

Damian Swieczkowski¹, Patryk Poniatowski², Piotr Merks³, Milosz Jaguszewski¹

¹First Department of Cardiology, Medical University of Gdansk, Poland

²Community Pharmacist, Lancaster, United Kingdom

³Department of Pharmaceutical Technology, Faculty of Pharmacy Collegium Medicum in Bydgoszcz, Nicolaus Copernicus University in Toruń, Poland

The pharmaceutical care in asthma — Polish and global perspective

The authors declare no financial disclosure

Abstract

The pharmaceutical care is a pharmacist's contribution to the care of individual patients and leads to optimize the use of drugs. The pharmaceutical care may improve adherence, clinical effectiveness of providing therapy and improve the health-related quality of life. The conducted literature review confirmed that pharmaceutical care and advanced pharmaceutical services are clinically effective in asthma. The implementation of pharmaceutical care under Polish conditions is currently insufficient and remains challenging for the future. Herein we should admit, that the Polish government has recently put an effort to appoint specially dedicated team establishing a program of reimbursed pharmaceutical care. This move should be considered as a new phase for amendments community pharmacy in Poland. The experience of different health care systems, including for instance United Kingdom, Australia or Canada, might be used in the process of changing Polish perspective. Herein, we have reviewed the literature and highlighted the services creating the program of pharmaceutical care in asthma. This unique work describes the complex nature of optimal pharmaceutical services emphasizing the strong necessity of multidimensional approach in this field.

Key words: pharmaceutical care, asthma, community pharmacy

Pneumonol Alergol Pol 2016; 84: 225–231

In the opinion of Polish experts, several factors including the low therapy adherence, inappropriate inhalation technique or insufficient symptom control using the available classes of medications, etc. essentially influence the course of asthma [1]. Adherence to therapy is one of the most critical conditions of successful treatment of asthma [2]. The high level of adherence is also one of the critical factors associated with good prognosis in the chronic disease [3]. Improving adherence remains challenging, and needs a well-designed and multi-approach attitude [4].

Asthma is a chronic inflammatory and respiratory disease characterized by recurrent, reversible, episodes of shortness of breath, chest

tightness, coughing, and wheezing. A large body of literature describes a high prevalence of asthma patients, i.e. 300 millions, in global perspective. Despite the availability of effective preventive therapy, the direct and indirect costs of management of patients with asthma increase constantly [5, 6].

One of the well-known methods to improve adherence and control the expenditure associated with asthma is to include the pharmaceutical care into healthcare system.

The aim of this article is to introduce the concept of pharmaceutical care as a list of services provided by a pharmacist in a community pharmacy to patients diagnosed with asthma. The

Address for correspondence: Damian Swieczkowski MPharm, First Department of Cardiology, Medical University of Gdansk, Poland, Debinki 7, 80–952 Gdansk,

e-mail: d.swieczkowski@o2.pl

DOI: 10.5603/PiAP.2016.0028

Received: 13.03.2016

Copyright © 2016 PTChP

ISSN 0867–7077

services are selected for possible implementation in the Polish health care system.

The promotion of the pharmaceutical care as a new approach of cooperation between healthcare practitioners and the promotion of the community pharmacy as a place of public health protection remains substantial for the successful development of new services.

Last but not least, the article describes the current situation of implementation of advanced pharmaceutical services in the community pharmacy in Poland. Finally, the discussion highlights the possibility of introducing advanced pharmaceutical services into Polish community pharmacy.

The pharmaceutical care — the development of services

Over the years, the definition of pharmaceutical care has evolved. Finally, in 2013, was proposed the definition of pharmaceutical care as a pharmacist's contribution to the care of individual patients, leading to optimize the use of drugs and improve health outcomes [7, 8]. In the practice pharmaceutical care is realized by a range of services provided by pharmacists to patients, particularly suffering from chronic diseases. Among other services should be distinguished medications reviews. In line with Dutch guidelines, a medication review is a structured critical examination of a patient's medication, performed by a pharmacist to achieve an agreement with the patient about the management strategy, optimizing the efficacy of the treatment, and minimizing the number of medication-related problems [9]. In the context of asthma should also be mentioned another pharmaceutical service - instructing the patient about proper using of inhalers [10]. The important is also the role of the pharmacist as an educator about the nature of the disease and healthy lifestyle [11]. Currently, in Poland only one of the various possible advanced pharmaceutical services has been implemented — advising about side effects or interactions between the drug used in asthma and medicinal products available without physicians' prescription (OTC, over the counter) [12]. Moreover, the quality of mentioned services is doubtful because the lack of well-established standards [13]. Thus, in Polish health system pharmacists are the guardian of the quality of the drug e.g. ensures that medicinal products dispensed to patients were stored in appropriate conditions [14]. Analysis of the literature provides scientific evidence confirming the clinical and cost effectiveness of pharmaceutical care [15].

