Prevalence, awareness, treatment and control of hypertension among adults in Kenya: cross-sectional national population-based survey

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Abstract

Background: Hypertension is a major and fast-growing public health problem in Africa.

Aims: To determine the prevalence of hypertension and assess the levels of awareness, treatment and control in Kenya.

Methods: A national cross-sectional study based on stratified cluster random sampling was conducted in 2015. The total sample included 4500 individuals aged 18–69 years, (60.0% female; median age 38.0 years, interquartile range 29–52 years) from Kenya. We used the World Health Organization STEPS method: Step 1, questionnaire interview; Step 2, anthropometric and blood pressure (BP) measurements; and Step 3, biochemical tests. Logistic regression was used to investigate the determinants of hypertension (systolic/diastolic) BP ≥ 140/90 mm Hg or use of antihypertensive medication), and awareness, treatment and control.

Results: Overall, 28.6% of the population had hypertension, 29.2% among men and 27.9% among women, 17.7% among individuals 18–29 years and 58.3% among those aged 60–69 years. Among hypertensives, 29.4% were aware, 6.5% were currently using antihypertensive medication, and 12.5% had controlled their BP (< 140/90 mmHg). In the fully adjusted model, older age, higher education, overweight and obesity, past month binge drinking, and type 2 diabetes were positively associated with hypertension. In addition, underweight was negatively associated with hypertension.

Conclusions: There was a high prevalence of hypertension among adults in Kenya, with low awareness, treatment and control rates. Public health response is needed in the form of integrated and comprehensive action targeting major noncommunicable diseases in the country.

Keywords: hypertension, awareness, treatment, control, Kenya

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Introduction

Globally, hypertension is a major cause of morbidity and mortality, with a prevalence of hypertension of 31.1% in 2010 (1). There has been an increase in the prevalence of hypertension in Africa, from 19.7% in 1990 to 30.8% in 2010 (2). In sub-Saharan Africa, between 2000 and 2013, the predicted prevalence of hypertension at mean ages of 30, 40, 50 and 60 years was 16%, 26%, 35% and 44% (3).

Previous studies have shown that awareness and control of hypertension are low. From 2000 to 2010, awareness (58.2% vs 67.0%), treatment (44.5% vs 55.6%) and control (17.9% vs 28.4%) increased substantially in high-income countries, whereas awareness (32.3% vs 37.9%) and treatment (24.9% vs 29.0%) increased less, and control (8.4% vs 7.7%) even decreased in low- and middle-income countries (1). In 2010, the pooled awareness rate (expressed as percentage of hypertensive cases) was 33.7% in Africa (2), while another review in sub-Saharan Africa found a pooled awareness rate of 27% (3). In the same review, 18% of individuals with hypertension were receiving treatment, and only 7% had controlled blood pressure (BP) (3).

In Kibera, a slum area in Nairobi, Kenya, the age-standardized prevalence of hypertension was 22.8%, and 20% were aware of their hypertensive status (4). In adults aged ≥ 35 years (mean age 46.7 years), the age-standardized prevalence of hypertension was 29.4 %, and 39.0% were unaware they had hypertension (5). Kenya is experiencing an epidemiological transition that has contributed to an increase in prevalence of risk factors for hypertension, such as change in dietary pattern and sedentary lifestyle (4,5). There is a lack of national data on the prevalence and risk factors for hypertension in Kenya, and such data is needed for control strategies.

Hypertension is a preventable condition and is associated with unhealthy lifestyle, including tobacco smoking, lack of physical activity, and alcohol consumption (6). Various risk factors have been found to be linked with hypertension, including sociodemographics (older age, female or male gender, lower education level, and lower household income)

(7–14), urban residence (9,13) and other risk factors, including body weight status, health risk behaviour, and psychosocial stress and support. Higher body mass index (BMI) is positively (7,9–11,15) and underweight negatively (15) associated with hypertension. Other metabolic risk factors for hypertension include diabetes (10,16). Various dietary behaviours, including insufficient fruit and vegetable intake (17), consumption of fatty foods (18), and salt intake (19), increase the odds of developing hypertension. Several studies have found an association between physical inactivity (15), smoking (20), problem or habitual drinking (7), and hypertension. The aim of this study was to assess the prevalence of hypertension and the levels of awareness, treatment and control in Kenya.

