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THE ROLE OF PHARMACISTS IN THE DETECTION, MANAGEMENT AND PREVENTION OF HYPERTENSION IN LEBANESE COMMUNITY PHARMACIES

Master thesis

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THE ROLE OF PHARMACISTS IN THE DETECTION, MANAGEMENT AND PREVENTION OF HYPERTENSION IN LEBANESE COMMUNITY PHARMACIES

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SUMMARY

Master Thesis of R. Zreik “The role of pharmacists in the detection, management, and prevention of hypertension in Lebanese community pharmacies”. Scientific supervisor Prof. Dr. V. Briedis, Lithuanian University of Health Sciences, Faculty of Pharmacy, Department of Clinical Pharmacy – Kaunas.

The aim and tasks of the thesis. To evaluate the involvement of pharmacists in the detection, management, and prevention of hypertension in Lebanese community pharmacies.

Methodology. This study was performed using a structured questionnaire with 69 questions for a data collection. Data concerning detection of hypertension, lifestyle modification, and treatment was collected. It was conducted from 10th of July till 27th of August 2016 in community pharmacies in Beirut, Lebanon. A total of 35 pharmacists were included in the study. Data were analyzed using Excel software program.

Results: Results were divided into three sections. In the first section concerning detection of hypertension, 74.29% of the respondents answered that they always, 17.14% answered sometimes, while the remaining 8.57% of the respondents answered to never measure their patients’ blood pressure. The most frequently asked risk factor by pharmacists during detection of hypertension is “age”: 71.43% answered to always ask, 22.86% sometimes, 5.71% never. The other most frequently asked risk factors is about chronic disease such as diabetes and kidney disease where 48.57% of the respondents answered always, 48.57% sometimes, 2.86% never.

In the second section concerning lifestyle modifications, 77.14% answered to always ask their patients to lose weight, 77.14% answered to always ask their patients to stop smoking, 80% answered always to ask their patients to obtain healthy diet such as healthy eating, 82.86% replied to always urge their patients to manage their own stress, 65.71% answered to always ask their patients to maintain a moderate physical activity and 80% of the respondents answered to always ask their patient to reduce their alcohol abuse.

In the third section, most of the respondents (82.86%) answered to always ask their patients if they are currently taking antihypertensive medication and 88.57% of the respondents answered to always to ask their patients if they ever used antihypertensive medication before. As well as 65.71% answered to always check for the drug to drug interactions and 31.43% answered sometimes, while the other 2.86% answered never. As for the pharmacists’ recommendation concerning the long-term treatment of hypertension, only seven out of thirty-five pharmacists recommended medication for long term treatment.
Conclusions: Lebanese pharmacists are more aware of their role in hypertension detection and prevention than hypertension management. This is due to the fact that pharmacists in Lebanon lack the ability to prescribe medication, and that is why their role in hypertension management was restricted to certain criteria but corresponds in general with the standards stated by WHO.
SANTRAUKA

Magistro baigiamasis darbas R. Zreik “Hipertenzijos nustatymas, valdymas ir prevencija Libano visuomenės vaistinėse: vaistininko vaidmuo“. Mokslinis vadas Prof. Dr. V. Briedis, Lietuvos Medicinos Universitetas, Farmacijos fakultetas, Klinikinės farmacijos katedra – Kaunas.

**Tyrimo tikslas.** Įvertinti farmatikų idėlį hipertenzijos aptikime, valdyme ir prevencijoje.

**Tyrimo uždaviniai.** Išanalizuoti farmatikų rolę hipertenzijos aptikime, valdyme ir prevencijoje bendruomenėje vaistinėje.

**Metodika.** Šis tyrimas buvo atliktas naudojant struktūruota 69 klausimų anketa duomenų rinkimui. Tyrimas buvo atliktas nuo 2016 metų liepos 10-os iki 27-os dienos bendruomeninėse Beiruto vaistinėse Libane. 35 farmatikai buvo įtraukti į tyrimą. Duomenys išanalizuoti su Excel programa. Duomenys surinkti įtraukiant klausimus apie hipertenzijos aptikimą, gyvenimo būdo keitimą ir gydymą.

**Rezultatai:** Rezultatai buvo paskirstyti į 3 dalis pagal anketos struktūrą. Pirmoje dalyje apie hipertenzijos atradimą, 74,29% respondentų atsakė kad jie visada patikrina paciento kraujo spaudimą, 17,14% kartais o likusieji 8,57% niekada jo netikrina. Amžius, kaip dažniausiai klausomas rizikos faktorius hipertenzijos aptikime: 71,43% atsakė kad jie klausia to visada, 22,86% kartais, o 5,71% niekada. Sekantis dažniausiai klausomas rizikos faktorius yra apie chroniškas ligas kaip diabetas ar inkstu ligos kur 48,57% respondentų atsakė kad jie klausia to visada, 48,57% kartais, o 2,86% niekada.

Antroje, gyvenimo būdo kitimo, dalyje 77,14% respondentų atsakė kad jie prašo savo pacientų numesti svorio, 77,14% atsakė kad jie prašo savo pacientų mesti rūkyti, 80% atsakė kad jie visada prašo savo pacientų pakeisti valgymo įpročius kaip sveikas maitinimas, 82,86% atsakė kad jie ragina savo pacientas valdyti savo streso lygį, 65,71% atsakė kad jie visada prašo savo pacientų palaikyti vidutinį fizinio aktyvumo lygį ir 80% respondentų atsakė kad jie visada prašo savo pacientų mažinti alkoholio suvartojimą.

Trečioje dalyje dauguma respondentų atsakė kad jie visada klausia savo pacientų ar jie vartoja antihipertenzijos medikamentus esamuoju laiku; 82,86% klausė kiekvieną kartą ir 88,57% visada klausė ar pacientai vartojo antihipertenzinius medikamentus anksčiau. 65,71% taip pats atsakė kad jie visada patikrina vaistų sąveiką, 31,43% kartais, o 2,86% niekada. Tik septyni iš 35-ių farmatikų davė ilgalaikio hipertenzijos gydymo rekomendaciją.
Išvados: Libano farmatikai stipriai suvokia savo role hipertenzijos aptikime ir prevencijoje taip pat kaip ir valdyme. Taip yra dėl to, kad farmatikai Libane stokoja galimybės išrašyti medikamentus, būtent dėl to jų rolė hipertenzijos valdyme buvo ribotas iki tam tikrų kriterijų bet atitinka nurodytus WHO (pasaulio sveikatos organizacijos) standartus.
ABBREVIATIONS

ACE inhibitor – Angiotensin-converting-enzyme inhibitor

ARB – Angiotensin II receptor antagonist

BP – Blood pressure

CCB – Calcium channel blocker

COX – 2 – Cytochrome c oxidase subunit 2

CVD - Cardiovascular disease

DBP - Diastolic blood pressure

ECG – Electrocardiography

GFR - Glomerular filtration rate

GP – General practitioner

NSAID – Nonsteroidal anti – inflammatory drug

OTC – Over – the-counter drug

RCT - Randomized controlled trial

SBP - Systolic Blood Pressure

SCRIP – HTN - Study of Cardiovascular Risk Intervention by Pharmacists – Hypertension

WHO – World Health Organization
DEFINITIONS

Hypertension is defined as values >140mmHg systolic blood pressure (SBP) and/or >90mmHg diastolic blood pressure (DBP), based on the evidence from randomized controlled trials (RCTs) that in patients with these blood pressure (BP) values treatment-induced BP reductions are beneficial [1].
Elevated blood pressure is a major health problem that is affecting humans throughout the world because of its prevalence and association with cardiovascular disease including myocardial infarction, heart failure and stroke, and kidney diseases [2]. For hypertensive patients aged from 40–70 years, and having a blood pressure of 20 mmHg in systolic blood pressure or 10 mmHg in diastolic blood pressure doubles the risk of cardiovascular disease. Recent improvements in the diagnosis and treatment of hypertension have caused a decline in coronary heart disease and stroke mortality in developed countries. In those countries, the control rates for high blood pressure have slowed down in the last few years. However, it is as well noted that cardiovascular complications of high blood pressure are increasing such as stroke, end-stage renal disease, and heart failure. Individuals, who are at the age of 55, have a 90% lifetime risk of developing hypertension. The global prevalence of raised blood pressure (defined as systolic and/or diastolic blood pressure ≥140/90 mmHg) in adults aged 18 years and over was around 22% in 2014. [3]. In Lebanon, and according to the latest World Health Organization (WHO) data published in 2012; the mortality of the cardiovascular disease: death rate per 100,000 population equaled 214 for both sexes [4].

