

The impact of clinical pharmacist-led hypertension screening at the community pharmacy in Türkiye

Ceren E. DEMİRCİOĞLU AKYILMAZ^{1*} , Betül OKUYAN² , Mesut SANCAR² 

¹ Department of Clinical Pharmacy, Institute of Health Science, Marmara University, Istanbul, Türkiye.

² Department of Clinical Pharmacy, Faculty of Pharmacy, Marmara University, Istanbul, Türkiye.

* Corresponding Author. E-mail: cerendmrcgl05@yahoo.com (C.E.D.A.); Tel. +00-0216-77752 28.

Received: 18 May 2022 / Revised: 18 July 2022 / Accepted: 19 July 2022

ABSTRACT: The aim of this study was to evaluate the impact of clinical pharmacist-led hypertension screening program (including referring high-risk individuals who are not aware of being hypertensive or prehypertensive to the physician) at a community pharmacy in Türkiye. This prospective observational pilot study was conducted in a community pharmacy located in Mersin-Türkiye between October 2017 and April 2018. Blood pressure measurements were performed by the clinical pharmacist at baseline and follow-up. The rate of participants who had high blood pressure measurements (≥ 140 mmHg for systolic and/or ≥ 90 mmHg for diastolic) was determined at the baseline by clinical pharmacist. According to the guidelines, participants with high blood pressure were referred directly to the physician by the clinical pharmacist. In the follow-up, the number of patients diagnosed with prehypertension or hypertension and the changes in their measurement of blood pressure were identified between baseline and follow-up. According to findings of clinical pharmacist-led blood pressure measurement, 23 (37.1%) out of 62 participants with high blood pressure were referred to the physician by the clinical pharmacist. In the follow-up, it was determined that 12 patients (52.2%) out of 23 participants were diagnosed with hypertension by a physician and eight patients (34.8%) out of 23 participants had prehypertensive. According to the findings of this pilot study, it was determined a positive impact of the clinical pharmacist-led hypertension screening program for high-risk individuals for hypertension.

KEYWORDS: Hypertension; screening; clinical pharmacist; community pharmacy; preventive health

1. INTRODUCTION

Hypertension is one of the most important reasons for mortality and morbidity globally. Hypertension is defined as systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg in adults over 18 years of age by repeated clinical measurements by a physician [1]. Although the frequency of hypertension varies from country to country, it is one of the most common cardiovascular risk factors [2]. In the same age group, every 20/10 mmHg increase in blood pressure from 115/75 mmHg doubles the risk of cardiovascular diseases. In addition to coronary heart disease and cerebrovascular disease, high blood pressure leads to heart failure, renal failure, peripheral vascular disease, deterioration of retinal blood vessels, and vision loss [3]. According to a study using data from 184 countries, it has been reported that the number of individuals whose blood pressure is not under control has reached 1.28 billion people in the last 30 years [4].

Prehypertension is defined as systolic blood pressure of 120-139 mmHg and/or diastolic blood pressure of 80-89 mmHg [5]. Prehypertension is particularly common in young obese individuals and is associated with other cardiovascular risk factors, increasing the risk of hypertension and possible cardiovascular events [6]. Lifestyle changes and pharmacological treatments prevent the development of hypertension in prehypertensive patients. In Türkiye, approximately 20% of normotensive adults have high-normal blood pressure (Systolic Blood Pressure [SBP]: 130-139 mmHg, and Diastolic Blood Pressure [DBP]: 85-89 mmHg); they are prehypertensive [7]. According to the screening results of the Chronic Diseases and Risk Factors Frequency in Adults in Turkey (TEKHARF) study in 1991, the prevalence of hypertension in adults over the age of 30 in our country was found to be 33.7% (approximately 11.8 million people) [8]. In our country, 1 out of every three people has hypertension. It is more common in women than men [9]. Although the prevalence of hypertension is high in Türkiye, only 40% of patients are aware of it [7]. Even though the rates of awareness, treatment, and control of hypertension are low worldwide, there are

How to cite this article: Demircioglu Akyilmaz CE, Okuyan B, Sancar M. The impact of clinical pharmacist-led hypertension screening at the community pharmacy in Türkiye. J Res Pharm. 2022; 26(6): 1900-1906.

significant differences between countries [10]. The rates of being aware of hypertension (40.7%) and receiving treatment (31.1%) are quite low in our country.

