

Review on the Management of Patients with High Blood Pressure in Community Pharmacy: Epidemiological Data

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Abstract

Background: Community pharmacies are an important part of primary health care, contributing daily to information, vigilance, and disease control. High blood pressure is a worldwide problem that affects billions of people. Indeed, a lot of people are unaware of their problem and are consequently in constant danger. One of the most important causes of this problem is still the lack of monitoring and vigilance.

Objective: This study aims to highlight the role of community pharmacists worldwide in case management of patients with high blood pressure.

Methods: This study presents data from published articles on PubMed, Google scholar and Scopus between the time period 2017 and 2022. During the literature research, specific criteria were used to better fulfill the purpose of the study. Broad terms “community pharmacist”, “primary health care”, and “screenings” were used in combination with “control of high blood pressure” and “hypertensive patients”. Studies with no comparator were excluded.

Results: Only 8 studies measured outcomes against a comparator, consistent with the research question. The results led to very optimistic data as all the actions proved to be of timely importance and benefited the regulation of cardiovascular disturbances. Many studies worldwide have shown the positive effect of community pharmacies on blood pressure control. Most studies focused on the creation of targeted services in pharmacies that led to significant reductions in blood pressure rates and to the detection of many new cases.

Conclusion: The participation of community pharmacies in the management of patients with high blood pressure can reduce complications, increasing the awareness and vigilance of citizens. An important obstacle is still the socio-economic level of the country as well as the lack of information about public health issues.

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Keywords: Community pharmacist; Control of high blood pressure; Primary health care system; Screenings; Hypertensive patients; Services.

Introduction

Community pharmacists are an integral part of primary health care system, with an important role in educating patients on various health issues [1]. The role of community pharmacists is constantly changing, evolving and has an increasingly important place in the service delivery process. They are the third largest healthcare professional group in the world after physicians and nurses. At present, factors such as the ageing of the population, multimorbidity, but also increasing technologies have opened up the field in the management of chronic diseases in the community pharmacists [2,3]. Pharmacy services are increasingly offered around the world [4]. On November 20, 2013, the European Parliament issued the “Directive 2013/55/EU” regarding the recognition of pharmacist professional services. The decision underlines pharmacists’ roles in advising on medicine use, reporting drug side effects to authorities, and aiding in health campaigns, signifying their critical contribution to healthcare and public health [5].

An interesting definition of community pharmacist services was written by Cipolle RJ, Strand LM, Morley PC at “Pharmaceutical care practice” in 1998 and it indicates that it is: “the use of specialized knowledge by the pharmacist for the patient or health professionals for the purpose of promoting effective and safe drug therapy” [6]. The role of pharmacists has therefore been shifted from the safe and effective use of medicines to the provision of services, promoting the maintenance of patient’s health [7]. Community pharmacists could help to improve health by reducing drug-related adverse events and promoting better medication adherence, which may help in reducing unnecessary provider visits and hospitalizations. In addition to Directive 2013, community pharmacies now offer a variety of extra pharmaceutical services daily, including enhancing medication adherence, managing chronic diseases like hypertension and diabetes through monitoring blood pressure and glucose levels, administering vaccinations for influenza and tetanus, reporting adverse drug effects, and conducting diagnostic tests for COVID-19. These expanded services reflect the evolving role of pharmacies in public health and individual care management [7].

Many of the patients who visit community pharmacies, are patients, who have experienced some problems with their blood pressure levels. Some of them have been diagnosed immediately and are receiving medication, while there is also a percentage of non-diagnosed due to carelessness. Blood pressure measurement in the community pharmacy is an integral part of everyday life, contributing to the tracking of new cases and following up on old ones. Raised Blood Pressure (BP) is a major global public health issue as the leading risk factor for global death. Cardiovascular Disease (CVD) is one of the leading causes of death in Canada [8] while hypertension prevalence is high and still increasing due to aging and obesity worldwide [9]. It is the most prevalent chronic disease; affecting 1 in 4 Canadian adults aged 20 to 79 and is the leading modifiable risk factor for premature and worldwide morbidity [10]. According to the World Health Organization (WHO), high BP is responsible for nine million deaths annually worldwide, and it is estimated that nearly one-quarter of the adult world population will suffer from hypertension in 2025 [11]. However, an important proportion of hypertensive patients are unaware of their condition [12,13]. Even patients with established coronary artery disease are unaware of their elevated blood pressure, indicating the need for more efficient cardiovascular prevention campaigns