Pharmacists may be the first person to interfere with patients suffering from hypertension due to the fact that, and in general, they are freely accessible to patients; that is why it is believed that pharmacists can have a big role in detecting, managing and controlling hypertension [5]. In Lebanon, no data was found about in progress or completed hypertension controlling programs where pharmacists are involved and unlike other countries, for example, the United States of America, a program called “Pharmacist’s Patient Care Process” has been developed and is used in order to minimize the risk of death caused by hypertension [6].

Pharmacists in Lebanon have no authority to control and manage hypertension on their own; they are as well prohibited to prescribe any medication related to hypertension and similar diseases. Data about how Lebanese pharmacists tend to detect, manage and control hypertension continues to lack until our current days.

Pharmacy-Based Hypertension Management Model [7] provided by WHO explains pharmacists' role in detecting, prevention and controlling hypertension. According to this model, pharmacists first detect hypertension by measuring the patient’ blood pressure, then the patient is asked about his/her lifestyle and the list of prescribed medication that he/she is taking in order to avoid any drug to drug
interactions. In addition, pharmacists educate their patients about hypertension and lifestyle modifications and how to self-monitor the blood pressure and the importance of their strict adherence to their prescribed medication in order to control hypertension.

Due to the lack of research about hypertension in Lebanon, a pilot study in the pharmacy was conducted to evaluate the current situation concerning hypertension detection, management and treatment, and to propose possible future steps on how to improve the situation.
AIM AND WORK TASKS

Aim:

To evaluate the involvement of pharmacists in the detection, management, and prevention of hypertension.

Work tasks:

1. To construct a standard questionnaire to assess detection, prevention, and management of hypertension in a pharmacy setting.
2. To investigate how a pharmacist deals with patients who suffer from hypertension by using standard questionnaire and direct observations from the pharmacist.
3. To provide possible recommendations on how to improve the hypertension control in a pharmacy setting.
1. LITERATURE REVIEW

1.1. Theoretical background of hypertension

1.1.1. Definition of Hypertension

According to World Health Organization “Hypertension”, also known as high or raised blood pressure, is a condition in which the blood vessels have persistently raised pressure, putting them under increased stress. Each time the heart beats; it pumps blood into the vessels, which carry the blood throughout the body” [8].

WHO specifies that normal adult blood pressure is defined as a blood pressure of 120 mm Hg when the heart beats (systolic) and a blood pressure of 80 mm Hg when the heart relaxes (diastolic). When systolic blood pressure is equal to or above 140 mm Hg and/or a diastolic blood pressure equal to or above 90 mm Hg, the blood pressure is considered to be elevated or high [8].

1.1.2. Classification of Hypertension

The Seventh report [2] of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure classifies pressure for adults aged ≥18 years (Table 1). The classification is based on the average of two or more properly measured, seated, BP readings on each of two or more physician encounters.

Table 1. Classification of blood pressure for adults

<table>
<thead>
<tr>
<th>Blood Pressure Classification</th>
<th>SBP (mmHg)</th>
<th>DBP (mmHg)</th>
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<tbody>
<tr>
<td>Normal</td>
<td>&lt; 120</td>
<td>And &lt;80</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>120 – 139</td>
<td>Or 80 – 89</td>
</tr>
<tr>
<td>Stage 1 Hypertension</td>
<td>140 - 159</td>
<td>Or 90 – 99</td>
</tr>
<tr>
<td>Stage 2 Hypertension</td>
<td>≥160</td>
<td>Or ≥100</td>
</tr>
</tbody>
</table>

SBP- Systolic blood pressure.
DBP- Diastolic blood pressure.
1.1.3. Symptoms of Hypertension

Patients with uncomplicated primary hypertension are usually asymptomatic initially [9]. In cross-sectional surveys, headache is among the most common of the symptoms that are reported [10]. Some major symptoms of hypertension include the following: severe headaches, fatigue or confusion, vision problems, chest pain, breathing difficulties, irregular heartbeat, blood in urine, and pounding in chest, neck or ears. In most cases, high blood pressure does not cause headaches or nosebleeds. Evidence indicates that high blood pressure does not cause headaches or nosebleeds only during hypertensive crisis, when blood pressure reaches 180/110 mm Hg or higher [11]. Other related symptoms which could be indirectly related to hypertension are blood spots in the eyes, facial flushing, and dizziness [12].

1.1.4. Detection of Hypertension

A health care specialist will measure the patient’s blood pressure 3 or more times in order to diagnose him/her with hypertension, and this is due to the variation of blood pressure throughout the day and especially during medical check-ups also known as white coat hypertension. Specialists advise their patients to monitor and to record their blood pressure at home and in their working place in order to provide additional information [13].

If hypertension is detected by a pharmacist, then this patient should be directly referred to a specialist in order to get an adequate diagnosis and treatment. But if it was detected by a physician on the spot, more tests will be conducted such as physical examination and echocardiogram in order to get a proper diagnosis [13].

1.1.5. Etiology

The exact etiology of essential hypertension is unknown; however, lifelong management with lifestyle modifications and pharmacotherapy are needed [14].

Fist type which is primary hypertension: For adults, the main cause of hypertension is yet unknown, but all we can say about primary hypertension is that it develops over several years [15].
Second type which is secondary hypertension: Secondary hypertension tends to appear suddenly without any signs of warning. It’s more severe than primary hypertension and causes higher blood pressure. Several conditions and medications can lead to secondary hypertension such as sleep apnea, kidney malfunction, gland tumors, and defects in blood vessels, certain medication, illegal drugs and alcohol abuse [15].

Drug-induced hypertension: In some cases, certain medications are leading cause in increasing blood pressure. A few examples include sympathomimetic agents, pseudoephedrine, amphetamines derivatives, NSAIDs (nonsteroidal anti – inflammatory drugs) and COX-2 inhibitors (Cytochrome c oxidase subunit 2), corticosteroids, caffeine, estrogens and progestins, serotonin – norepinephrine reuptake Inhibitors, venlafaxine, sibutramine and immunosuppressant’s (cyclosporine) [15].

1.1.6. Risk factors of Hypertension

Risk factors are a group of aspects which increases the chance of becoming a hypertensive patient. These risk factors include age, race, family history and lifestyle. Some factors are uncontrollable such as family history and age, and other factors concerning the patient lifestyle can be modified in order to control hypertension [16].

As it was said, age, race and family history are uncontrollable. It is well known that the risk of being hypertensive increases as the person gets older. During the early middle age, high blood pressure is more common in men, whereas women are more likely to develop high blood pressure after the age of 65. Talking about race, high blood pressure is more common among black people rather than white people, and it is also known that black people are more likely to suffer from stroke, heart attack and kidney failure due to the fact that they develop high blood pressure at an early age. To add, high blood pressure tends to run in families from generation to generation, and that is why hypertension is uncontrollable [16].

Some risk factors that can be controlled include lifestyle, diet, and other diseases that cause hypertension. The lifestyle risk factor is observed when the person is obese or overweight, and then he/she should know that they are at higher risk of being hypertensive. Another issue concerning lifestyle is not being physically active. People who are inactive tend to have higher heart rates than people who often exercise. Moreover, the lack of physical activity increases the risk of being overweight. Also concerning lifestyle, nicotine consumption and alcohol consumption both increase the risk of being hypertensive.
Consuming alcohol on regular basis indirectly increases the risk of being hypertensive by affecting first the kidneys. Other lifestyle factors that increase the risk of being hypertensive are related to daily diet; such as consuming a lot of salt or sodium in ones’ diet can cause the body to retain extra fluids, thus, increasing blood pressure. Or, consuming a low amount of potassium in ones’ diet might cause the increase in the accumulation of sodium in the body, thus causing hypertension. Another controllable major risk factor is stress. Stress is known to be one of the reasons that cause the increase in blood pressure. Sometimes stress coupled with alcohol and nicotine abuse can cause the patient to be hypertensive [16].

1.2. Role of the pharmacist in the detection, management, and prevention of hypertension

The prevalence of hypertension increases with age [17, 18], it is expected that the new generation to come will have a higher prevalence of hypertension and the healthcare system will have a lack of healthcare resources in order to manage elevated pressure in the upcoming years.

Until today, many studies have indicated that there is a shortage of primary care physicians and it is estimated to be continuous throughout the forthcoming future. Even if the number of physicians will increase, misdistribution of these physicians will always be a major problem, especially in the suburbs or in places where people have low income which will prevent them from visiting those physicians. Involvement of pharmacist in alternative practitioner models to provide healthcare for patients, especially for those who are suffering from chronic conditions such as systemic hypertension [19].