One of the essential reasons why hypertension awareness is so low is that blood pressure is not adequately measured. It is noteworthy that the rate of people who have never had their blood pressure measured before is 32.2%. This rate rises to 51.3% in the 18-29 age group [7].

Clinical pharmacist-led hypertension screening programs at the community pharmacy are common in other countries [11-12]. Three hundred fifty-one individuals participated in blood pressure measurements performed at an independent community pharmacy in the USA; the blood pressure of 216 (62%) people was above 140/90 mmHg. Of these, 121 people were referred to a doctor, and 43 people changed their regiment (11). Blood pressure values of 350 people over the age of 35 without hypertension or any other cardiovascular disease were measured in a community pharmacy in Thailand. 36% were determined as prehypertensive, 29% as hypertensive [12]. Many hypertension screening studies have been done in the UK in community pharmacies that screen individuals with undiagnosed hypertension led by pharmacists, but it was limited because there was no follow-up [13].

The aim of this study was to evaluate the impact of clinical pharmacist-led hypertension screening program (including referring high-risk individuals who are not aware of being hypertensive or prehypertensive to the physician) at a community pharmacy in Türkiye. It is crucial to show the role of the clinical pharmacist as a health consultant in screening, identifying, and referring patients who are unaware of being hypertensive or prehypertensive.

2. RESULTS

One hundred and six eligible participants were invited to the study, 62 of whom agreed to be screened. The characteristics of the 62 participants included in this study are shown in Table 1. The mean age of them was 55.8 (SD: 9.9) years, and 23 participants (37.1%) were referred to the physician by the clinical pharmacist according to their blood pressure measurements. It was determined that 12 of 23 participants (52.2%) were diagnosed with hypertension by the physician during the follow-up, and 8 of 23 people had prehypertensive.

The mean age and standard deviation of those diagnosed with hypertension were 55.2 ±7.4 years, and the mean body mass index was 26.34±4.24 (overweight). 16.1% (n=2) of those diagnosed with hypertension have a concomitant disease. The characteristics of the 12 participants diagnosed with hypertension are shown in Table 2.

11 out of 12 people started receiving antihypertensive medications. There was a significant difference between mean systolic/diastolic blood pressure at baseline and follow-up in patients diagnosed with hypertension and who started receiving antihypertensive medication as shown in Figure 1 (146.4±11.4 mmHg vs. 128.42±5.5 mmHg and 91.5±4.6 mmHg vs. 81.42±4 mmHg; respectively, $p<0.001$).

3. DISCUSSION

This is the first study about clinical pharmacist-led hypertension screening at a community pharmacy in Türkiye to the best of our knowledge. Over the third fourth of the participants with high blood pressure were diagnosed with prehypertension or hypertension with this clinical pharmacist-led hypertension screening program at the community pharmacy. A significant decline in their blood pressure was observed when participants started receiving antihypertensive medication. Although the pharmacists' role in the management of hypertension and promoting medication adherence is well-known, this study highlights the role of pharmacists in screening and identifying people who may have hypertension.

With the PatenT (Prevalence, awareness, treatment, and control of hypertension in Türkiye) study in 2003, hypertension in Türkiye was determined as 31.8%. The prevalence was 36.1% in females and 27.7% in males. 32.2% of people in this study had never had hypertension measured before. While only 40.7% of those with hypertension are aware of hypertension, 31.1% received pharmacological treatment, and only 8.1% had their hypertension under control [14]. In our study, the prevalence of hypertension was determined as 19.4% in those who agreed to participate in the study. During the follow-up, 12 (52.2%) of the 23 people referred to the doctor by the clinical pharmacist were diagnosed with hypertension. In a study conducted in an independent community pharmacy in the USA, 103 participants (29%) had not received a previous diagnosis (were unaware of their blood pressure). Forty seven of 103 (46%) were referred to their physician [11].