The pharmaceutical care — the process of optimizing pharmacotherapy

The primary objective of pharmaceutical care is to optimize pharmacotherapy. One of the studies shows a tremendous role in the optimization of pharmacotherapy in patients diagnosed with asthma. The medication errors associated with asthma include, among others, using of non-selective β -blockers or using of long-acting β -agonists (LABA), without inhaled corticosteroids. The Danish study showed that approximately 5,2% of the asthma patients are using β -blockers, and 21,8% of them received non-cardioselective β -blockers. 6,3% of the asthma patients were treated with two or more oral courses of corticosteroids in 2008, and 17,4% of these patients did not receive inhaled corticosteroids in 2009. Therefore, optimization of pharmacotherapy should be based on finding medications' errors. Moreover, pharmacists can target successfully pulmonary patients that were not treated according to the evidence-based guidelines [16]. This constitutes a great potential for pharmaceutical care [17].

Medication review may significantly reduce medication burden in geriatric population [18, 19]. Because of the complexity of pharmacotherapy in asthma, similar results for mentioned service should be strongly expected. Finally, pharmaceutical care programs showed a positive impact on improving patient's asthma-related quality of life, lung function, and asthma control [20, 21].

The role of telemedicine in pharmaceutical services

The pharmaceutical research services are also conducted in the area of telemedicine, as being recognized as mHealth — mobile health. One of the analyzed studies presents the first intervention based on the mobile communication technology involving community pharmacists in asthma management. It shows the evolution of pharmaceutical services provided in the community pharmacy. 'The Empowering pharmacist in asthma management through interactive SMS' (EmPhAsIS) remains the system supporting pharmacists to provide effective pharmaceutical services. The EmPhAsIS intervention consists of asthma patient education, short message service (SMS)-based monthly assessment of adherence, and follow-up of non-adherent individuals by community pharmacists. The primary outcome is adherence to inhaled corticosteroids ascertained

by the medication possession ratio, the ratio of the days of medication supplied to days in a given time interval. This intervention may consequently provide the increase of the adherence [22].

Proper way to use inhalers

The most fundamental method of drug delivery in asthma is inhalation. The studies show that the adherence is mainly improved by advanced services of well-trained pharmacists. From the methodological point of view, the participants' inhaler technique remains critical and should be carefully assessed. Regardless of the teaching method used, (with or without visual feedback), pharmacists' intervention increased substantially the number of patients using inhalers correctly. The study also affirms that above mentioned intervention should be enriched with illustrated materials dedicated to increasing patients education [23].

Another study shows that inhalation technique and adherence to controller medication were significantly better in patients surrounded by the pharmaceutical care. The primary outcome was the level of asthma control, as assessed by the Asthma Control Test (ACT). The authors of this study simplify the pharmaceutical care to the correct use of inhalers. Unfortunately, this is not consistent with the current approach to pharmaceutical care. Pharmaceutical care is a range of services leading to optimize pharmacotherapy what has been widely discussed hereinabove [24]. However, many patients are not aware of how helpful may be pharmacists' support in asthma. The patients felt little need for the inhaler counseling service. Patients, however, accepted the service for various reasons of which the feeling how staff showing an interest in helping them seemed especially convincing [25].

Screening test in the community pharmacy

Next study shows that less sophisticated pharmaceutical services also may be beneficial for the patients. Validated questionnaire e.g. Pharmacy Asthma Control Screening tool (PACS) or Asthma Control Questionnaire (ACQ-6) should be used to assess of patients' adherence. This study describes a simple asthma control screening as a feasible tool for the use in the community pharmacies, which has additionally a good sensitivity for identifying patients with not well-controlled asthma. These questionnaires are useful in primary care to identify patients who require more

detailed examination of their asthma status and require more attention from physicians and pharmacists. Due to this fact, providing questionnaire in the community pharmacy remains uncomplicated to improve patients' adherence [26].