1.2.1. Pharmacist care for hypertension

The effectiveness of pharmacist’s intervention in the long-term treatment of hypertension was demonstrated by their ability to control blood pressure and by complying patients to their medication using a veteran’s medical home model of primary care. This model requires that pharmacists should meet in person with their patients, modify medications in case of any drug-related problem and inform their patients about hypertension in general [20].
Zillich et al. [20] have concluded that pharmacists are successful in managing hypertension, due to their expertise in the field of medications, their ability to make patients adhere to the treatment, their capability to reduce all the possible side effects of each treatment and to provide a cost-effective approach to manage hypertension. Findings from this research [27] and other articles [21, 22] have claimed that to the role of the pharmacist should be expanded as a part of the patient-centered home model in order to improve hypertension outcomes. While using this model, pharmacists were allowed to prescribe new antihypertensive medications or to discontinue the use of other antihypertensive medications, without the consulting physicians, which resulted in a better outcome [23]. This study [20] has resulted in a significant reduction of both systolic (by 4.0 and 7.1 mmHg) and diastolic pressure (by 2.5 and 3.2 mm Hg) at six and twelve months, respectively. Due to the fact that such results were obtained, the researchers concluded that using the pharmacist hypertension care management program can improve blood pressure control among patients in a medical home model of primary care.

1.2.2. **Pharmacist – physician collaboration in the management of hypertension**

Pharmacists manage hypertension while using evidence-based protocols that are approved and supervised by a physician. Pharmacists together with other health care professionals can reduce the gap in the primary care by keeping their patients as their number one priority or by another word, patient-centered. Meanwhile, in order to obtain a more beneficial clinical outcome, it is important that patients adhere to their treatment [24], and pharmacists together with a physician should work in collaboration to have less drug to drug interactions and minimize the risk of side effects.

Despite that treatment is always available; in most cases, hypertension is still uncontrolled due to non-adherence to treatment, and due to the incorrect prescription of hypertensive medications [25, 26]. In facilitating patient - centered care [27], there is a need for multifaceted interventions, which have more integrated and collaborative approach to hypertension management, and which are proposed at the most assessable point of care [28].

1.2.3. **Role of pharmacist in disease management**
Community pharmacy is the most available health care service according to the primary care setting, which states that “patients, who suffer from any medical chronic disease and regularly require refills of prescribed medications, tend to visit more their pharmacists rather than their general practitioner (GP) [29]”. Several studies have indicated that pharmacists’ intervention in hypertension management, has contributed to an improvement in patient’s self-management, treatment adherence and better clinical outcomes [30, 31] and more adequate prescribed medications [32-35].

In order to understand more about the patient perspective concerning a pharmacist’s intervention, Bajorek et al.[36] conducted a study in which patients admitted were feeling positive about such interventions and positive experience was obtained when a pharmacy based hypertension management services were used. Such interventions conducted by the pharmacist motivated some patients to adhere more their medications while keeping in my mind that medication adherence is a key role in the management of hypertension because some patients tend to dislike the use of some hypertensive medication in order to control their blood pressure in the long term.

Despite the pharmacist’s interventions, the management of hypertension was not effective, because patients had to visit their general practitioner in order to get prescriptions for antihypertensive medication [29]. This is due to the fact that and in certain countries such as Australia, pharmacists do not have the right to prescribe any medications related to chronic diseases [37]. Because of this inability, pharmacists’ intervention is not efficient, disregarding the studies and the researches that were conducted in order to permit non-medical prescribing in nonmedical workplaces [37, 38]. In other countries where pharmacists are allowed to prescribe medications when mentioning hypertension management, better outcomes and better patient satisfaction was obtained, which led to a conclusion that pharmacists are a cost effective substitution to physicians [39, 40].

Patients, who received awareness and education about high blood pressure, had a better response to the management of hypertension, by enhancing their adherence to lifestyle modifications and to their prescribed medications.

In order to successfully manage hypertension, patients have to accept the pharmacist’s intervention, cooperate and collaborate with him/her. Studies have indicated that cooperative aspects of care can reduce cardiovascular risk factors in patients who suffer from mild to moderate hypertension by having an adequate and appropriate blood pressure control, promoting lifestyle modifications and by making beneficial changes in the antihypertensive medication [41].
In Bajorek et al. [36] research, while conducting the experiment, patients in the control group, who received pharmacist’s interventions, had a more positive response. This was due to the fact that those patients felt more relaxed, trusted more their pharmacists and felt more comfortable in the community pharmacy. Consequently, it came to the conclusion that patients preferred to manage hypertension in a community pharmacy rather than at the physician as they can have a regular contact with the pharmacist. Yet, this was again limited with the fact that pharmacists do not have the right to prescribed antihypertensive medications.

Factors contributing to the patients’ positive experiences provide important insights for community pharmacy practice. Good rapport with the pharmacist and a long-term relationship underpin patients’ engagement in such services. Restrictions on the pharmacists’ scope of practice prevent their expertise, and the benefits of their accessibility, as a primary point of contact, from being fully realized. However, funding the implementation of such services needs to carefully consider patients’ low willingness to pay for these given the free services offered by some GPs [36].

1.2.4. Effect of pharmacist prescribing on improving BP

Nevertheless, in other countries where pharmacists are able to prescribe medications for all types of diseases such as in the United Kingdom [42], this resulted in a better delivery of health care and a greater patient focus. In addition and because of this ability, pharmacists showed to provide more support for medication use, greater adherence to medication and better results [43].

Moreover, studies have revealed that a pharmacist’s interventions can deliver a greater response in both medication therapy management and chronic disease management [44], as well as improving patients’ adherence to their prescribed medications [45].

As a result, one policy recommendation may be to provide prescribing pharmacists’ services at locations and times at greatest convenience to women and individuals with existing long-term conditions. Findings from an RCT evaluating a community pharmacy–based medicines management service for chronic patients with coronary heart disease showed females more satisfied with the new pharmacy service [46].
Gerard et al. [40] conducted a research that demonstrates that patients have valid preferences for how primary care prescribing services in general practice for long-term conditions are delivered. On this occasion, the pharmacist prescribing service is valued by patients as an alternative to doctor prescribing and therefore represents an acceptable form of service delivery when informing policy and practice. In turn, it is important that policymakers and practices take note of these preferences.

When considering responses to the key question of patients’ preferred prescribing service, and as predicted, the fixed alternative, “available family doctor,” was chosen on very few occasions (2%). Rather patients’ choices were more evenly distributed between the more preferred alternatives prescribing pharmacist (43%) and “own family doctor” (55%). Patients’ choices proposed that about 16% of consultations with a patient’s own GP can be replaced by a prescribing pharmacist instead. Even though there is a strong desire for seeing own GP, alternative combinations of attribute levels can be used to compensate and reconfigure a more preferred prescribing pharmacist service [40].

Services provided by a pharmacist are valued by patients as an alternative to a doctor prescribing in primary care and therefore represent an acceptable form of service delivery when informing policy [40].

Tsuyuki et al. [40] designed a patient-level, randomized, controlled trial, enrolling adults with above-target BP and has observed that intervention group had a mean ± SE reduction in systolic BP at 6 months of 18.3±1.2 compared with 11.8±1.9 mm Hg in the control group, an adjusted difference of 6.6±1.9 mm Hg, more than double that observed in the control arm of the Study of Cardiovascular Risk Intervention by Pharmacists – Hypertension (SCRIP-HTN) in a similar population [48].

The results from this study, the first randomized, controlled trial of pharmacist prescribing, and prodigious evidence from 39 non-prescribing trials [20] support recent efforts to expand pharmacists’ scope of practice to include medication management activities in an effort to address clinical inertia in hypertension management [49].

The results demonstrate that pharmacist’s prescribing, when provided in addition to a usual care, results in a clinically significant reduction in BP and a substantial improvement in the proportion of patients with initially uncontrolled hypertension reaching their target BP, even though a very high proportion, 78%, were already taking antihypertensive therapy at baseline. Pharmacists prescribing for patients with hypertension resulted in a clinically important and statistically significant reduction in BP. Policy makers should consider an expanded role for pharmacists, including prescribing, to address the burden of hypertension [39].
1.3. Models and Programs used to detect Hypertension

1.3.1. Pharmacy based Hypertension management model

WHO created a model considering pharmacy based hypertension management in order to improve hypertension control at the pharmacy, by actively involving pharmacists in the prevention, detection, and management of hypertension. This model consists of 3 steps [47]:

1) **Primary prevention, medication review and drug therapy optimization:** The goal of this step is to promote a healthy lifestyle for CVD (Cardiovascular disease) prevention through health education. At this level, the pharmacist advises his/her patients to acquire healthy lifestyles, in particular to adult individuals with unfavorable cardiovascular risk profile. The pharmacist should as well talk about lifestyle modification such as smoking cessation, losing weight for obese patients. Pharmacists should also promote a healthy diet such as healthy eating (low sodium diet, low potassium diet and avoiding fatty and greasy food). Pharmacists should underline the severity of stress and what could cause and how patients can manage their stress. Reduce alcohol abuse and increase in physical activity [47].

