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Original Research

Using scenarios to test the appropriateness of pharmacist prescribing in asthma management

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ABSTRACT*

Objective: To explore the potential for community pharmacist prescribing in terms of usefulness, pharmacists' confidence, and appropriateness, in the context of asthma management.

Methods: Twenty community pharmacists were recruited using convenience sampling from a group of trained practitioners who had already delivered asthma services. These pharmacists were asked to complete a scenario-based questionnaire (9 scenarios) modelled on information from real patients. Pharmacist interventions were independently reviewed and rated on their appropriateness according to the Respiratory Therapeutic Guidelines (TG) by three expert researchers.

Results: In seven of nine scenarios (78%), the most common prescribing intervention made by pharmacists agreed with TG recommendations. Although the prescribing intervention was appropriate in the majority of cases, the execution of such interventions was not in line with guidelines (i.e. dosage or frequency) in the majority of scenarios. Due to this, only 47% (76/162) of the interventions overall were considered appropriate. However, pharmacists were deemed to be often following common clinical practice for asthma prescribing. Therefore 81% (132/162) of prescribing interventions were consistent with clinical practice, which is often not guideline driven, indicating a need for specific training in prescribing according to guidelines. Pharmacists reported that they were confident in making prescribing interventions and that this would be very useful in their management of the patients in the scenarios.

Conclusion: Community pharmacists may be able to prescribe asthma medications appropriately to help achieve good outcomes for their patients. However, further training in the guidelines for prescribing are required if pharmacists are to support asthma management in this way.

Keywords: Asthma; Drug Prescriptions; Community Pharmacy Services; Professional Practice; Professional Role; Patient Simulation ; Australia

INTRODUCTION

Asthma rates in Australia are comparatively high internationally¹, and asthma control amongst these patients is generally inadequate.^{2,3} In addition to

clinical consequences, asthma poses a great economic load on the Australian health sector and individual patient.^{1,4} This prevalence and morbidity of asthma in Australia have led to a focus on its treatment, however the standard of current practice is less than ideal.^{5,6} Given the focus on a more multidisciplinary model of primary care, the utilisation of the pharmacist's skills may help. Asthma management programs using specially trained pharmacists have been developed and proven to be successful in terms of clinical, economic and humanistic outcomes.⁷⁻⁹

However, there is scope for pharmacists to do more. Pharmacists in other countries, such as the UK, USA and Canada, have adopted expanded prescribing roles into their practice.¹⁰⁻¹⁴ Broadly, these models of prescribing are either independent or dependent (i.e. collaborative with another prescriber) in nature.¹⁵ Supplementary prescribing, a form of dependent prescribing, is the most utilised and preferred approach, where a pharmacist can develop, in consultation with another prescriber, a patient-specific clinical management plan under which he/she can prescribe.¹⁰ In Australia, momentum for the structured and rational implementation of pharmacist prescribing has developed through initiatives such as the "Health Professionals Prescribing Project"¹⁶ and Prescribing Competencies Framework¹⁷ with input from the Pharmacist Prescribing Collaborative of Australia and New Zealand (PPCANZ). Australian pharmacists already 'prescribe' over-the-counter "Pharmacy/Pharmacist Only" medicines, and with a framework of prescribing already in place, pharmacist prescribing in Australia can very much complement the scope of practice.¹⁸

Literature on pharmacist prescribing in Australia in primary health care is limited, but evolving. To date, much of the Australian research has focused on exploring the practice landscape to ascertain its readiness for pharmacist prescribing, including: exploring views of pharmacists¹⁹⁻²², general practitioners²³, and clients¹⁵; identifying needs and preferences for training and skill development²⁴; surveying pharmacists' experiences of training opportunities^{25,26}; and developing frameworks for the implementation of pharmacist prescribing.²⁷

Some pilot studies have explored the implementation of pharmacist prescribing in hospital practice, with a particular focus on anticoagulation or specific settings (e.g. preadmission clinics).^{28,29} A more recent study conducted in the preadmission clinic of a tertiary hospital has shown that pharmacist-prescribed inpatient medication charts can improve medication safety (i.e. fewer significant