[14]. High blood pressure is the main factor associated with early mortality worldwide, causing almost 10 million deaths [15]. More than 200 million people worldwide are diagnosed with high blood pressure and receive appropriate medication [16]. In the USA almost 116 million adults (47,3%) present hypertension and most of them (almost 92 million) face severe problems with the management of hypertension [17]. This includes about 24.3 million adults who are recommended lifestyle modifications only and 67.8 million adults who are recommended lifestyle modifications and prescription medication. Undiagnosed and unmanaged hypertension leads to increase healthcare costs in the United States [18]. Without a doubt, pharmacies are the first station of primary care that patients recall when they feel the first symptoms of a disease [19]. Pharmacists are noting that they are the “most trusted professional” by the public. The most recent confirmation of this was on Covid-19, where pharmacies play a role in providing advice, acting as the first point of contact to those in need and improve early recognition of health issues [20].

The aim of our study is to highlight the role of community pharmacies in the management of patients with high blood pressure. Therefore, we will present the appropriate tools that have been used to control and regulate hypertensive patients in community pharmacies and whether these can affect positively the patient’s lives.

Materials and methods

In our study literature search was carried out on the active role of pharmacies in blood pressure control around the world, guided by various economic and social criteria. The results of the studies presented below were obtained after an investigation on the following platforms: pubmed, scopus, and google scholar with the following keywords: “community pharmacist”, “screening for hypertension”, “hypertensive patient”, “control of high blood pressure”, “role of pharmacists in the primary health care system”. Pub Med was chosen as the main search platform since it contained the majority of the related articles. This study includes many statistical results reflecting the current situation in different geographical parts of the world. Epidemiological data and demographic criteria were evaluated for the same reason. Exclusion criteria of our research were as follows: articles published before 2017, articles that were not published in English language and articles that the results of them, were based on qualitative analysis. The inclusion and exclusion criteria are detailed in Table 1.

Additionally, Figure 1 illustrates the article selection process, starting from the initial identification of 175 articles. The process narrows down the selection based on publication date, language, text availability, resulting in 87 articles. Further refinement based on outcome structures and other criteria finally led to the inclusion of 8 studies in our analysis.

Results

The michigan medicine hypertension pharmacists’ program

In 2019 a new program was added to the system to evaluate the pharmacist’s role in blood pressure regulation. The Michigan Medicine Hypertension Pharmacists’ Program (MMHPP) was created by pharmacists to provide hypertension management services in collaboration with physicians in primary care and community pharmacy settings. The results of this study showed that more patients in the intervention group than in the comparison group achieved blood pressure control at 3 months

(66.3% vs 42.4%) and 6 months (69.1% vs 56.5%). The intervention group experienced more days with blood pressure under control within a 3-month (18.6 vs 9.5 days) and 6-month period (57.0 vs 37.4 days) than the comparison group. The examination of blood pressure control within 3 and 6 months showed that the intervention group was 2.67 ($p < 0.001$) times more likely than the comparison group to achieve blood pressure control within 3 months and 1.72 ($\chi^2 = 72.73$, $p < 0.001$) times more likely to achieve the desirable control within 6 months [21].

