

# Hypertension Risk Factors for Climacteric Women in Rural Areas: A Cross-Sectional Study

## Kırsal Bölgede Klimakterik Kadınlarda Hipertansiyon Risk Faktörleri: Kesitsel Bir Çalışma

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**ABSTRACT Objective:** The study examined the prevalence and risk factors of hypertension in climacteric women living in rural areas of Türkiye. **Material and Methods:** It is a descriptive-relational study. This study found that hypertension prevalence was 40.8% with a confidence level of 95%, a test power of 95.98%, and an effect size of  $d=0.20$ , resulting in a sample size of 84. Post-hoc power analysis revealed a power of 99.99% with a sample size of 348. The researcher used a face-to-face questionnaire to gather data from 348 women who applied to the family health center and met the inclusion criteria. The data was analyzed using the IBM SPSS Statistics 23 software package, employing t-tests, chi-square tests, and binary logistic regression analysis. **Results:** The study found that one out of three climacteric women had hypertension and that the majority of those who weren't aware had pre-hypertension or Stage 1 hypertension. In addition, hypertension was found to be significantly higher in climacteric women aged 56 to 64 who were married, did not consume fruit and vegetables regularly, and had been menopausal for 1 to 5 years ( $p<0.05$ ), and it was more common in older, married, chronically ill, and obese women. **Conclusion:** Women in the climacteric period who have hypertension should receive information and awareness-raising services on the associated risk factors.

**ÖZET Amaç:** Araştırma, Türkiye'nin kırsal kesiminde yaşayan klimakterik dönemde olan kadınlarda hipertansiyon ve risk faktörlerini belirlemek amacıyla yapılmıştır. **Gereç ve Yöntemler:** Çalışma, betimsel-ilişkisel türdedir. Çalışmalara dayalı olarak hipertansiyon prevalansı %40,8 alınmış, %95 güven, %95,98 test gücü ve  $d=0,20$  etki büyüklüğü ile örneklem büyüklüğü 84 olarak hesaplanmıştır. "Post hoc" güç analizi sonucuna göre aynı etki büyüklüğü ve 348 örneklem ile testin gücü %99,99 bulunmuştur. Araştırma, aile sağlığı merkezine başvuran dâhil edilme kriterlerine uyan 348 kadın ile yüz yüze görüşme yöntemiyle soru formu doldurularak gerçekleştirilmiştir. Veriler IBM SPSS Statistics 23 paket programı üzerinde t-testi, ki-kare testi ve ikili lojistik regresyon analizi kullanılarak yapılmıştır. **Bulgular:** Her üç klimakterik dönemde olan kadından birinde hipertansiyon olduğu, hipertansiyonun farkında olmayan kadınların çoğunluğunun prehipertansiyon ve Evre 1 hipertansiyon olduğu saptanmıştır. Ayrıca 56-64 yaş grubunda, evli, düzensiz meyve sebze tüketen, menopoza girme süresi 1-5 yıl olan klimakterik kadınlarda ( $p<0,05$ ), yaşlılarda, evli, kronik hasta ve obez klimakterik kadınlarda hipertansiyon anlamlı derecede daha fazla saptanmıştır. **Sonuç:** Hipertansiyon sorunu yaşayan klimakterik dönemde olan kadınlara risk faktörleri konusunda eğitim ve farkındalık hizmeti verilmelidir.

**Keywords:** Women; climacteric period; hypertension

**Anahtar Kelimeler:** Kadın; klimakterik dönem; hipertansiyon

The climacteric period in women includes premenopause, menopause, and postmenopause. It has been reported that menopause increases the risk of cardiovascular heart disease in women due to the de-

crease in estrogen hormone. Hypertension (HT) is one of the leading causes of morbidity and mortality related to cardiovascular diseases worldwide.<sup>1,2</sup> HT is defined globally as having systolic blood pressure

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(SBP) 140 mmHg or diastolic blood pressure (DBP)  $\geq 90$  mmHg or taking antihypertensive medications. The overall prevalence of HT in adults 18 years of age and older is 24% in men and 20% in women.<sup>3</sup> It has been reported that 61% of hypertensive individuals in Türkiye are women, and HT is most common in the 35-64 age group.<sup>4</sup> HT is a silent health problem, lacking serious symptoms until it causes complications. Due to its “asymptomatic nature, delays and problems are experienced both in its detection and in the continuation of its treatment”.<sup>5</sup>

