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TITLE

Independent nurse medication provision: a mixed method study assessing impact on patients' experience, processes, and costs in sexual health clinics

ABSTRACT

Background: Local services within the United Kingdom National Health Service enable autonomous provision of medication by nurses, supporting individual nurses to gain prescribing qualifications or by introducing local patient group directions.

Aim: To compare nurse prescribing and patient group directions regarding clinic processes, patients' experiences, and costs from the perspectives of providers, nurses, and patients.

Design: Mixed methods, comparative case study in five urban sexual health services in the United Kingdom.

Methods: Data were collected from nurse prescribers, patient group direction users and their patients July 2015 to December 2016. Nurse questionnaires explored training (funding and methods). Nurses recorded consultation durations and support from other professionals in clinical diaries. Patient notes were reviewed to explore medication provision, appropriateness and safety; errors were judged by an expert panel. Patients completed satisfaction questionnaires about consultations and information about medications.

Results: Twenty-eight nurse prescribers and 67 patient group directions users took part; records of 1,682 consultations were reviewed, with 1,357 medications prescribed and 98.5% therapeutically appropriate. Most medication decisions were deemed safe (96.0% nurse prescribers, 98.7% patient group directions, Fisher's Exact Test $p=0.55$). Errors were predominantly minor (55.6% nurse prescribers, 62.4% patient group directions) and related to documentation omissions (78.0%); no patients were harmed. Consultation durations and unplanned re-consultations were similar for both groups. Nurse prescribers sought assistance from colleagues less frequently (chi-squared=46.748, $df=1$, $p<0.001$) but spent longer discussing cases. Nurse prescribing training required more resources from providers and nurses, compared to patient group directions. Nurse prescribers were on higher salary-bands. Patient satisfaction was high in both groups (>96%).

Conclusions: Nurse medication provision by both nurse prescribers and patient group direction users is safe and associated with high patient satisfaction; effects on clinic processes and costs are similar. Undertaking the prescribing qualification involves independent study but may bring longer term career progression to nurses.

Keywords

- Nurse/ non-medical prescribing
- Sexual health
- Patient group directions/ medication directives
- Cost consequence
- Health resources

INTRODUCTION

Nurses can independently provide medication without a prescription from a medical doctor in some countries including Australia, Canada, China, Ireland, Spain, New Zealand, Norway, South Africa, Sweden, Netherlands, and USA (Kroezen et al., 2011; Gielen et al., 2014; Ling et al., 2018). Nurses' scope of prescribing practice varies internationally ranging from a restricted formulary to prescribing powers comparable to doctors (Gielen et al., 2014); in some countries the authority to prescribe may be limited to nurse practitioners. The United Kingdom (UK) is considered world-leading with regards to medication provision by nurses (Kroezen et al., 2012). This ability for nurses to provide medication enables greater flexibility in service planning and has the potential to affect patient outcomes as well as processes and costs (Nursing & Midwifery Council (NMC), 2006; UK Department of Health (DH), 2006). Evaluations of nurse prescribing have found benefits for patients (Latter et al., 2007; Courtenay et al., 2010) but have not specifically investigated patient group directions. The study reported in this paper compared two different models of independent medication delivery by nurses in the UK National Health Service (NHS): patient group directions and independent nurse prescribing.

BACKGROUND

Patient group directions are local agreements, introduced in 2000 (DH, 2000), that enable nurses to supply and/or administer certain medications within a specified scope. Patient group directions can be used by larger numbers of nurses deemed competent locally but involve time by senior members of local services to achieve the required governance approvals from the employing organisation. Once agreed, training is usually delivered to nurses by the provider organisation (National Institute for Health and Care Excellence (NICE), 2013).

