Prevalence, control and risk factors related to hypertension among Moroccan adults: a multicentre study

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Abstract

Background: Hypertension is a leading risk factor for mortality and morbidity.

Aims: The objective of this study was to determine the prevalence and clinical profile of hypertension in a large sample of individuals in Morocco.

Methods: This was a multicentre and cross-sectional study conducted on patients consulting primary care physicians in Morocco between 2008 and 2009. Data were collected via a medical examination and a questionnaire covering patient demographics, medical history and cardiovascular risk factors.

Results: In total, 10 714 individuals attending primary care physicians participated in this study. Mean age was 49.6 ± 16.3 years. The total prevalence of hypertension was 39.8%. When adjusted for age and sex, the overall prevalence of hypertension was 26.6% (26.3% in men and 28.0% in women). Among patients with history of hypertension, 85.9% of patients were prescribed antihypertensive medication and/or lifestyle and dietary advice. Nevertheless, only 17.1% had controlled hypertension.

Conclusions: This study suggests that the prevalence of hypertension in Morocco is high. Hypertension may also be underdiagnosed and ineffectively treated. Efforts to heighten public awareness and control of hypertension should be enhanced in the public primary care services.

Keywords: hypertension, Morocco, epidemiology, antihypertensive, controlled hypertension.

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Introduction

Most low- and middle-income countries are currently confronting a significant public health challenge due to a continued high burden of communicable diseases and noncommunicable diseases, especially hypertension (*1–3*). Elevated blood pressure (BP) represents the principle contributor to the global mortality of disease and burden (*4*). Globally, elevated BP is the leading risk factor for mortality and morbidity, accounting for 7% [CI 95%, 6.2–7.7] of global disability adjusted life years and 9.4% [CI 95%, 8.6–10.1] million deaths in 2010 (*5*). Also, the number of individuals with uncontrolled hypertension (defined as SBP ≥ 140 mm Hg or DBP ≥ 90 mm Hg) increased from 605 to 978 million because of population growth and aging (*5*). The number of adults with hypertension in 2025 was predicted to increase by about 60% to a total of 1.56 billion globally (*6*).

Hypertension may be present for many years before it becomes an emergency. Many patients around the world continue to have unrecognized or untreated hypertension, with variation between countries (*7*). The JNC 7 report "Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure", showed that hypertension was unrecognized in 30% of cases; in recognized patients, 54% were treated and only 34% were controlled (*8*).

In Morocco, the ministry of health conducted a study on the main cardiovascular risk factors in 2000 and indicated that the prevalence of hypertension in adults was 33.6% (*9*). In North Africa a cross-sectional study ETHNA (Epidemiological Trial of Hypertension in North Africa) was conducted in 28 500 patients consulting primary care physicians in Algeria, Tunisia and Morocco; the total prevalence of hypertension was 45.4% (*10*). The aim of this study was to determine the prevalence and clinical profile of hypertension in a large sample of individuals in Morocco.

Methods

Participants

This was a national, multicentre, epidemiological, cross-sectional study conducted in patients attending primary care physicians in Morocco between September 2008 and January 2009. Eligible patients were aged 18 years or older of either sex who were willing to participate in the survey. Patients who had fever (≥ 38°C) were excluded from the study (*11*).

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study. The study was reviewed by the Independent Ethics Committee.

The sample size was calculated based on an estimated prevalence of hypertension of 30%. With a risk of error of 0.01 (1%), a difference of imprecision of 1.0%, and a cluster effect of 2, the number to be included in the study was rounded to 11 000. A cluster was defined as a neighbourhood in an urban area and a locality in a rural area. One cluster was selected at random from each region included in the survey and one primary care centre from each commune of the cluster was selected at random. One hundred and ten physicians participated in the study, each of which recruited more than 100 participants.

Data collection and medical examination

Data were collected by participating primary care physicians using a checklist that covered demographics of the patient; personal and family medical history; risk factors for cardiovascular disease and hypertension; and whether a BP measurement had been recorded in the last year. If the patient had a history of hypertension, additional information from their medical history was collected including duration of hypertension; prescription of antihypertensive medication (including type(s), number of medications, any single-pill combinations); and history of hypertension-related complications (including left ventricular hypertrophy, angina, myocardial infarction, chronic heart failure, stroke, chronic kidney disease, retinopathy, revascularization or peripheral arterial disease).