   Initial assessment: First follow-up (3-5 days), Second follow-up (7-10 days), Third follow-up (14-21 days), Fourth follow-up (28-56 days), Fifth follow-up (day 90), final follow-up (day 180). Each pharmacist should review his/her patient medication therapy while focusing on potential interactions, suboptimal dosages, adherence issues, or unnecessary medications. Based on patients’ needs, pharmacist then develops a pharmaceutical plan, including recommendations for medication and dosage changes, which were shared with the patient’s family physician. Physicians are asked to consider the recommendations and reply to the pharmacist. If necessary, the pharmacist conducts a medication review follow-up to address any outstanding drug therapy related issues [47].

2) **Detection:** The objective of this step is to contribute to an early detection of hypertension by measuring the blood pressure of a customer and referring persons with possible hypertension to the GP. Simultaneous screening for other cardiovascular risk factors can be provided [47].

3) **Hypertension management:** Pharmacists should monitor patients with elevated blood pressure on treatment and should always refer those patients who do not achieve an adequate blood pressure to their GP. To add, pharmacists should make sure that their patients are following their treatment and should always inform their patients about the importance of such compliance. It is the pharmacist duty
to inform and advise their patients about necessary lifestyle modifications and how to measure their blood pressure at home. It is important that the pharmacist follow-up on the patient’s blood pressure and compliance to treatment in between the patient’s visits to the GP since it complements the GP’s role and helps to ensure therapeutic compliance [47].

To monitor patients on treatment with hypertension the pharmacist should regularly monitor the patient’s blood pressure, inform the patient about drug treatment (indication of each medication, side effects, interactions with other medications and other possible side effects), monitor the patient’s health problems, advise their patients about all possible lifestyle modifications and teach their patients on how to self-measure their blood pressure. In order to improve patient’s adherence to their prescribed medication, the pharmacist should use strategies to improve patient’s adherence to medication by simplifying the treatment, such as switching to a drug that can be used one time per day instead of twice per day, which is an easier treatment for the patient. The pharmacist should modify patient’s beliefs about negative effects in case of non-adherence and the positive effects of treatment. Most important is evaluating the patient’s compliance to prescribed medication by measuring and evaluating their adherence reliably [47].

1.3.2. Pharmacists’ Patient Care Process program

Another way for pharmacists to detect, manage and treat hypertension in adults, in collaboration with doctors and other health care professionals in a more efficient manner, is a program called Pharmacists’ Patient Care Process proposed by the Centre for Disease Control and Prevention’s in the United States of America [6] was established.

This program consists of five steps:

**Step 1: Collect:** Collecting subjective and objective information by the pharmacist in order to have a clear understanding of the relevant medical/medication history and clinical status of the patient. This process includes the collection of:

1) Current medication list and medication use history.
2) Health data that include medical history, biometric test results, and physical assessments findings.
3) Patients lifestyle habits, preferences and beliefs, health and goals, and socioeconomic factors that affect the access to medications and other aspects of care [6].
Step 2: Assess: The second step includes assessing:

1) Each medication for its effectiveness, safety, appropriateness and patient’s adherence.
2) Health and functional status, health data, risk factors and cultural factors, health literacy and access to medications.
3) Immunization status and the need for preventive care and other health care services.

When all the information is gathered, the pharmacist assesses this information and analyzes the clinical effects of the patient’s therapy in the context of the patient’s health goals in order to identify and prioritize problems and achieve optimal care [6].

Step 3: Plan: The third step in the Pharmacists’ Patient Care Process is to develop a patient-centered care plan that:

1) Addresses medication-related problems and optimize medication therapy.
2) Sets goal of the therapy for achieving clinical outcomes in the context of the patient’s health care goals and access to care.
3) Engages the patient through education, empowerment, and self-management.
4) Continuously supports care, including follow-ups [6].

Step 4: Implement: During the process of implementing the care plan, the pharmacist should:

1) Address medication and health related problems and engage in preventive care strategies.
2) Initiate, modify, discontinue or administer medication therapy as authorized.
3) Provide education and self-management training to the patient or caregiver.
4) Contribute to coordination of care, and should always refer their patient to specialists.
5) Always schedule follow-up care as needed in order to achieve goals of therapy [6].

Step 5: Follow-Up: The fifth step in this process is to follow up by monitoring and evaluating patient adherence to the health care plan, as well as health outcomes and progress toward meeting goals. During each follow-up, the pharmacist should repeat Steps 1 to 4 as needed, in order to assess the progress and determine if adjustments to the care plan are needed.

This process includes the continuous monitoring and evaluation of:
1) The appropriateness, effectiveness, and safety of each medication and the patient’s adherence to health data, biometric test results, and patient feedback.

2) The clinical endpoint which contributes to the patient’s health.

3) Outcomes of care including progress towards the achievement of goals therapy [6].
2. METHODOLOGY

2.1. Construction of a standard questionnaire

In order to construct the questionnaire (Annex 1), general information about hypertension such as symptoms, risk factors, management, and treatment was collected from the scientific literature. The structure of the questionnaire was based mostly on Pharmacy-based hypertension management model: protocol and guidelines by WHO [17].

This guideline contains three major levels, which are: 1) Hypertension prevention; most questions concerning lifestyle were based on this level. 2) Detection of hypertension; all the questions in the questionnaire concerning detection of hypertension were based on this level. 3) Hypertension management; most questions related to treatment and management of hypertension were based on this level. In addition to WHO guidelines, some questions were also based on a program called Pharmacists’ Patient Care Process program [6], including questions related to patients adherence to treatment, and open questions related to hypertension treatment. Thus, the questionnaire intended to obtain information about detection, management, and treatment of hypertension in Lebanese pharmacies. Subsequently, this questionnaire includes sixty-nine questions which cover three major topics: detection of hypertension, lifestyle modification, and treatment – related questions.

In the first topic, detection of hypertension, pharmacist were questioned if they measure their patients’ blood pressure, if they ask their patient’s about their laboratory tests, ask about the risk factors, symptoms, hypertension-related diseases and complications caused by hypertension.

In the second topic, lifestyle modification, pharmacists were asked whether they tend to modify their patient’s lifestyle or not, whether they advise their patient’s about the importance of lifestyle modification or not and if they explain to their patients why they should modify their lifestyle.

In the third topic on treatment-related questions, pharmacists were questioned as to whether they tend to ask their patients if they are currently taking any antihypertensive medication or if they have ever used antihypertensive medication before. They were as well questioned if they ask for prescriptions before giving antihypertensive medication or not, or whether they ask about who prescribed them with such medication in case there is no prescription for new patients and for patients who came for replenishment, ask their patients if they are currently taking any OTC (over – the-counter drug) drugs or other...
supplements and other prescribed medication in order to check for any drug to drug interactions. In addition, pharmacists were questioned whether they prescribed antihypertensive medications for hypertension crisis in the pharmacy or not and whether they recommend long-term therapy of hypertension or not.

Out of sixty-nine questions, there are sixty-six multiple questions and three open-ended ones. The multiple questions are based on a 3-items Likert scale (never, sometimes, and always). The open-ended questions are used in order to gather more detailed information.

### 2.2. Conduction of the survey

This questionnaire was used to question Lebanese pharmacists in community pharmacies in Beirut. Pharmacists were interviewed from 10-07-2016 till 27-08 2016. During the period of conducting the survey, the general ambiance in Beirut was not stable due to political reasons. The security situation became tensed due to civil disturbances whereby demonstrations, protests, and stage in were led by civilians against the local authorities, restricting free movement in the capital and other main districts. Consequently and out of 223 pharmacies in the capital Beirut [50], only twenty pharmacies within safe areas of Beirut were visited and a total of forty-two questionnaires were collected. Before launching the questioning period, each pharmacist was given some time to read the questionnaire and to ask for clarifications on the questions if any. The questioning time was approximately ten minutes per pharmacist. The time spent on filling the questionnaire did not exceed the overall ten minutes. Lebanese pharmacists revealed a high level of cooperation, were honest with their answers and were committed to answering all the questions in order to obtain maximum efficient results.