Table 1. Characteristics of participants (n=62)

	Total n (%)	Participants who had hypertension /prehypertension n=20	Participants who did not have hypertension /prehypertension n=42	p value
<i>Age, mean ±SD*</i>	55.85±9.29	55.10±6.66	56.21±10.37	0.612
Sex				
Female	37 (59.7)	12 (60.0)	25 (59.5)	1.000
Man	25 (40.3)	8 (40.0)	17 (40.5)	
Education				
Primary school	32 (51.6)	10 (50.0)	22 (52.4)	0.985
Secondary school	12 (19.4)	4 (20.0)	8 (19.0)	
High school	11 (17.7)	4 (20.0)	7 (16.7)	
University and above	7 (11.3)	2 (10.0)	5 (11.9)	
Body mass Index				
Underweight	1 (1.6)	0 (0)	1 (2.4)	0.779
Healthy weight	21 (33.9)	8 (40.0)	13 (31.0)	
Overweight	28 (45.2)	9 (45.0)	19 (45.2)	
Obesity	12 (19.4)	3 (15.0)	9 (21.4)	

*SD: Standard deviation

Table 2. The characteristics of Participants Diagnosed with Hypertension (n=12)

Mean age, SD*	55.2±7.34
Mean BMI SD	26.34±4.24
Healthy weight n (%).	5 (41.7)
Overweight	5 (41.7)
Obesity	2 (16.1)
Concomitant disease n (%)	2 (16.1)

*SD: Standard deviation

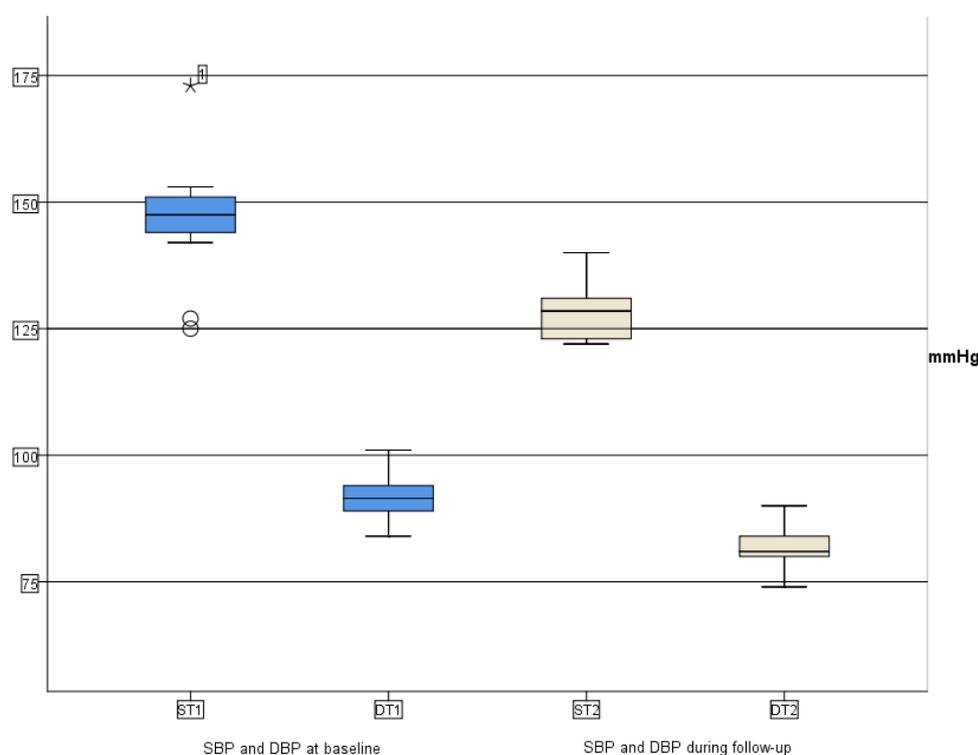


Figure 1. Mean systolic/diastolic blood pressure (SBP/DBP) at baseline and follow-up in patients diagnosed with hypertension and who started receiving antihypertensive medication.

In the CREDIT (In the Chronic Renal Disease in Türkiye) study conducted in our country, the prevalence and awareness of hypertension were found to be 32.7% and 48.6%, respectively [15]. In a 6-week study conducted in Wakefield, England, to screen people over the age of 40 who do not have hypertension, refer them to a doctor for early diagnosis, and make lifestyle changes, 20% of 3632 people were identified as having undiagnosed hypertension [13]. In a study conducted with 118 people within a 3-month follow-up period in a community pharmacy in Poland, the rate of people diagnosed with high blood pressure and referred to a doctor was 16.9% [16]. In a one-year study conducted in Ghana, which was performed in community pharmacies, out of 250 clients approached, 170 agreed to be screened. Forty-three (25%) were pre-hypertensive, 42 (25%) had stage 1 hypertension and 13 (8%) had stage 2 hypertension. Of the 34

participants referred to the physician, 10 (29%) were diagnosed with hypertension, and an antihypertensive was prescribed [17].