Methods

Data, study design and participants

A multistage cluster sampling method was used to select adults aged 18–69 years for the Kenya STEPS Survey (April–June 2015) (21). A 3-stage cluster sample design was adopted for the survey, involving selection of clusters, households and eligible individuals. In the first stage, 200 clusters (100 urban and 100 rural) were selected from 1 subsample of National Sample Surveys and Evaluation Programme master sample frame. A uniform sample of 30 households from the listed households in each cluster was selected in the second stage of sampling. The last stage of sampling was done using personal digital assistants (PDAs) at the time of survey, where one individual was randomly selected from all eligible listed household members using a programmed Kish method of sampling (26). The total sample included 4500 individuals aged 18–69 years, (60.0% female; median age 38.0 years, interquartile range 29–52 years) from Kenya. The response rate for Step 1 (questionnaire) was 95%, Step 2 (physical measurements) 99% and Step 3 (biochemical measurements) 93% (21). The Kenya Ministry of Health Ethics Committee approved the study protocol and participants provided written informed consent prior to the study.

Measures

The World Health Organization (WHO) STEPS method included 3 steps: Step 1, questionnaire interview; Step 2, anthropometric and BP measurements; and Step 3, biochemical tests (22). Physical activity level was calculated from the duration of moderate and vigorous physical activities (at work, transport and recreation) in a typical day and week. Physical activity levels were classified into low, moderate and high, as per WHO Global Physical Activity Questionnaire (GPAQ) (23). The GPAQ has been validated for crosscultural use (24). Current tobacco use was measured with 2 questions: "Do you currently smoke any tobacco products, such as cigarettes, hand-rolled, cigars, water pipes/shisha or pipes/kiko?" and "Do you currently use any smokeless tobacco products such as snuff, chewing tobacco, kuber pan?" (Yes, No) (25). Past month binge drinking was assessed by asking participants how many times they had ³ 6 standard alcoholic drinks in a single drinking session during the past 30 days (21). Dietary behaviour was assessed with the following questions. (1) "Consumption of soft drinks (like Fanta, coca cola, 7-up, Aya, Softa, Vimto or other sugary drinks?" Responses: number of days in a week and number of servings in 1 day; classified into consumption of soft drinks 6 or 7 days a week or < 6 days a week. (2) "Consumption of processed food high in sugar (biscuits, wafers, cakes, candy, sweets and chocolate?" Responses ranged from 1, always (every meal) to 5, never, and were classified into consumption daily or with every meal, and less than daily or never. (3) "Adding sugar to your beverages?" Responses ranged from 1, always (every drink) to 5, never, and were classified into every day or every drink, and less than every day or every drink. (4) "How often do you add salt or a salty sauce such as soya sauce to your food?" Responses ranged from 1, always (every meal) to 5, never, and were classified into every or most meals and sometimes, rarely or never. (5) "Use spices other than salt when cooking?"(Yes or No). (6) Daily fruit and vegetables intake was calculated from the number of servings of FAV consumed per day in a typical week. Inadequate fruit and vegetable consumption was defined as < 5 servings per day.

BMI was classified as underweight (< 18.5 kg/m²), normal weight (18.5–24.9 kg/m²), overweight (25.0–29.9 kg/m²) and obesity (≥ 30 kg/m²) (35). BP was measured 3 times using automated BP measurement (OMRON) (21). For the 3 measurements of systolic BP (SBP) and diastolic BP (DBP), average BP was calculated. Raised BP was defined as SBP ≥ 140 mmHg and/or DBP ≥ 90 mmHg, a self-reported diagnosis of hypertension, or current use of antihypertensive medication (26). Awareness of hypertension included "ever been told by a doctor or other health worker that you have raised blood pressure or hypertension" (21) among the population classified as having hypertension. Treatment of hypertension included "having taken any drugs (medication) for raised blood pressure prescribed by a doctor or other health worker in the past two weeks" (21). Control of hypertension was classified as an average SBP < 140 mmHg and DBP < 90 mmHg among hypertensives. A point-of-care instrument (CardiocheckPA analyser; PTS Diagnostics) was used for blood glucose measurement (21). Diabetes was defined as fasting plasma glucose ³ 7.0 mmol/l (126 mg/dl); using insulin or oral hypoglycaemic drugs; or having a history of diagnosis of diabetes (27). The highest educational level was grouped into low education (no schooling or incomplete primary school) and high education (completed primary school or higher) (21). Household wealth index quintiles, created from a list of household variables, were used to determine the economic status of the households surveyed (21).

