). Team support has been shown to be of particular importance as its presence can facilitate prescribing while its absence can limit it (Creedon et al., 2015).

Limitations imposed by restrictions on the list of medications able to be prescribed (Bowskill et al., 2013; Scrafton et al., 2012), documentation requirements (Bowskill et al., 2013; Scrafton et

al., 2012), inadequate knowledge/expertise (Courtenay & Carey, 2008a, Bowskill et al., 2013), access to continuing professional development (Smith et al., 2014; Courtenay, Carey & Burke, 2007) and lack of support from employers/colleagues (Courtenay & Carey, 2008a) have also been identified as barriers to prescribing.

Beyond the aforementioned specialist diabetes nurse project evaluations, there is little previous research on this topic in New Zealand. Lim, North and Shaw (2018) compared 10 nurse practitioners' and 16 doctors' reflections on their early prescribing experiences. Considerable overlap was found in feelings of responsibility and concern for patient safety at the outset and their approach to prescribing involving reliance on a list of familiar medications which was extended over time as experience and confidence grew. Differences related to nurse prescribers already having considerable clinical experience prior to prescribing, whereas doctors were new to the clinical situation as well as new to prescribing. When seeking advice, doctors tended to defer to medical colleagues while nurses worked with senior medical and nursing colleagues in joint decision making. Interviews with the 10 nurses (Lim et al., 2018) found that their experiences of initiating prescribing practice exemplified two themes; shifting professional boundaries and navigating the boundaries of practice. As the non- medical prescribing role was relatively new, nurses in Lim's study experienced issues with medical and nursing peers, as well as with pharmacists, around understandings of the role and the way in which prescribing would work. Patients too were in need of education about the nurse prescribing role and sometimes questioned the nurses who appeared to be taking on tasks they associated with the medical role. Prior to the introduction of a broader authorisation for RN prescribing in 2016, Wilkinson (2015) surveyed 305 primary care nurses about their views of the

two proposed prescribing pathways (community and specialist) and personal intentions regarding prescribing. Generally, feelings about RN prescribing were favourable and 82% of nurses were interested in becoming a community prescriber and 63% a specialist prescriber. Improvements in efficiency, role clarity, autonomy and patient access were anticipated to accompany prescribing but concerns were expressed about lack of education funding and support for RN prescribing roles.

It is now eight years since the implementation of RN prescribing in diabetes care in New Zealand and the full extent to which nurses' prescribing capability is implemented and utilised in this country is unknown. There is also little known about the system factors that act as barriers or facilitators to nurse prescribing at this point in time. The aim of this study was to explore the uptake and implementation of RN prescribing in diabetes in NZ and compare the findings to those from a sample of nurses prescribing in diabetes care in the UK. The research was based on earlier work by Courtenay and Carey (2008a) who surveyed 1377 independent/supplementary nurse prescribers in the UK to identify their prescribing practices and the factors which hampered or facilitated them in their prescribing role. Findings identified that 87% (n=1107) of prescribers had used independent prescribing and 45% (n=568) supplementary prescribing. Barriers to independent prescribing, reported by 68% of those using independent prescribing, included: local prescribing arrangements; lack of clinical expertise; lack of peer support; and objections by medical staff or pharmacists. Barriers for 47% of those using supplementary prescribing included: issues surrounding setting up the CMP; lack of peer support; problems with support from doctors and pharmacists; and difficulties accessing a doctor. Results from the 439 nurses prescribing for people with diabetes identified that almost

all (93.1%) had used independent prescribing and half (49.8%) had used supplementary prescribing. Three-quarters of the nurses agreed or strongly agreed that their prescribing enabled faster patient access to medicines and two-thirds that it improved quality of patient care (Courtenay & Carey, 2008b).

This paper provides results from a collaborative NZ/UK study designed to compare current diabetes prescribing practices in NZ and the UK.

Objectives

The objectives of this study were to explore:

- The extent of registered nurse and nurse practitioner prescribing in diabetes care in NZ and in a subset of nurse prescribers in the UK
- And compare facilitators and barriers to implementation of nurse prescribing in diabetes care in NZ and the UK
- The governance structures (workplace guidelines, policies etc) that support nurse prescribers within both countries.

Method

This study was an exploratory study employing an online survey with both quantitative and qualitative elements. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist has been followed (Supplementary File 1).