From 2001, UK nurses have had increasing powers to prescribe independently, outside of patient group directions, (referred to hereafter as 'nurse prescribing') (Great Britain. *Health & Social Care Act 2001*; DH, 2006). Nurses who successfully complete an accredited prescribing course are now able to provide almost all medications within their clinical competence (*The Human Medicines Regulations 2012* Statutory Instrument 2012/1916). At the time of this study, the UK regulatory body, the NMC, required that nurse prescribing training was at degree level or above, over a minimum of 26 days, with a further 12 days (7.5 hours/day) of clinical practice supervised locally by a 'designated medical practitioner' (NMC, 2006; NMC, 2015). Since the present study, 'designated medical practitioners' have been replaced with 'designated prescribing practitioners' which also allows experienced nurse and pharmacist prescribers to act as clinical supervisors (NMC, 2018).

As the supply/ administration of medications using a patient group direction is not prescribing, the term 'medication delivery' is used in this paper to denote the provision of medication through patient group directions and nurse prescribing.

THE STUDY

Aim

The aim of this paper is to compare the implications of patient group directions and nurse prescribing for provision of medications in sexual health clinics from the perspectives of local NHS services,

individual nurses, and patients. The study investigated training, clinic processes, patients' experiences, and costs, to provide an overview of relevant factors.

Design

The study used mixed methods and a comparative case study design. A convergent mixed methods design (Creswell, 2014) collected qualitative and quantitative data in parallel, analysed each component separately, and then merged data. A high-level costs assessment was undertaken based on all of the data collected.

Setting and Participants

The study was set in five geographically spread urban-based specialist sexual health services (three in England, one in Wales, one in Scotland). Patient group directions and/or nurse prescribing were actively being used in each service. Participants were sexual health nurses who managed patient care using patient group directions or nurse prescribing, and their patients. Data were collected in the clinical notes review on patients' gender, age, ethnic origin, sexual orientation, diagnoses and whether they were attending with symptoms to determine how alike patients were across both study groups. To facilitate nurse recruitment and staff awareness, the study was presented to staff at local site meetings.

Data collection

Factors of interest in the comparison of patient group directions and nurse prescribing were identified from an initial literature review and discussion amongst investigators. Those pertinent from the NHS perspective were: (i) training, set-up and governance costs; (ii) clinic processes, including: medication provision, errors and appropriateness; consultation lengths; impact on the workload of other professionals; rates of unplanned repeat attendances for the index condition, and (iii) patient experiences. From the nurses' perspective embarking on prescribing training may incur personal time to study and out-of-pocket expenses, but may generate benefits in terms of career progression and job satisfaction (Latter et al., 2007; Courtenay et al., 2010). Patient group direction training is usually delivered in work time ('on-the-job').

Data were collected sequentially between 1st July 2015 and 31st December 2016 using nurse questionnaire, nurse diary, patient notes review and patient questionnaire at each site. Costs (British pounds (Curtis and Burns, 2016)) were attributed to the resources, where possible. Data sources are summarised in Table A and described further below. Synthesis was largely narrative.

NHS perspective

The implications for the NHS of different forms of nurse medication delivery relate to provision training, governance, clinic process (e.g. medication provision, safety, appropriateness; consultation times, repeat attendances, see Table A for summary).

(i) Training and governance for patient group directions and nurse prescribing

The resource implications of developing and implementing patient group directions were assessed by observing the process of writing one local patient group direction for a contraceptive implant and updating a group of other directions (also contraceptives). Each step was logged and senior staff contributing to the process asked to report the time involved. Being a local policy, patient group direction training is delivered in work time and staff time implications were not gathered in detail.

Regarding local sponsorship of nurse prescribing courses, nurses at each site who had completed training were asked to report on courses attended and clinical support received (role and hours of designated medical supervisors) by means of a questionnaire (further details below). Course fees were obtained from the websites of universities reported by questionnaire respondents.

(ii) *Clinic processes*

Overview of medications delivered: Data were obtained for four categories of patient presentations (consultations): when patient group direction users did/did not provide medications, and when nurse prescribers did/did not provide medications. A sample size of 344 consultations for each category was calculated as required to enable a comparison of the appropriateness of prescribing by patient group direction users and nurse prescribers with 99% power at the 5% significance level. Using data from Black (2012), it was assumed 98% of consultations from nurse prescribers would be appropriate, compared with 89% of patient group direction users.