### 2.3. Data analysis

After the survey was accomplished, all the responses to the questionnaire were compiled into an Excel sheet in order to obtain both quantitative and qualitative results. The Excel program was used in order to convert the numerical data obtained from the pharmacists and convert them to charts and graphs.
The first step was to create a table that contained all the questions with the multitude of selected answers, and then numeric answers were converted into statistical numbers. For the questions with Likert scale, an algorithm was created where the answers were coded as the following: never=1, sometimes=2, always =3. Then we referred to make the first count of total answers given by the respondents and then counting the answers for each option given.

The questionnaires also had three open-ended questions, which did not have predetermined answers to choose from. That is why open-ended questions were divided into sub-questions, and each sub question had yes and no for an answer, same coding method was used with 1= yes and 2=no. Also some qualitative information, for example, the type of medications recommended, was counted manually.

After finishing the conversion of all the questions and sub-questions with specific answers, a bar-shaped graph was created for each main question with its respective sub-questions, then data was selected and a side bar chart was inserted in order to better visualize the answers and data obtained from the survey.
3. RESULTS

A total of forty-two pharmacists were interviewed in Beirut, Lebanon. During the survey period, twenty community pharmacies in Beirut were visited, and in which there were at least two to three pharmacists present. Of those forty-two pharmacists, only thirty-five were interviewed face to face, and all of them answered all the questions in full. The remaining seven pharmacists submitted the questionnaire at a later stage. Of these, seven questionnaires were removed from the study as they were incomplete. So in total, thirty-five from forty-two questionnaires (87.5%) were used in this study.

3.1. Detection of hypertension

In the first phase of the questionnaire, when questioning pharmacists about the frequency of blood pressure measurement in patient with suspected hypertension, 74.29% of the respondents answered that they always measure their patients’ blood pressure and 17.14% answered to sometimes measure their patients’ blood pressure, while the remaining 8.57% of the respondents answered to never measure their patients’ blood pressure.

3.1.1. Laboratory tests

According to the results obtained from the pharmacists, 48.57% of the respondents answered to never ask their patients about electrocardiography (ECG), while 45.71% answered to sometimes ask, and the remaining 5.71% o answered to always ask their patients about ECG results. In addition to ECG, 45.71% of the respondents answered to always ask their patients about their cholesterol level, while 37.14% answered to always ask about cholesterol level and the remaining 17.31% answered to never ask their patients about their cholesterol level. According to the obtained results, most of respondents tend to ask more about their patient’s blood glucose level (51.43% answered to sometimes ask their patients about their blood glucose level, 34.29% answered to always asking their patients about their blood glucose level and 14.29% answered never ask about blood glucose level) and less about hematocrit level, potassium level and glomerular filtration rate (GFR). (45.71 % of the respondents answered to never ask their
patients about their hematocrit level, 48.57% answered to never ask about potassium level and 48.57% answered to never ask about their patients GFR). More details are shown in the figure below.

**Figure 1. List of laboratory tests asked by pharmacists in percentage**

<table>
<thead>
<tr>
<th>Laboratory tests</th>
<th>never</th>
<th>sometimes</th>
<th>always</th>
</tr>
</thead>
<tbody>
<tr>
<td>GFR</td>
<td>48.57%</td>
<td>37.14%</td>
<td>14.29%</td>
</tr>
<tr>
<td>Potassium level</td>
<td>48.57%</td>
<td>28.57%</td>
<td>22.86%</td>
</tr>
<tr>
<td>Hematocrit level</td>
<td>45.71%</td>
<td>34.29%</td>
<td>20.00%</td>
</tr>
<tr>
<td>Blood glucose level</td>
<td>14.29%</td>
<td>51.43%</td>
<td>34.29%</td>
</tr>
<tr>
<td>Cholesterol level</td>
<td>17.14%</td>
<td>45.71%</td>
<td>37.14%</td>
</tr>
<tr>
<td>ECG</td>
<td>48.57%</td>
<td>45.71%</td>
<td>5.72%</td>
</tr>
</tbody>
</table>

**3.1.2. Detection of hypertension risk factors**

According to the respondents, the most frequently asked risk factor by pharmacists during detection of hypertension is “age”: 71.43% answered to always ask about the age of their patients, 22.86% answered to sometimes ask and 5.71% answered to never ask). The other most frequently asked risk factors is about chronic disease such as diabetes, and kidney disease where 48.57% of the respondents answered to always ask about such diseases, and 48.57% answered sometimes while 2.86% answered never.

Concerning diet-related risk factors, knowing that high levels of sodium and low levels potassium in one’s diet are able to cause hypertension, 71.43% of the respondents answered to always ask their
patients if their sodium intake is high, and 77.14% answered to always ask their patients if their potassium intake is low. More detailed results are shown in the figure below.

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>Percentage, (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic disease such as: kidney disease, diabetes</td>
<td>2.86% 48.57% 48.57%</td>
</tr>
<tr>
<td>Blood pressure in pregnancy</td>
<td>34.29% 37.14% 28.57%</td>
</tr>
<tr>
<td>Too little potassium in diet</td>
<td>34.29% 37.14% 28.57%</td>
</tr>
<tr>
<td>Too much salt in diet</td>
<td>8.57% 14.29% 77.14%</td>
</tr>
<tr>
<td>Age</td>
<td>5.71% 22.86% 71.43%</td>
</tr>
</tbody>
</table>

**Figure 2. How frequently pharmacists ask their patients about risk factors in percentage**

### 3.1.3. Detection of hypertension – related diseases

According to the respondents, diabetes and high cholesterol were mostly asked. Regarding diabetes; 60 % answered to always ask about diabetes as a disease related to hypertension, while 17.14% answered never. On high cholesterol; 65.71% answered to always ask high cholesterol, while 17.14% answered never, and on other related diseases such as Angina; 54.29% answered to always ask about angina and on stroke; 57.14% answered to always ask about stroke and 8.57% answered “never”. More detailed results are shown in Figure 3 below.
3.1.4. Detection of Hypertension related symptoms

According to the respondents, the most frequently asked questions regarding the symptoms of hypertension are on a headache; 62.86% answered always to ask about headaches and on shortness of breath; 42.86% answered always to ask about shortness of breath. The less frequently asked questions were on dizziness; 22.86% answered to never ask about dizziness, while 48.57% answered sometimes and 28.57% answered always, while on nausea; 31.43% of the respondents answered to never ask about nausea when asking about the symptoms related to hypertension, while 51.43% answered to sometimes ask and 17.41% answered to always ask about nausea and on nosebleeds; 22.86% answered to never ask about nosebleeds as a symptom related to hypertension, while the other 60.00% voted sometimes to ask and 17.14% answered to always ask. More detailed results are shown in Figure 4 below.
3.1.5. Complications related to Hypertension

In the figure below (Figure 5), when pharmacists were questioned about the complications caused by hypertension, almost most of them answered to “always” and “sometimes” ask about the complications affecting:

1) The heart. For example, 1) coronary artery disease, 42.86% answered to always ask and 40% answered to sometimes ask while 17.14% answered to never ask. 2) Myocardial infarction, 40% answered to always ask about it as a complication, 45.71% answered sometimes and 14.29% answered never to ask. More examples are shown in the figure below.

2) The kidneys. For example, 1) chronic kidney disease. 2) Kidney failure. Concerning chronic kidney disease, 51.43% of the respondents answered by always asking about such complication. In addition, 51.43% of the respondents also answered to always ask about kidney failure. More details are found in the figure below.
3) Concerning complications which affect the eye such as retinopathy, 45.71% of the respondents answered sometimes to ask about such complication and 11.43% answered by always, while the other 42.86% answered never to ask about retinopathy. More detailed results are shown in Figure 5 below.

