Journal of Smoking Cessation (2019), **14**, 186–189
doi:10.1017/jsc.2019.3

CAMBRIDGE UNIVERSITY PRESS

Brief Report

Smoking cessation and the general practice pharmacist

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Abstract

Introduction. Roles for pharmacists in general practice are developing in Australia. It is known that pharmacists can provide effective smoking cessation services in other settings but evidence in general practice is lacking.
Aim. To determine whether a pharmacist can provide effective smoking cessation services within general practice.
Method. Data from smoking cessation consultations were obtained for 66 consecutive patients seen by one practice pharmacist. The pharmacist tailored interventions to the individual. Medication was offered in collaboration with community pharmacists and general practitioners. Quit coaching, based on motivational interviewing, was conducted. Smoking status was ascertained at least 6 months after the intended quit date and verified by a carbon monoxide breath test where possible.
Results. The patients' median age was 43 years (range 19–74 years); 42 were females (64%). At baseline, the median (i) number of pack years smoked was 20 (range: 1–75); (ii) Fagerstrom Test of dependence score was 6 (1–10); and (iii) number of previous quit attempts was 3 (0–10). Follow-up after at least 6 months determined a self-reported point prevalence abstinence rate of 30% (20/66). Of all patients who reported to be abstinent, 65% (13/20) were tested for carbon monoxide breath levels and were all below 7 ppm. The biochemically verified smoking abstinence rate was therefore 20% overall (13/66). Successful quit attempts were associated with varenicline recommendation (69% v 25%), increased median number of practice pharmacist consultations (4 v 2 per patient) and mental health diagnosis (85% v 51%).
Conclusion. Our observed abstinence rate was comparable or better than those obtained by practice nurses, community pharmacists and outpatient pharmacists, indicating the general practice pharmacist provided an effective smoking cessation intervention. A larger randomised trial is warranted.

Key words: General practice, pharmacist, primary care, smoking, smoking cessation

(Received 12 November 2018; revised 13 February 2019; accepted 17 February 2019)

Introduction

Tobacco smoking is the leading risk factor for death and disease in Australia (Australian Institute of Health and Welfare, 2016). Smoking rates in Australia had been decreasing since 1991 but recent surveys indicate that the decline has plateaued, with a non-significant reduction of the daily smoking rate from 12.8% to 12.2% between 2013 and 2016 (Australian Institute of Health and Welfare, 2017). Of the current smokers surveyed in 2016, 28.5% had tried to quit but did not succeed (Australian Institute of Health and Welfare, 2017). The lack of significant decline in smoking rates in recent years and the proportion of individuals who had an unsuccessful quit attempt suggest that there is scope to trial different models of care in smoking cessation.

All health professionals, including pharmacists, can have a role in offering smoking cessation advice and support (The Royal Australian College of General Practitioners, 2011). Pharmacists, in particular, possess skills that enable them to assess the suitability of pharmacotherapy to support quit attempts. Additionally, they may be trained in motivational interviewing (MI) and behavioural counselling (George & Thomas, 2014). Non-dispensing pharmacists working in general practice are becoming more common in Australia and internationally. These practice pharmacists can deliver a range of predominantly clinical activities (Deeks et al., 2018*c*), improve outcome measures (Tan, Stewart, Elliott, & George, 2014), and are acceptable to patients, general practitioners (GPs) and other healthcare workers (Deeks et al., 2018*b*; Tan, Stewart, Elliott, & George, 2013).

The integration of pharmacists in general practice may also provide an opportunity to utilise their skills in smoking cessation in an environment that is acceptable to patients. Pharmacists are an established provider of smoking cessation services in multiple settings, with evidence of effectiveness in community pharmacies (Sinclair, Bond, & Stead, 2008), Veterans Health Administration community-based outpatient clinics (Dent, Harris, & Noonan, 2009) and hospitals (Dobrinas et al., 2014), but evidence for smoking cessation interventions offered by general practice pharmacists is lacking. Therefore, the aim of this pilot study was to determine whether a pharmacist can provide effective smoking cessation services within general practice. The study was nested in a larger project evaluating the feasibility, acceptability and impact of three part-time non-dispensing pharmacists in general

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Cite this article: Deeks LS, Kosari S, Develin A, Peterson GM, Naunton M (2019). Smoking cessation and the general practice pharmacist. *Journal of Smoking Cessation* **14**, 186–189. https://doi.org/10.1017/jsc.2019.3

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https://doi.org/10.1017/jsc.2019.3 Published online by Cambridge University Press

practices in the Australian Capital Territory (ACT), Australia, that has been reported elsewhere (Deeks et al., 2018*b*, 2018*c*).

