Evaluation of pharmacist contribution to adherence and illness perception in hypertension: An observational study

Hipertansiyonda uyum ve hastalık algısına eczacı katkısının değerlendirilmesi: Gözlemsel bir çalışma

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Abstract

Aim: Hypertension (HT) is a chronic disease characterized by high blood pressure and can cause many complications. Pharmacists can contribute to the quality of life and treatment success of HT patients by providing pharmaceutical care service. The aim of our study is to examine the effects of pharmaceutical care services provided by pharmacists on HT illness perceptions and treatment adherence.

Methods: This study was a non-invasive, prospective, observational study with the participation of HT patients who applied to a community pharmacy in Istanbul between June and December 2020. In the first interview, demographic data, illness perceptions, and adherence levels of the participants were measured. At the end of the first interview, the participants were given structured written and oral patient education by the pharmacist, and the effects of the education provided by the pharmacist were measured again in the second interview 90 days later. The Illness Perception Questionnaire and the Morisky Green Levine Treatment Adherence Scale were used to examine the effects of the services provided by the pharmacist after two interviews conducted three months apart.

Results: Of the 75 patients included in our study, 48 (64%) were female, and the mean age was 59.68 ± 10.79 years. 55 participants (73.32%) had a secondary school education or less, and 58 (77.33%) were not working. In our sample, where the mean duration of HT was 11.48 ± 7.24 years, the most frequently prescribed antihypertensive drug group was diuretics. After the pharmaceutical care service provided by the pharmacist, a statistically significant difference was observed in all sub-dimensions of the participants' illness perception ($p<0.05$). The adherence level of the participants increased from 79.75% to 90.75% after the pharmacist intervention, and this increase was statistically significant ($p<0.05$).

Conclusion: It is available in the literature that increased illness perception and adherence in HT patients have positive effects on treatment success and quality of life. In our study, pharmaceutical care service provided by the pharmacist increased the illnes perception and adherence levels. As a result, clinical pharmacists are needed to improve patient care.

Keywords: Clinical pharmacist; hypertension; medication adherence; pharmaceutical care

Öz

Amaç: Hipertansiyon (HT) yüksek kan basıncıyla karakterize, birçok komplikasyona neden olabilen kronik bir hastalıktır. Eczacılar sundukları farmasötik bakım hizmetiyle HT hastalarının yaşam kalitelerine ve tedavi başarılarına katkı sağlayabilirler. Çalışmamızın amacı eczacı tarafından sunulan farmasötik bakım hizmetinin HT hastalık algısına ve tedavi uyumlarına etkilerinin incelenmesidir.

Yöntemler: Çalışmamız Haziran-Aralık 2020 tarhileri arasında invaziv olmayan, prospektif, gözlemsel bir çalışma olarak, İstanbulda bulunan bir serbest eczaneye başvuran HT hastalarının katılımıyla yapılmıştır. Birinci görüşmede katılımcıların, demografik verileri, hastalık algıları ve uyum düzeyleri ölçülmüştür. Birinci görüşme sonunda katılımcılara eczacı tarafından yapılandırılmış yazılı ve sözlü hasta eğitimi verilmiştir. Eczacını sunduğu eğitimin etkileri 90 gün sonra yapılan ikinci görüşmede tekrar ölçülmüştür. Eczacının sunmuş olduğu hizmetlerin üç ay ara ile yapılan iki görüşme sonrasında etkilerini incelemek amacıyla Hastalık Algısı Ölçeği ve Morisky Green Levine tedavi uyum ölçeği kullanılmıştır.

Bulgular: Çalışmaya dahil edilen 75 hastanın 48'i (%64) kadın ve yaş ortalaması 59,68 ± 10,79'tur. Katılımcıların çoğunluğunun (55, %73,32) ortaokul ve altı eğitim düzeyine sahip olduğu ve 58 (%77,33)'inin çalışmadığı kaydedilmiştir. Hipertansiyonla geçirilen ortalama sürenin 11,48 ± 7,24 yıl olarak kaydedildiği örneklemimizde en sık reçetelenen antihipertansif ilaç grubunun diüretikler olduğu göze çarpmaktadır. Eczacı tarafından sunulan farmasötik bakım hizmeti sonrasında katılımcıların hastalık algısının tüm alt boyutlarında istatiksel olarak anlamlı düzeyde farklılık görülmüştür ($p<0,05$). Katılımcıların uyum düzeyleri eczacı müdahalesi sonrasında %79,75'ten %90.75'e yükselmiştir ($p<0,05$).