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omissions of medicines, less prescribing errors) and maintain optimal prophylactic therapy (i.e. prevention of venous thromboembolism).³⁰ Whilst the hospital setting provides encouraging findings, particularly in providing data that may translate into improved outcomes and supporting the role of the pharmacist in this setting, additional research is needed to determine the potential for pharmacist prescribing in Australian community pharmacies, with a particular focus on high priority disease states such as asthma. Asthma also falls within a limited range of indications that pharmacists have identified as being suitable for independent prescribing, despite the general preference of pharmacists for supplementary prescribing³¹, highlighting their level of confidence in this area. Targeting chronic diseases, such as asthma, is underpinned by the Health Reform agenda, where the National Primary Health Strategy³¹ emphasises 'Better management of chronic conditions' as one of its priority directions for change, and includes a 'skilled workforce' as one of the five key building blocks. In acknowledging the need for patient-centred care in contemporary practice, studies have shown that patients themselves are 'overwhelmingly positive' in their attitude toward pharmacist prescribing in the primary care setting.³²

This study aimed to explore the potential for prescribing by pharmacists in the management of patients with asthma in primary care using a scenario based approach, focusing on usefulness, pharmacists' confidence, and appropriateness.

METHODS

A scenario-based questionnaire was designed and administered in August-September 2010, and approved by the institutional Human Research Ethics Committee. This was based on a previous Australian study of pharmacist prescribing³³ and comprised nine scenarios describing patients with asthma (Table 1). Each scenario depicted clinical features of asthma control and basic demographics, and was modelled on de-identified information from

real-life patients.⁹ It was stated that each patient had no other disease, no issues with inhaler technique or adherence, and took no other medications. The scenarios were pre-tested by experienced pharmacists for comprehension and readability, and were mailed to a convenience sample of 20 community pharmacists in Australia who had specialist asthma training from a previous study.⁹ None of the 20 pharmacists had seen the scenarios or the patients previously.

Pharmacists were asked to record a prescribing intervention for each scenario, assuming unrestricted prescribing rights, or no intervention if appropriate. Prescribing was defined for the pharmacists as "adding or subtracting a medication, or altering a dose of medication". Pharmacists could make more than one intervention for each scenario. Pharmacists were also asked to rate the usefulness of a prescribing function in his/her management of that scenario (scale: 1=not useful, 3=very useful) as well as his/her level of confidence in performing that intervention (scale: 1=not at all confident, 5=very confident).

The Respiratory Therapeutic Guidelines³⁴ were used to assess the appropriateness of pharmacists' interventions by a panel of three expert researchers who independently scored the interventions (appropriate/inappropriate), and then met and discussed their interpretations in order to reach a consensus.

SPSS (Version 17) was used for descriptive statistics.

RESULTS

Completed questionnaires were received from 18/20 pharmacists. There was good agreement as to the appropriateness or inappropriateness of the interventions between researchers when assessed (ICC 0.705). In 7/9 scenarios the interventions made by the majority of the pharmacists were in line with guideline recommendations (Table 2). However, although the pharmacist interventions

Table 1. Scenarios and expected prescribing interventions according to current guidelines

Summarised scenario	Expected prescribing intervention
1: 74 y/o male with cough at night, overuse of salbutamol, FEV ₁ 65% predicted	Prescribe a single ingredient inhaled steroid
2: 40 y/o female with poor asthma control, on regular fluticasone 250mcg twice daily	Prescribe a long acting beta agonist (LABA) or combination inhaled steroid /LABA
3: 74 y/o female with symptoms upon exertion, on regular budesonide 200mcg/eformoterol 6mcg once daily, FEV ₁ 75% predicted	Increase dose of inhaled steroid
4: 79 y/o female collecting salbutamol prescription, has had no symptoms in last 9 months	No action
5: 62 y/o female on fluticasone 500mcg/salmeterol 50mcg twice daily, and both salbutamol and ipratropium for relief	Removal of second reliever
6: 64 y/o female experiencing shortness of breath once a week whilst minding 2 y/o grandson. On fluticasone 250mcg/salmeterol 50mg twice daily, and both salbutamol and terbutaline nebulers for relief	Removal of nebulised medications
7: 65 y/o male has a cold, with symptoms of "a lot of trouble breathing" and trouble sleeping. Usually on fluticasone 500mcg/salmeterol 50mcg twice daily and salbutamol for relief	Prescribe a short course of an oral steroid
8: 61 y/o female has had not had to use Ventolin for a very long time, feels well. On fluticasone 100mcg/salmeterol 50mcg twice daily	Remove LABA
9: 62 y/o male has not had any problems for two years. On fluticasone 500mcg/salmeterol 50mcg twice daily and salbutamol for relief	Reduce inhaled steroid dose
Nine scenarios were modelled on information from real patients ⁹ and the expected prescribing intervention was determined based on current Respiratory Therapeutic Guidelines (TG) for each scenario. ³⁴	