Patients were also clinically examined and measurements were taken for weight, height, waist circumference and BP. Two BP measurements were planned: one after 5 minutes of rest and the second following a further 2-minute rest after the completion of the first measurement. When possible, BP measurements were recorded as the mean of the two measurements. Hypertension was identified according to the criteria of the European Society of Hypertension and the European Society of Cardiology (ESH/ESC) guidelines (*12*): grade 1 hypertension, SBP 140–159 mmHg and/or DBP 90–99 mmHg; grade 2 hypertension, SBP 160–179 mmHg and/or DBP 100–109 mmHg; grade 3 hypertension, SBP ≥ 180 mmHg and/or DBP ≥ 110 mmHg; systolic hypertension (also known as isolated systolic hypertension) was graded (1, 2 or 3) according to the SBP values in the above ranges, provided that DBP was < 90mmHg.

Current smoker was defined as a person who continued to smoke at the time of survey daily or occasionally and ex-smoker was defined as a person who had quit smoking. Abdominal obesity was defined as a waist circumference ≥ 90 cm in men and waist circumference ≥ 80 cm in women. Body mass index (BMI) was computed as weight (kg)/height (m^2) and classified according to the World Health Organization criteria as overweight (BMI ≥ 25 kg/m^2) and obese (BMI ≥ 30 kg/m^2). Diabetes, hypercholesterolaemia, kidney failure and postmenopausal women are self-reported from patients.

Statistical methods

Initially, descriptive analyses were used to determine the crude prevalence of hypertension over the whole sample. In addition, age- and sex-adjusted rates were calculated by multiplying the age- and sex-specific rate for each age group in the study population by the appropriate weights from a standard population (*13*). The overall age- and sex-adjusted rates were the sum of these products.

The associations between various facets of hypertension (e.g. a history of hypertension, newly detected hypertension, hypertension severity, controlled hypertension) and patient demographics and personal medical profile (e.g. age, sex, personal and family medical history, body mass index (BMI), smoking and current treatment) were investigated. Statistical analyses were based on conventional parametric tests (χ^2 test, Student's *t*-test and analysis of variance). A test was considered significant when P < 0.05. Where comparisons are made within a category containing more than two subcategories, P values have been denoted 'within category'. Statistical analyses were performed using SPSS (version 17.0).

Results

Participants

In this study, through 110 general physicians, 10 714 pas tients were included. Table 1 presents the characteristics of the study population. The mean age of participants was 49.6 ± 16.3 years. Two thirds of the participants were female (66.7%) and 73.4% of participants lived in urban area. Almost 43.5% of participants were illiterate, and 12.1% were educated to university graduate level. The mean BMI of the participants was 25.9 ± 4.8 kg/m^2. Only 12.4% of patients consulted primary care for cardiovascular motif.

Risk factors

Table 2 presents an overview of risk factors of hypertension in the study population. Family history of abdominal obesity, hypercholesterolaemia and type 2 diabetes were present in 35.6%, 13.5% and 13% of patients respectively. Menopause was present in 41.2% of female participants. Near half (46%) of participants had a normal BMI, and almost 52% of participants were overweight or obese. Smoking was present in 25.5% of males and 1.8% of females.

Table 1: Sociodemographic characteristics of the study population

	Number	%
Age (n=10 552)		
Mean ± SD: 49.6 ± 16.3 years		
18–29	1924	18.2
30–39	1948	18.5
40–49	2130	20.2
50–59	1968	18.7
≥ 60	2582	24.5
Sex (n=10 598)		
Female	7069	66.7
Area of habitation (n=10 303)		
Rural	2736	26.6
Urban	7567	73.4
Education (n=10 331)		
Illiterate	4495	43.5
Elementary school	1927	18.7
Secondary school	2654	25.7
University graduate	1255	12.1

SD = standard deviation.