Patient attendance lists at each site were used to identify clinical notes of patients managed by patient group direction users and nurse prescribers over a six-month period. Quotas for presentations were set for sites based on the number of nurse prescribers or patient group direction users in each site and notes randomly selected using Microsoft Excel®, until the sample size of 344 had been achieved for all four categories.

Details of all medications delivered and the documentation on the prescriptions were extracted from clinical notes onto a standardised proforma. Medication provision (numbers and types) by nurse prescribers and patient group direction users was compared.

Appropriateness of medication provision: The researcher judged appropriateness using the ten-item Medication Appropriateness Index (Hanlon et al., 1992), national guidance (BASHH, 2016; FRSH, 2016) and clinical judgement. The Medication Appropriateness Index covered: indication for the medication, effectiveness for the condition, dosage, directions, interactions, reactions, cost; scoring ranges from 0 (appropriate) to 18 (inappropriate) with the cut-off for appropriateness set at 3.

Categorisation of medication errors and severity assessments: All consultations (where medications were delivered and where they were not) were reviewed by the researcher to identify any potential issues with medication provision, or lack of, based on Dornan et al.'s (2009) prescribing error classifications. Errors (which included decisions judged inappropriate) were confirmed with a prescribing representative at each site, and any disagreements resolved locally. A project-specific error categorisation was created by the research team based on the error types observed in the data. In addition to Dornan et al.'s (2009) categorisation, potential of medication interactions, absence of risk assessment, omission of prescription documentation, instances of under/ over/ wrong prescribing and inappropriate use of patient group directions were added. Error rates per consultation were calculated.

An expert clinical panel, comprising two consultant physicians, two nurse prescribers and a pharmacist, was convened to assess the severity of errors using a validated, reliable scoring tool (Dean and Barber, 1999). Each panel member scored each error on a scale of zero (no harm) to ten (death). Errors were classified as minor (score 0-2), moderate (3-6), severe (7-10), and the mean score calculated. As part of this process, the panel identified any consultations where they considered the medication provided was not safe. 'Safe' was a categorical conclusion based on medication being indicated and appropriate and sufficient documentation provided to allow for complete assessment using research tools presented. Any disagreements were resolved by discussion. Further information on the methods for identifying and rating medication errors is provided in Black et al. (2020).

Consultation duration: Consultation length data were manually recorded in minutes by nurses completing clinical diaries over a two week period.

Workload of other professionals: The impact of nurse delivery of medications on the workload of other health professionals (e.g. nurses obtaining prescriptions or clinical advice from doctors) was also based on data collected through the clinical diaries. Participants were prompted to record episodes of professional support required, the role of the person they sought support from, and duration spent supporting them. Mean support durations were calculated and compared.

Unplanned re-consultations: Number of unplanned re-consultations within three months for the original presenting condition were obtained from clinical records and compared between nurse prescribers and patient group direction users as a measure of the effectiveness of the initial treatment received.

Patient perspectives

During the two-week period when nurses were completing their clinical diary, they invited patients provided with medications to complete a patient experience questionnaire. This was offered to patients at the end of the consultation. Prior to the consultation, patients had received a participant information leaflet that explained that completion of the questionnaire was entirely voluntary and that non completion would not affect their care in any way. Patients returned completed surveys in a collection box away from the nurse before leaving the clinic. Patients predominantly managed by another health professional or those deemed vulnerable (e.g. under 16, sexual assault victims) were excluded. The questionnaire included five items from the validated patient satisfaction survey for sexual health clinic attendees (Weston 2010) and 16 items in two domains (action and usage of medications, and potential problems of medicines) from the Satisfaction with Information about Medications Scale (Horne et al 2001). Each item is scored 0 (negative) or 1 (positive) and summed to obtain domain scores, range 0 to 8 (highest satisfaction).