An HT diagnosis is an important factor in its treatment and control. Even in the USA, which has the highest awareness of HT, only 70-80% are aware of their condition.<sup>5,6</sup> In developing countries, awareness of HT is even lower, with an average of 41% for men and 53% for women.<sup>6,7</sup> It has been reported that the HT awareness rate is 58% in Türkiye, which is a developing country, out of which only 16% are under control.<sup>8</sup> In the study by Dastan et al., older age, low education level, being married, low physical activity and living in rural areas are reported as factors that negatively affect HT awareness. In addition, the cardiovascular risks for climacteric women are often particularly underestimated, as reproductive health is considered to be protected by protective hormones. HT is more common in postmenopausal women around the world. Risk factors such as lower quality of socioeconomic well-being, exercise, and nutrition, as well as higher levels of smoking, alcohol use, and fasting blood sugar, etc. are likely to affect the development of HT in postmenopausal women.<sup>8,9</sup> For this reason, it is important for women in the climacteric period to be aware of their HT risk factors and to seek health checks and screenings in order to take more responsibility for their health.

There have been previous studies on risk factors affecting the occurrence of HT in different populations.<sup>8-10</sup> However, while studies have been carried out on HT risk factors in rural areas in Türkiye studies on HT risk factors in the menopausal period are scarce.<sup>4,11-14</sup> In addition, considering that women living in rural areas are disadvantaged in terms of economic freedom and educational attainment, they constitute a clear risk group with respect to chronic diseases.<sup>12,15</sup> Therefore, this study was conducted to

determine the risk factors affecting HT in climacteric women living in rural areas.

## MATERIAL AND METHODS

### STUDY DESIGN

This is a descriptive-relational study.

### SAMPLING AND SAMPLE SIZE

The population of the study consists of 730 women in the age group of 40-64 registered in a family health center in rural areas. In the existing literature, the prevalence of HT in women living in northern region of Türkiye has been reported as 41.6%.<sup>16</sup> In the sampling volume calculation based on these results, the minimum number of individuals to be sampled was determined as 84, with a 95% confidence interval, 95.98% test power,  $d=0.20$  effect size, and a frequency of 0.41. According to the result of the Post Hoc power analysis, the power of the test was found to be 99.99% with the same effect size and 348 samples. The study was completed with 348 women who visited the family health center between February and April 2019 and met the inclusion criteria. Inclusion criteria for those agreeing to participate in the study were: being a woman between the ages of 40-64, being capable of answering the research questions, and not having consumed any tea, coffee, or other caffeinated substance, cigarettes or preferably even food 30 minutes prior to the blood pressure (BP) measurement being taken.

### DATA COLLECTION

The data were recorded by the researcher face-to-face with the women who visited the family health center between February and April 2019. The completion of the data collection form took an average of 30-45 minutes.

### DATA COLLECTION TOOLS

The research data were collected using the “Data Collection Form” created by the researchers after examining the relevant literature.<sup>3,4,14,16</sup>

**Data Collection Form:** There are a total of 48 questions in the survey: 8 questions about the socio-demographic characteristics of the climacteric

women (age, education, income, marital and social security status, cohabitants); 21 questions about lifestyle and other risk factors that may affect the BP level (going through menopause, chronic illnesses, continuous drug use, physical activity, nutrition, smoking, and alcohol use, etc.); 12 questions concerning menopausal and obstetric health conditions; and 7 questions related to BP and anthropometric measurements.

## MEASUREMENT

BP was measured in triplicate using an investigator-calibrated digital BP machine (OMRON HEM-712C, Omron Healthcare Inc., Japan). The BP measurements of the participants were taken from the left arm while seated. Once the patient had rested 15 minutes, the first measurement was taken. Next, the patient rested another 5 minutes and then had the second measurement, followed by a final 5-minute rest before the third measurement. The mean of the three BP measurements was used in the analysis for each participant. Participants with high BP results were invited to repeat the measurement the next day to confirm their high BP.