Procedure

The application of the same questionnaire in both countries has enabled an international comparison. The questions used were based closely on those used by Courtney and Carey (2008a) and the minor amendments made were done with permission and input from one of the original authors. A few demographic questions differed slightly for the two nurse prescriber samples due to different NZ and UK prescribing authorisations and context. For example NZ nurses were asked about their prescribing qualification and prescribing regulation and whether they get any additional remuneration for their prescribing role. Overall however the content was the same. The questions were in sections relating to demographics, diabetes medications prescribed, current prescribing practice, prescribing barriers and facilitators and governance and support structures. The first section addressed general demographics with respect to age, sex and ethnicity and then focused on prescribing specific characteristics concerning registration, grade, prescribing qualification/authorisation, years as a prescriber and years of diabetes experience prior to prescribing. The next questions asked about their current employment situation; whether they were full or part-time, where they were located (NZ only), who they were employed by, their practice settings and whether they catered for rural or urban communities or a combination of both. Other questions examined the ethnicity of the population they were prescribing for, the percentage of time spent in clinical practice, education and leadership or management, the type and number of diabetes related medications they were prescribing and mechanisms through which they could prescribe. The next question asked about what facilitates their prescribing practice (open-ended question) and what barriers to prescribing they had experienced (tick box). Finally they were asked about the governance structures available to support their prescribing practice.

In NZ, consultation with Māori, Pacific and South Asian nurse prescribers and a general practitioner was undertaken to ensure cultural acceptability and appropriateness of the questions and to explore any relevant areas of questioning that may not have been considered in adapting a UK questionnaire for use in NZ. No problems were raised. The national NZ ethics committee was consulted regarding ethical approval and indicated that it was not required as it was a low risk self-report survey. In the UK ethical approval was granted by the university ethics committee.

An opportunistic sampling method was utilised to recruit nurses with prescribing authority nationally across both countries. It is not known exactly how many nurses are authorised to prescribe with a focus on diabetes care in either country, consequently an overall response rate cannot be calculated. An email containing an information sheet with details about the study, and the link to the online questionnaire (via SurveyMonkey) was sent to prospective participants via a wide range of established NZ nursing networks. The email stated that completion of the online survey implied consent to participate. Two follow-up reminder emails were sent at three-week intervals.

In the UK a variety of nursing forums and Colleges supported the dissemination of the questionnaire. Messages were placed on the UK Diabetes Specialist Nurse forum and the Royal College of Nursing's Long Term Conditions forum inviting eligible participants to complete the survey. Details of the study and its link were emailed to members of the Queen's Nurse Network by the Director of Programmes.

Analysis

The nature of the sampling approach, lack of substantial hypotheses and relatively small sample size, especially for the UK nurse, means that the study was intended to be descriptive. Consequently data analysis involved frequencies, with means and standard deviations being used to compare and summarise results using SPSS version 20. Qualitative responses were grouped according to content, with quotes provided to exemplify thematic content. Not all participants answered all of the questions and so response rates are recorded with the corresponding N for each question. Nobody was removed from the analysis as the small amount of missing data was not specific to individuals. No imputation of missing data occurred. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist (von Elm et al., 2007) was used to report the study results.

Participants

A total of 250 nurses authorised to prescribe in diabetes care responded to the invitation; 139 in the UK and 111 in NZ.

Results

Demographic information for both samples is presented in Table 1. Nurses in the UK and NZ had a mean age of 48.2 and 50.2 years respectively. Years of practice experience prior to prescribing ranged from 0 to 30 years in the UK (*M*=7.8) and 0 to 36 years in NZ (*M*=10.9). Years as a prescriber ranged from <1 to 32 years in the UK (*M*=6.9) and from <1 to 20 years in NZ (one nurse prescriber had been prescribing in another country before coming to NZ) (*M*=3.2). So in keeping with the prescribing history of the different locations, on average the NZ nurses had more practice experience prior to prescribing and had spent less time prescribing than the UK

nurses. Most were female, 98.2% in the UK and 96.4% in NZ, and working full-time. In the UK, 123 (89.9%) were White British, and 6 (4.3%) were non-white British - identifying as Caribbean (2), Indian (2), African (1) and Chinese (1). In NZ, 15 (13.6%) were Māori, 4 (3.6%) were Pasifika, and 72 (65.5%) were NZ European. In both locations the majority were practising in either urban or mixed urban and rural practice settings.

Table 1

The first objective was to identify the extent of nurse prescribing in diabetes care. Nurse prescribers in both countries identified a range of practice settings within which they were actively prescribing. As can be seen in Figure 1, a similar range of practice settings were identified between the two countries. However, UK nurses were better represented in non general practice community services and home visits, and NZ nurses identified general practice and acute/after hours services with greater frequency than the UK nurses.