Nurse perspectives

Questionnaires were distributed to nurses (both groups) in each site to capture information on the training received. They indicated their motivations for training for independent delivery of medications from a series of statements (e.g. improving job satisfaction, patient experience and clinical skills). Background information was gathered on gender, age, nurse banding/ grade, prior qualifications and clinical experience. Nurse prescribers reported the prescribing course they had attended, who funded the course and whether they were given study leave to attend. Respondents in each group were asked about study leave provided, personal time devoted to studying, and out-of-pocket expenses for travel and purchase of learning resources for training. Possible career implications were proxied through a comparison of current seniority salary bandings of nurse prescribers in the study with those of nurses using patient group directions.

Ethical considerations

A favourable ethical opinion was obtained for the study from Wales Research Ethics Committee 4, reference 15/WA/0120. Participation was voluntary for nurse and patient participants. No additional consent was required for the clinical notes review (as approved by the ethics committee). All identifying data were anonymised.

Data analysis

Data gathered on the various factors were synthesised using a cost-consequences balance sheet, or through descriptive narrative to enable a comparison of patient group directions versus nurse prescribing. A cost-consequences framework permits comparisons in the context of multiple influences, perspectives and effects (Mauskoff et al., 1998), and supports the inclusion of non-health related factors and processes of care, providing a broad and comprehensive consideration in the context of service delivery interventions (Drummond et al., 2015; Sutton et al., 2018). Data are presented as non-aggregated information so that healthcare systems, organisations and individuals can review specific aspects of the same dataset to determine whether the issues under consideration are likely to be economically beneficial from their perspective.

Statistical methods

Data were analysed using Statistical Package for Social Sciences (SPSS) version 24.0 (IBM Corp, 2016), Microsoft Access® and Microsoft Excel®. Data are presented, where appropriate, using the mean (standard deviation), range, median and frequencies (percentages). The chi-squared test was used to compare differences in proportions between nurse prescribers and patient group direction users, or the Fisher's Exact Test if any expected cell values were <5 (Field, 2009). Group means were compared using the Independent Samples t Test.

Consultation lengths, in minutes, were compared between nurse prescribers and patient group direction users distinguishing between new and follow up consultations, and between consultations where medications were or were not provided.

Costs were estimated in British pounds (2016) for items where statistically significant differences were observed between nurse prescribers and patient group direction users. Hours spent by staff involved in patient group direction governance and as designated medical practitioners were valued according to national salary tariffs (Curtis and Burns, 2016) inclusive of on-costs and overheads. Medications prescribed were costed based on the British National Formulary (2016) prices. Wrong- and over-prescribing were taken as an indication of wastage and the cost of 'wasted' medication estimated. For under-prescribing, the medications that should have been prescribed were identified and costs included.

Validity and reliability/ rigour

The medication appropriateness index (Hanlon et al., 1992), error severity scoring (Dean and Berber, 1999) and patient experience (Horne et al., 2001; Weston et al., 2010) research tools had been tested for validity. The staff questionnaire and other data extracts from the clinical notes review were deemed to have 'face validity' by the authors as they measured what was required, based on clinical guidelines and available evidence.

RESULTS/ FINDINGS

NHS perspective

(i) Training and governance for nurse prescribers and patient group direction users

Twenty-six of 28 (93%) nurse prescribers recruited across the five sites returned the staff questionnaire. The fees of 25 nurse prescribers (at 10 different universities) were paid in full by employers or health training grants, ranging from £900 to £3,555 (mean £1,695, from data available for 2016). Consultant level doctors were the most frequently reported designated medical practitioner (20 of 26 nurses), with Registrars and Associate Specialists supporting the others. Support ranged

from 2 to 12 days. Ten nurses reported additional support from existing nurse prescribers (1 to 3 days). Including all clinical supervision, a mean of 7.4 paid study days (range 2 to 13.7) was provided to each nurse prescriber during training. This would equate to a cost to the NHS of £6,451 (weighted mean, range £1,283 to £11,138) per nurse prescribing student but would not apply if the supervision was provided alongside normal clinical duties. Ninety-two percent (n=24) of respondents reported a mean of 20.1 employer-funded study days (range 1 to 31) with nurses in higher bands reported receiving more study leave (Supplementary tables 1- 3).