In the study, individuals diagnosed with HT for at least 1 year and those using antihypertensive therapy regardless of their BP were considered hypertensive. The criteria in the 2018 European Society of Cardiology (ESC) HT classification report were used to evaluate the BP measurements of hypertensive participants.<sup>17,18</sup> Controlled HT status was taken as the BP measurements of participants previously diagnosed with HT having BP values accepted in the European Society of Hypertension (ESH) and of the ESC guidelines.<sup>17,19</sup>

These values are SBP and DBP lower than 140 and 90 mmHg, respectively.

## ANTHROPOMETRIC DATA

Anthropometric measurements included weight and height. Bodyweight was measured to the nearest 0.1 kg using a SECA 803 (Kimeks, Türkiye) digital scale placed on a flat surface with the participant wearing light clothing and no shoes. Height was measured to the nearest 0. Body mass index (BMI) was calculated using the formula  $\text{kg/m}^2$  and interpreted according to

the criteria of the World Health Organization (WHO, 2021a): BMI was classified as normal when measured as  $\leq 25 \text{ kg/m}^2$ , overweight when  $25.1\text{-}30 \text{ kg/m}^2$  and obese when  $>30 \text{ kg/m}^2$ . Current smoking was defined as any tobacco smoked in the previous 30 days. Low fruit or vegetable intake was defined as consuming less than an average of five servings of fruit or vegetables per day.

## STATISTICAL ANALYSIS

The data were analysed using the SPSS Statistics 23 package program (IBM, USA). Frequencies (number, percentage) were given for categorical variables (e.g. gender) and descriptive statistics (mean, standard deviation) were given for numerical variables (e.g. age). When using independent samples t-test to compare numerical data with HT; the chi-square test was used in the analysis of categorical data. Independent risk factors on HT were examined via binary logistic regression analysis. Quantitative data were presented as mean $\pm$ standard deviation, while categorical data were given as frequency (percent). Statistical significance was interpreted at the 0.05 level in the analyses.

## ETHICAL CONSIDERATIONS

This was conducted according to the Declaration of Helsinki. Ethics committee approval was received from Nevşehir Hacı Bektaş Veli University Non-invasive Research Ethics Committee (date: October 18, 2018; no: 2018.12.143). Written approval was received from the Ministry of Health Scientific Research Platform prior to data collection (199448395-044). An explanation preceded the questions in the survey to clarify the intent and content of the study, and to inform the prospective participant about the voluntary nature of their participation.

## RESULTS

### SAMPLE DESCRIPTION

The mean age of women in their climacteric periods was  $55.91\pm 7.16$ . It was determined that 64.6% of the participants were in the postmenopausal period, 19.3% did not receive primary education but could read and write, 89.8% were married and 88.2% were not gainfully employed. Moreover, 11.3% of the

women smoked, 82.6% were obese, 98.9% did not exercise regularly, 93.4% consumed fresh fruits and vegetables irregularly, and 90.7% stated that they did not have their BP monitored regularly (Table 1).

**TABLE 1:** Some sociodemographic characteristics of climacteric women and their distribution by menopausal status.

Descriptive characteristics		
Age	Mean	SD
	55.91	7.16
	Number	%
Educational level		
Illiterate (Cannot read/write)	41	11.8
Literate (Can read/write)	67	19.3
Primary education	218	62.6
High school graduate	22	6.3
Marital status		
Single/Widowed/Divorced	35	10.1
Married	313	89.9
Occupation		
Housewife	307	88.2
Employee (Retired, employee, free-lance)	41	11.8
Previous hypertension diagnosis		
Yes	260	74.7
No	88	25.3
Blood pressure monitoring		
Irregular	313	90.7
Regular	32	9.3
BMI		
Overweight* (>25 kg/m <sup>2</sup> )	60	17.4
Obese (>30 kg/m <sup>2</sup> )	284	82.6
Menopause state		
Menopausal	292	83.9
Non-menopausal	56	16.1
Menopause onset		
Natural	251	86.0
Surgical	41	14.0
Smoking status		
Smoking	39	11.2
Non-smoker	309	88.8
Consumption of fresh fruits and vegetables		
Those who never consume	14	4.0
Irregular consumers	325	93.4
Every day	9	2.6
Salt consumption		
High salt consumption	16	4.6
Normal	293	84.7
Low salt**	37	10.7
Physical activity		
Once or twice a week	4	1.1
Never	344	98.9

\*2 people in the normal class are included in the overweight;

\*\*2 people no salt consuming; SD: Standard deviation.