Table 2. Interventions recommended by pharmacists, using three scenarios as an example.		
Intervention		Frequency (%)
Scenario 2	Combination steroid inhaler prescribed	59.1*
	No prescribing action taken	27.3
	Short acting beta agonist increased or SMART therapy	13.6
	Inhaled steroid dose increased	4.5
	Smoking cessation product prescribed	4.5
	Long acting beta agonist prescribed	4.5
Scenario 8	No prescribing action taken	68.4
	Inhaled steroid dose decreased	15.8
	Combination steroid inhaler changed	5.3
	Smoking cessation produce prescribed	5.3
	Long acting beta agonist removed	5.3*
Scenario 9	Inhaled steroid dose decreased	89.5*
	Smoking cessation product prescribed	5.3
	No prescribing action taken	5.3
*Intervention that was in line with guideline recommendations for that scenario		

were in-line (e.g., adding a long acting beta agonist) in the majority of scenarios, the pharmacists did not always execute their interventions relative to guideline recommendations (e.g., did not give complete directions or had alternative dosage). Therefore, due to the execution, many interventions were overall judged as inappropriate (86/162, 53%). The reasons they were considered inappropriate are as follows:

1. Followed common practice (n=56/162) e.g. initiating steroid-naïve patients on combination inhalers or medium/high doses of inhaled corticosteroids (ICS) (rather than low dose ICS);
2. Clinically inappropriate (n=15/162) e.g. did not prescribe a short course of oral corticosteroids when appropriate, did not increase dose of ICS when required, prescribed antibiotics;
3. No dose specified (n=8/162); and
4. The pharmacist was hesitant (n=7/162) e.g. took no action or referred to the general practitioner (GP) when they could have made an intervention.

So, although 53% of interventions were judged inappropriate, when consideration of common practice (i.e. what GPs do) was taken into account, 81% of pharmacist's decisions were in-line with common practice.

A small number of interventions were considered clinically inappropriate (n= 23 [15+8]). This was usually about pharmacist inaction, e.g. they did not prescribe a short course of an oral corticosteroid or no dose was specified.

Although pharmacists were asked to ensure that their interventions were of a prescribing nature only, a large proportion of pharmacists made interventions beyond the traditional prescribing function. Patient review and counselling were the most frequent additional interventions made by pharmacists. Spirometry was seen as an important tool to aid in the prescribing function and was often requested in the scenarios by pharmacists. Additionally, some pharmacists reported prescribing an action plan when treating patients in the scenarios. In a small number of scenarios,

pharmacists felt the need to refer patients onto their GP rather than making any intervention themselves.

When asked to rate the usefulness of a prescribing function in his/her management of each scenario, pharmacists rated this as 'very useful' (median 2.5; range of 2-3). When asked about their confidence in undertaking the stated prescribing interventions, pharmacists were 'very confident' (median 4).

DISCUSSION

This is the first Australian study exploring the utility of prescribing interventions by community pharmacists in the management of patients with asthma using a scenario based approach. There was a good understanding of appropriate therapeutic recommendations, however the execution of the pharmacists' recommendations did not always agree with current guidelines. In overseas studies that have illustrated pharmacists' abilities to identify appropriate drug therapy (in other diseases) and improve patient outcomes by prescribing roles^{35,36}, pharmacists were offered specific training in, and frameworks for, prescribing. Similarly, Australian pharmacists would need specific training especially around the execution of prescribing interventions, which was not provided in this study. This would enable them to reach optimal, rather than acceptable, standards of practice in this extended role.