Screening program in Switzerland based on MMM

Low hypertension awareness was one of the reasons for a worldwide effort to measure blood pressure annually, called May Measurement Month (MMM). The purpose of this effort is to screen people around the world who have not had their blood pressure measured for at least one year. Over 4.2 million participants have been screened worldwide during the 3-year campaign (MMM17-MMM19). Based on it, pharmacies of the Canton de Vaud in Switzerland started a program using only data from pharmacies and only participants with three consecutive blood pressure measurements [22]. The patient is under a specific measurement position (cuff at the heart level, preferably left arm and resting on a table, back supported, legs in the uncrossed position for 5 min). When examining the effect of consecutive measurements on blood pressure, the systolic blood pressure decreased from the first to the third measurement 0.7 mmHg ($p < 0.001$) and the diastolic blood pressure decreased 0.4 mmHg ($p < 0.001$). The most important outcome of this study is that the prevalence of hypertension using the newly proposed thresholds for pharmacies is high (38.3%) and that less than half of treated hypertensive achieve a blood pressure goal $< 135/85$ mmHg in pharmacies [23]. From a total sample of 3634 Swiss participants who were included during this 3-year campaign, 2567 participants were recruited only in pharmacies and had three BP measurements. Their mean age was 47.1 ± 18.5 years. Most of the participants were women and had higher control rates than men when applying the pharmacy thresholds [24].

The impact of pharmacies in Ghana; an unequal battle

The lack of awareness and inadequate treatment of hypertensive patients are factors contributing to the high burden of hypertension in Ghana [25]. According to the Health Professionals Regulatory Bodies Act, a pharmacist can provide medical care, as first aid during an accident, and also treatment for illnesses of common occurrence. Although many studies have been carried out in European countries and the US, something like this is not evident in underdeveloped or developing countries. There are many underlying reasons for the poor control of blood pressure, of which poor knowledge of patients and non-adherence to prescribed therapy are deemed critical contributing factors. In 2017, a non-randomized control study was conducted in five community pharmacies close to the Kumasi metropolis in Ghana. It indicates that patients visit their doctors for a review approximately every three months, without requiring a blood test, and the visits to the pharmacy concerned only for prescription refills. Based on the pharmaceutical care model, the intervention offered by the community pharmacist was monthly medicines, health education, and adherence counseling. This study included two comparison groups. 180 hypertensive patients were recruited. 23 participants dropped out of the study due to different reasons, so participants who finally completed the study were thus 75 and 71 for the intervention and control groups respectively. The mean age for the

intervention group was 56.56 ± 9.197 while that for the control group was 53.45 ± 8.299 . These groups had no significant difference in demographic characteristics. After 6 months follow up the mean diastolic blood pressure difference between the intervention group and the control group was statistically significant ($p = 0.001$). The mean adherence difference between the two groups was also statistically significant at the end of the study ($p = 0.001$) [25].

A randomized controlled trial in Zunyi (China); the effects of pharmacist intervention on community control of hypertension

Another study, published in 2021 by the World Health Organization (WHO), proves that about two-thirds of hypertensive patients in the world live in China [26]. Also, here hypertension treatments account for 6.61% of the total health expenditure [27]. In recent years, pharmacist services in the east side have changed their focus from ensuring drug supply to providing patient-centered care. This study below is a quick review of the impact of pharmacist interventions on hypertension in primary care facilities in China [28]. The high prevalence of irrational prescriptions and the self-medication of consumers increased the necessity to explore the role of community pharmacists [29,30]. This survey started in January 2018 and 746 participants were invited. Of these, 636 chose to continue and they were randomly allocated into the control and intervention groups equally. Eventually, 28 participants dropped out of the intervention group, compared with 20 in the control group. So the final sample was 588 patients. The systematic program for hypertension included a series of monitoring and intervention procedures: appointments, telephone interviews, home visits, medication compliance, and assessment of risk factors. The routine follow-up arrangement was complemented with an annual physical examination, including blood tests and electrocardiograms [31]. The participants had an average age of 65.98 years ($SD = 9.48$). More than half (57.31%) were female and the majority (52.72%) had only completed primary school education. About 18.71% were smoking, 26.02% were drinking, and 17.86% had heavy salt intake. Approximately 86.73% reported regular daily exercise of moderate intensity, such as walking, housework, sports, and other activities. More than 30% of the participants had been living with hypertension for 10 or more years and less than 10% had their blood pressure under control. The intervention group had a higher percentage of elderly (aged ≥ 65 years) participants, about 2.55 years older than the control group ($P < 0.001$). The levels of blood pressure improved in both groups ($p < 0.005$). However, a significantly higher percentage of participants in the intervention group had their blood pressure under control at the end of the trial (60.7% vs. 40.9%, $p < 0.001$). The effects of the intervention became significant 3 months after the trial (46.9% vs. 38.3%, $p = 0.034$) and continued until the end of the trial. Both groups experienced a drop in their blood pressure, but the intervention group gained higher rates. Furthermore, higher knowledge scores were found in the intervention group compared with the control group (77.46 ± 19.33 vs. 61.00 ± 26.98 , $P < .001$). Six months after the trial, 60.7% of the participants who received pharmacist interventions had their blood pressure under control, already exceeding the government target. In contrast, only 40.9% of the participants in the control group had their blood pressure under control, 19 percentage points below the governmental target. This study provides new insight into the potential role of pharmacists in the community, improving knowledge and medication adherence of hypertensive patients [32].