The process for patient group direction creation, approval, and implementation followed National Institute for Health and Care Excellence guidance (NICE, 2013), summarised in Figure 1. The process for the creation of a new contraceptive patient group direction, including drafting by a senior nurse and review and committee approval involving another senior nurse and a consultant doctor involved a total of 13.8 hours (time cost to the employer of £912); the updating of a patient group direction for individual contraceptives (same staff) took 4.0 hours (£276) (Supplementary table 4).

Thirty-five of 67 (52.2%) patient group direction users recruited across the five sites returned the staff questionnaire. Twenty-nine of 35 (82.9%) respondents reported how they were trained to become competent to use patient group directions. A variety of methods (often hybrid) were reported including classroom teaching (23), one-to-one instruction (11), self-directed learning (20) and e-learning (10). (Supplementary table 5). While there was no requirement for the NHS to provide study days for patient group direction training, 30 respondents identified a mean of 6.4 study hours (0.9 days); 16 respondents reported no study time and one reported 85 hours. As with nurse prescribers, more senior patient group direction users reported a larger amount of study leave than those in junior bands (Supplementary table 6).

(ii) Clinic processes

Overview of medications delivered: A total of 1,682 presentations were reviewed to achieve the sample size of 344 in each of the four categories (nurse prescriber consultations with and without medication delivery; patient group direction user consultations with and without medication delivery). Presentations to nurse prescribers in which no medications were delivered were the least frequent category of consultation, and resource constraints meant data collection had to stop when only 326 records of this sort of consultations had been identified. The remaining 18 consultations were therefore sourced from nurse diaries collected at dates outside the six-month period covered by the record review (thus avoiding double counting) (Table B).

A total of 1,357 medications were provided in the 879 (52.3%) presentations involving medication provision. Nurse prescribers delivered 620 medications from 399 consultations (1.55 per consultation); patient group direction users delivered 737 medications from 480 consultations (1.54 per consultation). The most frequently prescribed medications were antibiotics (n=486, 35.8%) and local anaesthetics (n=156, 11.5%); vaccinations, wart treatment, contraceptives (short and long acting) and anti-fungals each accounted for between 8 and 9% of all prescriptions. The overall mean costs of medication per patient was higher for nurse prescribers than for patient group direction users (£19.00 vs £11.25 respectively), reflecting a more complex case load and higher rates of prescribing of HIV-related medications.

Appropriateness of medication delivery: Both nurse prescribers and patient group directions users consistently provided appropriate medication choices. Overall, medication was determined to be therapeutically effective in 1,336 (98.5%) of 1,357 cases. Including consultations when medications

were not provided, the proportion that were appropriate was lower for nurse prescribers (714/743, 96.1%) than for patient group direction users (883/939, 94.0%) (Fisher's Exact $p < 0.001$); the mean Medication Appropriateness Index was similar (0.9 (SD=2.3) vs 0.8 (SD=2.0); t -test=1.032(df=1239.6), $p=0.302$). The main reason for medication provision to be deemed 'inappropriate' related to inadequate clinical documentation. Patient group direction users also made inappropriate use of the directions in a small number of cases.