According to the Turkish Society of Cardiology data, the prevalence of hypertension is 19% in the 30-39 age group, while it is nearly half in men and more than half in women in the 50-59 age group [18]. The prevalence of hypertension in participants aged 35 years and over found was 36% and 31% respectively in Thai community pharmacy study [12].

The mean age of the patients diagnosed with hypertension in our study was 55.2 (SD:7.4), and more than half of the diagnosed patients were women, 66.6% (n=8). It is known that there is a relationship between body mass index (BMI) and hypertension. In the PatenT study, the prevalence of obesity (BMI \geq 30 kg²/m²) in the Turkish population was 24.9%. The average BMI in the Turkish population was found to be 26.8 kg²/m². While the mean BMI is 29.8 kg²/m² in hypertensive individuals, this value was 25.1 kg²/m² in normotensive individuals [7]. In a study conducted with 118 people within a 3-month follow-up period in a community pharmacy in Poland, the mean BMI of those diagnosed with hypertension (20% of participants) was found 30.9% (obese) [16]. In our study, the mean body mass index was 26.76 \pm 3.96 (overweight). The mean BMI of those diagnosed with hypertension is 26.34 \pm 4.24. Of those diagnosed with hypertension, 41.7% (n=5) were normal weight, 41.7% were overweight (n=5), and 16.7% (n=2) were obese. According to The PatenT 2 study published in 2012, the prevalence of hypertension in our country is still around 30% [19]. The study conducted in the USA, stressed that through ongoing screening programs, community pharmacists are in an ideal position to screen patients at risk for cardiovascular and cerebrovascular disease and refer patients to their physicians for further evaluation [11]. In a systematic review and meta-analysis in hypertension management, medication management and hypertension education were the most used interventions by the pharmacists and the most sensitive intervention was the reduced systolic blood pressure [20].

According to the Turkish Hypertension Prevalence Study, hypertension is a common problem in epidemic rates in Türkiye; it shows that we are not aware enough of this problem, and it is not adequately treated. The first step that needs to be taken is to raise awareness about hypertension by raising public awareness. Pharmacists worldwide and in our country are more easily accessible than other health professionals. In 2005, the World Health Organization (WHO) prepared a guideline that recommends a community pharmacy-based model of hypertension that can be adapted to any country. The main goal is to improve hypertension control at the population level through more active participation of pharmacists in the prevention, detection, and management of hypertension [21].

One of the main limitations of this pilot study was that it was conducted in one pharmacy with a small number of participants. This resulted in a lack of generalizability of the findings.

The current literature highlights the multifaceted role of the community pharmacist. Evidence of effectiveness for community pharmacy/ community pharmacist interventions exists for lipid, diabetes, and hypertension management and preventive services such as weight management, osteoporosis prevention, and flu immunisation services [22].

Blood pressure control, screening, and management of hypertension treatment in community pharmacy will result in early detection of possible hypertension problems, initiation of effective patient counselling by the clinical pharmacist, and early referral of the patient to the physician. Clinical pharmacists are primary healthcare providers, and future studies should be conducted to evaluate their involvement in the healthcare team by providing pharmaceutical care in hypertension prevention, screening (early diagnosis), and treatment management.

4. CONCLUSION

This study demonstrated the positive impact of the clinical pharmacist-led hypertension screening program for high-risk individuals with hypertension. Further studies can be conducted to evaluate clinical pharmacists' involvement in the healthcare team by providing pharmaceutical care in hypertension prevention, screening (early detection), and treatment management when considering their role as primary healthcare consultants.

5. MATERIALS AND METHODS

This prospective observational pilot study was conducted at a community pharmacy located in the Çamlıyayla district of Mersin in Türkiye between October 2017 and April 2018. The owner of this community pharmacy had a Master of Science in clinical pharmacy and a Ph.D. student in clinical pharmacy.

The individuals over 40 years old who visited the pharmacy, had a family history of hypertension, and had not yet been diagnosed with hypertension, were included in this study. The informed consent form was obtained from the participants. Approval for this study protocol was obtained from the Ethics Committee of Marmara University Institute of Health Sciences (21.06.2016-61).