Methods

The site for this study was one general practice business across three sites in the ACT, Australia. One practice pharmacist (AD) worked 15.2 hours per week and undertook extra training to become the designated healthcare professional for smoking cessation at the practice. This comprised completion of: a smoking cessation course at a teaching hospital; training in health behaviour change methods to support person-centred care and self-management; and a MI workshop.

De-identified recorded data on the nature and outcomes of all pharmacist-conducted smoking cessation consultations were retrospectively analysed. Information collected from the initial consultation included date of consultation, gender, age, source of referral, current smoking type/amount, pack years smoked, Fagerstrom Test for Cigarette Dependence (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991), carbon monoxide (CO) breath level (using the piCO smokerlyzer™, range 0–150 ppm; https://www.bedfont.com/shop/smokerlyzer/pico), previous quit attempts, confidence to quit (Likert scale of 1–10) (Rollnick, Butler, & Stott, 1997), motivation to quit (1–10) (Rollnick et al., 1997) and pharmacist intervention(s). For follow-up consultations, data collected were quit attempt progress, details of further pharmacist interventions (e.g., MI, pharmacotherapy changes) and CO level.

Each patient was contacted by telephone at least 6 months after their intended quit date and asked about their current smoking status. Those who self-reported abstinence were invited to have a CO breath level determination at the general practice to verify their quit status. We defined a successful quit as self-reported abstinence verified by a CO breath test level of 7 ppm or less after at least 6 months (MacLaren et al., 2010). All other participants were considered to be continuing smokers.

Statistical analyses were conducted with SPSS version 23 (IBM, Armonk, NY, USA). Demographic and behavioural characteristics were compared between the successful and unsuccessful groups, using χ^2, Mann–Whitney, or independent *t*-tests as appropriate. The effect of medications on abstinence was assessed using logistic regression test. A *P* value of <0.05 was considered statistically significant. The University of Canberra Human Ethics Research Committee had approved the study (Project number 15-235).

Results

Data were collected for 66 consecutive patients with pharmacist-conducted smoking cessation consultations between 14 September 2016 to 29 August 2017 (Table 1). Patients were referred by their GP ($n = 58$), dietician ($n = 3$), self- ($n = 2$), medication review pharmacist ($n = 1$), practice nurse ($n = 1$) and a combination of spouse and GP ($n = 1$). The referrals from other health care professionals followed discussions with the patient about desire to quit or reduce smoking during a consultation. The self-referrals followed promotion of the pharmacist intervention via an education session, word of mouth or the general practice newsletter.

The consultations were face-to-face with the patient or patient plus carer in a consulting room at the general practice where the pharmacist offered interventions tailored to the individual patient. Medication options were discussed and offered to all patients and supplemented by quit coaching based on MI in all but one case, where the patient was unsuitable for mental health reasons. The pharmacist collaborated with the patients' community pharmacies to ensure there was pharmacist support when accessing pharmacotherapy and in-between consultations.

Follow-up after at least 6 months determined a self-reported point prevalence abstinence rate of 30% (20/66). Verification by a CO level of 7 ppm or less occurred for 65% (13/20) of the patients who had self-reported quitting (accounting for all those who attended for a CO level); all other patients who self-reported quitting were unable to attend an appointment for a CO level. The biochemically verified smoking abstinence rate was therefore 20% overall (13/66) and all other patients (53/66) were classified as having an unsuccessful quit.

In addition to the 30% who self-reported smoking abstinence, 40% patients (26/66) reportedly reduced their smoking, whilst 17% (11/66) were lost to follow-up (seven did not return telephone calls, four had left the general practice). There was no reduction in smoking reported for 12% (8/66) and one patient died during the follow-up period.

There were several statistically significant differences in characteristics and interventions between the patients who had a verified successful quit and those who were classified as unsuccessful (Table 1). A practice pharmacist recommendation of varenicline as the initial pharmacotherapy was associated with abstinence (OR = 6.7, 95% CI 1.6–28.9, $P = 0.011$ using binary logistic regression), as were a higher median number of visits to the practice pharmacist ($P = 0.006$, Mann–Whitney test) and the presence of a mental health diagnosis ($P = 0.028$, χ^2 test).