Medication errors categorisation and severity: From the 1,682 presentations (i.e., with and without medication prescribing), a total of 1,844 individual medication errors were identified. There were 879 errors across 743 nurse prescriber consultation, and 965 errors across 939 patient group direction user presentations, an average 1.18 and 1.03 errors per consultation, respectively (chi-squared=10.418,df=1, $p=0.001$). Errors most frequently related to documentation omissions (1,439, 78.0%), e.g. certain aspects of the prescription weren't documented; dose, frequency, route of administration, duration. Patient group direction users were more likely to make medication risk assessment errors than nurse prescribers. Most errors were categorised by the expert panel as being minor (nurse prescribers, 55.6%; patient group directions, 62.4%). The rates for wrong, over and under provision of medications, and their associated costs, were similar for nurse prescribers and patient group direction users (Table B). Overall, 713 of 743 (96.0%) of all nurse prescriber medication decisions were considered safe, as were 927 of 939 (98.7%) of patient group directions decisions (Fisher's Exact, $p=0.55$). For more details see Black et al. (2020).

Consultation duration: Overall the mean (SD) consultation duration (minutes) was longer for nurse prescribers than patient group direction users (24.9 (12.9) vs. 22.8 (13.9)). New consultations, however, were longer than follow ups for both nurse prescribers and patient group direction users, but with no significant differences between the groups: new, 27.3 (13.0) vs. 25.7 (15.1), t -test=1.434 (df=694), $p=0.15$; follow-up 19.5 (10.9) vs. 19.4 (12.0), t -test=-0.338 (df=448), $p=0.74$. Length of consultations was also longer when medications were provided, rather than not: with medications 25.7 (12.7) vs 23.3 (14.2); without medications 23.3 (13.1) vs. 22.1 (13.3).

Workload of other professionals: Nurse prescribers sought advice from professional colleagues about medication delivery less frequently than patient group direction users (95 of 737, 12.9% vs. 152 of 539, 25.6% of all consultations respectively, chi-squared=46.748,df=1, $p < 0.001$) but the time they spent with colleagues was longer (mean (SD) 11.0 (11.7) vs. 8.2 (6.9) minutes). Advice was sought mostly from doctors (81% of nurse prescriber enquiries; 85% of patient group direction user enquiries). They also approached pharmacists (9; 2%) and nurses (6, 10%). The weighted mean time cost of the other professionals providing advice was £10.41 (nurse prescribers) and £9.39 (patient group direction users).

Unplanned re-consultations: Patients returned to the clinic after 306 of the 1,682 (18.2%) of index consultations; this involved 145 (19.5%) of 743 patients of nurse prescribers and 161 (17.1%) of 939 patients of patient group direction users (chi-squared=1.565,df=1, $p=0.21$), involving 400 specific reasons (200 in both groups). The reasons why patients returned were also similar in both groups. Re-consultations were mostly attributable to patients' behaviour (17%), e.g. non-adherence to medication or potential risk of re-infection. No instances were judged to have been potentially avoidable by the nurse in the original consultation.

(iii) *Patient experiences*

A total of 393 (48.6%) of a potential 808 eligible patients were given a patient questionnaire after their consultation with the nurse and 380 of 393 (96.7%) were returned (nurse prescribers 180 of 198

(90.9%), patient group directions 173 of 195 (88.7%). Consultation satisfaction rates were above 96% for both nurse prescribers and patient group direction users for all five questions (friendliness/approachability of the nurse; confidence/ trust in the nurse; information provided (two items); perceived skills of the nurse). Scores on the Satisfaction with Information about Medications Scale were also high and similar between groups. Nurse prescribers and patient group direction users scored 6.9 and 7.1 out of 8 respectively (t-test=-0.960 (df=341), p=0.34) on the action and usage of medicines domain (medications' name, purpose, what it does, how it works, duration to act, understanding if medication is working, treatment duration and obtaining further supplies). Both groups scored 6.4 out of 8 (t-test=-0.022 (df=341), p=0.98) on the potential problems of medicines domain (side effects (risks and how to manage them), interactions with other medicines and alcohol, drowsiness, ability to have sex and what to do if doses are missed). Overall mean scores were 13.3 (nurse prescribers) and 13.5 (patient group direction users), maximum 16. For further information see Black et al. (2021a).