Pharmacists demonstrated their holistic approach to asthma management by specifically suggesting that written Asthma Action Plans be provided. Although the deliverance of written Asthma Action Plans is recommended in asthma guidelines in Australia, ownership remains low at about 20%.¹ The pharmacists added this as part of their prescribing interventions.

Referral patterns identified the cautious nature of pharmacists in referring patients to a doctor whenever doubt existed and reflects the pharmacist's ability to recognise the critical role of the physician, especially in diagnosis and review. This is contrary to common misconceptions of pharmacist prescribing as competition for doctors^{37,38}, rather than an avenue for collaborative improvement of patient outcomes and a means of

reducing the physician's burden. Appreciation of the expertise possessed by doctors, and its role in the prescribing process, is highlighted in other studies where pharmacists have specifically recognised that, even in a supplementary prescribing role, they would benefit from training in patient diagnosis, assessment and monitoring.²⁴ This emphasis on the need for specific skills has been identified in other studies exploring pharmacist's perspectives on postgraduate training opportunities to assist prescribing roles.²⁷

Although pharmacists were considered to make appropriate interventions based on guidelines, the execution of such interventions in the context of asthma management was deemed to be inappropriate in most scenarios. In the vast majority of these scenarios, pharmacists did not prescribe the recommended low starting doses of inhaled corticosteroids and often high doses of inhaled corticosteroids and combination therapy were prescribed.

There are a number of possible reasons why these scenarios (n=86) were judged to be inappropriate when compared to guidelines. Firstly, although the pharmacists in this study received formal training on disease state management of asthma, the focus of such training was not on prescribing. This highlights the importance and need for further training and credentialing of Australian community pharmacists to ensure competent and appropriate prescribing is achieved.^{24-27,39-41} Secondly, pharmacists were not told in this study that their interventions would be assessed according to therapeutic guidelines, and interventions may therefore be reflective of common practice rather than evidence based practice. The non-adherence of physicians to prescribing guidelines is well described^{42,43}, and our study illustrates that pharmacists may be influenced by their frequent exposure, through dispensing, to the 'common practice' of physicians. Thirdly, in this study, mock scenarios were created depicting the clinical features of real life patients. Information about the core components of asthma control are considered necessary in making informed prescribing decisions for patients with asthma.^{44,45} For practical purposes, the information provided to pharmacists about patients in the scenarios may have lacked the detail available in a real life prescribing setting. Thus pharmacist interventions may have differed with additional information accessible to them in a clinic setting. However, pharmacists are certainly capable of having in depth discussions with patients and gathering appropriate information from the patients to make fully informed prescribing decisions. If guideline appropriate and common clinical practice interventions are combined the proportion of appropriate prescribing was 81% across the nine scenarios.

The pharmacists reported that having a prescribing role would be very useful in their management of these asthma patients. Even when making recommendations which were not consistent with the guidelines, most pharmacists expressed confidence in their prescribing interventions.

Limitations

The findings of the study might not be generalisable given the: selection of asthma specialist trained pharmacists who were untrained in prescribing or use of the guidelines; use of limited information in the scenarios; and small sample size. Pharmacist interventions may also have differed if they had been aware that they were being assessed according to therapeutic guidelines. None of the scenarios involved people under the age of 18. The pharmacists were selected because they had previously been involved in a trial focused on asthma care in the community.^{2,9} This trial focused on adults. Future studies should address people under 18 as well.

CONCLUSIONS

This study has provided encouraging results using scenarios to test the potential utility of prescribing by community pharmacists in primary care in Australia. These initial results should be used as a part of the basis for further research in determining the appropriateness of prescribing in actual practice and the training and skills required by pharmacists to successfully adopt an effective prescribing role.

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CONFLICT OF INTEREST

The authors have none to declare.