The clinical pharmacist collected the data; including age, sex, marital status, education, body mass index, family hypertension history, smoke, and alcohol use, history of allergy, any concomitant chronic diseases, and regularly used medication records. The participant's blood pressure measurements were performed at least three times a week, at least twice a day, in the morning and evening by the clinical pharmacist. The means of these measurements were recorded. Participants were informed about blood pressure measurement (including not eating heavy meals and not consuming tea, coffee, and cigarettes for the last half hour before the measurement). Blood pressure measurements were made after at least five minutes of rest, and two consecutive measurements of blood pressure were performed at 1-2 minutes intervals. The Turkish Association of Hypertension and Kidney Diseases instruction was followed for blood pressure measurements [23]. According to the guidelines, people with high blood pressure were referred directly to the physician by the clinical pharmacist. At follow-up (after 1-3 months of baseline assessment), it was checked whether the participants, who were referred to the physician were diagnosed with hypertension and started to receive antihypertensive medications. The primary outcome measures were the rate of people with high blood pressure (≥ 140 mmHg for systolic and/or ≥ 90 mmHg for diastolic) at the baseline, the number of people diagnosed with hypertension or prehypertension after referral made by the clinical pharmacist, and the changes in their measurement of blood pressure were identified between baseline and follow-up. The clinical pharmacist gave oral and written patient education and counselling to those diagnosed with prehypertension or hypertension.

5.1. Data Analysis

Continuous variables were given as mean (standard deviation [SD] or standard error of mean [SEM], where appropriate), and nominal variables were presented as n (%). The Kolmogorov Smirnov test was used to determine whether the study data were normally distributed. The mean blood pressure of the patients diagnosed with hypertension and the mean blood pressure after the treatment was started were analysed with the Paired T-test. The findings were evaluated at the 95% confidence interval and the significance level of $p < 0,05$.

Acknowledgements: None.

Author contributions: Concept - E.C.D.A., M.S.; Design - E.C.D.A., M.S.; Supervision -M.S.; Resources - E.C.D.A.; Materials - E.C.D.A.; Data Collection and/or Processing - E.C.D.A., Analysis and/or Interpretation - E.C.D.A., B.O., M.S.; Literature Search - E.C.D.A.; Writing - E.C.D.A., B.O., M.S.; Critical Reviews - E.C.D.A., B.O., M.S.

Conflict of interest statement: The authors declared no conflict of interest.

REFERENCES

- [1] Aydogdu S, Guler K, Bayram F, Altun B, Derici U, Abaci A, Tukek T, Sabuncu T, Arici M, Erdem Y, Ozin B, Sahin I, Erturk S, Bitigen A, Tokgozoglu L. 2019 Turkish Hypertension Consensus Report. *Turk Kardiyol Dern Ars.* 2019 Sep;47(6):535-546. [CrossRef]
- [2] Abaci A. The current status of cardiovascular risk factors in Turkey, *Arch Turk Soc Cardiol* 2011;39 Suppl 4:1-5.[CrossRef]
- [3] TURKIYE KALP ve DAMAR HASTALIKLARI ONLEME ve KONTROL PROGRAMI. <https://tkd.org.tr/TKDDData/Uploads/files/Turkiye-kalp-ve-damar-hastaliklari-onleme-ve-kontrol-programi.pdf> (accessed on 18 January, 2022).
- [4] Zhou B, Carrillo-Larco RM, Danaei G, Riley LM, Paciorek CJ, Stevens GA, Greg EW, et al. Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: a pooled analysis of 1201 population-representative studies with 104 million participants. *Lancet.* 2021; 398(10304): 957-980.[CrossRef]
- [5] Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL, et al. The seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure: the JNC 7 report. *Jama.* 2003; 289(19): 2560-2571.[CrossRef]
- [6] Elliot WJ, Black HR. Prehypertension. *Nat. Clin. Pract. Cardiovasc. Med.* 2007; 4(10): 538-548. [CrossRef]