Figure 1

Participants were asked to identify the ethnicity distribution of patients seen where prescribing occurs **(Table 2).**

As can be seen in Table 2, for NZ nurses, Māori, Pacific and Asian people make up the majority of ethnicities seen. The ethnicity of patients UK nurses are prescribing for is predominantly White (71%) followed by Asian (18%) and Black (8%).

Average reports of the percentage of time spent in clinical practice, education and leadership or management are presented in **Table 3.**

This shows that the amount of time spent in educating other health professionals is very similar for the UK and NZ nurses, but NZ nurses reported spending slightly less time in leadership or management and more time in clinical practice than their UK counterparts.

Of the nurses who indicated they were prescribing within their current role, 40 (34.2%) of the UK and 64 (64.6%) of the NZ nurses indicated they were prescribing to the full extent of their scope of practice/authorization. This suggests that overall the NZ prescribers are prescribing a wider range of diabetes-related medications than the UK prescribers. This is borne out by their responses when asked to indicate which, from a list of diabetes-related medications, they prescribe (see Figure 2).

Insulin, metformin and sulphonylureas are the drugs prescribed by the most nurses in both countries, and a considerably greater proportion of NZ than UK nurses reported prescribing the other medications.

In order to ascertain the volume and frequency of prescribing, the nurses were asked to indicate the number of separate diabetes-related items (including test strips, glucose lowering, lipid modifying and antihypertensive medicines) they prescribed in a typical week. Numbers of items ranged from 0 to 30 with NZ nurses prescribing greater numbers overall (Figure 3).

Participants were asked about the ways in which they were able to provide patients with a prescription. Seven options were provided ranging from remote prescribing via telephone, email or fax, to making a recommendation via patients' hospital notes to e-prescribing (**see Table 4**).

Responses for both NZ and UK nurses were similar across most categories, the mean scores suggesting that most prescribing options are used rarely or infrequently. The exception is issuing a prescription directly to the patient, which happens regularly in the UK and frequently in NZ.

The second objective was to compare the facilitators and barriers to prescribing experienced by the nurses in the UK and NZ. Firstly, participants were asked to identify three things or roles acting as facilitators for their prescribing and to add any detail about how they have a positive influence. The themes were similar across the two locations and are presented in Table 5 with example quotes. Note that the majority of the participants provided more than one response so the number of comments analyzed does not equal the total number of participants. However there was repetition within some people's comments in that they provided more than one piece of information which was coded under the same theme. Where that was the case the code was only applied once.

Table 5

Notably, the nurses in both countries see access to colleagues for mentorship and support as being the major facilitator of their prescribing practice, the next most salient being access to

guidelines and personal attributes for the UK nurses and case review and educational opportunities for the NZ nurses.

Secondly, with respect to barriers, the nurses were asked to indicate whether each of a list of 14 potential barriers was a problem for them in that it hampered or prevented them from prescribing to the full extent of their authorisation, or prescribing at all. The potential barriers, and the number of nurses indicating they experienced them, are presented in **Table 6.**

There are clearly some similarities in the extent to which these problems act as barriers to prescribing in both countries. Lack of time, for example, was the greatest problem for the UK nurses and the second greatest for NZ nurses, affecting close to a third of the nurses in both countries. The largest disparity occurred in relation to inadequate organisational prescribing guidelines or policies, experienced by twice as many NZ as UK nurses and making it their greatest problem. Level of clinical expertise was also rated as affecting the prescribing of twice as many NZ as UK nurses. The lowest ranked problems, affecting only a few nurses in both countries, were objections from pharmacists and access to an authorized prescriber.

The number of potential barriers could range from 0 (none of the barriers experienced) to 14 (all of the barriers experienced). The range for the UK nurses was 0 to 9 (*M*= 1.8; mode= 0) and for the NZ nurses was 0 to 8 (*M*= 2.0; Mode=0).

The third objective was to identify the availability of governance structures supporting the nurses in their prescribing practice. Participants were provided with a list of statements relating to possible governance structures and support and were asked to indicate which applied to them.

Table 7 presents the number and percentage of UK and NZ nurses providing positive responses to the statements.

Here it can be seen that the type of support occurring most often in both countries is being able to access ongoing professional development. This is followed by the employer ensuring that nurses receive all relevant clinical information for UK nurses, and being able to access all electronic medicine updates via employer systems for NZ nurses. The least available support for UK nurses was being able to access their own prescribing data. For the NZ nurses, it was the employer providing them with regular data to monitor their prescribing practice.