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EL USO DE ESCENARIOS PARA PROBAR LA ADECUACIÓN DE LA PRESCRIPCIÓN FARMACÉUTICA EN EL MANEJO DEL ASMA

RESUMEN

Objetivo: Explorar el potencial de prescripción de los farmacéuticos comunitarios en términos de utilidad, confianza de los farmacéuticos, y adecuación en el contexto del manejo del asma.

Métodos: Se reclutó a 20 farmacéuticos comunitarios mediante un muestreo de conveniencia de entre un grupo de facultativos entrenados que ya habían proporcionado servicios en asma. Se pidió a estos farmacéuticos que completasen un cuestionario basado en escenarios (9 escenarios) diseñados a partir de información de pacientes reales. Las intervenciones farmacéuticas fueron revisadas independientemente por 3 investigadores expertos y evaluada su adecuación de acuerdo con las Guías Terapéuticas Respiratorias (TG).

Resultados: En 7 de los 9 escenarios (78%) la intervención prescriptora más frecuente de los farmacéuticos estaba de acuerdo con las recomendaciones de las TG. Aunque la intervención prescriptora era apropiada en la mayoría de los casos, la ejecución de esas intervenciones no estaba en línea con las guías (i.e. dosis o frecuencia) en la mayoría de los escenarios. Debido a esto, sólo el 47% (76/162) del total de las intervenciones fueron consideradas apropiadas. Sin embargo, se consideró que los farmacéuticos seguían con frecuencia la práctica clínica común de prescripción en asma. Por tanto, el 81% (136/162) de las intervenciones

prescriptivas fueron considerados consistente con la práctica clínica, que a menudo no está basada en las guías. Los farmacéuticos informaron que estaban confiados en la realización de intervenciones de prescripción y que esto sería muy útil en su manejo de los pacientes en los escenarios.

Conclusión: Los farmacéuticos comunitarios pueden ser capaces de prescribir medicación para el asma adecuadamente para ayudar a conseguir buenos resultados a sus pacientes. Sin embargo, se requiere más

formación sobre las guías de prescripción, si los farmacéuticos desean apoyar el manejo del asma de esta manera.

Palabras clave: Asma; Recetas; Servicios de Farmacia Comunitaria; Práctica Profesional; Papel Profesional; Simulación de Pacientes; Australia