Table 2: Hypertension risk factors in the overall study population

	Number	% (CI 95%)
Smoking		
Male (n= 3484)		
Ex-smoker	561	16.1 (14.8–17.3)
Current smoker	889	25.5 (24.1–26.9)
Female (n= 6925)		
Ex-smoker	52	0.8 (0.6–1.1)
Current smoker	123	1.8 (1.5–2.1)
Abdominal obesity (n=9972)	3550	35.6 (34.7–36.4)
Diabetes (n=10 663)		
Type 1	295	2.8 (2.5–3.1)
Type 2	1388	13.0 (12.3–13.7)
Hypercholesterolemia (n=10 064)	1358	13.5 (12.8–14.2)
Kidney failure (n=10 029)	140	1.4 (1.2–1.6)
Postmenopausal women (n=6730)	2771	41.2 (40.0–42.4)
HRT in postmenopausal women (n=2452)	84	3.5 (2.8–4.3)
Body mass index (BMI)		
Underweight (< 18.5 Kg/cm^2)	261	2.5 (2.2–2.9)
Normal (18.50–24.99 Kg/cm^2)	4728	45.7 (44.6–46.7)
Overweight (25–29.99 Kg/cm^2)	3398	32.8 (31.9–33.8)
Obesity		
Classe I (30–34.99 Kg/cm^2)	1510	14.6 (13.9-15.3)
Classe II (35–39.99 Kg/cm^2)	361	3.5 (3.2–3.8)
Classe III (≥ 40 Kg/cm^2)	87	0.8 (0.7–1.0)

HRT = hormone replacement therapy

CI = Confidence interval

Prevalence of hypertension

Among the 10 717 participants surveyed, 4262 individuals had hypertension – an overall crude prevalence of 39.8% [95% CI 38.9–40.8]. Of these individuals, 2480 (58.2%) had a history of hypertension. Among them, 2130 (85.9%) received antihypertensive medication. When adjusted for age and sex, the overall prevalence of hypertension was 26.6% (95% CI 25.8–27.4; 26.3% in men [95% CI 24.8–27.8] and 28.0% in women [95% CI 26.9–29.1]). The duration of hypertension in patients with a history of hypertension averaged 7.6 ± 5.7 years. In near half of the patients (48.5%), the duration of hypertension was more than 5 years.

An overview of hypertension severity in patients with a history of hypertension is shown in Table 3. In total, 7.2% of patients had either normal or optimal BP at the time of the study visit. Around 10% of the patients had normal–high BP and around 33% of the patients had isolated systolic hypertension. Of patients who were untreated, approximately 20% and 18% had hypertension grade 1 and grade 2, respectively. More than half (51.6%) of patients had isolated systolic hypertension.

The proportions of patients with a history of hypertension according to their socio-demographic characteristics are summarized in Table 4. The proportions of patients with hypertension increased with age ($P < 0.0001$); 53.4% of participants aged 60 years or older had a history of hypertension, compared with just 1.6% of those aged 18 to < 30 years. Hypertension was more common in women than men (24.4% vs 22.2%; $P = 0.01$), in rural than in urban areas (26.4% vs 22.9%; $P < 0.005$), in illiterate participants than in those with some formal education (e.g. 33.8% for illiterate vs 12.6% for university graduates; $P < 0.0001$ within category). Hypertension was more common in individuals who had abdominal obesity, diabetes, hypercholesterolaemia and kidney failure than in individuals without these comorbidities (all $P < 0.001$). Hypertension was also more common in individuals who were overweight or obese than in those who were of normal weight or underweight ($P < 0.001$ within category).

Control of hypertension

Among patients with a history of hypertension, 85.9% of patients were prescribed antihypertensive medication and or lifestyle and dietary advice. Nevertheless, only 17.1% had controlled hypertension (BP < 140/90 mmHg). Control of disease was higher in patients who received antihypertensive medication: 18.4% in treated patients versus 9.1% in untreated patients.

Table 3: Severity of hypertension in study population

	Patients with history of hypertension			Newly detected (n=1782)
	Received treatment (n= 2130)	Untreated (n = 350)	Total (n=2480)	
	%	%	%	%
Hypertension classes				
Optimal	0.8	0.6	0.8	–
Normal	7.0	2.6	6.4	–
High normal	10.5	6.0	9.9	–
Hypertension grade 1	10.8	9.7	10.6	19.6
Hypertension grade 2	19.0	22.6	19.5	18.4
Hypertension grade 3	18.3	22.6	18.9	10.4
Isolated systolic hypertension	32.7	34.3	32.9	51.6
Grade 1	54.8	50.0	54.1	69.6
Grade 2	34.4	31.7	34.0	23.4
Grade 3	10.8	18.3	11.9	7.1
Invalid measurements	0.8	1.7	1.0	–
Total	**100.0**	**100.0**	**100.0**	**100.0**

The proportions of patients with controlled hypertension according to their socio-demographic characteristics are shown in Table 5. Controlled hypertension was not associated with gender. However it was higher in university graduates than in patients educated to lower levels (P = 0.006 within category). It was also higher in younger patients, urban area and low weight patients (P < 0.001).