For the UK nurses the overall number of supports ranged from 0 to 7 with a mean of 4.6 and a mode of 5. Very similar results were found with the NZ nurses whose number of supports ranged from 1 to 7 with a mean of 4.7 and a mode of 5.

Discussion

This study has drawn a comparison between groups of nurses prescribing for people with diabetes in the United Kingdom and in New Zealand. Overall, more similarities than differences were found and it is likely that most of the areas of difference can be explained by the different legislation and history of prescribing across the two nations.

The demographic profiles of the UK and NZ study participants were similar except that the NZ participants were more ethnically diverse and the NZ nurses had generally been prescribing for less time than the UK nurses. Nurses in both places described either urban or mixed urban/rural as their most common practice settings. Specific service locations were similar for both

countries and ranged from general practice, specialist outpatient clinics, emergency primary health care, community hospitals, residential care homes and, for NZ nurses, satellite clinics on remote islands. It is interesting to note that compared with previous UK research (Courtenay & Carey 2008b), in which greater numbers of nurses reported to be prescribing in the general practice setting, higher numbers of nurses were prescribing in the hospital and home settings. However, this is more than likely because most prescribers were working in primary care at the time of the study (Courtenay & Carey et al 2008a), with greater numbers working in secondary care as prescribing has rolled out across the UK (Courtenay et al 2017). The variety in practice settings demonstrates the broad reach of service provision in which nurse prescribing occurs. It is interesting that prescribing in the hospital inpatient setting was reported by over 40% of participants as, traditionally, prescribing within the hospital setting has been carried out by doctors. International evidence for the impact of nurse prescribing on inpatient prescribing practices and shifting professional boundaries was provided by Maier et al. (2018). Higher levels of nurse prescribing and lower levels of doctor prescribing were identified in relation to inpatient breast cancer and acute myocardial infarction in three countries that had recently extended nurses' scope of practice when compared to six countries that had not.

Extent of prescribing

As the pressure on health systems increases, government priorities reflect the need for health services to be staffed by competent and capable workforces performing to the top of their scope of practice. In New Zealand, Health Workforce New Zealand aims for the health workforce to have the flexibility and resources to meet the needs of the public into the future

(Health Workforce NZ, 2019). Mechanisms to enable translation into practice include the implementation of non-medical prescribing along with updating of relevant legislation to enable nurses and others, such as pharmacists) to enact their prescribing authority fully, and changing pharmaceutical schedules to ensure prescriptions can be filled at the pharmacy. Nurses' responses in the current study showed a general trend of positivity at being enabled to practise to the top of their scope. This aligns with the findings of the evaluation of diabetes nurse prescribing in NZ (Budge & Snell, 2013) where the ability to prescribe enabled diabetes nurse specialists to maximise their scope of practice and offer a more comprehensive service to their patient population. It also served to enhance service delivery by freeing up doctors and nurse practitioners to focus on the more medically complex patients. There is a significant reward experienced by being able to provide a full episode of care and extending the role by integrating prescribing (Casey et al., 2020; Pearson, Papps & Walker, 2020).

The NZ nurses expressed slightly more positive views about their prescribing experiences than their UK counterparts. The greatest differences were apparent in their ratings of continuation of support from prescribing supervisors and receiving support for prescribing from local pharmacy, with NZ nurses rating these higher that the UK nurses. The exception is in relation to their ability to prescribe all the drugs they need to in order to do their job, where UK nurses were in stronger agreement than NZ nurses.

For NZ nurses, Māori, Pacific and Asian people make up the majority of ethnicities seen. According to the 2018 census, Māori comprise 16.5% of the NZ population, Pacific 8.1% and Asian 15.1%, and diabetes prevalence rates of 5.3% in Māori, 10.8% in Pacific, 5.3% in Asian and

4.5% in European/Other population groups have been reported (HQSC, 2018.) It therefore appears that as nurses are prescribing more for minority groups which experience disproportionately higher diabetes prevalence than the general population, prescribing by NZ nurses is reaching high risk and vulnerable groups with diabetes, thus improving equity of access to care and specifically to diabetes-related medications. A qualitative study of NZ nurses found improved access to cost-effective care was seen as an advantage of adding prescribing to their practice (Pearson et al., 2020).