## SOME CHARACTERISTICS OF THE PARTICIPANTS RELATED TO HT

The mean systolic and diastolic values differed according to the HT control status of the participants (142.6±4.7; 131.8±3.0;  $p<0.05$ ; 82.9±5.2; 81.0±3.8;  $p<0.001$ ; Table 2). There is a statistically significant difference between the distributions of Joint National Committee-7 (JNC-7) and ESC/ESH BP classes according to the HT control status of the women participating in the study ( $p<0.001$ ; Table 2). In our study, which used the JNC-7 HT classification, 84.9% of the participants whose HT was not under control were found to be pre-hypertensive, while 100% of the control group had pre-HT. Our research showed that among those women who were previously diagnosed with HT, there was a statistically significant difference in the results according to age group ( $p<0.001$ ). The highest incidence of HT (79.2%) was between the ages of 56-64 (Table 3).

With regard to the risk factors, statistically significant differences were found for the climacteric women, based on age, marital status, daily bread consumption, regular consumption of fresh fruit and fiber foods, and previous diagnosis of HT relative to the menopause time ( $p<0.05$ , Table 3). Accordingly, the rate of HT was higher in women who were aged 56-64, married, consumed fruits and vegetables irregularly, and were 1-5 years since menopause.

When the risk factors affecting the occurrence of HT in climacteric women were examined by the univariate model binary logistic regression analysis, it was found that age, family history of chronic disease, marital status, being menopausal, and BMI significantly affected the incidence of HT (Table 4). Accordingly, the HT risk of those aged 48-55 years is 3.866 times more than those aged 40-47 [odds ratio (OR)=3.866, 95% confidence interval (CI): 1.766-8.465]; while those aged 56-64 years are over 40 times more likely to get HT than those aged 40-47 (OR=40.144, 95% CI: 17.692-91.087). As the BMI value increases, the risk of HT increases 1.079 times. While the risk of HT was 153.6 times higher in those with other chronic diseases, the risk of HT was 27.627 times higher in those with a family history of HT (OR=1.079, 95% CI: 1.002-1.161). The risk of HT was found to be approximately 10.84 times

**TABLE 2:** Distribution of HT levels for women according to different classifications.

Blood pressure (mmHg)	HT		Test statistics	p value
	Non-controlled $\bar{X}\pm SD$	Controlled $\bar{X}\pm SD$		
Systolic blood pressure	142.6 $\pm$ 4.7	131.8 $\pm$ 3.0	t=22.262	<0.001
Diastolic blood pressure	82.9 $\pm$ 5.2	81.0 $\pm$ 3.8	t=3.274	0.001
	n (%)	n (%)		
mmHg according to JNC-7				
Normal (<120/80)	107 (84.9)	115 (100)	$\chi^2$	<0.001
Pre-hypertensive (120-139/80-89)	19 (15.1)	0 (0)	18.825	
mmHg according to ESC/ESH				
Normal (120-129/80-84)	0 (0) <sup>a</sup>	2 (1.7) <sup>a</sup>	$\chi^2$	
High normal (130-139/80-89)	107 (84.9) <sup>a</sup>	113 (98.3) <sup>b</sup>	<0.001	
Mild HT (140-159/90-99)	19 (15.1) <sup>a</sup>	0 (0) <sup>b</sup>	20.705	

a and b have been used to indicate a difference. There is a statistically significant difference in proportions with different letters.

$\chi^2$ : Chi-square test statistic; t: Two independent samples t-test statistic; HT: Hypertension; JNC-7: Joint National Committee-7;

ESC/ESH: European Society of Cardiology and of the European Society of Hypertension.