Newly detected hypertension

Among the 8047 participants surveyed without a history of hypertension, 1782 (22.1%) individuals had hypertension at consultation. Of these individuals, 18.4% and 10.4% had hypertension grade 2 and 3 respectively. The proportions of patients with newly detected hypertension according to their socio-demographic characteristics are summarized in Table 6. The frequency of newly detected hypertension increased significantly with age (P < 0.001). Newly detected hypertension was also higher in illiterate people than in those with a formal education (P < 0.001 within category) and in people from rural areas than in those from urban areas (P < 0.001). The prevalence of newly detected hypertension increased with BMI (P < 0.001). Therefore, in obese patients' grade 3, the proportion of hypertension was 43.8% versus 16.7% in patients with normal BMI.

Discussion

The ETHNA study is the first cross-sectional study with a large sample in the Maghreb. This study in Morocco shows that the prevalence of hypertension is high in the population consulting general medicine (overall prevalence = 39.8%; age-adjusted prevalence = 26.6%) and its treatment and control were still inadequate. Among these individuals with hypertension at consultation, 58.2% had a history of hypertension. In addition, when comparing Morocco to other countries of North Africa, Morocco had the lowest prevalence of hypertension among adults ≥ 18 years compared to Tunisia (47.4%) (*14*) and Algeria (49.5%) (unpublished data). This study showed also a rising overall prevalence of hypertension compared to the study of ministry of health in 2000 that indicates that the prevalence of hypertension in adults is 33.6% (*9*). Urbanization, sedentary lifestyle, high consumption of salt and fatty food may have contributed to the rising prevalence of hypertension (*15,16*).

In Arab countries, hypertension prevalence varied widely between and within countries (*17*). The prevalence of hypertension ranged from 20.1% in the Syrian Arab Republic (*18*) to 50.2% in Algeria (*19*), while within countries, the prevalence varied from 35.3% to 50.2% in Algeria (*19,20*). For national studies, hypertension prevalence ranged from 27.6% in Palestine (*21*) to 41.5% in Oman (*22*). In the Iranian population, the prevalence of hypertension ranged from 18.4% (*23*) and 38% (*23*). Risk factors for hypertension in Eastern Mediterranean Region (EMR) countries consist of two categories: nonmodifiable risk factors including age, sex, genetic factors and family history of hypertension, and modifiable factors such as physical inactivity, obesity, high levels of dietary sodium intake, hypercholesterolaemia, diabetes and educational level (*15–26*).

In treated patients, the control of hypertension decreases the risk of cardiovascular events. Despite the treatment rate observed in our study the control of hypertension was lower. However, national and international surveys suggest that many people continue to have unrecognized or untreated hypertension (*13,27*). Consequently, efforts to heighten public awareness and control should be enhanced in the public primary care services where majority of the hypertensive individuals are managed.

Table 4: **Proportions of individuals with a history of hypertension according to socio-demographic and clinical characteristics**

Category	Number of individuals in overall study population	Individuals with history of hypertension (%)	*P*
Age (years)			**<0.0001**
18–30	1877	1.6	
30–40	1904	4.8	
40–50	2096	16.1	
50–60	1946	32.3	
≥ 60	2547	53.4	
Sex			**0.013**
Female	6942	24.4	
Male	3479	22.2	
Origine			**<0.001**
Rural	2686	26.4	
Urban	7443	22.9	
Education level			**<0.0001**
Illiterate	4421	33.8	
Elementary school	1901	20.3	
Secondary school	2611	14.1	
University graduate	1233	12.6	
Smoking			**0.18**
Ex-smoker or smoker	1612	24.9	
Not smoker	8721	23.3	
Abdominal obesity			**<0.001**
Yes	3498	36.4	
No	6314	16.7	
Diabetes			**<0.001**
No diabetes	8819	17.7	
Type 1	286	57.7	
Type 2	1376	53.3	
Hypercholesterolemia			**<0.001**
Yes	1344	62.4	
No	8562	17.3	
Postmenopausal women			**<0.001**
Yes	2745	46.2	
No	3874	09.0	
Kidney failure			**<0.001**
Yes	140	75.7	
No	9734	22.4	
Body mass index classes			**<0.001**
Underweight	252	14.3	
Normal	4655	15.9	
Overweight	3356	25.5	
Obesity			
Classe I	1486	37.5	
Classe II	359	42.9	
Classe III	87	46.0	