From the clinical notes review, patients were comparable between nurse prescribers and patient group direction users with regards to age (mean 30.2years), ethnic origin (White British, Irish other 73.3%), sexual orientation (heterosexual 68.1%) and types of sexual infection diagnoses managed; however, nurse prescribers were more likely than patient group direction users to manage female patients (56.8% vs. 46.6%, respectively), those with symptoms (48.2% vs. 32.3%, respectively), patients living with HIV (2.3% of medications delivered vs. 0.5%, respectively) and work more autonomously (83.0% vs. 76.0%, respectively) (See Black et al., 2021b).

Nurse perspective

Nurses responding to the questionnaire were mostly female (25 of 26 nurse prescribers and 34 of 35 patient group direction users). The mean years of clinical experience was 19 in both groups (range 6 to 35 years for nurse prescribers, and 3 to 45 years for patient group direction users).

Loss of personal time: Twenty one (81%) of nurse prescriber respondents reported spending a mean of 26.3 (SD=13.9) days (range 8 to 60 days) of personal time studying for nurse prescriber qualifications, additional to employer-provided study days (based on 7.5 hours per day). By comparison, 26 of 35 patient group direction users who answered the question reported spending a mean of 1.6 (SD=2.8) days of personal time undertaking training, but most reported no days.

Out-of-pocket expenses during training: Twenty-two nurse prescribers and 21 patient group direction users answered questions relating to out-of-pocket expenses. Predominantly across both nurse prescribers and patient group direction users there were no additional out-of-pocket expenses reported. Across all categories of expenditure, including books and travel, nurse prescribers reported spending a mean of £32.02 (SD= £46.09; median £20) compared to a mean of £1.49 (SD=£6.05; median £0) by patient group direction users.

Nurses' benefits: Twenty-six nurse prescribers and 35 patient group direction users provided responses on motivations for providing medications independently. Nurse prescribers were predominantly motivated by a desire to enhance their clinical skills and job satisfaction and improve the patient experience (over 90% agreeing with these statements). While these motivations were also important for patient group direction users (over 80% agreed), the main influencing factor for this group (n=30, 85.7%) was fulfilling the expectation of their employer (n=16, 61.5% of nurse prescribers) Table C. Nurse prescribers tended to be more senior and in higher salary-bands than patient group direction users; 18 (69.2%) of 26 nurse prescribers salary-band 7 or 8, annual salary (in 2018) above £40,000 whilst 29 of 35 (82.9%) patient group direction users were salary-band 5 or 6,

annual salary in the range £26,000 to £32,000). Although the ability to prescribe cannot be confirmed as the causal factor (as prescribing may be expected of senior nurses), it does suggest nurse prescribers are likely to gain higher lifetime financial benefits compared to patient group direction users.

Synthesis

Findings are summarised in Table D and discussed below.

DISCUSSION

While some studies have compared nurse prescribing with medical prescribing, a unique feature of this study is that it compares two alternative ways in which nurses independently provide medications. Although largely descriptive, the cost-consequence approach provides a framework to summarise the differences between nurse prescribers and patient group direction users. Although the training and governance arrangements differ, the study found little or no difference between nurse prescribing and use of patient group directions in clinic processes or patients' experiences.

Training and governance for nurse prescribing and patient group directions

Establishing nurses' independent medication provision, either through use of patient group directions or independent prescribing, allows greater flexibility in the delivery of care to patients. Local services must balance the resource implications of adopting these approaches in the context of current budgets, the nature and size of the service and the expected longer-term benefits. Introducing a new patient group direction has the advantage that it can be applied in practice (after completing training) by all nurses. When directions relate to commonly presenting conditions, they offer potential efficiencies and savings. Nurses with prescribing qualifications have wider scope of practice but may be more expensive to hire or keep in post.

Nurses in our study who had completed the prescribing qualification tended to be more senior than patient group direction users. We do not know if gaining the qualification led to promotion or if only more senior nurses were expected, or allowed, to become prescribers by their employer. The nurse prescribers in higher salary-bands, however, enjoy the benefits of higher lifetime earnings which more than offset any personal costs incurred during training. Higher salaries for nurse prescribers compared to those who could not prescribe was also found in other literature, although the reasons underlying this remained somewhat speculative (Kroezen et al., 2012; Courtenay et al., 2015; Creedon et al., 2015).