**TABLE 3:** Distribution of some characteristics of the women according to their pre-study diagnosis of HT.

	Diagnosed with HT	Without HT diagnosis	Test	p value
Age				
40-47	38 (45.2) <sup>a</sup>	13 (5) <sup>b</sup>	$\chi^2=120.110$	<0.001
48-55	31 (36.9) <sup>a</sup>	41 (15.8) <sup>b</sup>		
56-64	15 (17.9) <sup>a</sup>	206 (79.2) <sup>b</sup>		
Daily bread consumption				
2-3 thin slices	6 (7.3) <sup>a</sup>	12 (4.7) <sup>a</sup>	$\chi^2=10.253$	0.006
Half a loaf	47 (57.3) <sup>a</sup>	102 (39.7) <sup>b</sup>		
Between half and entire loaf	29 (35.4) <sup>a</sup>	143 (55.6) <sup>b</sup>		
Regular consumption of fresh fruits, vegetables and fibrous foods				
No	1 (1.2) <sup>a</sup>	10 (3.9) <sup>a</sup>	$\chi^2=10.259$	0.006
Yes, irregularly	76 (91.6) <sup>a</sup>	246 (95) <sup>a</sup>		
Yes, every day	6 (7.2) <sup>a</sup>	3 (1.2) <sup>b</sup>		
How do you perceive your mental health?				
Excellent	2 (24) <sup>a</sup>	4 (1.5) <sup>a</sup>	$\chi^2=13.870$	0.001
Good	47 (56) <sup>a</sup>	200 (76.9) <sup>b</sup>		
Average	35 (41.7) <sup>a</sup>	56 (21.5) <sup>b</sup>		
Menopause onset				
Natural	37 (78.7)	212 (87.6)	$\chi^2=2.602$	0.107
Surgical	10 (21.3)	30 (12.4)		
Time from menopause				
1-5 years	37 (78.7) <sup>a</sup>	118 (48.4) <sup>b</sup>	$\chi^2=14.887$	0.001
6-10 years	9 (19.1) <sup>a</sup>	101 (41.4) <sup>b</sup>		
11 years and above	1 (2.1) <sup>a</sup>	25 (10.2) <sup>b</sup>		

a and b have been used to indicate a difference. There is a statistically significant difference in proportions with different letters.

HT: Hypertension.

higher in those who were menopausal than in those who were not (OR=10.584, 95% CI: 5.558-20.154). Compared to those who do not consume fresh produce on a daily basis, the risk of HT is 0.05 times less

in those who consume it daily. The HT risk for those who consume half a loaf of bread is 0.44 times less than those consuming an entire loaf of bread (OR=0.44, 95% CI: 0.26-0.46).

**TABLE 4:** Some characteristics and confidence intervals affecting hypertension.

	Univariate			Multivariate						
	Beta	Standard error	OR (95% CI)	p value	WHO	Beta	Standard error	OR (95% CI)	p value	WHO
Age (40-47)										
48-55	1.352	0.4	3.866 (1.766-8.465)	0.001	82.8	0.765	0.6	2.149 (0.663-6.972)	0.203	
56-64	3.692	0.418	40.144 (17.632-91.087)	0.000		2.442	0.597	11.493 (3.569-37.01)	0.000	
Body mass index	0.076	0.038	1.079 (1.002-1.161)	0.044	75.9					
Presence of chronic disease (No)	5.034	0.624	153.6 (45.231-521.611)	0.000	90.4	4.655	0.779	105.125 (22.849-483.666)	0.000	
Hypertension in the family (No)	3.319	1.069	27.627 (3.401-224.407)	0.002	77.8					
Non-menopausal	2.359	0.329	10.584 (5.558-20.154)	0.000	81.1					92.5
No daily regular consumption of at least one serving of fresh fruit, vegetables, and fibrous foods										
Regular daily consumption of at least one serving of fresh fruit, vegetables, and fibrous foods	-1.13	1.057	0.24 (0.041-2.569)	0.286	76.6					
Regularly daily consumption of at least one serving of fresh fruit, vegetables, and fiber foods	-3	1.265	0.05 (0.004-0.597)	0.018						
Daily bread consumption (one loaf)										
Daily bread consumption (2-3 slices)	-0.9	0.54	0.406 (0.141-1.169)	0.095	75.8					
Daily bread consumption (half a loaf)	-0.82	0.269	0.44 (0.26-0.46)	0.002						

OR: Odds ratio; CI: Confidence interval; WHO: World Health Organization.