Health education in the community pharmacy

Combine the optimization of pharmacotherapy with education about healthy lifestyle should be analyzed in the field of public health. In the UK or Canada, pharmacists play a key role in the promotion of immunization and in reducing the spread of infectious diseases [27]. These and other activities described in the article lead to the population health improvement. In the coming years, the role of pharmacists and pharmacy community will probably increase in health promotion and prevention behaviors [28, 29].

Last but not least, a combination of education about the disease and education on the proper use of inhalers remains beneficial for the patients diagnosed with asthma. Adult asthma patients in the intervention group received a protocol-based intervention addressing individual needs related to asthma control, inhaler technique and medication adherence. The information provided to the patients is directly associated with the life-style and health education. The intervention resulted in improved medication adherence and inhaler technique. It is possible to combine different pharmaceutical services to improve clinical outcomes [30].

Education about the natural history of the disease is crucial in providing pharmaceutical services. Pharmacists may provide patient education to explain the role of medications, to provide smoking cessation or to recommend strategies to minimize adverse effects of prescribed medications. 'Asthma-Friendly Pharmacy' is the model of integration pharmaceutical care with the care provided by another healthcare team member. Last but not least, pharmaceutical services in this program are beneficial for promoting interprofessional collaboration in healthcare system [31].

Pharmacists should fulfill the needs of patients, find the medication error and detect inappropriate inhaler use. Australian research indicated that pharmaceutical services are beneficial also in rural areas [32]. A national pharmacy-based service in Australia (the PACP) for the care of patients with asthma resulted in improved clinical and humanistic outcomes. The mentioned services indicated the improving the level of quality of life in patients surrounded by the pharmaceutical care [33].

Pediatrician populations in the community pharmacy

So far, there is limited number of the clinical studies based on large patient cohorts. One study, including the large pediatric setting of Chicago presents a methodology of assessing the effect of large multi-component community interventions for asthma, using administrative pharmacy data. The results suggest a beneficial effect on the quality of care in the subgroup of children with asthma targeted by the project [34]. The key role of adherence of pharmacists assistance to the pediatric guidelines has been highlighted in another interesting study depicting the strong need of active involvement of pharmacists in the asthma treatment in children [35].

Challenge for interprofessional collaboration

In the light of current knowledge, pharmacists who participate in the pharmaceutical care process show a higher level of satisfaction with their work [36]. This has been supported by the Australian experience. The pharmacists were engaged as research partners, recognizing their role as pioneers of a novel, clinically advanced service model for other Australian pharmacists [37]. Pharmaceutical care and advanced pharmaceutical services remain challenging and offer the interesting and effective way to promote interprofessional collaboration between pharmacists and physicians. The advanced pharmaceutical services also need the changing of settings of the health care system [38]. The new standards and guidelines should be implemented and used effectively.

Current situation in Poland

Currently, pharmaceutical care and advanced pharmaceutical services are not implemented into Polish community pharmacy. This paper describes current achievements of social and practice pharmacy in the context of pharmaceutical care in asthma. However, it should be noted that these services are not merely limited to asthma and might be extended to different chronic respiratory diseases e.g. chronic obstructive pulmonary disease. Authors are aware of difficulties associated with successful implementation the cognitive services into the routine settings. Particularly, two of these impediments are extremely important. First relates to the legal issues, the second is related to the insufficient accomplishment of

interprofessional collaboration between the physicians and pharmacists in Poland. In contrary, the recent study comparing the situation in Poland and UK has shown that the implementation of pharmaceutical care may essentially help to increase patient loyalty and consequently enhance the competitiveness of pharmacies [39].

Of note, currently, in Poland, the role of the pharmacist has been limited to dispense medicines and to provide short advice concerning medical related problems. This state lasts despite the fact that pharmaceutical care was introduced to the Polish law in 2008 with the amendment to the Act on Chambers of Pharmacists (pl. Ustawa o izbach aptekarskich, Dz. U. 1991 Nr 41 poz. 179). As highlighted previously, the popularization of interprofessional collaboration is the prerequisite in the process of implementation of pharmaceutical care in Poland. This process should be launched in concert with the undergraduate training and, subsequently continued in the postgraduate education. The future should bring enhanced efforts of all relevant stakeholders in the dissemination of the concept of interprofessional collaboration, predominantly from the practical point of view.