The ethnicity of patients UK nurses are prescribing for is predominantly White (71%) followed by Asian (18%) and Black (8%). This more or less reflects the UK demographic profile reported by the latest national census (GOV.UK, 2011) of White 86%, Asian/Asian British 7.5%, Mixed/Multiple ethnic groups 2.2%, Black/African/Caribbean/Black British 3.3% and other 1%. However, on average it appears the Asian patients are over represented in the groups for which UK nurses are prescribing.

Having sufficient time in clinical practice and engaging in regular prescribing of medications are important to ensure currency is maintained. Nurses from NZ and the UK indicated that a similar amount of time was spent in education and leadership; however NZ nurses described having more time in clinical practice than UK nurses. Participants were asked if they were prescribing to the full extent of their scope of practice/authorisation e.g. all diabetes-related medicines (including lipid modifying and anti-hypertensive medication). Sixty four percent of the NZ nurses and 34% of UK nurses said they were, suggesting NZ nurses are prescribing a wider range of diabetes-related medications. Responses indicated that insulin, metformin and

sulphonylureas are the drugs prescribed by the most nurses in both locations, a finding that is consistent with the NZ managed roll out experience (Budge& Snell, 2013). Prescribing authority was mostly utilised through direct prescribing to the patient, making a recommendation via letter, email or phone to the general practice team or via hospital medication charts.

Facilitators and barriers to the implementation of nurse prescribing in diabetes care in NZ and the UK were explored. Facilitating factors for both NZ and UK nurses were identified as effective supervision, collegial relationships with medical specialists, pharmacists and peers, ongoing education/study days and support from patients. Positive personal attributes/experiences were identified as facilitating prescribing practice with participants describing their own drive and determination as assisting their acceptance by others. Similar critical success factors were identified in the NZ managed roll out of diabetes nurse specialist prescribing report as the importance of the nurses' preparation for prescribing, the availability of supervisors, collaborative team functioning, employer support, effective communication and national oversight (Budge& Snell, 2013) and by Casey et al. (2020). Similarly, McHugh et al.'s (2020) interviews with non-medical prescribers in Ireland identified their relationships with the interdisciplinary team, support from peers and ongoing education as facilitators of their prescribing practice.

A review of barriers to non-medical prescribing in the UK was carried out by Graham-Clarke et al. (2018). Three overarching themes were identified relating to: intrinsic characteristics such as attitude, which could be affected by attitudes of others, and confidence which could limit practitioners from using their prescribing skills; human factors including support from patients,

medical practitioners and peers; and organisational factors such as formulary guidance/restrictions, work pressure, and access to records. Some clear similarities in the barriers to prescribing described by Graham-Clarke et al. were experienced by both NZ and UK nurses. In our study, objections from medical, nursing and pharmacist colleagues were identified by both NZ and UK nurses although they did not rank high in the order of potential barriers. Self-confidence in prescribing competence and practice experience was identified as a facilitator and conversely self-perceived level of expertise and inadequate prescribing preparation, suggestive of lower self-confidence, was identified as a barrier. Lack of time to prescribe was the greatest problem for the UK nurses and the second greatest for NZ nurses, affecting close to a third of the nurses in both countries. The largest disparity occurred in relation to inadequate organisational prescribing guidelines or policies, experienced by twice as many NZ as UK nurses and making it their greatest problem. This is despite the NCNZ, the regulatory body for nurses, setting requirements for nurses and employers when nurses are applying for prescriptive authority as a designated prescriber. The NCNZ (2020) guidance includes the requirement for specific clinical team and employer support and specific features of the work environment to be in place. These include: collaborative and collegial team relationships that operate to optimise patient outcomes; a registered nurse position that supports prescribing activity; clinical governance, policies and procedures that support safe prescribing including case review, audit, a system for reporting adverse events or incidents; continuing professional development activities; and identified prescribing mentor(s) committed to providing support and guidance for the registered nurse including regular case review and referral when a patient's health needs are beyond the nurse's level of expertise. Similar

requirements are provided for nurses in the UK by the Nursing and Midwifery Council (NMC, 2018).