Effects of lifestyle advice provided by pharmacists on blood pressure; a randomized trial in community pharmacies of Japan

Elevated morning blood pressure is one of the most common risk factors for atherosclerotic disease [33]. This study aimed to evaluate the effects of brief motivational lifestyle advice provided by community pharmacists in Japan to hypertensive patients with the intent to improve home-monitored BP in a community setting. The duration of the study included two periods; from September 2014 to March 2015 and from May 2015 to November 2015. Each pharmacy was responsible for the guidance of 3 patients, who were selected based on data from a blood pressure diary of the last 3 months and on the medications they were taking. The pharmacists who participated in this study were required to attend a 4-hour training course on the methods for interviewing patients and providing information at community pharmacies. More specifically, they trained in the goal of the study, in correct home device methods for BP measurements, and in the provision of brief motivational advice to patients. The program had five areas that could be selected by patients: i) reducing sodium intake, ii) including more vegetables in meals, iii) exercising, iv) losing weight, and v) reducing alcohol consumption. Patients were divided into two groups - an intervention group and a control group. Both groups were given blood pressure monitors for home use and basic instructions for use. The duration of the study was 12 weeks, including 5 sessions with the pharmacist. The intervention group received counseling from the beginning of the study, while the control group only at the last 2 visits. The final analysis included 30 pharmacies (64 patients) in the intervention group and 26 pharmacies (61 patients) in the control group. Although patients in the intervention group were younger, with fewer incidents of diabetes, and fewer medications, they had higher morning blood pressure values before the study. The difference in SBP change at 12 weeks was -6.0mmHg (Intervention: -1.1 mmHg, Control: +4.9 mmHg; 95% confidence interval, $p=0.021$). More intervention patients were less physically active. No significant differences were observed for any other secondary endpoints (such as salt intake score, BMI, or knowledge about a healthy lifestyle) [33].

Pilot model of community pharmacy diabetes and hypertension care program implemented in twin cities of Pakistan; “clinical skills for the management of diabetes mellitus and hypertension”

This study involved 8 community pharmacies in two different areas near Pakistan (Islamabad and Rawalpindi), which were randomly selected to ensure absent bias [34]. Patients who only suffered from diabetes and hypertension were included in the participants, while those who had other co morbidities or were receiving medication for the first two were excluded. These pharmacies were classified into two groups of 4: the intervention group (group A) and the control group (group B). Only the pharmacists of group A received special training in patient management and counseling based on the International Diabetes Federation Diabetes Education Module and Pharmacy- Based Hypertension Management Model: Protocol and Guidelines (World Health Organization (2005). Each group included 40 patients. The intervention of pharmacists included questionnaires with measurements of blood pressure, glucose, and adherence to medication. At the same time, they advised their patients according to their ailments, complications, and needs, such as special diets. Patients enrolled in the control and intervention

groups were required to visit the community pharmacy every 15 days for 6 months during the study. Group B patients received the usual counseling for their treatment as before. The majority of the respondents had a history of hypertension for more than 6 years (32.5%, $n=13$). Among patients in the intervention group, 52.5% ($n=21$) were men, while 47.5% ($n=19$) were women. After 6 months it was observed that the average knowledge of the patients in the intervention group increased in relation to the management of hypertension. In more detail at baseline, the mean systolic blood pressure between the control group (142.15 ± 9.36) and the intervention group (145.85 ± 10.88) did not show any significant differences. On the other hand, systolic BP decreased between the intervention group at 3 months (130.18 ± 10.85) and 6 months (130.10 ± 6.89). Among the demographic characteristics, it was observed that the age group 31-40, men and post-graduated patients showed better achievement of the goal. Therefore, the results of the research came up with extremely encouraging results for the role of counseling in the management of chronic diseases by community pharmacies [34].