Discussion

Pharmacists in general practice can provide smoking cessation services which patients will attend. Smoking cessation interventions from one practice pharmacist resulted in a self-reported point prevalence abstinence rate of 30% (20/66) and a verified abstinence rate of 20% (13/66) after at least 6 months.

Our data compare favourably with other service providers in general practice. A cluster-randomised trial in Sydney and Melbourne determined self-reported 12-month point prevalence rates of 17.1% for practice nurse intervention, 18.8% for telephone support referral and 16.4% for usual GP care (Zwar et al., 2015). Although our follow-up period was shorter (6 v 12 months) and sample size smaller, our pilot study suggests that interventions by a pharmacist in general practice may be comparable in efficacy or even superior to that provided by practice nurses, telephone support or GPs. It should be noted that the effect in our study may have been under-stated, as not all the self-reported quitters could attend for a follow-up CO level and were consequently categorised as non-quitters according to our pre-defined criteria.

Pharmacists can also provide smoking cessation services in other settings. Similar abstinence rates with pharmacist-led smoking cessation programmes have been reported when services were delivered in community pharmacies at 1–12 months follow-up periods (11.6–36.4%) (Saba, Diep, Saini, & Dhippayom, 2014) and in an outpatient setting at 6 months (28%) (Dent et al., 2009).

There is evidence that smoking cessation services are cost-effective, delivering cost savings and net gains to individuals and primary health care providers (Ekpu & Brown, 2015). Ongoing funding for smoking cessation could be part of a broader respiratory focus for practice pharmacists. In addition to supervising patients to a successful quit attempt, appropriate patients were referred for a chronic obstructive pulmonary disease (COPD) assessment in our study, potentially identifying patients with undiagnosed disease. Elsewhere in the ACT, another practice

https://doi.org/10.1017/jsc.2019.3 Published online by Cambridge University Press

Table 1. Characteristics of participants

Median (range) or *n* (%)			
Variable	Total sample (*n* = 66)	Verified quit (*n* = 13)	Had not quit (*n* = 53)
At baseline			
Age (years)	43 (19–74)	47 (24–62)	43 (19–74)
Gender (male)	24 (36%)	4 (31%)	20 (38%)
Number of cigarettes smoked per day	20 (4–50)	20 (12.5–45)	15 (4–50)
Pack years	20 (1–75)	23 (5–69)	20 (1–75)
CO level (ppm)	24 (4–86)	22 (13–33)	24.5 (4–86)
Not assessed	31 (47%)	5 (38%)	26 (49%)
Number of previous quit attempts	3 (0–10)	3 (1–10)	3 (0–10)
Unknown	1 (2%)	0	1 (2%)
Fagerstrom test[a]	6 (1–10)	5 (2–8)	6 (1–10)
Very high (9–10)	8 (12%)	0	8 (15%)
High (6–8)	27 (41%)	6 (46%)	21 (40%)
Moderate (3–5)	22 (33%)	6 (46%)	16 (30%)
Low (1–2)	8 (12%)	1 (8%)	7 (13%)
Not assessed	1 (2%)	0	1 (2%)
Confidence to quit[a]	6 (3–9)	7 (4–9)	6 (3–9)
Not assessed	5 (8%)	0	5 (9%)
Motivation to quit[a]	8 (3–10)	8 (5–10)	7 (3–10)
Not assessed	4 (6%)	0	5
COPD diagnosis	16	1 (8%)	15 (28%)
History of mental health condition	38 (58%)	11 (85%)	27 (51%)
Interventions			
Referral to GP for COPD assessment	19 (19/50, 38%)	5 (5/12, 42%)	14 (14/38, 37%)
Initial medication			
Combination NRT	33 (50%)	3 (23%)	30 (57%)
Varenicline	22 (33%)	9 (69%)	13 (25%)
Varenicline plus NRT	5 (8%)	0	5 (9%)
Bupropion	5 (8%)	1 (8%)	4 (8%)
None	1 (2%)	0	1 (2%)
Number of consultations with GP pharmacist	2 (1–14)	4 (1–14)	2 (1–12)
Consultation with community pharmacist	36 (55%)	8 (62%)	28 (53%)

[a]0–10.

CO, carbon monoxide; ppm, parts per million; COPD, chronic obstructive pulmonary disease; GP, general practitioner; NRT, nicotine replacement therapy.

pharmacist has demonstrated that pharmacist asthma interventions are feasible and acceptable with benefits to patients, including improvements in control and probable hospital admission avoidance (Deeks et al., 2018*a*). An English study demonstrated that a specialist respiratory pharmacist visiting general practices reduced asthma and COPD exacerbations, drug costs and other associated healthcare costs (Khachi, 2014).