When the results of the Multivariate model are examined using the Backward stepwise regression method, since the risk factors are included in the model, the risk of HT in the 56-64 age group is seen to be 11.493 times higher than that in the 40-47 age group (OR=11.493, 95% CI: 3.569-37.01). Those with other chronic diseases have a 105.125 times higher risk of HT than those without (OR=105.125, 95% CI: 22.849-483.666).

## DISCUSSION

The age and gender distributions of a sample group selected for the HT prevalence study in adults are important. The prevalence of HT in women aged 18 years and older was found as 39.7% of the population in the United States, 32.5% in Nigeria (2020), and 25.4% in East and West Africa.<sup>20-22</sup> While the prevalence of HT in women aged 30 and over in Trkiye is 41.6%; in another study conducted on the 40-64 age group, HT was seen to be present in 59.2% of the women.<sup>16,23</sup> It has been reported that the prevalence of HT in Trkiye varies between regions, and it is seen with highest frequency in the Black Sea region.<sup>24</sup> Ulusoy et al. found that 62.3% of hypertensive individuals in the Central Anatolian region were female and their average age was 50.<sup>25</sup> In our study, the prevalence of HT among women aged 40-64 was found to be 74.7%. The variations among the results of different studies on the subject may be due to the cultural differences among the regions and countries where the studies researches were conducted.

Estrogen imbalance or deprivation is associated with increased risks of HT and cardiovascular disease in women; however, the effect of estrogen on HT is not fully understood.<sup>9,20,21</sup> According to the logistic regression analysis, the HT risk of the 48-55 year olds in our study was 3 times higher than that of the 40-47 year olds; the risk of HT in the 56-64 age group is 11 times higher than the same in the 40-47 age group (p<0.001). In addition, the risk of HT in menopausal women was found to be approximately 10 times higher than in non-menopausal

women (OR=10.584, 95% CI: 5.558-20.154). In a study conducted in China, it was found that menopause triggers the development of HT in women, and that HT is more common among women living in rural areas.<sup>26</sup> In the literature, it is reported that HT becomes more prevalent among women with advancing age.<sup>4,9,12,16</sup> In Türkiye, even though cancer screenings related to reproductive health for women are common in primary health care services, there is no such structured screening program for HT. There is a clear need to improve the screening and management of HT in Turkish health services for women who suffer from it during the menopausal period.

Awareness and control of HT are vital for the prevention of cardiovascular diseases and their complications.<sup>8,27,28</sup> In our study, the averages of systolic and diastolic values vary based on whether the participants HT is under control (142.6±4.7; 131.8±3.0; p<0.05; 82.9±5.2; 81.0±3.8; p<0.001). Salazar et al. found the mean BP of hypertensive patients to be 134.8/82.4 mmHg.<sup>29</sup> In a study by Sanuade et al., mean SBP in women was found as 110.3±15.9 in women, with mean DBP as 73.7±11.4.<sup>30</sup> The mean BP of women in Türkiye has been reported as 133/82.3 mmHg.<sup>31</sup> In our study, the mean HT was found to be higher than that reported in the existing literature.

Previous research indicates that awareness of HT is higher in developed countries, with a rate of 50-65%.<sup>32</sup> The HT awareness rate has been reported as 31.5-42.2% in studies conducted in Türkiye, which is classified as a developing country.<sup>8,16,25</sup> In our study, 84.9% of the participants who had not been diagnosed with HT according to JNC-7 were pre-hypertensive, while almost all (98.3%) of those with HT were found to be in first stage. Estimated pre-HT prevalence (120-139/80-89 mmHg) in Nigeria was 30.9%.<sup>21</sup> In the United States, the prevalence of HT was reported to be 34.2% among adults, when measured according to conventional BP thresholds, while the pre-hypertensive rate increased by 44.0% when more recently recommended thresholds were used.<sup>9</sup> The prevalence of pre-HT has been reported to be 17.2%-42.5% in the literature.<sup>26,29,33</sup> In our study, the incidence of HT was significantly higher in climacteric women who were married, did not consume