Screening services in a community pharmacy in Poznan (Poland) to increase early detection of hypertension

The role of pharmacists in Poland is quite encouraging in terms of diagnostic screenings. However, no protocol has been established regarding the management of patients with hypertension [35]. With this in mind, three pharmacists from a community pharmacy in Poznan decided to survey from January to April 2019. The participants in the survey were people who visited community pharmacies and showed interest in participating. Their selection criteria were to be adults without diagnosed hypertension. First, a small interview was conducted about their history and then they were divided into 3 groups according to this: i) Standard Consultation (SC: normal blood pressure, without risk factors) ii) Intensive Consultation (IC: normal blood pressure with risk factors, e.g., family history, elevated blood glucose level, and cholesterol) iii) High-Risk Consultation (HRC: blood pressure reading $\geq 140/90$ mmHg). They were informed about the correct practices for taking blood pressure, including many counseling instructions. Participants who had smoked or drunk coffee an hour before were excluded from the control. After a rest of 5 minutes, the blood pressure was taken twice, and in case there was a difference greater than 10 mmHg, a third measurement followed. The participant was prepared for examination according to the Polish Society of Hypertension recommendations. Finally, a total number of 118 participants were included in screenings for blood pressure in a community pharmacy (69.5% women and 30.5% men). The results showed that participants with high BMI and co morbidities had significantly higher rates of blood pressure ($p=0.0001$). 50.0% of participants applied for a follow-up consultation in the pharmacy and 15.0% received recommendations for a more advanced health examination. It's worth noting that 24 new cases were detected with hypertension. Additional analysis of results by age, sex, and education showed no statistically significant differences [35].

A collaboration program between community pharmacists and academic medical center for managements of hypertension

The present study evaluated the recognition and participation of community pharmacists in hypertension management in a Community Health Service Center (CHSC) in Hongkou District of Shanghai, China from June 2017 to May 2018 [36]. Patients'

Table 1: Included and excluded criteria for the research

Criterion	Inclusion	Exclusion
Date of publication	Between 2017 and 2022	Before 2017
Language	English & Greek	Other languages
Outcomes	Positive results of pharmacist Intervention	No significantly important results
Structure	Community pharmacies	Hospitals, Clinical pharmacists
Text availability	Free full text	Subscription articles

Table 2: Summary of presented studies.

Article information	Method	Results
Evaluation of a Pharmacists' Patient Care Process Approach for Hypertension [21]	Randomized controlled study	More than 65% of intervention group achieved their blood pressure goal in 3 months after their pharmacist's directions.
High blood pressure screening in pharmacies during May Measurement Month campaigns in Switzerland [24]	Cross-sectional study	From 3634 Swiss participants who were included during this 3-year campaign, 2567 participants were recruited only in pharmacies and had three BP measurements. The triple measurement service contributed to the faster achievement of the blood pressure target. Woman accepted the threshold measure in a higher percentage.
Effects of Pharmacist Intervention on Community Control of Hypertension: A Randomized Controlled Trial in Zunyi, China [32]	Randomized Controlled study	Participants in the intervention group showed a higher knowledge score, decrease systolic and diastolic blood pressure in 3 months. Short-term effects is a disadvantage.
Effects of lifestyle advice provided by pharmacists on blood pressure: The COMMUNITY Pharmacists ASSist for Blood Pressure [33]	Randomized controlled study	The intervention was feasible and well accepted by pharmacists and patients. The brief healthy lifestyle advice provided by pharmacists during daily practice had an effect on patients' blood pressure control. After 12 weeks the intervention group had almost 6 times better results in reducing systolic blood pressure.
Effectiveness of Community Pharmacy Diabetes and Hypertension Care Program: An Unexplored Opportunity for Community Pharmacists in Pakistan [34]	Randomized controlled study	A significant improvement in blood pressure was observed over a period of 3 months and better compliance in patients aged 30-41 years who had a higher level of education. New hypertensive cases were detected.
Screening Services in a Community Pharmacy in Poznan (Poland) to Increase Early Detection of Hypertension [35]	Screening study	A community pharmacy created a model for blood pressure control screening and counseling. 50.0% of participants applied for a follow-up consultation in the pharmacy, 15.0% received recommendations for a more advanced health examination and 24 new cases were detected with hypertension.
Community Pharmacist Services for Hypertensive Patients: A Novel Practice in Shanghai, China [36]	Randomized Control study	Evaluation of the impact of community pharmacists in educating the patients with high blood pressure. The different stages of the intervention confirm the positive effect they exert on better management of blood pressure and underline the importance of their existence.