Sonuç: HT hastalarında hastalık algısının ve uyumun artması tedavi başarısına ve yaşam kalitesine olumlu etkileri olduğu literatürde mevcuttur. Çalışmamızda eczacı tarafından sunulan farmasötik bakım hizmetinin etkileri gösterilmiştir. Sonuç olarak hastaların yaşam kalitesini arttırmak için klinik eczacının sunuduğu hizmetlere ihtiyaç vardır.

Anahtar Sözcükler: Farmasötik bakım; hipertansiyon; klinik eczacılar; tedavi uyumu

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INTRODUCTION

Cardiovascular diseases stand as the primary contributors to global mortality and health complications (1). Hypertension (HT), characterized by elevated blood pressure (BP) (systolic BP ≥140 mmHg and/or diastolic BP ≥90 mmHg), represents a risk factor for various cardiovascular diseases (2). The global impact of HT extends to 1.28 billion adults aged 30-79 years, with a predominant concentration in developing countries, significantly straining their healthcare infrastructures. This escalating prevalence in developing countries can be predominantly attributed to factors such as population aging, behavioral tendencies, urbanization, unhealthy dietary habits, obesity, societal stress, and sedentary lifestyles (3). To counteract the expansion of HT and enhance its management, evidence-based clinical directives have pivoted towards a comprehensive strategy encompassing screening approaches, blood pressure targets, treatment modalities, and lifestyle adjustments (4, 5).

As readily accessible healthcare professionals, pharmacists have a pivotal role in the care of patients with chronic diseases, notably HT (6-10). Within the scope of HT management, pharmacists offer a spectrum of services including patient education, counseling, blood pressure assessment, adherence monitoring, and medication management (11-15). Existing research predominantly explores the impact of pharmacy interventions on HT control; however, the absence of standardized strategies for comprehensively evaluating the outcomes of community pharmacist engagements s crucial (16). Moreover, the challenge of tailored programs to overcome the barriers hindering HT management, especially in developing countries, to cope with the increasing burden remains significant (17). Hence, there exists a need for investigation to illuminate the pharmacist's role in community-based HT management. Developing and validating effective and sustainable interventions in line with evidence-based clinical practice guidelines and global public health policies is emerging as a crucial endeavour.

The role of pharmacists in medication dispensing and counseling to contributing to public health is an important component of health systems. Today, the patient's need for a tailored treatment plan requires pharmacists to provide patient-orientated cognitive services in addition to the traditional role of pharmacist. Cognitive pharmacy services include pharmaceutical care, patient counseling and education, and provision of drug information. Cognitive pharmacy services provided by pharmacists in Turkey aim to promote rational drug use and improve the quality of pharmacotherapy through these services. The concept of Pharmaceutical care services is rather new in Turkey. Recently, by implementing patient-oriented services within the pharmacy education, encouraging cognitive pharmacy services, and establishing postgraduate education a rapid advancement took place in Turkey (18).

Thus, the aim of this study was to determine the effects of pharmacist intervention on HT patients' disease perceptions and adherence levels.

MATERIALS AND METHODS

Design, setting, sample size, and patient characteristics

This study was designed as a prospective, observational study. HT patients' disease perception, knowledge levels, and adherence levels were investigated. This study was approved by Bezmialem Vakif University Non-Interventional Research Ethics Committee (date: 08.06.2020, decision no: 08/153). The current study was conducted in a community pharmacy between the 15th of June 2020 and the 15th of December 2020. Patients who applied to the pharmacy and were diagnosed with HT were included in the study. The patients were informed about the study, and written consent was obtained. According to the sample size analysis performed by considering the existing studies in the literature, it was calculated that the study would reach 95% power with the inclusion of 50 patients when α error was taken as 0.05, 1-β error as 0.95 and effect size (d) as 0.9025 (19).