- [7] Turk Hipertansiyon Prevelans Calismasi. http://www.turkhipertansiyon.org/pdf/Turk_Hipertansiyon_Prevalans_Calismasi_Ozeti-1.pdf (accessed on 6 January, 2022).
- [8] Onat A, Senocak M, Ornek E, Gozukara Y, Surdum-Avcı G, Karaaslan Y, et al. Türkiye’ de Eriskinlerde Kalp Hastalığı ve Risk Faktorleri Sikligi Taramasi: 5. Hipertansiyon ve Sigara İçimi. *Turk Kardiyol Dern Ars.*1991; 19: 169-177.
- [9] Tas F, Buyukbese MA. Hypertension Awareness and Role of the Nurse. *TAF Prev. Med. Bull.* 2013; 12(6): 729-734. [CrossRef]
- [10] Hajjar I, Kotchen TA. Trends in prevalence, awareness, treatment, and control of hypertension in the United States. *Jama.* 2003; 290(2): 199-206. [CrossRef]
- [11] Mangum SA, Kraenow KR, Narducci WA. Identifying at-risk patients through community pharmacy-based hypertension and stroke prevention screening projects. *J. Am. Pharm. Assoc.* 1996; 43(1):50-55. [CrossRef]
- [12] Pongwecharak J, Treeranurat T. Screening for pre-hypertension and elevated cardiovascular risk factors in a Thai community pharmacy. *Pharm World Sci.* 2010; 32(3): 329-333. [CrossRef]
- [13] Albasri A, Clark CE, Omboni S, McDonagh STJ, McManus RJ, Sheppard JP. Effective detection and management of hypertension through community pharmacy in England. *The Pharmaceutical Journal.* 2020; 304(7935). [CrossRef]
- [14] Altun B, Arıcı M, Nergizoglu G, Derici U, Karatan O, Cetin T, et al. Prevalence, awareness, treatment and control of hypertension in Turkey (the PatenT study) in 2003. *J Hypertens.* 2005; 23(10): 1817-1823. [CrossRef]
- [15] Altun B, Suleymanlar G, Utas C, Arinsoy T, Ates K, Ecder T, et al. Prevalence, awareness, treatment and control of hypertension in adults with chronic kidney disease in Turkey: results from the CREDIT study. *Kidney Blood Press Res.* 2012; 36(1): 36-46. [CrossRef]
- [16] Waszyk-Nowaczyk M, Guzenda W, Plewka B, Mihalak M, Cerbin-Koczorowska M, Stryczynski L, et al. Screening services in a community pharmacy in Poznan (Poland) to increase early detection of hypertension. *J Clin Med.* 2020; 9(8): 2572. [CrossRef]
- [17] Marfo AF, Owusu-Daaku FT. Evaluation of a pharmacist-led hypertension preventative and detection service in the Ghanaian community pharmacy: an exploratory study. *Int J Pharm Pract.* 2016; 24(5): 341-348. [CrossRef]
- [18] Turk Kardiyoloji Derneği Ulusal Hipertansiyon Tedavi ve Takip Kılavuzu. https://tkd.org.tr/kilavuz/k03/3_2d304.htm?wbnum=1104 (accessed on 05 March, 2022).
- [19] Sengul S, Akpolat T, Erdem Y, Derici U, Arici M, Sindel S, et al. Changes in hypertension prevalence, awareness, treatment, and control rates in Turkey from 2003 to 2012. *J Hypertens.* 2016; 34(6): 1208. [CrossRef]
- [20] Machado M, Bajcar J, Guzzo GC, Einarson TR. Hypertension: sensitivity of patient outcomes to pharmacist interventions. Part II: Systematic review and meta-analysis in hypertension management. *Ann Pharmacother.* 2007; 41(11): 1770-1781. [CrossRef]
- [21] Pharmacy-Based Hypertension Management Model: Protocol and Guidelines. <https://apps.who.int/iris/bitstream/handle/10665/107638/E85730.pdf?sequence=1&isAllowed=y> (accessed on 13 January, 2022).
- [22] George PP, Molina JAD, Cheah J, Chan SC, Lim BP. The evolving role of the community pharmacist in chronic disease management-a literature review. *Ann Acad Med Singapore.* 2010; 39(11): 861-867.
- [23] Turk Hipertansiyon ve Bobrek Hastalıkları Derneği Kan Basıncı Ölçümü. <http://www.turkhipertansiyon.org/dogruKanBasinci.php> (accessed on 08 January, 2022).

This is an open access article which is publicly available on our journal’s website under Institutional Repository at <http://dspace.marmara.edu.tr>.