A component of this pilot study was that the pharmacist had undertaken extra training in smoking cessation with MI. MI assists individuals to overcome ambivalence about behaviour change, and can improve outcomes compared to brief advice or usual care (Lindson-Hawley, Thompson, & Begh, 2015). Studies have demonstrated that as the number of MI sessions increases, so do quit rates (Siu, 2015), as was the case in our study. Whilst MI could be offered by psychologists, a suitably trained pharmacist can provide both pharmacotherapy advice and MI, thereby potentially reducing the number of appointments with different healthcare professionals required.

Factors linked to successful quits in our study were varenicline pharmacotherapy recommendation at the start of quit attempts, increased consultations with the practice pharmacist and a mental health diagnosis. The observed superior outcome with varenicline is broadly consistent with the findings of a Cochrane network meta-analysis (Cahill, Stevens, Perera, & Lancaster, 2013).

https://doi.org/10.1017/jsc.2019.3 Published online by Cambridge University Press

Increased visits to a smoking cessation practitioner have been associated with successful outcomes previously (Siu, 2015). The finding that the practice pharmacist can support patients with a mental health diagnosis to quit smoking should be further explored in studies which target this patient group.

There were several important strengths of this pilot study. The pharmacist intervention was based on evidence of effectiveness of smoking cessation programmes (pharmacotherapy and behaviour support). Data from one pharmacist were interrogated, so all patients received an equivalent service. The pharmacist was placed in a general practice surgery which may have encouraged patients to attend multiple sessions, which is associated with better outcomes (Costello et al., 2011). In accordance with good practice, we determined abstinence after at least 6 months with biochemical validation using CO breath test monitors (Bittoun, 2008; Lancaster & Stead, 2017) to demonstrate sustainability. Quit status was determined for some patients at more than 6 months post-quit, potentially lowering the success rate.

This study was conducted in one Australian city and so may not be generalisable, as population demographics including smoking habits and prevalence vary throughout Australia and overseas. Compliance with pharmacotherapy was not measured. Pharmacists in Australia cannot prescribe, whereas some overseas pharmacists can prescribe varenicline or bupropion, possibly reducing barriers to obtaining medication and increasing quit rates. There was no comparative group. Assessing other factors that may have contributed to the outcome of quit attempts was beyond the scope of this study.

Conclusion

The practice pharmacist in this pilot study became a specialist smoking cessation practitioner and provided an effective smoking cessation intervention in the general practice setting. Abstinence rates were similar or better than those obtained by practice nurses and pharmacists in community, hospital or outpatient settings. A larger randomised controlled trial is required to validate these promising findings.

Acknowledgements. None.

Financial support. We acknowledge the Capital Health Network for undertaking the pilot program using funding provided by the Australian Government under the Primary Health Network Program.

Conflicts of interests. None.

Ethical standards. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

References

Australian Institute of Health and Welfare. (2016). Australian burden of disease study: impact and causes of illness and death in Australia 2011. *Australian Burden of Disease Study series no.* 3. Cat. no. BOD 4.

Australian Institute of Health and Welfare. (2017). National Drug Strategy Household Survey 2016: detailed findings. *Drug Statistics series no.* 31. Cat. no. PHE 214.

Bittoun R. (2008). Carbon monoxide meter: the essential clinical tool-the 'stethoscope'-of smoking cessation. *Journal of Smoking Cessation*, *3*(2), 69–70.

Cahill K., Stevens S., Perera R. and Lancaster T. (2013). Pharmacological interventions for smoking cessation: An overview and network meta-analysis. *Cochrane Database of Systematic Reviews* (5). doi: 10.1002/14651858.CD009329.pub2.

Costello M. J., Sproule B., Victor J. C., Leatherdale S. T., Zawertailo L. and Selby P. (2011) Effectiveness of pharmacist counseling combined with nicotine replacement therapy: A pragmatic randomized trial with 6,987 smokers. *Cancer Causes & Control*, *22*(2), 167–180.

Deeks L. S., Kosari S., Boom K., Peterson G. M., Maina A., Sharma R. and Naunton M. (2018*a*). The role of pharmacists in general practice in asthma management: A pilot study. *Pharmacy* *6*(4), E114.

Deeks L. S., Kosari S., Naunton M., Cooper G., Porritt J., Davey R., Dawda P., Goss J. and Kyle G. (2018*b*). Stakeholder perspectives about general practice pharmacists in the Australian Capital Territory: A qualitative pilot study. *Australian Journal of Primary Health*, *24*(3), 263–272.