Clinical Pharmacist Intervention

In order to evaluate the role of the pharmacist in the treatment of HT, two interviews were conducted with patients on days 0 and 90. In the first interview, demographic characteristics, disease and medication history, illness perception, adherence, and level of knowledge about HT were recorded. The 4-question Morisky Green Levine (MGL) Treatment Adherence Scale, The Illness Perception Scale, and the HT knowledge level measurement questionnaire were used (20, 21). In the

second interview, conducted three months after the first interview, the same tests were repeated to determine the changes in treatment adherence and illness perception. The medication used by the patients were monitored regarding side effects, contraindications, and interactions, and the patients were referred to the physician when deemed necessary by the pharmacist.

Structured written and verbal patient education was provided to the patients by the pharmacist. The education provided by the pharmacist included information about the participants' diseases, treatment processes, complications, prescribed medications, and non-pharmacological approaches. The Illness Perception Scale measures the patient's perception of HT disease in 8 questions which was translated and validated by Armay et al. (20). The items in the questionnaire were structured appropriately to the knowledge and understanding levels of the patients (20). The MGL Scale used to measure the patient's adherence to the medication was used in 4 questions. The scale, coded as 1 point for each question answered yes and 0 points for each question answered no, consists of 4 points. In the MGL Scale, 3 and 4 points indicate low adherence, while 1 and 2 points indicate high adherence (21). The HT knowledge measurement questionnaire measures patients' knowledge about HT disease, the use processes of HT medications, HT-related complications, and practical treatment approaches.

Statistical Analysis

Demographic data were expressed as percentage values and continuous and discrete variables as mean, standard deviation, median, and interquartile distribution. Kolmogorov-Smirnov, Shapiro-Wilk tests, and histogram analysis determined data distribution. Paired-t test was used to analyze the data with parametric distribution. Wilcoxon tests were applied to analyze discrete variables. Pearson correlation analysis was used to determine the level of relationship between quantitative variables. Statistical analyses were performed using Statistical Package for the Social Sciences package programme version 26.0 (SPSS Inc., Chicago, IL, USA).

RESULTS

A total of 75 patients were included in our study. The mean age was 59.68 ± 10.79 years, and 48 (64%) were female. It is seen that the majority of our patients were unemployed. 17 (22.66%) of our patients were actively working, 28 (37.33%) were housewives, and 30 (40%) were retired. 58 (77.33%) of our patients were married, 14 (18.66%) were widowed, and 3 (4%) were single. Of the participants, 32 (42.66%) were primary school graduates, 22 (29.33%) were high school graduates, 11 (14.66%) were university graduates, 7 (9.33%) were secondary school graduates, 1 (1.33%) were a post-graduate graduate, and 2 (2.66%) were illiterate. It was noted that smoking was common among the participants (43, 57%). While 49 (65.3%) of our participants had no allergy, 26 (34.6%) had a history of allergy. The socio-demographic data and clinical features of the participants are given in **Table 1**.

The most common comorbid disease in the patients included in our study was type 2 diabetes mellitus. Hyperlipidemia followed diabetes mellitus among the comorbid diseases. 33 patients (44%) had type 2 diabetes mellitus and HT. 22 (29.33%) of the participants were diagnosed with hyperlipidemia, 11 (14.66%) with coronary artery disease, 13 (17.33%) with thyroid disorders, 10 (13.33%) with psychiatric diseases, and 5 (6.66%) with rheumatoid arthritis. The duration of HT was recorded as 11.48 ± 7.24 years. 16 (21.33%) of the patients were diagnosed with HT and diabetes at the same time. Only 14 (18.66%) patients had HT as the only disease **(Table 1).**

The mean number of medications used by the patients in our study was 5.01±0.84. The most frequently used medications for HT were diuretics, prescribed to 47 (62.6%) patients; angiotensin receptor blockers (ARB), prescribed to 40 (53.3%) patients; angiotensin-converting enzyme inhibitors (ACEI) and beta-blockers (BB) prescribed to 28 (37.3%) patients and calcium channel blockers (CCB) prescribed to 26 (34.6%) patients. 81% of the participants included in our sample did not use any food supplements. 3 (4%) of our patients used vitamin C, 3 (4%) vitamin D, and some of these patients used both vitamin C and vitamin D. 5 (6.6%) of our patients consume herbal tea. 2 (2.66%) of our patients use vitamin B and 1 (1.33%) multivitamin. 3 (4%) participants use other herbal supplements **(Table 1)**.