Table 5: **Hypertension control rates in patients with history of hypertension according to socio-demographic characteristics**

	Number of patients in population	Patients with controlled hypertension (%)	*P*
Age (years)			**0.003**
18–30	30	40.0	
30–40	92	31.5	
40–50	338	15.4	
50–60	628	17.4	
≥ 60	1361	16.0	
Sex			**0.84**
Female	1695	17.1	
Male	772	17.4	
Area of habitation			**0.001**
Rural	709	12.4	
Urban	1708	18.7	
Education			**0.006**
Illiterate	1496	15.2	
Elementary school	386	17.6	
Secondary school	366	18.9	
University graduate	155	28.8	
Body mass index classes			**<0.001**
Underweight	36	25.0	
Normal	738	22.5	
Overweight	856	17.3	
Obesity			
Classe I	556	11.2	
Classe II	154	13.0	
Classe III	40	12.5	

Table 6: **Prevalence of newly detected hypertension in individuals without a history of hypertension according to sociodemographic characteristics**

	Number of individuals in population	Individuals with newly detected hypertension (%)	*P*
Age (years)			**<0.001**
18–30	1847	04.7	
30–40	1812	11.2	
40–50	1758	23.0	
50–60	1318	37.3	
≥ 60	1189	46.8	
Sex			**0.012**
Female	5247	21.2	
Male	2705	24.3	
Area of habitation			**<0.001**
Rural	1977	28.0	
Urban	5735	20.4	
Education			**<0.001**
Illiterate	2925	31.1	
Elementary school	1515	20.2	
Secondary school	2245	16.3	

Table 6: Prevalence of newly detected hypertension in individuals without a history of hypertension according to sociodemographic characteristics (*concluded*)

University graduate	1078	12.9	
Body mass index classes			**<0.001**
Underweight	216	10.2	
Normal	3917	16.4	
Overweight	2500	25.1	
Obesity			
Classe I	930	35.2	
Classe II	205	42.4	
Classe III	47	42.6	

The study shows that a minority of patients had controlled hypertension and the determinants of uncontrolled disease were older patients, illiterate individuals and obese patients. The WHO SAGE study, realized in middle-income countries, showed that hypertension control rates are particularly low for adult across distinct cultures (*28*). Similarly, many studies showed, as demonstrated in the ETHNA study, that several determinants influence the control of BP like age, gender, area of habitation and BMI. In the FLAHS study (*29*), a survey conducted in metropolitan France, the determinants of BP control are age (55–64 years vs 80 years old; 57.6%/49.1%), gender (women vs men; 60.3%/50.1%), BMI (< 25 vs > 30; 63.1%/46.1%). With regards to factors associated with hypertension control, in the REDISCOVER study (*30*), residing in the rural areas and being female were identified as the independent factors. Poor BP control is linked to other factors related to physician or patient, i.e. lack of adherence to treatment, comorbidity, depression and high salt intake (*31*).

Our results confirms that hypertension prevalence was high among individuals from rural area compared to urban area, based on data collected by the ministry of health in 2000 (*32*). A recent meta-analysis study showed that prevalence estimates of hypertension were higher in urban communities, compared to participants in rural settings in Latin America, Asia and Sub-Saharan Africa (*33*). However, in Europe and central Asia the relationship was similar to our findings but there was no difference between rural and urban areas in the Middle East and North Africa region (*33*). Possible explanations for this phenomenon include the fact that epidemiologic and nutrition transition also affect people from rural regions. In rural areas, initiatives to change dietary behaviour should be implemented in order to reduce cardiovascular risk factors, especially reducing salt intake (*34*).

This study had a number of limitations linked to their observational design and the fact that data are only collected from general practitioners. Results of BP may be affected by the environment and the instrument of measurement. In addition, BP of individuals fluctuates through the time. Therefore, a confirmation of hypertension is required by a qualified person and on a different day. Overall, the above limitations are quite common in all studies of this nature and are unlikely to have a significant impact on the overall hypertension prevalence, especially considering the large sample size. In addition, comparisons with other studies are possible because of adjustment of hypertension prevalence on age and sex.