To effectively implement the cognitive services, legal-related issues should be resolved, particularly these related to the medical information. For this, pharmacists need to have access to the patients' medical history. So far, physicians cannot transfer information about the health status of the patient to the pharmacist. These factors make the process of conducting pharmaceutical care under the conditions of the Polish healthcare system difficult and ineffective. Currently, from the legal point of view, information obtained through the pharmaceutical care process from e.g. medication reviews, can be submitted to the physicians only after obtaining the direct patients' consent. Of note, the implementation of advanced pharmaceutical services should be understood in the context of the barriers and impediments to the efficient proliferation of pharmaceutical care into community pharmacies settings. Firstly, patients should be ensured that the pharmaceutical care is conducted in the private and intimate atmosphere. Hence, there is strong need to create the professional area mainly dedicated to more insightful relations with patients. Consequently, the organizational structure of community pharmacies should be arranged on a *de novo* basis, e.g. the new professional staff should be recruited and adjusted to more cognitive duties. From the academic point of view, changes in pharmaceutical

practice should be supported by the postgraduate training, also in the scope of soft skills and communication abilities. Finally, one of the most significant factors contributed to the process of the successful implementation of pharmaceutical care under Polish conditions is the collaboration between pharmacists and primary care physicians. The introduction of more advanced role of community pharmacists in the healthcare system should be provided in line with direct cooperation with family medicine specialists. For instance, some of the pharmaceutical or medical meetings might be considered as the opportunity of joint discussion. On the other hand, indispensable in the process of providing pharmaceutical care is to promote the specialized computer assistance. This topic has been already widely discussed in light of the implementation of falsified directive [14]. Currently, the wide range of interactive websites with the applied tools are launched, also in Poland. The milestone would be to create the interactive platform where the pharmacists and physicians could transfer the patient-related information. This medium is, indeed, one of the fundamental pillars of e-health services. The financial matter should be resolved before the full implementation of new services. Furthermore, the pharmaceutical care is dedicated to chronic and elderly populations. Hence, the services should be reimbursed from public sources. Otherwise, the widespread of these services will be rather marginal. All these factors remain a significant

challenge to the community of healthcare professionals, and, on the other hand, for the politicians responsible for the healthcare system in Poland.

So far, the research on pharmaceutical care in Poland has been limited to the setting of hypertension. Patients who participated in the pharmaceutical care had the proper blood pressure (achieved in 79% cases, $p < 0.05$). Accordingly, the patients who did not participate in this program achieved the proper value in 55% of cases. Skowron *et al.* also showed that pharmaceutical care improves the level of patients' knowledge about hypertension [40]. Although the authors put their effort to perform an objective and precise search, no studies describing the pharmaceutical care in asthma in Poland has been identified.

Scientific evidence proves beyond doubt the clinical effectiveness of pharmaceutical care for patients with asthma. According to Drozd *et al* pharmaceutical care under the conditions of Polish health care system should focus on technical advice regarding the correct usage of inhalers, information about anti-asthmatic drugs, effects-focused therapy advice for patients, comprehensive monitoring of therapy results [41].

Perspectives on implementation to polish healthcare system, as well as the advanced and new pharmaceutical services are summarized in Table 1. In the opinion of the authors of this work, services easy to be implemented into the Polish healthcare include the following: the advisory in

Table 1. Perspectives on implementation advanced and new pharmaceutical services to Polish healthcare system