The most common side effects complained of by the participants were swelling of the ankles and muscle pain. The following most common side effects were joint pain

Table 1: Demographic and clinical characteristics of the participants

Parameters		n=75
Gender (n, %)		
	Female	48, 64 %
	Male	27, 36 %
Age (Mean ± SD)		59.68 ± 10.79
Marital Status (n, %)		
	Married	58, 77.33 %
	Single	14, 18.66 %
	Widow	3, 4 %
Education Level (n, %)		
	Literate	1, 1.33 %
	Primary School	32, 42.66 %
	Middle School	22, 29.33 %
	High School	11, 14.66 %
	University	7, 9.33 %
	Master's Degree	2, 2.66 %
Occupation Status (n, %)		
	Employed	17, 22.66 %
	Housewife	28 37.33 %
	Retired	30, 40 %
Herbal Product Use (n, %)		
	Yes	61, 81.3 %
	No	14, 18.66 %
Allergy (n, %)		
	Yes	26, 65.33 %
	No	49, 34.66 %
Smoking (n, %)		
	Yes	43, 57 %
	No	32, 82 %
Alcohol (n, %)		
	Yes	1, 3 %
	No	33, 97 %
Number of Medication Used (Mean ± SD)		5.01±0.84
The most common HT Drugs Classes (n, %)		
	Diuretics	47, 62.6 %
	Angiotensin Receptor Blockers	40, 53.3 %
	Angiotensin Converting Enzyme Inhibitors	28, 37.3 %
	Beta-blockers	26, 34.6 %
	Calcium Channel Blockers	26, 34.6 %
Comorbidities (n, %)		
	Type 2 Diabetes Mellitus	33, 44 %
	Hyperlipidemia	22, 29.33 %
	Coronary artery disease	11, 14.66 %
	Thyroid Disorders	10, 13.33 %
	Psychiatric Diseases	5, 6.66 %
Duration of hypertension (Year)		11.48 ± 7.24

HT: Hypertension, n: Number, SD: Standart Deviation.

Table 2: Participants' responses of the Illness Perception Questionnaire at the first and second interview.

Illness Perception Questionnaire	1st Interview			2nd Interview			p
	Mean	SE	SD	Mean	SE	SD	
How much does your illness affect your life? *Not at all 1-10 Totally*	3.55	0.344	2.98	2.24	0.306	2.65	<0.001*
How long do you think your illness will last? *My illness will last a short time 1-10 My illness will last for a long time*	9.05	0.217	1.88	9.84	0.0806	0.698	<0.001*
How much control do you feel you have over your illness? *Not at all 1-10 Totally*	7.59	0.318	2.76	8.67	0.220	1.91	<0.001*
To what extent do you think your treatment can help you with your illness? *Not at all 1-10 Totally*	9.29	0.188	1.63	9.57	0.122	1.05	<0.001*
To what extent do you experience symptoms related to your illness? *Not at all 1-10 Totally*	3.12	0.322	2.79	2.17	0.271	2.35	<0.001*
How worried are you about your illness? *Not at all 1-10 Totally*	3.17	0.426	3.69	2.31	0.362	3.13	<0.001*
How well do you understand what your illness is? *Not at all 1-10 Totally*	8.68	0.328	2.84	9.64	0.160	1.38	<0.001*
How much does your illness affect you emotionally? *Not at all 1-10 Totally*	3.73	0.438	3.80	3.25	0.383	3.32	<0.001*