References

1. Australian Centre for Asthma Monitoring. Asthma in Australia 2011. AIHW Series no.4. Cat. No. ACM 22. Canberra: AIHW; 2011.
2. Armour CL, LeMay K, Saini B, Reddel H, Bosnic-Anticevich S, Smith L, Burton D, Song Y, Alles M, Stewart K, Emmerton L, Krass I. Using the community pharmacy to identify patients at risk of poor asthma control and factors which contribute to this poor control. *J Asthma*. 2011;48(9):914-922. doi: 10.3109/02770903.2011.615431
3. Marks G, Abramson M, Jenkins C, Kenny P, Mellis C, Ruffin R, Stosic R, Toelle B, Wilson D, Xuan W. Asthma management and outcomes in Australia: a nation-wide telephone interview survey. *Respirology*. 2007;12(2):212-219.
4. Kenny P, Hall J, King M, Lancsar E. Sources of variation in the costs of health care for asthma patients in Australia. *J Health Serv Res Policy*. 2009;14(3):133-140. doi: 10.1258/jhsrp.2008.008078
5. Matheson M, Wicking J, Raven J, Woods R, Thien F, Abramson M, Walters E. Asthma management: how effective is it in the community? *Intern Med J*. 2002;32(9-10):451-456.
6. Burton C, Proudfoot J, Ramsay E, Holton C, Bubner T, Harris M, Beilby J. Management of asthma in Australian general practice: care is still not in line with clinical practice guidelines. *Prim Care Respir J*. 2009;18(2):100-105. doi: 10.3132/pcrj.2008.00059
7. Armour C, Bosnic-Anticevich S, Brillant M, Burton D, Emmerton L, Krass I, Saini B, Smith L, Stewart K. Pharmacy Asthma Care Program (PACP) improves outcomes for patients in the community. *Thorax*. 2007;62(6):496-502.
8. Gordo A, Armour C, Bosnic-Anticevich S, Brillant M, Burton D, Emmerton L, Krass I, Saini B, Smith L. Cost effectiveness of a pharmacy asthma care program in Australia. *Dis Manag Health Outcomes*. 2007;15(6):387-396.
9. Armour C, Reddel H, LeMay K, Saini B, Bosnic-Anticevich S, Song Y, Alles M, Burton D, Emmerton L, Stewart K, Krass I. Feasibility and effectiveness of an evidence-based asthma service in Australian community pharmacies: a pragmatic cluster randomised trial. *J Asthma*. 2013;50(3):302-309. doi: 10.3109/02770903.2012.754463
10. Tonna A, Stewart D, West B. Pharmacist prescribing in the UK - a literature review of current practice and research. *J Clin Pharm Ther*. 2007;32(6):545-556.
11. Dijana V, Bajorek B. Australian General Practitioners' views on pharmacist prescribing. *J Pharm Pract Res*. 2008;38(2):96-102.
12. Bhanbhro S, Drennan VM, Grant R, Harris R. Assessing the contribution of prescribing in primary care by nurses and professionals allied to medicine: a systematic review of the literature. *BMC Health Serv Res*. 2011;11:330. doi: 10.1186/1472-6963-11-330
13. Yuksel N, Eberhart G, Bungard TJ. Prescribing by pharmacists in Alberta. *Am J Health Syst Pharm*. 2008;65(22):2126-2132. doi: 10.2146/ajhp080247
14. Latter S, Blenkinsopp A. Non-medical prescribing: current and future contributions of pharmacists and nurses. *Int J Pharm Pract*. 2011;19(6):381-382. doi: 10.1111/j.2042-7174.2011.00183.x
15. Hoti K, Hughes J, Sunderland B. An expanded prescribing role for pharmacists – an Australian perspective. *Australas Med J*. 2011;4(4):236-242. doi: 10.4066/AMJ.2011.694
16. Health Workforce Australia. Health Professionals Prescribing Pathway project. Available from: <https://www.hwa.gov.au/work-programs/workforce-innovation-and-reform/health-professionals-prescribing-pathway-project> (Accessed 11/11/2013).
17. NPS: Better choices, Better health. Competencies required to prescribe medicines: putting quality use of medicines into practice. Sydney: National Prescribing Service Limited, 2012.
18. Kay O, Brien J. Pharmacist prescribing: review of the literature. *J Pharm Pract Res*. 2004;34(4):300-304.
19. Hanes C, Bajorek B. Pharmacist prescribing: is Australia behind the times? *Aust J Pharm*. 2004;85(1014):680-1.
20. Hanes C, Bajorek B. Pharmacist prescribing: views of Australian hospital pharmacists. *J Pharm Pract Res*. 2005;35(3):178-180.
21. Kay OC, Bajorek B, Brien JE. Pharmacist prescribing activities – an electronic survey on the opinions of Australian pharmacists. *J Pharm Pract Res*. 2006;36(3):199-203.
22. Hoti K, Sunderland B, Hughes J, Parsons R. An evaluation of Australian pharmacist's attitudes on expanding their prescribing role. *Pharm World Sci*. 2010;32(5):610-621. doi: 10.1007/s11096-010-9400-2
23. Vracar D, Bajorek B. Australian general practitioners' views on pharmacist prescribing. *J Pharm Pract Res*. 2008;38(2):96-102.
24. Hoti K, Hughes J, Sunderland B. Identifying the perceived training needs for Australian pharmacist prescribers. *Int J Pharm Pract*. 2014;22(1):38-46. doi: 10.1111/ijpp.12014
25. Weeks GR, Marriott J, George J. Australian hospital pharmacists' experiences of a UK non-medical prescribing course. *J Pharm Pract Res*. 2010;40(3):187-193.