knowledge source and self-management were assessed before and after an intervention by community pharmacists. 196 people participated in this study and were divided into 2 groups: an intervention group and a control group. Community pharmacists conducted 1 baseline visit and 1 post-intervention visit to assess patients' cognition, attitudes, and health indicators, with monthly follow-up for the intervention group with the aid of family doctors and media channels including social media and telephones. Pharmacists had the role of investigators, trained by a specialized research team. The results were very encouraging. All the population was above 50 years old and the gender distribution was almost equally balanced (43.9% men and 56.1% woman). The majority of participants reported that their training and information on health issues comes from pharmacists. After 12-month intervention, this percentage had increased dramatically, reaching 94.2%. For the non-intervention group, the percentage obtaining hypertension knowledge from pharmacists had changed (from 64.5% to 67.7%). The management methods increased for the intervention group after 12 months (from 36.6% to 63.4%) while more than half of the intervention participants agreed that pharmacists had professional knowl-

edge and skills. 63.4% of the non-intervention participants had a neutral attitude regarding the professional knowledge and skills of community pharmacists [36].

Table 2 offers a summary of the research articles discussed, focusing on the impact of community pharmacists in managing hypertension. It illustrates various study methods and key findings, such as the significant role pharmacists play in guiding patients to achieve blood pressure goals, enhancing awareness and control of hypertension through screening and interventions, and the success of lifestyle advice in managing blood pressure.

Discussion

According to the references above, pharmacies have perhaps the most important role in the monitoring and early diagnosis of patients with blood pressure. Of the studies, four (4) were randomized controlled trials, and led to a common conclusion; the education of patients by pharmacists contributed to better monitoring of blood pressure, maintaining at normal levels. In

fact, the results are encouraging in all of them from the first trimester of follow-up. Other two (2) studies were cross-sectional. These evaluated the effect of pharmacists on patients and the awareness they caused. At the same time, the significant effect in reducing the burden on the health system was noted in these two. Another important notice is that women were the majority in all of the studies. The higher participation of women suggests that they are more likely to be screened in pharmacies than men, which is consistent with the literature [24,35,37]. In order to screen men's behavior new studies have been directed to investigate men's blood pressure in places that they choose more often to visit, such as a barbershop [37]. Pharmacists can create direct and personal contact which contributes to the development of familiarity and trust, prompting the systematic receipt of advice. All the studies identified showed a positive outcome in the effect of community pharmacists on the education and mobilization of citizens on health issues. Therefore, the economic level of a country significantly affects the provided pharmaceutical services. The database search confirmed the suspicion that there is less literature on community pharmacist involvement in the care of patients with chronic conditions (such as hypertension) in these countries. These situations can't get improve, unless the state supports, both financially and institutionally, the primary health system.

Conclusion

In conclusion, hypertension is a disease affecting many patients worldwide. Its incomplete monitoring increases both mortality and the state budget due to complications and changes in the medication treatments. The key to this problem is early diagnosis and systematic follow-up by trained health staff. The maintenance of a specific working protocol for the successful measurement of blood pressure has been shown to have a positive impact on improving patients health. Community pharmacies are an important station of primary health care and have the potential to relieve the burden on other health structures. The existence of health facilities with well qualified trained staff will contribute to the prevention and awareness of citizens on health issues. Thus, new cases of hypertension will be controlled and cases with complications will be minimized.

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Appendix