* Paired Sample t-test, SE: Standard Error, SD: Standard Deviation

and cramps. 41 of our patients (54. 66%) did not experience any side effects due to medication, 8 (10.66%) had ankle swelling (CCB users), 8 (10.66%) muscle pain (diuretic users), 7 (9.33%) cramps (diuretic users), 6 (8%) joint pain (diuretic users), 4 (5.33%) reported cough (diuretics users), 3 (4%) reported high uric acid or gout (ARB users), 3 (4%) reported knee pain (diuretic users), 3 (4%) reported fatigue (BB users), 3 (4%) reported swelling. Patients who used ACEI and experienced the side effects of cough were referred to a doctor. Patients who experienced high uric acid due to diuretic use were referred to a doctor. The doctor discontinued the diuretic, and another group of blood pressure medications was added instead. Patients who experienced side effects such as muscle pain, cramps, and joint pain due to diuretic use were referred to a doctor for measurement and initiation of necessary vitamins. Patients who experienced ankle swelling due to CCB were advised to take the drug in the evening and were referred to a doctor if the swelling continued.

The Illness Perception Scale measured individuals' perceptions and attitudes about their disease. The mean scores of the answers given by the participants to the short illness scale are given in **Table 2**. After the pharmacist intervention, the increase in the disease perception of the participants was found to be statistically significant ($p<0.05$) (Table 2). In our study, the adherence levels of the participants according to the MGL Adherence Scale after the first and second interviews are given in **Figure 1**. The adherence levels of the participants were measured as 79.75% and 90.75% in the first and second interviews, respectively. There was a statistically significant difference ($p<0.05$) between the adherence of the participants before the pharmacist intervention (0.81 ± 1.01) and after the intervention (0.37 ± 0.83).

Nine of our patients (14%) did not perceive HT as a disease and did not fully aware of how serious it is and what the possible consequences might actually manifest. Three of our patients (4%) thought that HT is a disease that can be treated with medication when needed rather than a disease that requires chronic pharmacotherapy. The responses of our patients to the questions about the causes and complications of HT and helpful approaches in the treatment of HT are presented in **Figure 2-4**.

DISCUSSION AND CONCLUSION

In our study, patient education and counseling given by the pharmacist to the treatment adherence and disease

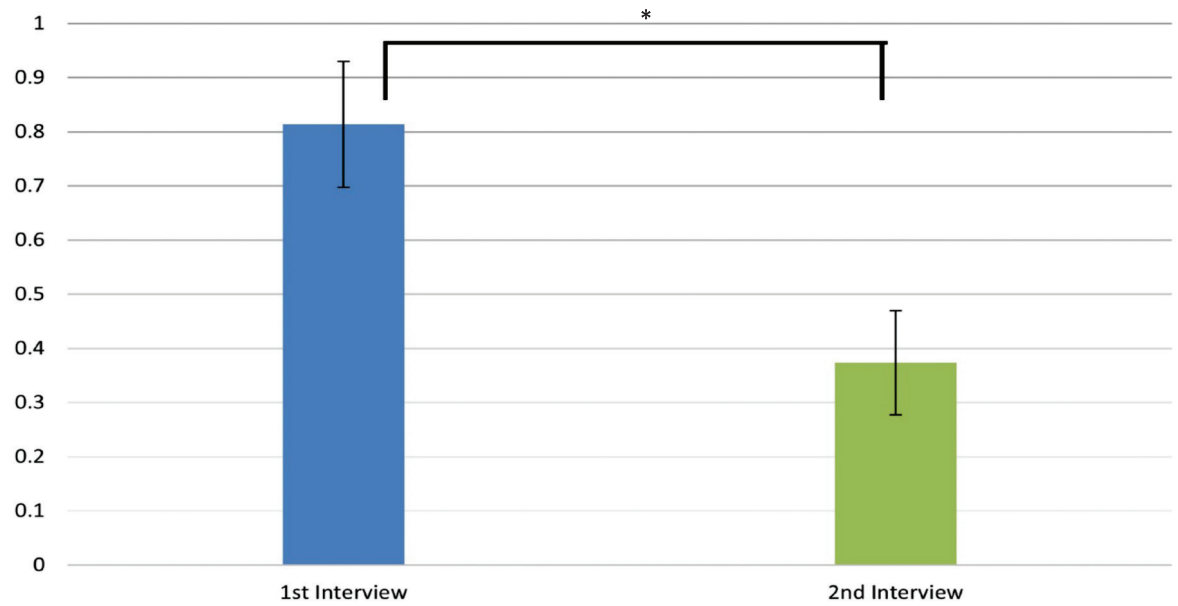

Figure 1. Morisky Green Levine (MGL) Treatment Adherence Scale, Adherence scale. Participants' compliance values recorded according to the MGL scale at the first and second interviews, * Paired t-test $p<0.05$.