<table>
<thead>
<tr>
<th>Complications caused by hypertension</th>
<th>Never</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retinopathy</td>
<td>42.86%</td>
<td>45.71%</td>
<td>11.43%</td>
</tr>
<tr>
<td>Kidney failure</td>
<td>8.57%</td>
<td>40.00%</td>
<td>51.43%</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>14.29%</td>
<td>34.28%</td>
<td>51.43%</td>
</tr>
<tr>
<td>Left ventricular dysfunction</td>
<td>28.57%</td>
<td>48.57%</td>
<td>22.86%</td>
</tr>
<tr>
<td>Abdominal aortic aneurysm</td>
<td>34.29%</td>
<td>34.28%</td>
<td>31.43%</td>
</tr>
<tr>
<td>Peripheral arterial disease</td>
<td>22.86%</td>
<td>54.28%</td>
<td>22.86%</td>
</tr>
<tr>
<td>Transient ischemic attack</td>
<td>11.43%</td>
<td>48.57%</td>
<td>40.00%</td>
</tr>
<tr>
<td>Ischemic stroke</td>
<td>17.14%</td>
<td>31.43%</td>
<td>51.43%</td>
</tr>
<tr>
<td>Chronic stable angina</td>
<td>17.14%</td>
<td>31.43%</td>
<td>51.43%</td>
</tr>
<tr>
<td>Acute coronary syndrome</td>
<td>17.14%</td>
<td>42.86%</td>
<td>40.00%</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>14.29%</td>
<td>45.71%</td>
<td>40.00%</td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>17.14%</td>
<td>40.00%</td>
<td>42.86%</td>
</tr>
</tbody>
</table>

*Figure 5. Pharmacist’s tendency to ask their patients about complications caused by hypertension in percentage*

3.2. **Lifestyle modification and prophylaxis**

In the second part of the questionnaire, and when questioning pharmacists on the lifestyle modifications, almost all pharmacists were keen to promote a healthy lifestyle to their patients, and were as well eager to explain the importance and the necessity of these modifications to their patients as seen in Figure 6 below.
3.2.1. Pharmacist’s recommendations

When asking the pharmacists about the types of recommendations they propose to their patients, we came to a conclusion that most of the pharmacists urge their patients to change their bad habits such as tobacco smoking, excessive alcohol abuse, excessive eating, and a bad source of nutrients, stress and not being physically active. Based on the answers collected from the respondents, 77.14% answered to always ask their patients to lose weight, 77.14% answered to always ask their patients to stop smoking, 80% answered always to ask their patients to obtain healthy diet such as healthy eating, 82.86% replied to always urge their patients to manage their own stress, 65.71% answered to always ask their patients to maintain a moderate physical activity and 80% of the respondents answered to always ask their patient to reduce their alcohol abuse. In addition, most of the respondents answered to never ask their patients to obtain a vigorous physical activity. Detailed results are shown in Figure 7 below.
In addition, pharmacists were asked whether they tend to inform their patients about the importance of these modifications. Results obtained are shown in the figure below. While analyzing those results, we got to a conclusion that almost most of the pharmacists do inform their patients about these lifestyle modifications, for example, 1) 85.71% of the respondents answered to always inform their patients about the importance of weight reduction and the other 14.29% answered sometimes while none of the respondents answered never. 2) 88.57% answered to always inform their patients about the importance of diet modification and 11.43% answered sometimes, while none of the respondents answered never. More details results are shown in Figure 8 below.
Treatment-related questions:

When pharmacists have questioned about treatment-related questions, at first, most of them answered to always ask their patients if they were currently taking antihypertensive medication; 82.86% answered to always ask and 88.57% answered always to ask if they ever used antihypertensive medication before. From these results, it was noticed that pharmacists always ask their patients if they are currently taking any antihypertensive medications in case hypertension was detected. Results are shown in Figure 9 below.

Figure 8. The tendency to inform patients about the importance of such recommendations in percentage.
Figure 9. Pharmacists’ tendency to ask their patients if they are currently taking antihypertensive medications, or if they have ever used antihypertensive drugs before in percentage

To add, the majority of the pharmacists answered to always ask their patients for prescriptions as well as who gave them these prescriptions, before giving any antihypertensive medication, whether it is for a new patient or for a patient who came for replenishment. Results were gathered and are shown in Figure 10 below.

The majority of the respondents answered to always ask for prescriptions whether it is for a new patient (82.86% answered always) or for a patient who came for replenishment (88.57% answered always to ask for prescriptions).
Figure 10. The frequency of asking patients about their prescription before dispensing any antihypertensive medication in percentage

In the figure below, the obtained results indicated that almost all pharmacists ask their new patients as to who has prescribed them with antihypertensive medication; 54.29% answered to always ask their new patients about the source of the prescription and 28.57% answered to sometimes ask about the source, while the remaining 17.34% answered to never ask. On the other hand, and for regular customers, it was a bit different; 37.14% of the respondents answered to never ask their regular patients about who prescribed them with antihypertensive medications, and 37.14% answered sometimes to ask while the other 25.71% answered to always ask about the source of the patients prescription. Detailed results are shown in Figure 11 below.

Figure 11. The tendency of asking patients about the source of their medication in case there is no prescription in percentage
According to the obtained results, Lebanese pharmacists tend to ask their patients about other prescribed medications such as OTC drugs and food supplements in order to screen for the drug to drug interactions. In Figure 12 below, 65.71% answered to always check for the drug to drug interactions and 31.43% answered to sometimes ask, while the remaining 2.86% answered never to check for the drug to drug interactions.

![Figure 12](image_url)

**Figure 12. The frequency of screening for drug-drug interactions by pharmacists, in percentage**

According to the obtained results shown below, 74.29% answered to always ask their patients about the currently taken OTC drugs, due to the fact that some painkillers, for example, are in contradiction with antihypertensive medications and 65.71% of the respondents answered to always ask about other prescribed medications in order to screen for any contraindications. As for food supplements, pharmacists tend to sometimes ask about these when screening for interactions. More results are shown in **Figure 13** below.
3.3.1. Medication adherence

When questioning pharmacists about patient’s adherence to their prescribed medications, 77.14% answered to always ask their patients about their adherence, 22.86% answered to sometimes ask while 0.00% answered never (Figure 14). At the same time, 82.86% of the respondents answered to always explain to their patients about the importance of their adherence to prescribed medication. More results are shown in Figure 14 and 15.
Due to the fact that Lebanese pharmacists do not have the right to prescribe medications, patients are referred to their physicians in order to get a valid prescription. Patients with high blood pressure were strongly advised by their pharmacists to constantly visit their physicians for medical examinations. According to the respondents, when asking about recommending patients for medical check-ups, 91.43% answered to always recommend their hypertensive patients for medical checkups and 8.57% answered sometimes, while 0.00% answered never. Results are shown in Figure 16 below.
Concerning hypertension crisis in a pharmacy, almost all pharmacists recommended medication in this case. This is based on the results obtained which showed that 62.86% of the respondents answered to always recommend medication in case of a crisis in pharmacy while the other 37.14% do not recommend any type of medications. In addition, the most recommended medication in case of hypertension crisis in a pharmacy, according to the respondents, is nitroglycerin, whether it is via oral administration or via patches (45.46% answered to always recommend sublingual nitroglycerin, and 15.15% recommended nitroglycerin patches). Other medications were also recommended such as nifedipine (3.03% of respondents answered to also recommend nifedipine), Amlodipine (3.03% of the respondents recommended amlodipine), Sublingual Isosorbide dinitrate (3.03% recommended isosorbide dinitrate), Angiotensin II Receptor Blockers (ARB’s) (3.03% recommend ARB’s for hypertension crisis in the pharmacy), Diuretics (9.09% of the respondents recommended diuretics as short term medication for hypertension crisis in the pharmacy), Captopril (3.03% recommended captopril as a medication for hypertension crisis), ACE inhibitors (angiotensin-converting-enzyme inhibitor) (9.09% of the pharmacists recommended the use of ACE inhibitors during hypertension crisis in a pharmacy) and aspirin (3.03% of the respondents recommended aspirin in case of hypertension crisis). Results are integrated into the Figure 17 and 18 below.
As for the pharmacists’ recommendation on long-term treatment of hypertension, only seven out of thirty-five pharmacists recommended medication for long term treatment. Based on the answers obtained from the respondents, 20% of the pharmacists recommend long term therapy and the other 80% of the pharmacists didn’t recommend long-term therapy. Nevertheless, all the respondents (100%) answered to always refer their hypertensive patients to specialists, despite the fact that some of them recommended long-term therapy.
The most recommended medication for long-term therapy of hypertension was ACE inhibitor, followed by diuretics and calcium channel blockers (CCB’s). More detailed results are shown in Figure 19 below.

**Figure 19. the frequency of recommending long-term treatment for hypertensive by pharmacists, as well as the type of medication recommended and the tendency of referring hypertensive patients to specialists**

Finally, pharmacists were always keen to refer their hypertensive patients to specialists in order to better detect, manage and prevent hypertension. According to the obtained results, 35 pharmacists answered by 100% referring their patients to specialists, while the other the three pharmacists answered by 90%, 80%, and 70% respectively.
4. DISCUSSION

In general, it is observed that there is a lack of studies and researches concerning hypertension in Lebanon. This study is one of the few studies made on the role of the pharmacists in the prevention, detection, and management of hypertension in Lebanon [51, 52].

Pharmacists recognize the importance of their potential role in cardiovascular disease health promotion and prevention, especially hypertension, which is one of the main causes of CVD [53]. Similar results were observed in our survey where we noticed that Lebanese pharmacists have the same desire when it comes to hypertension detection and prevention. Still, a gap between their perceptions about their role concerning hypertension prevention, detection and management and their daily practice was noticed. Since Lebanese pharmacists don’t have the right to prescribe medications, their role in hypertension management was narrowed to certain criteria. Mostly, their role is limited to prevention and detection of hypertension.