	Services	Impact on adherence	Impact on health-related quality of life	The perspective of implementation to Polish healthcare system
1	Short message service (SMS-based intervention)	Increase	Increase	Difficult, from legal point of view currently unavailable service
2	Advising about the correct use of inhalers	Increase	Increase	Possible to implement to Polish healthcare system. Need to prepare the standardization of advising
3	Using validating test to assess the asthma control profile	Increase	Increase	Possible to implement to Polish healthcare system
4	Education about pro healthy lifestyle	Increase	Increase	Possible to implement to Polish healthcare system
5	Pharmaceutical care among pediatrician population	Increase	Increase	Hard to be implemented Changing the law is necessary Necessary is to increase the level of knowledge in the field of pediatrician pharmacotherapy among Polish pharmacists
6	Medication reviews	Increase	Increase	Possible to implement to Polish healthcare system.
7	Advising about side effects or interactions between the drug used in asthma and medicinal products available without physicians' prescription	Increase	Increase	Possible to implement to Polish healthcare system

correct use of inhalers, the use of validating test to assess the asthma control profile, education about healthy lifestyle, conducting the medication reviews or the advisory in side effects or interactions between the drug used in asthma and medicinal products available without physicians' prescription. Nevertheless, it is directly associated with the development of standards and recommendations for pharmacists. Other services, however, require significant changes in the pharmaceutical law.

Recently in Poland the process of development the concept of reimbursed pharmaceutical care has been launched [42]. Implementing to Polish health care system an efficient model for pharmaceutical care in various chronic diseases may bring the clinical and economic benefits [43].

Conclusions

Pharmaceutical care is clinically effective in patients diagnosed with asthma. The implementation of pharmaceutical care under Polish conditions is insufficient and challenging for the future. Asthma service providers and politics (e.g. government) should make a special effort in the process of designing and development of pharmaceutical services. The process should be developed carefully and thoroughly, respecting the autonomy of other medical professionals and patients' preferences [44]. It is expected that the nearest future will bring the research about pharmaceutical care in asthma in Polish reality.

Conflicts of interest

The authors declare no conflict of interest.

References:

- Bodzenta-Lukaszyk A, Fal AM, Jassem E, Kowalski ML, Kuna P, Kupczyk M. The statement of the Polish Society of Allergology experts on the treatment of difficult-to-treat asthma. *Pneumonol Alergol Pol*. 2015; 83: 324–334. doi: 10.5603/PiAP.2015.0052.
- Kardas P, Lewek P, Strzondała M. Adherence to treatment in asthma and COPD patients in their doctors' assessment. *Pneumonol Alergol Pol* 2015; 83: 436–444. doi: 10.5603/PiAP.2015.0072.
- Aslani P, Schneider MP. Adherence: The journey of medication taking, are we there yet? *Int J Clin Pharm* 2014; 36: 1–3. doi: 10.1007/s11096-013-9901-x.
- Mansoor SM, Aslani P, Krass I. Pharmacists' attitudes and perceived barriers to provision of adherence support in Australia. *Int J Clin Pharm* 2014; 36: 136–144. doi: 10.1007/s11096-013-9840-6.
- Bahadori K, Doyle-Waters MM, Marra C *et al*. Economic burden of asthma: a systematic review. *BMC Pulm Med* 2009; 9: 24. doi: 10.1186/1471-2466-9-24.
- Shepherd J, Rogers G, Anderson R *et al*. Systematic review and economic analysis of the comparative effectiveness of different inhaled corticosteroids and their usage with long-acting beta2 agonists for the treatment of chronic asthma in adults and children aged 12 years and over. *Health Technol Assess*. 2008; 12(19): iii–iv, 1–360. <http://www.ncbi.nlm.nih.gov/pubmed/18485271>; 1.01.2016.
- Hepler CD, Strand LM. Opportunities and responsibilities in pharmaceutical care. *Am J Hosp Pharm* 1990; 47: 533–543.
- Mangiapane S, Schulz M, Mühlhig S, Ihle P, Schubert I, Waldmann H-C. Community pharmacy-based pharmaceutical care for asthma patients. *Ann Pharmacother* 2005; 39: 1817–1822. doi: 10.1345/aph.1G180.
- van der Meer HG, Wouters H, van Hulten R, Pras N, Taxis K. Decreasing the load? Is a Multidisciplinary Multistep Medication Review in older people an effective intervention to reduce a patient's Drug Burden Index? Protocol of a randomised controlled trial. *BMJ Open*. 2015; 5: e009213. doi: 10.1136/bmjopen-2015009213.
- Giraud V, Allaert F-A, Roche N. Inhaler technique and asthma: feasibility and acceptability of training by pharmacists. *Respir Med* 2011; 105: 1815–1822. doi: 10.1016/j.rmed.2011.07.004.
- Mathialagan A., Nagalinggam P., Mathialagan S *et al*. Relationship between performance barriers and pharmacist competency towards the implementation of an expanded public health pharmacy role. *Int J Pharm Pract* 2015; 23: 320–326. doi: 10.1111/ijpp.12170.
- Balińska-Miśkiewicz W. Diagnostyka i leczenie astmy oskrzelowej u osób dorosłych. *Farm Pol* 2009; 65: 793–803.
- Merks P, Świeczkowski D, Blicharska E *et al*. Perspektywa wdrożenia opieki farmaceutycznej do praktyki aptecznej w warunkach polskiego systemu opieki zdrowotnej. *Czasopismo Aptekarskie* 2015; 8–9: 33–43.
- Skowron A, Dymek J. Rola farmaceuty w wykrywaniu i rozwiązywaniu problemów lekowych wśród pacjentów ambulatoryjnych. *Zdrowie Publiczne i Zarządzanie* 2013; 11: 44–58.
- Obrel-Neto PR, Marusic S, Guidoni CM *et al*. Economic evaluation of a pharmaceutical care program for elderly diabetic and hypertensive patients in primary health care: a 36-month randomized controlled clinical trial. *J Manag Care Spec Pharm* 2015; 21: 66–75.
- Ottenbros S, Teichert M, de Groot R *et al*. Pharmacist-led intervention study to improve drug therapy in asthma and COPD patients. *Int J Clin Pharm* 2014; 36: 336–344. doi: 10.1007/s11096-013-9887-4.
- van Boven JFM, Hiddink EG, Stuurman-Bieze AGG, Schuiling-Veninga CCM, Postma MJ, Vegter S. The pharmacists' potential to provide targets for interventions to optimize pharmacotherapy in patients with asthma. *Int J Clin Pharm* 2013; 35: 1075–1082. doi: 10.1007/s11096-013-9829-1.
- McKean M, Pillans P, Scott IA. A medication review and deprescribing method for hospitalised older patients receiving multiple medications. *Intern Med J* 2016; 46: 35–42.
- Weiss BD, Brega AG, LeBlanc WG *et al*. Improving the effectiveness of medication review: guidance from the health literacy universal precautions Toolkit. *J Am Board Fam Med* 29: 18–23. doi: 10.3122/jabfm.2016.01.150163.
- Shanguman S, Varughese JN, Manjuladevi AS *et al*. Pharmaceutical care for asthma patients: A Developing Country's Experience. *J Res Pharm Pract* 2012; 1: 66–71.
- Petkova VB. Pharmaceutical care for asthma patients: a community pharmacy-based pilot project. *Allergy Asthma Proc* 29: 55–61. doi: 10.2500/aap.2008.29.3083.
- De Vera MA, Sadatsafavi M, Tsao NW *et al*. Empowering pharmacists in asthma management through interactive SMS (EmPhAsIS): study protocol for a randomized controlled trial. *Trials*. 2014; 15: 488. doi: 10.1186/1745-6215-15-488.
- Toumas-Shehata M, Price D, Basheti IA, Bosnic-Anticevich S. Exploring the role of quantitative feedback in inhaler technique education: a cluster-randomised, two-arm, parallel-group, repeated-measures study. *NPJ Prim care Respir Med* 2014; 24: 14071. doi: 10.1038/npjpcrm.2014.71.
- Mehuys E, Van Bortel L, De Bolle L *et al*. Effectiveness of pharmacist intervention for asthma control improvement. *Eur Respir J* 2008; 31: 790–799. doi: 10.1183/09031936.00112007.
- Kaae S, Sporrang SK. Patients' reasons for accepting a free community pharmacy asthma service. *Int J Clin Pharm* 2015; 37: 917–924. doi: 10.1007/s11096-015-0142-z.