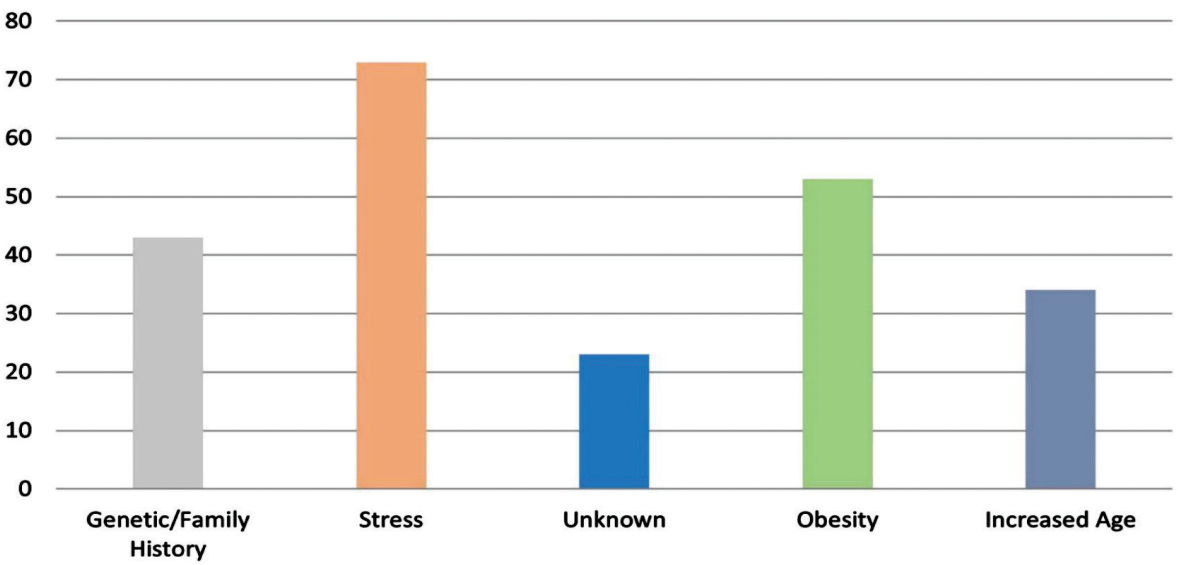

Figure 2. Participants' answers to the question "Reasons of hypertension".

perceptions of 75 patients with HT were investigated. After the structured patient education provided by the pharmacist, it was observed that the medication adherence and illness perceptions of the participants increased significantly in favor of the treatment ($p<0.05$).

It was observed that the adherence levels of HT patients, which were around 79% before the pharmacist intervention, increased to 90.75% on the 90th day after the intervention. The findings of our study and the relevant literature show that clinical pharmacist services provided to HT patients effectively improve treatment outcomes and increase disease perception and adherence. At this point, many researchers emphasized that pharmaceutical care services provided by pharmacists improve health outcomes in parallel with our results (22-24). Studies conducted in different countries have