4.1. Detection of hypertension

According to obtained results, it was indicated that Lebanese pharmacists tend to measure their patient’s blood pressure (74.29% of the respondents answered that they always measure their patients’ blood pressure and 17.14% answered to sometimes measure their patients’ blood pressure) in case hypertension was suspected. These results indicated that the majority of pharmacists tend to follow the procedure of hypertension detection by measuring patient’s blood pressure at first, as mentioned by Pharmacy based Hypertension management model created by WHO [47], which states that for early detection of hypertension, pharmacists should measure the blood pressure of a customer and refer possible persons with possible hypertension to the GP. Nevertheless, some of the respondents (8.57%) answered to never measure their patient’s blood pressure if hypertension was suspected. This show that still, a considerable number of pharmacists do not follow the regulation that is why more awareness should be promoted to those respondents in order to make them more active concerning hypertension detection.

Based on the results obtained, pharmacists tend to more frequently measure their patient’s blood pressure rather than asking about their ECG or laboratory tests. This is because; those respondents lack the ability to interpret some of those tests. Results indicate that Lebanese pharmacists tend to ask more about
blood glucose levels and cholesterol level because they are generally easier to interpret. Other tests, such as GFR, ECG, and sodium level which are essential in the detection of the comorbidities related to hypertension complications are less frequently asked.

When discussing hypertension risk factors, respondents showed insignificant awareness to the level of potassium in one’s diet and about of the blood pressure during pregnancy. On the other hand, more awareness regarding the patient’s age, high level of sodium in the diet and chronic diseases such as diabetes and chronic kidney disease was noticed. According to the scientific literature, age is a major risk factor for hypertension increasing the chances of becoming hypertensive as we get older [16]. In this respect, respondents showed awareness by always asking their patients about their age, and this is translated in the obtained results. As for diet-related risk factors, similar studies revealed that high levels of sodium intake in a person’s diet can cause the elevation of blood pressure [54]. In Lebanon, diet is made up of mainly salty, fatty, and greasy food. Consequently and based on the attained results, Lebanese pharmacists showed awareness to the fact that high level of sodium can increase blood pressure, and were asking their patients about their sodium intake. In addition to diet and age, chronic disease such as diabetes and kidney, are also considered risk factors for hypertension, and respondents recognized the importance of these risk factors, by always asking patients about those risk factors.

Besides showing awareness to diabetes, angina and high cholesterol level, respondents showed greater awareness towards stroke, when talking about the hypertension-related disease. In addition, the least frequently asked disease by the respondents was intermittent claudication. It might be because the respondents did not understand the exact meaning of it, or they do not consider it to be a disease related to hypertension.

Dizziness, nausea, shortness of breath and nosebleeds were considered as common symptoms in all major chronic diseases, and that is why respondents showed less awareness regarding these symptoms. In addition, most of our respondents showed greater awareness towards shortness of breath, and according to them, shortness of breath is an emergency symptom of hypertension. However, the respondents noted that hypertension may be an asymptomatic condition. A similar view is shared in the scientific literature [55, 56].

In the questionnaire, three major groups of hypertension complications were covered, namely cardiovascular complications, kidney related complications, and ophthalmic complications. Minimum awareness towards retinopathy was noticed. In addition, less awareness towards cardiovascular
complications was noticed too, specifically about peripheral arterial disease, abdominal aortic aneurysm and left ventricular dysfunction. Instead, respondents showed more awareness concerning coronary artery disease, myocardial infarction, ischemic stroke, acute coronary syndrome, chronic stable angina and transient ischemic attack. This may be due to the lack of awareness or knowledge of some of the complications that affect the heart. As for complications affecting the kidney, less awareness concerning chronic kidney disease was noticed. Nevertheless, respondents showed greater awareness towards kidney failure.

4.2. **Lifestyle modification and prophylaxis**

Results have indicated that Lebanese pharmacists apply their theoretical knowledge during the time of practice and show a positive attitude towards hypertension prevention. Lebanese pharmacists tend to follow the regulations when it comes to hypertension prevention and as described by the Pharmacy based Hypertension management model created by WHO [47], which states that the role of the pharmacists in hypertension prevention is to promote healthy lifestyles, such as healthy diet, stress management, moderate physical activity, and the reduction of alcohol abuse [47]. Since Lebanese pharmacists are non-prescribing pharmacists and due to the lack of time, space and also a lack of communication with the patient’s physician, pharmacists role concerning hypertension prevention is mainly limited to lifestyle modifications, drug-drug interaction checking and promoting adherence to prescribed medications. Similar views were shared in other scientific literature [54, 57].

Pharmacists in Lebanon tend to advise their patients with suspected or diagnosed hypertension to lose weight, quit smoking, obtain healthy, stress management, increase physical activity and reduce alcohol abuse as indicated by the model [47]. Results obtained from the questionnaire showed that most of the pharmacists answered to always suggest such modifications when hypertension is suspected or diagnosed. Nevertheless, some of the respondents answered never to recommend such modifications, which might be because of the lack of awareness about hypertension prevention, as indicated in other studies [58]. Pharmacists also showed a positive attitude towards explaining to their patients the reasons for changing lifestyle, and the benefits they would derive from these lifestyle modifications, in order to better prevent hypertension.
4.3. Treatment-related questions

Like any other pharmacists in developed countries, Lebanese pharmacists lack the ability to prescribe medications. Their role was restricted to ask for prescriptions before giving any antihypertensive medication. In this respect, patients were asked as to whether they are currently using or have used antihypertensive medication, and if other prescribed medication and supplements are being taken with the current antihypertensive medication in order to screen for the drug to drug interactions.

Moreover, pharmacists are able to ask their patients about their adherence to the prescribed medication and recommend hypertensive patients to regularly visit their physicians for medical check-ups.

As seen from the attained results, the role of the Lebanese pharmacists in managing hypertension problems fits the regulations and the standards as indicated by the pharmacy based hypertension model created by WHO [47], which states that for hypertension management, pharmacists should not only modify their patients’ lifestyle but to regularly monitor the patient’s blood pressure, inform the patient about drug treatment such as indication of each medication, side effects, interactions with other medications and other possible contraindications and monitor the patient’s health problems.

In addition, Lebanese pharmacists usually follow up with their patients; regimens and make sure that they are constantly updated regarding their adherence to their tailored treatments. However, the pharmacists fail to adhere to the recommendations indicated by the pharmacy based hypertension model issued by the WHO. This model states that pharmacists should improve their patients’ adherence to their prescribed medication by using strategies which simplify the treatment scheme. Examples include switching to a drug that can be used one time per day instead of twice per day, which simplify the patients’ tasks. In addition, they can evaluate the patient’s adherence to prescribed medication by measuring and evaluating their adherence reliably [47]. This is because Lebanese pharmacists are non-prescribing pharmacists, which means pharmacists cannot intervene in their patients’ treatment; they can only advise their patients to consult their physicians in case any drug to drug interaction was noticed, or the dosage is incorrect.

Most respondents answered to always ask for prescriptions whether it is for a new patient or for patients who come for replenishment, before giving any antihypertensive medication. But still, 2.86% answered to never ask for prescriptions, which shows that a small number of pharmacists neglect their role in asking for prescriptions in order to increase the sale of prescribed medication, which is against the
regulations, or to help patients refill their prescribed medication for a limited period of time, instead of referring him/her to a physician, because those patients cannot afford to regularly visit their specialists due to the fact that each consultation is expensive.

Over 90% of the respondents answered to always refer their patients to specialists in case hypertension was detected. Yet, some of the respondents do not refer their patients to specialists, it may be because they want to personally treat those patients so as to increase the sale of prescribed medication, or they neglect their duty in referring patients with uncontrolled or suspected hypertension to specialists, as indicated by the pharmacy based hypertension model created by WHO [47].

Concerning hypertension crisis in a pharmacy, almost all pharmacists recommend medication. In this respect, 62.86% of the respondents answered to always recommend medication in case of crisis, while the remaining 37.14% did not recommend any type of medications, instead, they only advised referring such patients to the emergency room because it is against the regulations to give antihypertensive medication without a prescription. The most suggested medication in case of hypertension crisis taking place in a pharmacy and according to the respondents is nitroglycerin, either via oral administration or via patches. Recommending nitroglycerin, whether in the form of sublingual or in form of patches, was chosen due to its minimal side effects, the efficiency in decreasing the patient’s blood pressure during hypertension crisis and to limit the risk of heart failure and angina [59, 60].