With respect to the governance structures supporting their prescribing, nurses in both NZ and UK provided positive responses overall to being able to access ongoing professional development. This is important as Basford (2013) states that "nurse prescribers have a professional and moral duty to maintain their prescribing competence and must seek ways in which this can be achieved as part of continuing professional development and lifelong learning. The employer must support the maintenance of competence as part of clinical governance and pursue the notion of becoming a learning culture with adequate learning resources" (p.40). However, for some nurses in our study, access to ongoing professional development was limited due to lack of funding and release-time and lack of availability of appropriate, quality education specific to prescribing. This is consistent with literature reported elsewhere (Smith et al., 2014) where general barriers for UK nurses were identified as lack of staff cover, other work commitments, lack of support from managers and some activities provided not being adequate to maintain patient safety. Smith and colleagues (2014) described this as a concern as it is thought that this lack of support may lead to a lack of confidence in prescribing. So within both NZ and the UK, despite the respective regulatory bodies (NCNZ & NMC) providing clear guidance and directives about governance requirements for registered nurse prescribing, it appears that some practice environments lack the support structures essential for ensuring nurses feel enabled to practice safe prescribing.

Access to electronic clinical updates or bulletins was reported by participants to be an effective mechanism for nurses to maintain currency of knowledge, with UK nurses describing greater access to online learning via employer systems than NZ nurses. The least available support for UK nurses was access to their own prescribing data. This is in contrast to NZ nurses who reported that their employers were providing them with regular data to monitor their prescribing practice. Differences in access to prescribing data for quality assurance purposes was also found by Smith et al. (2014) with nurses in primary care trusts having more routine access to electronic prescribing analysis and cost data but the reverse being true for secondary care nurses due to a lack of electronic prescribing systems in secondary care services.

Strengths and limitations

The strengths of this study included the involvement of a broad sample of registered nurses and nurse practitioners in NZ and the UK with prescribing authority and a focus on diabetes care who were practising in a variety of settings. Many nurses were experienced prescribers and provided great insight into the facilitators and barriers, and those who were new to prescribing also provided valuable information around the importance of governance and organisational support as they embarked on their prescribing practice. Collecting responses anonymously may have helped to limit bias as respondents could freely describe potentially sensitive barriers to prescribing practice without concern about consequences. As an opportunistic sampling approach was utilised, we were potentially able to reach more nurses rather than only seek out those known to provide specific diabetes care. However, not knowing the absolute numbers of eligible nurses in each of the network has not allowed us to identify

an overall response rate which could be viewed as a limitation as could the relatively small sample sizes. Another potential limitation is that not all questionnaires were fully completed. However, this was mitigated by reporting the actual number of responses for questions answered and is not considered to substantially undermine our findings.

Conclusions

Uptake of prescribing by nurses in NZ and the UK has increased in response to demand. Prescribing by nurses occurs across multiple and diverse practice settings enabling better access and seamless care as a consequence. The results of this survey suggest that vulnerable patient groups benefit from nurse prescribing in NZ and the UK through increased and improved opportunities to access care and medications. Nurse prescribers in NZ and the UK are prescribing a broad range of diabetes-related medications across a diverse range of practice settings. Some differences in range of prescribing were noted between countries with NZ nurses more regularly prescribing a broader range of medications. Barriers and facilitators were similar in both locations – with the same factors acting as barriers when missing and facilitators when present. The importance of adequate supervision, support from multidisciplinary team colleagues and prescribing education/guidelines are paramount.

Further research

Building on the current study findings, a logical next step would be to use random sampling techniques and recruit larger samples in both countries in order to undertake inferential analysis and better quantify uncertainty.

Relevance to clinical practice

Overall, the findings from this study provide important insights into the implementation of nurse prescribing in the UK and in NZ and despite a considerable difference in years of nurse prescribing in the UK compared with NZ, the identified issues are similar. Enabling nurses to prescribe has provided opportunity for nurses to practice to the top of the scope of their regulated scope and provide a fuller episode of care. More timely management of existing health conditions and/or reducing risk for potential related health conditions promotes well-being and equitable outcomes for high risk and vulnerable groups.

Impact statement

What does this paper contribute to the wider global clinical community?

- International comparison of the extent and range of nurse prescribing in diabetes care
- Important insights into the barriers and facilitators to implementation of nurse prescribing in the UK and in NZ

References

Basford, L. (2003). Maintaining nurse prescribing competence: experiences and challenges. *Nurse Prescribing 1*(1), 40-45. https://doi.org/10.12968/npre.2003.1.1.11187

Best Practice Advocacy Centre NZ. (2019). National report: A pharmacological profile of patients with type 2 diabetes. Retrieved from https://bpac.org.nz/report/snippet/type-2-diabetes-national.aspx)

Bowskill, D., Timmons, S., & James, V. (2013). How do nurse prescribers integrate prescribing in practice: case studies in primary and secondary care? *Journal of Clinical Nursing, 22*, 2077–2086. https://doi.org/10.1111/j.1365-2702.2012.04338.x.