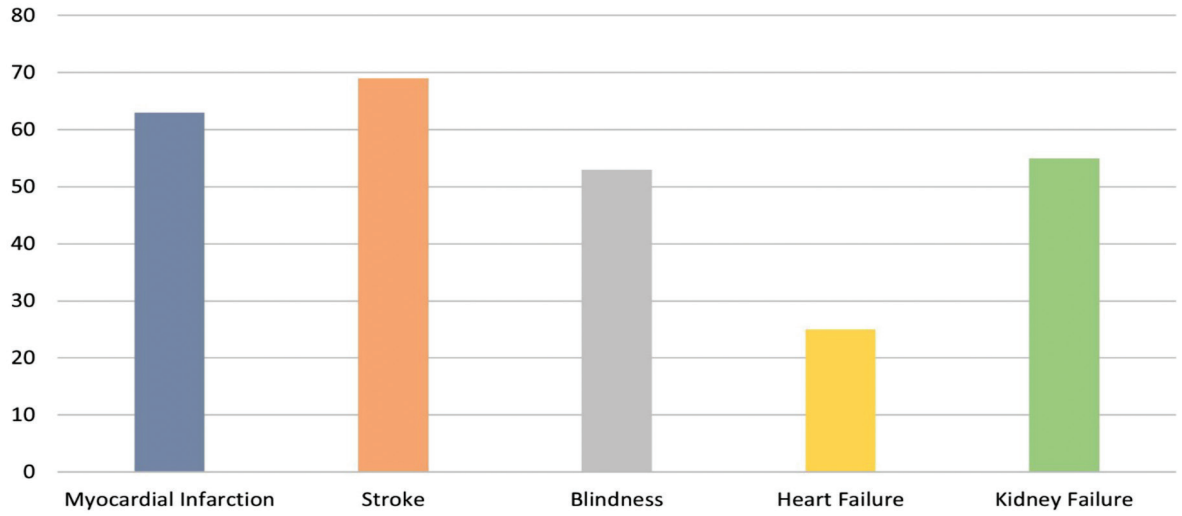

Figure 3. Participants' answers to the question "Complications of hypertension".

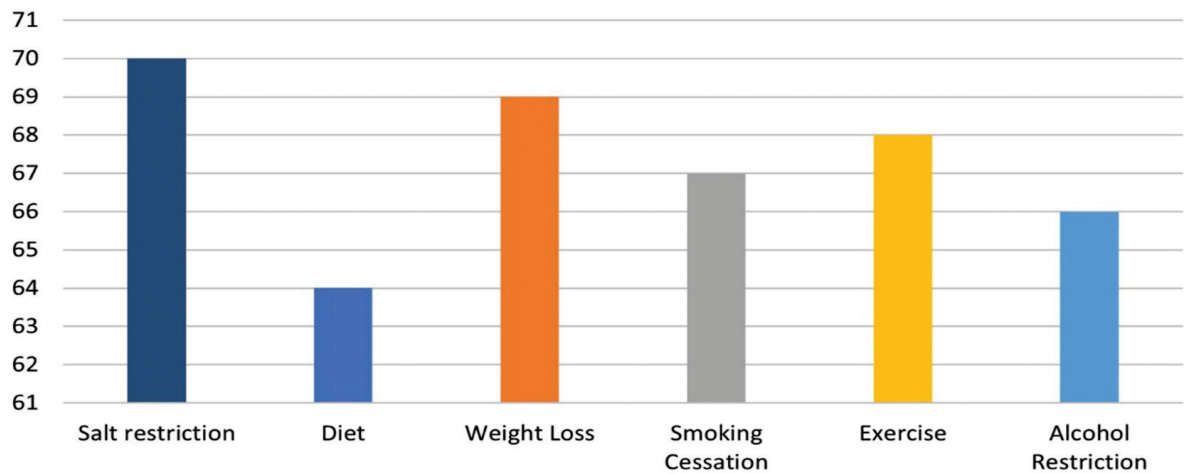

Figure 4. Participants' answers to the question "Alternative approaches to the treatment of hypertension".

shown that a pharmacist with an active involvement in the healthcare team may contribute to improving HT control and medication therapy management (25-29). Different beliefs about treatment and disease among individuals may lead to diversity in attitudes toward treatment. It is possible to change beliefs and attitudes about medicines and diseases through patient education.

It has been reported in existing studies that such changes may increase treatment adherence and improve treatment success (30-34). The study by Chabot et al. also suggests that the attitudes and behaviors of hypertensive patients can be changed by providing information and understanding about the nature of HT (33). In line with the literature, our study also reveals that patients showed a statistically significant improvement in disease perception and treatment adherence levels after pharmacist intervention ($p<0.05$).