For long term therapy, most of the respondents (80%) answered to never recommend any type of antihypertensive medication due to the fact that it is against the law. However, some of the pharmacists (20%) recommended long-term therapy due to many reasons that they suggested, for example, patients cannot afford to regularly visit the specialist because the specialist consultation is expensive, or it may be to increase the sale of prescribed medications. The most recommended antihypertensive medication according to the respondents was ACE inhibitors (Angiotensin- converting enzyme inhibitor), diuretics, and calcium channel blockers. Long term treatment should not be advised by pharmacists because they do not have the appropriate information on the patient’s health status and because they normally do not communicate with the patient’s physician when needed. The best approach is to refer hypertension patients to specialists, who are in the right position to recommend the appropriate therapy.

4.4. Strengths and Limitations of the research
When interpreting the findings of this study, some limitations need to be acknowledged. This study was narrowed to a certain number of pharmacists within specific regions of Beirut, due to the tensed security situation at that time. Hence, the obtained results do not accurately represent the majority of pharmacists in Lebanon. In addition, seven questionnaires were removed from the study as they were found incomplete.

Social desirability bias is a pattern or tendency to think in a certain way and in this respect, pharmacists responded to the questionnaire in ways that make them appear more in favor to the author; that is why this research is found to be exploratory rather than conclusive.

Yet and despite the above-mentioned limitations, this study provides important insights regarding the behavior of Lebanese pharmacists, and their role in the detection, prevention, and treatment of hypertension.
CONCLUSION

In conclusion, Lebanese pharmacists are more aware of their role in hypertension detection and prevention than in hypertension management. This is due to the fact that pharmacists in Lebanon lack the ability to prescribe medication, and that is why their role in hypertension management was restricted to certain criteria but corresponds in general with the standards stated by WHO.

In addition, pharmacists showed great awareness and great desirability in helping their patients with hypertension detection and prevention, and the attained results revealed that pharmacists tend to apply their knowledge and skills during their time of practice.

Due to the fact that the majority of the respondents chose to refer their hypertensive patients to specialists rather than recommending long term therapy, is an indication of their commitment to professional ethics, and concerns towards the patient’s health rather than just dispensing and distributing medicines.
PRACTICAL RECOMMENDATIONS

Pharmacists with the help of specialized physicians can lead to a better detection, management, and prevention of hypertension in a community pharmacy. Since Lebanese pharmacists do not lack the ability to treat hypertension on their own, granting them the right to prescribe medication will make them able to better manage and treat hypertension with the help of physicians.

Pharmacists should have full access to their patients’ health status, and they should as well monitor their patients’ blood pressure and to keep a record of each patient. In addition, the role of the Lebanese pharmacists towards hypertension should be expanded to allow pharmacists to work closely with physicians in order to better manage hypertension that is why pharmacists and physicians should communicate regularly concerning their patients’ health status.

Obtaining a program such as the Pharmacists’ Patient Care Process program in a community pharmacy in Lebanon will help pharmacists better detect, prevent and manage hypertension.

In Lebanon, data and researchers on the role of the pharmacists in the prevention, detection, and management of hypertension are limited. Consequently, more studies and researches should be conducted in order to expand the data in Lebanon.
REFERENCES


8. WHO | Q&As on hypertension [Internet]. Who.int. 2015. Available from: http://www.who.int/features/qa/82/en/


**I. Detection of hypertension:**

1) If you suspect that the patient may have hypertension

1.1) Do you measure his/her blood pressure?

□ Never □ Sometimes □ Always

1.2) Do you ask the patient about laboratory tests such as:

<table>
<thead>
<tr>
<th>Test</th>
<th>Never</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECG (Electrocardiography)</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Cholesterol level</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Blood glucose level</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Hematocrit level</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Potassium level</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>GFR</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

1.3) Do you ask about risk factors for hypertension?

<table>
<thead>
<tr>
<th>Factor</th>
<th>Never</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Too much salt in diet</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Too little potassium in diet</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Blood pressure in pregnancy</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Chronic disease such as kidney disease, diabetes</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

1.4) Do you ask about the symptoms of hypertension such as

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Never</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Shortness of breath</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Nosebleeds</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Nausea</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Dizziness</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

1.5) Do you ask the patient about hypertension-related diseases?
Diabetes □ Never □ Sometimes □ Always
High cholesterol □ Never □ Sometimes □ Always
Angina □ Never □ Sometimes □ Always
Stroke □ Never □ Sometimes □ Always
Intermittent claudication □ Never □ Sometimes □ Always

1.6) Do you tend to ask if the patient had any complications from hypertension

<table>
<thead>
<tr>
<th>Complications affecting the heart such as:</th>
<th>□ Never □ Sometimes □ Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coronary artery disease</td>
<td></td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td></td>
</tr>
<tr>
<td>Acute coronary syndrome</td>
<td></td>
</tr>
<tr>
<td>Chronic stable angina</td>
<td></td>
</tr>
<tr>
<td>Ischemic stroke</td>
<td></td>
</tr>
<tr>
<td>Transient ischemic attack</td>
<td></td>
</tr>
<tr>
<td>Peripheral arterial disease</td>
<td></td>
</tr>
<tr>
<td>Abdominal aortic aneurysm</td>
<td></td>
</tr>
<tr>
<td>Left ventricular dysfunction</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Complications affecting the kidneys such as:</th>
<th>□ Never □ Sometimes □ Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic kidney disease</td>
<td></td>
</tr>
<tr>
<td>Kidney failure</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Complication affecting the eye such as:</th>
<th>□ Never □ Sometimes □ Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>retinopathy</td>
<td></td>
</tr>
</tbody>
</table>

1.7) Do you ask the patient about some diseases related to his/her family?

<table>
<thead>
<tr>
<th>Disease</th>
<th>□ Never □ Sometimes □ Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevated blood pressure</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td></td>
</tr>
<tr>
<td>High cholesterol</td>
<td></td>
</tr>
</tbody>
</table>
II. Lifestyle modification and prophylaxis:

2.1) Do you recommend patients with suspected or diagnosed hypertension

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Never</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lose weight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quit smoking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A healthy diet such a:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Healthy eating, low sodium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>diet, low potassium diet, and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>also avoiding fatty and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>greasy food.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Obtain healthy nutrients</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>found in fruits and vegetables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and dairy products which</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>help lower blood pressure.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase physical activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Moderate activity at least</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>two and half hours a week.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Vigorous activity at least</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>one hour a week</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce alcohol abuse</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2.2) Would you inform the patient with elevated blood pressure on the importance of:

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Never</th>
<th>Sometimes</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet modification</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking cessation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol abuse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sodium reduction</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Weight reduction □ Never □ Sometimes □ Always

2.3) Do you explain to the patient on why he/she should change his/her lifestyle?

□ Never □ Sometimes □ Always

**III. Treatment-related questions:**

3. If you detect that the patient has hypertension, would you

3.1.1) ask the patient if she/he is currently taking any antihypertensive

□ Never □ Sometimes □ Always

3.1.2) if she/he have ever used antihypertensive drugs before?

□ Never □ Sometimes □ Always

3.2) before giving antihypertensive medication, how often do you ask for a prescription?

3.2.1) for new patients: □ Never □ Sometimes □ Always

3.2.2) for patients who came for replenishment: □ Never □ Sometimes □ Always

3.3) In case there is no prescription: Do you ask who gave him/her this medication?

3.3.1) for new patients: □ Never □ Sometimes □ Always

3.3.2) for patients who came for replenishment: □ Never □ Sometimes □ Always

3.4) Do you ask the patient about the list of medication he/she is taking such as:

3.4.1) OTC drugs (Over-the-counter drugs are medicines sold directly to a consumer without a prescription from a healthcare professional) such as painkillers.

□ Never □ Sometimes □ Always

3.4.2) Food supplements: □ Never □ Sometimes □ Always

3.4.3) other prescribed medication: □ Never □ Sometimes □ Always

3.5) Do you check for the drug to drug interaction?
☐ Never ☐ Sometimes ☐ Always

3.6) Do you ask hypertensive patients about of their adherence to prescribed medication?

☐ Never ☐ Sometimes ☐ Always

3.7) Do you explain to hypertensive patients about the importance of their adherence to prescribed medication?

☐ Never ☐ Sometimes ☐ Always

3.8) Do you recommend patients with elevated blood pressure to go for medical check–ups?

☐ Never ☐ Sometimes ☐ Always

3.9) In the case of a hypertensive crisis in pharmacy, what medications do you recommend? (Please write down)

3.10) for the long-term therapy of hypertension, what medications do you recommend for patients who are not able to visit his specialist? (Please write down)

3.11) If you suspect that patient has uncontrolled hypertension or elevated blood pressure, how often do you refer the patient to a specialist in percentage?