26. Kamarudin G, Penm J, Chaar B, Moles R. Preparing hospital pharmacists to prescribe: Stakeholders' views of postgraduate courses. *Int J Pharm Pract*. 2013;21(4):243-251. doi: 10.1111/ijpp.12000
27. Hale AR, Stowasser DA, Coombes ID, Stokes J, Nissen L. An evaluation framework for non-medical prescribing research. *Aust Health Rev*. 2012;36(2):224-228. doi: 10.1071/AH10986
28. Khoo A, Bajorek B. Extended roles for pharmacists in warfarin therapy: identifying opportunities for pharmacists prescribing. *J Pharm Pract Res*. 2006;36(3):190-193.
29. Marotti SB. Pharmacist prescribing in the pre-operative setting. *J Pharm Pract Res*. 2009;39(4):331.
30. Hale A, Coombes I, Stokes J, McDougall D, Whitfield K, Maycock E, Nissen L. Perioperative medication management: exploring the role of the preadmission clinic pharmacist in a single centre, randomised controlled trial of collaborative prescribing. *BMJ Open*. 2013;3(7).pii:e003027. doi: 10.1136/bmjopen-2013-003027
31. Primary Health Care Reform in Australia: Report to Support Australia's First National Primary Health Care Strategy, Commonwealth of Australia, 2009; ISBN:1-74186-936-6.
32. Stewart D, MacLure K, Bond C, Cunningham S, Diack L, George J, McCaig D. Pharmacist prescribing in primary health care: the views of patients across Great Britain who had experienced the service. *Int J Pharm Pract*. 2011;19(5):328-332. doi: 10.1111/j.2042-7174.2011.00130.x
33. Nguyen N, Bajorek B. Pharmacist prescribing in warfarin therapy: exploring clinical utility in the hospital setting. *J Pharm Pract Res*. 2008;38(1):35-39.
34. Respiratory Expert Group. Therapeutic Guidelines: Respiratory. Version 4. Melbourne: Therapeutic Guidelines Limited; 2009.
35. Margolis K, Asche S, Bergdall A, Dehmer S, Groen S, Kadrmas H, Kerby T, Klotzle K, Maciosek M, Michels R, O'Connor P, Pritchard R, Sekenski J, Sperl-Hillen J, Trower N. Effect of home blood pressure telemonitoring and pharmacist management on blood pressure control. A cluster randomized clinical trial. *JAMA*. 2013;310(1):46-56. doi: 10.1001/jama.2013.6549
36. Reid F, Murray P, Storrie M. Implementation of a pharmacist-led clinic for hypertensive patients in primary care - a pilot study. *Pharm World Sci*. 2005;27(3):202-207.
37. Blenkinsopp A, Tann J, Evans A, Grime J. Opportunity or threat? General practitioner perceptions of pharmacist prescribing. *Int J Pharm Pract Res*. 2008;16(1):29-34.
38. Cooper R, Bissell P, Ward P, Murphy E, Anderson C, Avery T, James V, Lymn J, Guillaume L, Hutchinson A, Ratcliffe J. Further challenges to medical dominance? The case of nurse and pharmacist supplementary prescribing. *Health (London)*. 2012;16(2):115-133. doi: 10.1177/1363459310364159
39. Emmerton L, Marriott J, Bessell T, Nissen L, Dean L. Pharmacists and prescribing rights: review of international developments. *J Pharm Pharm Sci*. 2005;8(2):217-225.
40. Tann J, Blenkinsopp A, Grime J, Evans A. The great boundary crossing: Perceptions on training pharmacists as supplementary prescribers in the UK. *Health Educ J*. 2010;69(2):183-191. doi: 10.1177/0017896910363300
41. Barber N. Extended prescribing rights - the UK experience. *Australian Prescriber*. 2009;32(5):118-119.
42. Bregnhøj L, Thirstrup S, Kristense M, Bjerrum L, Sonne J. Prevalence of inappropriate prescribing in primary care. *Pharm World Sci*. 2007;29(3):109-115.
43. Lucas A, Smeenk F, Smeele I, van Schayck C. Overtreatment with inhaled corticosteroids and diagnostic problems in primary care patients, an exploratory study. *Fam Pract*. 2008;25(2):86-91. doi: 10.1093/fampra/cmn006
44. Diette G, Patino C, Merriman B, Paulin L, Riekert K, Okelo S, Thompson K, Krishnan J, Quartey R, Perez-Williams D, Rand C. Patient factors that physicians use to assign asthma treatment. *Arch Intern Med*. 2007;167(13):1360-1366.