While the increase in adherence levels is evident, an important aspect to consider is the long-term impact of the educational program on medication adherence status. In the literature, several interventions related to treating and managing diseases have been analyzed. These studies usually implement and analyze interventions within a specific period. However, long-term effects should be noticed. Therefore, it is recommended that patient education should be continued at

regular intervals after the intervention so patients can maintain the highest level of knowledge and benefit from it in the long term (35). Increasing the level of health literacy of patients is among the duties and responsibilities of the pharmacist.

Our study reveals the beliefs of hypertensive patients about the necessity of drug treatment. Although participants had some concerns about medication use, beliefs about the necessity of medication predominated. Ilnees perception reveals that participants believe HT is a long-term condition that can be effectively controlled. Patients believe HT is associated with psychological or risk factors such as smoking and obesity (22).

Among our study participants, the belief that medication is necessary is at a high level and has a strong relationship with medication adherence. Horne et al. argued that the belief in the necessity of medication is essential in chronic diseases and may also be effective in acute conditions (36). The importance of the relationship with the management and treatment of the disease has been clearly expressed in studies in the literature. Moss-Morris et al. found in a study that patients distinguished between their ability to control blood pressure and the effectiveness of drug treatment and kept them separate (37). In our study, the participant's perception of medication necessity increased statistically significantly after the pharmacist intervention ($p<0.05$).

Researchers think that health beliefs not only predict adherence but also may realize this prediction more consistently than demographic variables and show remarkable differences between different studies (37). Ross et al. suggest that health beliefs mediate the relationship between adjustment and demographic variables such as age and gender (35). This may help explain the differences observed in adherence studies because age, gender, and other demographic factors may cause patients to have different health beliefs in different populations. In the population of our study participants, it was observed that adherence levels increased after pharmacist intervention. Lifestyle changes and weight loss may improve disease prognosis in conditions such as chronic diseases.

Furthermore, patient education and counseling services increase patients' perception and awareness of the disease, helping individuals improve their self-care and directly improve treatment success. As healthcare providers, community pharmacists have advantages in reaching patients at risk. They also utilize evidence-based pharmacy practice when providing health services. Community pharmacists have the necessary skills to deliver pharmaceutical care and patient-centered pharmacy services (38).

In 2015, a French Study on clinical pharmacists' effects of patients' medication adherence and prescription analysis were investigated (39). In this study pharmacists' interventions were particularly related with prescribing antihypertensive drugs and adverse event management. Clinical pharmacists play a role in patients with HT, preventing iatrogenic effects and contributing significantly to patient adherence (23). In another study, the services of pharmacists resulted in an enhancement of medication adherence among hypertensive patients (41). The results of the randomized controlled pointed out that written education provided by community pharmacists was more effective in improving patients' knowledge and understanding of HT and its treatment but did not lead to better blood pressure control (42). As seen in our investigations and in the literature, the involvement of pharmacists in HT education and the type of education whether it is written or oral is important. The patient education should be added to the community pharmacist's routine workflow.

There are some limitations in our study. The first of these limitations is the observational nature of the study. In addition, the study was conducted in a single center, and a single pharmacist took part in patient education and measurement processes can be counted among the limitations of our study. Also, the age range of the participant profile, the relationship with the pharmacy and pharmacist, and the short time interval are among the issues that should be carefully considered.

The role of pharmacists in a patient-centered HT care model is critical. Pharmacist interventions can positively change individuals' perceptions of the disease. Increases in illness perception are expected to increase adherence levels indirectly. To increase success in the treatment of HT, pharmacists must develop a professional approach in a patient-centered manner. Pharmacists should update and improve their knowl-

edge of HT management and related comorbidities.

Many professional organizations have published specific guidelines for pharmacists with recommendations for the management of hypertensive patients. Evidence based literature suggests that greater involvement of pharmacists in the care of hypertensive patients and collaboration with other health professionals contributes positively to treatment success. Research shows that a structured physician-pharmacist-patient collaboration-based intervention can be effective in improving blood pressure control. More comprehensive studies are needed to demonstrate in more detail the long-term benefits of pharmacy services in the management of HT. Such studies help fully understand pharmacists' contribution to treating and managing HT.

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Conflict-of-interest and financial disclosure

The authors declare that they have no conflict of interest to disclose. The authors also declare that they did not receive any financial support for the study.

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