Deeks L. S., Naunton M., Tay G. H., Peterson G. M., Kyle G., Davey R., Dawda P., Goss J., Cooper G. M., Porritt J. and Kosari S. (2018*c*). What can pharmacists do in general practice? Activities of pharmacists within general practice: A pilot. *Australian Journal of General Practice*, *47*(8), 545–549.

Dent L. A., Harris K. J. and Noonan C. W. (2009). Randomized trial assessing the effectiveness of a pharmacist-delivered program for smoking cessation. *Annals of Pharmacotherapy*, *43*, 194–201.

Dobrinas M., Blanc A.-L., Rouiller F., Christen G., Coronado M., Tagan D. and Schalie C. (2014) Clinical pharmacist's role in implementing a smoking cessation intervention in a Swiss regional hospital: An exploratory study. *International Journal of Clinical Pharmacy*, *36*, 526–534.

Ekpu V. U. and Brown A. K. (2015). The economic impact of smoking and of reducing smoking prevalence: Review of evidence. *Tobacco Use Insights*, *8*, 1–35.

George J. and Thomas D. (2014). Tackling tobacco smoking: Opportunities for pharmacists. *International Journal of Pharmacy Practice*, *22*(2), 103–104.

Heatherton T. F., Kozlowski L. T., Frecker R. C. and Fagerstrom K.-O. (1991). The Fagerström test for nicotine dependence: A revision of the Fagerstrom tolerance questionnaire. *British Journal of Addiction*, *86*(9), 1119–1127.

Khachi H. (2014). P56 impact of pharmacist-led asthma and copd reviews in general practice. *Thorax*, *69*, A98–A99.

Lancaster T. and Stead L. F. (2017). Individual behavioural counselling for smoking cessation. *Cochrane Database of Systematic Reviews* (3). doi: 10.1002/14651858.CD001292.pub3.

Lindson-Hawley N., Thompson T. P. and Begh R. (2015). Motivational interviewing for smoking cessation. *Cochrane Database of Systematic Reviews* (3). doi: 10.1002/14651858.CD006936.pub3.

MacLaren D. J., Conigrave K. M., Robertson J. A., Ivers R. G., Eades S. and Clough A. R. (2010). Using breath carbon monoxide to validate self-reported tobacco smoking in remote Australian Indigenous communities. *Population Health Metrics*, *8*, 2. doi: 10.1186/1478-7954-8-2.

Rollnick S., Butler C. C. and Stott N. (1997). Helping smokers make decisions: The enhancement of brief intervention for general medical practice. *Patient Education and Counseling*, *31*(3), 191–203.

Saba M., Diep J., Saini B. and Dhippayom T. (2014). Meta-analysis of the effectiveness of smoking cessation interventions in community pharmacy. *Journal of Clinical Pharmacy and Therapeutics*, *39*(3), 240–247.

Sinclair H. K., Bond C. M. and Stead L. F. (2008). Community pharmacy personnel interventions for smoking cessation. *Cochrane Database of Systematic Reviews* (1). doi 10.1002/14651858.CD003698.pub2.

Siu A. L. (2015). Behavioral and pharmacotherapy interventions for tobacco smoking cessation in adults, including pregnant women: U.S. preventive services task force recommendation statement. *Annals of Internal Medicine*, *163*(8), 622–634.

Tan E. C. K., Stewart K., Elliott R. A. and George J. (2013). Stakeholder experiences with general practice pharmacist services: A qualitative study. *BMJ Open*, *3*(9), e003214.

Tan E. C. K., Stewart K., Elliott R. A. and George J. (2014). Pharmacist services provided in general practice clinics: A systematic review and meta-analysis. *Research in Social and Administrative Pharmacy*, *10*(4), 608–622.

The Royal Australian College of General Practitioners. (2011). Supporting smoking cessation: a guide for health professionals. Retrieved 26 February 2017 from http://www.racgp.org.au/your-practice/guidelines/smoking-cessation/

Zwar N. A., Richmond R. L., Halcomb E. J., Furler J. S., Smith J. P., Hermize O., Blackberry I. D., Jayasinghe U. W. and Borland R. (2015). Quit in general practice: A cluster randomized trial of enhanced in-practice support for smoking cessation. *Family Practice* *32*(2), 173–180.

https://doi.org/10.1017/jsc.2019.3 Published online by Cambridge University Press