Bradley, E., & Nolan, P. (2007). Impact of nurse prescribing: A qualitative study. *Journal of Advanced Nursing, 59*(2), 120–128. https://doi.org/ 10.1111/j.1365-2648.2007.04295.x.

Budge, C., & Snell, H. J. (2013). *Registered Nurse Prescribing in Diabetes Care: 2012 Managed National Roll Out Project.* Report Prepared for Health Workforce New Zealand by the New Zealand Society for the Study of Diabetes. Retrieved from https://www.nzssd.org.nz/healthprofs/13%2010%20Registered%20Nurse%20Prescribing%20in%20Diabetes%20Care%20final%20report.pdf

Casey, M., Rohde, D., Higgins, A., Buckley, T., Cashin, A., Fong, J., Hughes, M., & McHugh, A. (2020). "Providing a complete episode of care": A survey of registered nurse and registered midwife prescribing behaviours and practices. *Journal of Clinical Nursing, 29*, 152-162.

Center for Disease Control (2013). Retrieved from https://www.cdc.gov/diabetes/statistics/meduse/fig2.htm

Courtenay, M., & Berry, D. (2007). Comparing nurses' and doctors' views of nurse prescribing: a questionnaire survey. *Nurse Prescribing 5*(5): 205–2010. https://doi.org/10.12968/npre.2007.5.5.23740

Courtenay, M., & Carey, N. (2008a). Nurse independent prescribing and nurse supplementary prescribing practice: National survey. *Journal of Advanced Nursing, 61*(3), 291-299. https://doi.org/ 10.1111/j.1365-2648.2007.04512.x.

Courtenay, M., & Carey, N. (2008b). Preparing nurses to prescribe medicines for patients with diabetes: A national questionnaire survey. *Journal of Advanced Nursing, 61*(4), 403-412. https://doi.org/10.1111/j.1365-2648.2007.04534.x

Courtenay, M., Carey, N., & Burke, J. (2007). Independent extended and supplementary nurse prescribing practice in the UK: A national questionnaire survey. *International Journal of Nursing Studies, 44*, 1093-1101. https://doi.org/10.1016/j.ijnurstu.2006.04.005.

Courtenay, M., Stenner, K., Carey, N. (2010). The views of patients with diabetes about nurse prescribing. *Diabetic Medicine, 27*, 1049-1054. https://doi.org/10.1111/j.1464-5491.2010.03051.x.

Courtenay M, Khanfer R, Harries-Huntly G, et al. An overview of the uptake and implementation of non-medical prescribing in Wales: A national survey. BMJ Open 2017. http://dx.doi.org/10.1136/bmjopen-2016-015313

Creedon, R., Byrne, S., Kennedy, J., & McCarthy, S. (2015). The impact of nurse prescribing on the clinical setting. *British Journal of Nursing, 2*4(17), 878-885. https://doi.org/ 10.12968/bjon.2015.24.17.878.

Drennan, V. M., Grant, R. L., & Harris, R. (2014). Trends over time in prescribing by English primary care nurses: a secondary analysis of a national prescription database. *BMC Health Services Research, 14*, 54. https://doi.org/ 10.1186/1472-6963-14-54.

GOV.UK (2011). Retrieved from https://www.ethnicity-facts-figures.service.gov.uk/british-population/national-and-regional-populations/population-of-england-and-wales/latest.

Graham-Clarke E, Rushton A, Noblet T, Marriott J (2018) Facilitators and barriers to non-medical prescribing: A systematic review and thematic synthesis. PLoS ONE 13(4): e0196471. https://doi.org/10.1371/journal.pone.0196471

Health Central. (2019). Nurse practitioner workforce growth “not fast enough” for Minister’s liking. Retrieved from (https://healthcentral.nz/nurse-practitioner-workforce-growth-not-fast-enough-for-ministers-liking/)

Health Quality & Safety Commission (2018). https://www.hqsc.govt.nz/our-programmes/health-quality-evaluation/projects/atlas-of-healthcare-variation/diabetes/

Health Workforce New Zealand (2019). *New roles and initiatives. Innovative thinking to ensure the health workforce has the flexibility and resources to meet the needs of the public into the future*. Retrieved from https://www.health.govt.nz/our-work/health-workforce/new-roles-and-initiatives.

Kroezen, M, van Dijk, L., Groenewegen, P. P., & Francke, A. L. (2011). Nurse prescribing of medicines in Western European and Anglo-Saxon countries: A systematic review of the literature. *BMC Health Services Research, 11*, 127. https://doi.org/ 10.1186/1472-6963-11-127.