Conclusion

This study indicates that hypertension is highly prevalent and may be ineffectively managed in Morocco. Efforts to heighten public awareness and control of hypertension should be enhanced in the public primary care services.

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Prévalence et contrôle de l'hypertension et facteurs de risque associés chez les adultes marocains : étude multicentrique

Résumé

Contexte : L'hypertension est un facteur de risque de mortalité et de morbidité principal.

Objectifs : La présente étude a pour objectifs de déterminer la prévalence et le profil clinique de l'hypertension dans un vaste échantillon d'individus au Maroc.

Méthodes : Il s'agit d'une étude multicentrique transversale menée auprès de patients consultant des médecins de soins primaires au Maroc entre 2008 et 2009. Les données ont été recueillies au moyen d'un examen médical et d'un questionnaire portant sur la démographie des patients, les antécédents médicaux et les facteurs de risque cardio-vasculaire.

Résultats : Au total, 10 714 médecins de soins primaires ont participé à cette étude. L'âge moyen était de 49,6 ± 16,3 ans. La prévalence totale de l'hypertension était de 39,8 %. Après ajustement selon l'âge et le sexe, la prévalence de l'hypertension était de 26,6 % (26,3 % chez les hommes et 28,0 % chez les femmes). Parmi les patients ayant des antécédents d'hypertension, 85,9 % des patients se sont vu prescrire des antihypertenseurs et/ou ont reçu des conseils concernant le mode de vie et le régime alimentaire. Néanmoins, seulement 17,1 % d'entre eux présentaient une hypertension contrôlée.

Conclusions : Cette étude suggère que la prévalence de l'hypertension au Maroc est élevée. L'hypertension peut également être sous-diagnostiquée et traitée de manière inefficace. Les efforts visant à sensibiliser davantage le public et à mieux contrôler l'hypertension devraient être intensifiés dans les services de soins primaires publics.

معدل انتشار ارتفاع ضغط الدم ومكافحته وعوامل الخطر المتعلقة به بين البالغين المغاربة: دراسة متعددة المراكز

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الخلاصة

الخلفية: يعد ارتفاع ضغط الدم أحد عوامل الخطر البارزة التي تسبب الوفاة والمراضة.

الأهداف: هدفت هذه الدراسة إلى تحديد معدل انتشار ارتفاع ضغط الدم ومرتسمه السريري في عينة كبيرة من الأفراد في المغرب.

طرق البحث: أُجريت هذه الدراسة المقطعية والمتعددة المراكز على المرضى الذين يراجعون الأطباء على مستوى الرعاية الأولية في المغرب بين عامي ٢٠٠٨ و٢٠٠٩. تم جمع البيانات من خلال فحص طبي واستبيان يغطي المحددات السكانية للمرضى وتاريخهم المرضي وعوامل الخطر ذات الصلة بأمراض القلب والأوعية الدموية.

النتائج: إجمالاً، شارك ١٠٧١٤ شخصًا قاموا بمراجعة الأطباء على مستوى الرعاية الأولية في هذه الدراسة. وبلغ متوسط العمر ١٦,٣ ± ٤٩,٦ عامًا. وبلغ إجمالي معدل انتشار ارتفاع ضغط الدم ٣٩,٨٪. وعند ضبط المعدل مع الأخذ في الاعتبار العمر ونوع الجنس، بلغ إجمالي معدل انتشار ضغط الدم ٢٦,٣ (٢٦,٦٪ بين الرجال و٢٨,٠٪ بين النساء). ومن بين المرضى الذين يوجد في تاريخهم المرضي إصابة بارتفاع ضغط الدم، ٨٥,٩٪ من المرضى وُصِفَت لهم أدوية مضادة لارتفاع ضغط الدم و/ أو نصائح تتعلق بأسلوب الحياة ونظام التغذية. ومع ذلك، وُجد أن ١٧,١٪ فقط من المرضى لديهم ارتفاع ضغط الدم تحت السيطرة.

الاستنتاجات: تشير هذه الدراسة إلى أن معدل انتشار ارتفاع ضغط الدم في المغرب مرتفع. وقد لا يُشخَّص ارتفاع ضغط الدم ولا يُعالج بشكل جيد وفعّال. ويجب بذل الجهود لإذكاء وعي الجمهور بشأن ارتفاع ضغط الدم وتعزيز مكافحته في خدمات الرعاية الأولية المقدمة بالقطاع العام.

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