26. LeMay KS, Armour CL, Reddel HK. Performance of a brief asthma control screening tool in community pharmacy: a cross-sectional and prospective longitudinal analysis. *Prim Care Respir J* 2014; 23: 79–84. doi: 10.4104/pcrj.2014.00011.
27. Papastergiou J, Folkins C, Li W, Zervas J. Community pharmacist-administered influenza immunization improves patient access to vaccination. *Can Pharm J* 2014; 147: 359–365. doi: 10.1177/1715163514552557.
28. Brown D, Portlock J, Rutter P, Nazar Z *et al.* From community pharmacy to healthy living pharmacy: Positive early experiences from Portsmouth, England. *Res Social Adm Pharm* 2014; 10: 72–87.
29. Fincham J. Public health, pharmacy, and the prevention education resource center (PERC). *Am J Pharm Educ* 2007; 71: 104.
30. García-Cárdenas V, Sabater-Hernández D, Kenny P, Martínez-Martínez F, Faus MJ, Benrimoj SI. Effect of a pharmacist intervention on asthma control. A cluster randomised trial. *Respir Med* 2013; 107: 1346–1355. doi: 10.1016/j.rmed.2013.05.014.
31. Berry TM, Prosser TR, Wilson K, Castro M. Asthma friendly pharmacies: a model to improve communication and collaboration among pharmacists, patients, and healthcare providers. *J Urban Health* 2011; 88 (Suppl 1): 113–125. doi: 10.1007/s11524-010-9514-9.
32. Saini B, Filipovska J, Bosnic-Anticevich S, Taylor S, Krass I, Armour C. An evaluation of a community pharmacy-based rural asthma management service. *Aust J Rural Health* 2008; 16: 100–108. doi: 10.1111/j.1440-1584.2008.00975.x.
33. Armour C, Bosnic-Anticevich S, Brillant M *et al.* Pharmacy Asthma Care Program (PACP) improves outcomes for patients in the community. *Thorax* 2007; 62: 496–502. doi: 10.1136/thx.2006.064709.
34. Davis SQ, Krishnan JA, Lee K, Persky V, Naureckas ET. Effect of a community-wide asthma intervention on appropriate use of inhaled corticosteroids. *J Urban Health* 2011; 88 (Suppl 1): 144–155. doi: 10.1007/s11524-010-9476-y.
35. de Vries TW, van den Berg PB, Duiverman EJ, de Jong-van den Berg LTW. Effect of a minimal pharmacy intervention on improvement of adherence to asthma guidelines. *Arch Dis Child* 2010; 95: 302–304. doi: 10.1136/adc.2008.145581.
36. Świeczkowski D, Bandurska E, Merks P *et al.* Badanie jakości życia farmaceutów i ryzyka wypalenia zawodowego jako istotny element farmacji społecznej. *Farm Pol* 2015; 71: 410–414.
37. Emmerton LM, Smith L, LeMay KS *et al.* Experiences of community pharmacists involved in the delivery of a specialist asthma service in Australia. *BMC Health Serv Res* 2012; 12: 164. doi: 10.1186/1472-6963-12-164.
38. Faletto EL, Grace WY, Armour C, Bandana S. Practice change in community pharmacy: using change-management principles when implementing a pharmacy asthma management service in NSW, Australia. *Int J Pharm Pract* 2013; 21: 28–37.
39. Merks P, Kaźmierczak J, Olszewska AE *et al.* Comparison of factors influencing patient choice of community pharmacy in Poland and in the UK, and identification of components of pharmaceutical care. *Patient Prefer Adherence* 2014; 8: 715–726. doi: 10.2147/PPA.S53829.
40. Skowron A, Polak S, Brandys J. The impact of pharmaceutical care on patients with hypertension and their pharmacists. *Pharm Pract (Granada)*. 2011; 9: 110–115.
41. Kijewska A, Drozd M, Zeliasz A. Ocena efektywności opieki farmaceuty nad chorym z astmą oskrzelową. Część 3. Rola farmaceuty w przekazywaniu wiedzy o chorobie i opiece nad pacjentem. *Farm Pol* 2012; 68: 149–153.
42. Rynek aptek. MZ: członkowie zespołu ds. opieki farmaceutycznej. <http://www.rynekaptek.pl/prawo/mz-czlonkowie-zespołu-ds.-opieki-farmaceutycznej,10531.html>; 1.01.2016.
43. Skowron A, Polak W, Golda A, Dymek J, Pelka P. The effectiveness of pharmaceutical care in diabetes in Poland-Markov model. *Int J Clin Pharm* 2015; 37: 419–419.
44. Naik-Panvelkar P, Armour C, Rose JM, Saini B. Patient preferences for community pharmacy asthma services a discrete choice experiment. *Pharmacoeconomics* 2012; 30: 961–976.