fruits and vegetables regularly, and with 1-5 years from menopause (p<0.05). The literature shows a positive relationship between HT and obesity, physical inactivity, stress, excessive salt intake, and bad dietary habits.<sup>8,11,33,34</sup> de Souza Filho et al. found that the risk of HT increases with an increase in BMI.<sup>33</sup> In our study, we found that as the BMI value increases, the risk of HT increases approximately 1-fold. In addition, we found that the risk of HT is 0.05 times less for those who consume fresh produce daily compared to those who do not. Radkevich and Radkevich evaluated the effect of daily food consumption on the risk of cardiovascular disease, and found that men living in high-income countries had a 3.9-fold risk of HT than those living in low-income countries, and that the risk was 9.5 times higher for women.<sup>34</sup> The findings of our study support these results, and it can be said that the likelihood of HT in women living in rural areas increases when obesity is present.

According to the single logistic regression analysis, women's age, family history of HT, excessive bread consumption, being menopausal, and obesity increase the risk of HT. According to the multiple regression analysis, only the variables of age and having another chronic disease affect the risk of HT in a statistically significant way. Having a family history of the disease is a common feature in hypertensive patients, and most heritability studies show a variation in the prevalence of HT between 35% and 50%.<sup>35</sup> In our study, the risk of HT was found to be approximately 27 times higher in those with a family history of HT. Although a family history of HT, which is one of the non-modifiable risk factors of HT, is not fully explained in the literature, it has been reported that it shows a polygenic transmission. In our study, it was found that women with chronic diseases other than HT were approximately 105 times more likely to have HT. Similar lifestyles and nutritional habits may also be a factor in the development of HT. It has been reported that the contribution rate of genetic characteristics to HT varies between 30% and 60%.

In our study, it was found that marital status, age, BMI, and time from menopause affect the risk of HT. In our study, HT risk in women in the climacteric period was found to be higher than in previous studies on the subject. This variation may be related to the

socio-economic features of the rural region where the research was conducted. In addition, women's age, excessive bread consumption, menopause, obesity, and having a family history of HT are found to increase the risk of HT. The importance of this research lies in the fact that it helps us understand the HT risk factors of women in the climacteric period, inform them about the risks, and enable them to control their BP. In addition, it is important to carry out BP screenings, especially in women in the climacteric period, and refer them to health institutions for early and definitive diagnosis of HT.

## STUDY LIMITATIONS

Our study has certain limitations. First, the study population only included women visiting the family health center. This may have caused the prevalence to be high. Another limitation is that the chronic disease history is based on self-reports.

## CONCLUSION

In our study, the prevalence of HT was found to be high among women living in rural areas. It has been determined that age, marital status, daily bread consumption, regular consumption of fresh fruit and fiber foods, and the time from menopause are significant factors affecting the development of HT. In addition, considering that the majority of women who are unaware of their HT have pre-HT and Stage 1 HT, determining the risk factors seems important for the management of HT.

High prevalence of HT in menopausal women by nurses, women in this age group BP measurements in field scans, risky groups determination of HT risk factors, informing them, directing them, directing them to health institutions for their treatment, training and consultancy services is recommended to be given.

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## Conflict of Interest

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.*

## Authorship Contributions

**Idea/Concept:** Gamze Gülsüm Kılıçlı, Ayşegül Özcan; **Design:** Gamze Gülsüm Kılıçlı, Ayşegül Özcan; **Control/Supervision:** Ayşegül Özcan, Figen İnci; **Data Collection and/or Processing:** Gamze Gülsüm Kılıçlı, Ayşegül Özcan; **Analysis and/or Interpretation:** Gamze Gülsüm Kılıçlı, Ayşegül Özcan; **Literature Review:** Gamze Gülsüm Kılıçlı, Ayşegül Özcan; **Writing the Article:** Gamze Gülsüm Kılıçlı, Ayşegül Özcan; **Critical Review:** Ayşegül Özcan, Figen İnci; **References and Fundings:** Gamze Gülsüm Kılıçlı, Ayşegül Özcan; **Materials:** Gamze Gülsüm Kılıçlı, Ayşegül Özcan.

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