A significant portion of the immediate costs for services of sponsoring a nurse to undertake a university prescribing qualification is their supervision during training. Questionnaire responses identified a mean of 7.4 days supervision (mostly by medical colleagues) as opposed to the NMC's expected 12 days (NMC, 2015). Nurse prescribing students, however, are expected to be competent autonomous practitioners before starting the university training (NMC, 2015) and much of the designated medical practitioner supervision is often provided alongside normal clinical duties, with support and advice being available as required. Moreover, with the NMC's (2018) move to 'prescribing practitioners, compared to reliance purely on medical colleagues, supervision costs could, perhaps, prove to be less expensive. Future nurses will also be trained and prepared for prescribing roles as an integral component of their undergraduate training (NMC, 2018). With regards to study leave, while it is not mandatory for the NHS to fully fund the 26 required study days, most sites in this study did.

Clinic processes

Compared to patient group direction users, nurse prescribers delivered a wider range of medication, including HIV medications, reflecting their broader scope of practice and ability to manage more complex patients. Patient group direction users sought professional support from colleagues more frequently than nurse prescribers, but the queries tended to be resolved more quickly. Excellent patient satisfaction with consultations and information provision around medication was recorded for both groups. Consultation duration was longer when the appointment was for a new issue (rather than a follow up) and when medications were prescribed but were similar for both groups of nurses.

We found that both nurse prescribers and patient group direction users made safe and appropriate medication choices with regards to patients' requirements and national guidelines. Unexpected re-consultations were similar and for unavoidable reasons such as positive test results, exacerbations of symptoms, medication reactions or completely new issues unrelated to the index consultation. Slightly higher error rates per consultation were recorded by nurse prescribers (1.18) than by nurses using patient group directions (1.03), but errors were predominantly judged minor and often attributed to documentation omissions. No patients were known to have been harmed from any errors identified (further details Black et al., 2020). One strength of this study is that it explored medication errors for patients who did not receive medications, i.e., potential of under-prescribing, whilst other large prescribing studies focus specifically on circumstances in which medication was provided (Dornan et al., 2009; Avery et al., 2012). This study also confirmed prior findings that sexual health nurses frequently provided medications (in approximately 50% of consultations) (Black 2012, Black et al., 2020). Such frequent, appropriate, and safe medication delivery indicates the benefits from investment in nurse training and governance around medications.

Individual nurses

Nurse prescribers reported spending personal leisure time in completing prescribing training. This was not found, or expected, in the patient group direction user cohort who reported they were delivering medications largely to fulfil the expectations of their employers. Nurses with prescribing qualifications in this study, as well as in other studies (Kroezen et al., 2012; Courtenay et al., 2015; Creedon et al., 2015), make a personal commitment and express motivations associated with improving knowledge, skills and job satisfaction.

Limitations

The study took place in sexual health clinics, which limits the findings' generalisability outside of this setting. Further research across a wider range of clinical specialties is required. The process of data extraction and analysis from clinic records and nurse diaries was methodical and the samples involved were large. However, the questionnaire response rate was lower and responses to some questions which required long term recall could have been inaccurate. In addition, nurses may have been selective in which patients they asked to complete satisfaction questionnaires. No adjustments were made for ongoing nurse training to maintain competence and knowledge.

CONCLUSION

Both nurse prescribing and patient group directions are beneficial from the perspectives of the health service, nurses, and patients, offering convenient, safe, and effective access to medications, enhanced service delivery, and improved use of staff skills and, high levels of patient satisfaction. Nurse prescribing offers greater autonomy and reduced reliance on professional colleagues. Differences

exist in training and governance and in scope of practice that affect local services, and which may influence decision making around which approach they might adopt in the context of their particular goals, caseloads, staffing profiles and resources.

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