Lewis-Evans, A., & Jester, R. (2004). Nurse prescribers’ experiences of prescribing. *Journal of Clinical Nursing, 13*, 796-805. https://doi.org/ 10.1111/j.1365-2702.2004.00993.x.

Lim, A. G., North, N., & Shaw, J. (2017). Navigating professional and prescribing boundaries: Implementing nurse prescribing in New Zealand. *Nurse Education in Practice, 27*, 1-6.

Lim, A. G., North, N., & Shaw J. (2018). Beginners in prescribing practice: Experiences and perceptions of nurses and doctors. *Journal of Clinical Nursing, 27*(5-6), 1-10. https://doi.org/ 10.1111/jocn.14136.

McHugh, A., Hughes, M., Higgins, A., Buckley, T., Cashin, A., Casey, M., & Rodhe, D. (2020). Non-medical prescribers perspective on prescribing within practice. *Journal of Prescribing Practice, 2*(2), 68-77. https://doi.org/10.12968/jprp.2020.2.2.68

Maier, C. B., Köppen, J., Busse, R., & MUNROS team (2018). Task shifting between physicians and nurses in acute care hospitals: Cross-sectional study in nine countries. *Human Resources for Health*, *16*(1), 24. https://doi.org/10.1186/s12960-018-0285-9

Ministry of Health (2020). Virtual diabetes register. Retrieved from https://www.health.govt.nz/our-work/diseases-and-conditions/diabetes/about-diabetes/virtual-diabetes-register-vdr

Nursing Council of New Zealand. (2020). *Registered Nurse prescribing in primary health and specialty teams: Guidance for registered nurses and employers.* Wellington: Author. Retrieved from

https://www.nursingcouncil.org.nz/Public/Nursing/Nurse_prescribing/RN_prescribing_in_primary_health_and_specialty/NCNZ/nursing-section/Registered_nurse_prescribing_in_primary_health_and_specialty_teams.aspx?hkey=e0dcf5e0-b496-4f84-9dd3-24b6fc55f766

Nursing and Midwifery Council. (2019). *Standards for prescribing programmes*. London: https://www.nmc.org.uk/standards/standards-for-post-registration/standards-for-prescribers/standards-for-prescribing-programmes/

Pearson, M., Papps, E., & Walker, R. C. (2020) Experiences of registered nurse prescribers; a qualitative study. *Contemporary Nurse, 56*, 4, 388-399. https://doi.org/10.1080/10376178.2020.1813044

Scrafton, J., McKinnon, J., & Kane, R. (2012). Exploring nurses' experiences of prescribing in secondary care: Informing future education and practice. *Journal of Clinical Nursing, 21*, 2044-2053. https://doi.org/10.1111/j.1365-2702.2011.04050.x.

Smith, A., Latter, S., & Blenkinsopp, A. (2014). Safety and quality of nurse independent prescribing: A national study of experiences of education, continuing professional development clinical governance. *Journal of Advanced Nursing, 70*(11), 2506-2517. https://doi.org/10.1111/hex.12193.

Stenner, K., & Courtenay, M. (2008). Benefits of nurse prescribing for patients in pain: nurses' views. *Journal of Advanced Nursing, 63*(1), 27-35. https://doi.org/0.1111/j.1365-2648.2008.04644.x.

Von Elm E., Altman, D. G., Egger, M., Pocock, S. J., Gotzsche, P. C., & Vandenbroucke, J.P. (2007). Strengthening the reporting of observational studies in epidemiology (STROBE) statement: Guidelines for reporting observational studies. *British Medical Journal 335*, 806. https://doi: https://doi.org/10.1136/bmj.39335.541782.AD

Wang Q, Shen Y, Chen Y, Li X.(2019). Impacts of nurse-led clinic and nurse-led prescription on hemoglobin A1c control in type 2 diabetes: A meta-analysis. *Medicine (Baltimore), 98*(23), e15971. https://doi.org/10.1097/MD.0000000000015971

Wilkinson, J. (2015). Proposals for registered nurse prescribing: Perceptions and intentions of nurses working in primary health care settings. *Journal of Primary Health Care, 7*(4), 299-308.

Wilkinson, J., Carryer, J., & Adams, J. (2014). Evaluation of a diabetes specialist nurse prescribing project. *Journal of Clinical Nursing, 23*(15-16), 2355-2366. https://doi.org/10.1111/jocn.12517.