Data analysis

Post-stratification adjustments were done to align with the population projections according to age–sex categories (21). Descriptive statistics on frequency, weighted prevalence and 95% confidence intervals (CIs) was performed for sociodemographic, health and hypertension

variables. c^2 statistics were used for comparison of proportions across groups. Analysis of variance was used for comparison of means across groups and Wilcoxon rank-sum (Mann–Whitney) tests for comparing medians between groups. Logistic regression was conducted to assess associations between sociodemographic factors, health variables and hypertension. Variables from bivariate analysis with a significance level of $P < 0.20$ were included in the multivariable model. Multivariable logistic regression was performed to estimate associations between sociodemographic factors, health variables, and awareness, treatment and control of hypertension. Global P values were calculated for categorical variables with Wald tests (using the testparm command in Stata). Multicollinearity among variables was checked by calculating their variance inflation factor and none exceeded 2. $P < 0.05$ was considered significant. Missing values (for all variables below 2.5%, except for BMI 4.6% and type 2 diabetes 7.1%) were excluded from the analysis. All analyses were adjusted for the multistage sample design and conducted with Stata software version 13.0 (Stata Corporation, College Station, TX, USA).

Results

Sample characteristics

Overall, 28.6% of the population had hypertension, 29.2% among men and 27.9% among women, 17.7% among individuals aged 18–29 years and 58.3% among those aged 60–69 years (Table 1). Among hypertensives, 29.6% were aware that they had hypertension, which was higher in women (41.2%) than in men (18.2%) ($P < 0.001$). Of the population with hypertension, 6.5% were currently using antihypertensive medication, and 12.5% had controlled their blood pressure (< 140/90 mm Hg). Mean SBP was 4.9 mmHg higher for men than for women ($P < 0.001$), while mean DBP was 0.5 mmHg higher for women than for men ($P = 0.789$). The prevalence of BMI overweight and obesity was higher in women (24.7% and 13.8%, respectively) than in men (13.2% and 4.4%, respectively)

Table 1 Sample characteristics of 4500 adults in the Kenya STEPS Survey, 2015

Variable name (no. of missing data)	Variable specification	Total	Male	Female	*P*
Sample	***n* (%)**	**4500**	**1799 (40.0)**	**2701 (60.0)**	
Median age, yr (0)	Range 18–64, median (IQR)	38.0 (29–52)	39.0 (30–-52)	38.0 (28–52)	0.214
Systolic blood pressure (67)	mmHg, mean (SD)	125.8 (18.1)	128.3 (17.0)	123.4 (18.8)	< 0.001
Diastolic blood pressure (63)	mmHg, mean (SD)	81.4 (11.7)	81.1 (11.8)	81.6 (11.5)	0.789
		***n* (%)**	***n* (%)**	***n* (%)**	
Hypertension (67)		1428 (28.6)	563 (29.2)	865 (27.9)	0.529
Of hypertensives	Aware	475 (29.6)	114 (18.2)	361 (41.2)	< 0.001
Of hypertensives	Treated	115 (6.5)	24 (3.3)	91 (9.6)	< 0.001
Of hypertensives	Controlled	187 (12.5)	38 (5.7)	149 (19.3)	< 0.001
Education (0)	None/less than primary Primary or more	1855 (35.8) 2645 (64.2)	580 (29.8) 1219 (70.2)	1275 (41.5) 1426 (58.5)	< 0.001
Wealth status (0)	Poorest/Second Middle Fourth/Richest	1800 (39.8) 900 (18.4) 1800 (41.9)	663 (36.5) 345 (17.9) 791 (45.6)	1137 (42.9) 555 (18.8) 1009 (38.3)	0.009
Residence (0)	Rural Urban	2306 (51.2) 2194 (48.8)	853 (47.4) 946 (52.6)	1453 (53.8) 1248 (46.2)	0.022
Body weight status and health behaviour					
Body mass index (208)	Normal Underweight Overweight Obese	2432 (60.1) 518 (11.9) 886 (18.9) 447 (9.1)	1165 (68.0) 254 (14.3) 254 (13.2) 87 (4.4)	1267 (52.0) 264 (9.5) 632 (24.7) 360 (13.8)	< 0.001
Add salt or a salty sauce to food (10)	Every/most meals	1084 (23.2)	500 (26.3)	584 (20.3)	0.070
Use spices other than salt when cooking (3)	Yes	886 (25.6)	371 (26.0)	515 (25.3)	0.733
Add sugar to beverages (8)	Always or often	1681 (35.8)	710 (37.9)	971 (33.9)	0.114
Soft drinks (21)	6–7 d/wk	158 (4.0)	80 (4.4)	78 (3.7)	0.466
Fruit and vegetable consumption (21)	<5 servings/d	4147 (80.1)	1651 (78.6)	2496 (81.5)	0.089
Physical activity (107)	Low Moderate High	530 (10.9) 668 (14.4) 3194 (74.7)	147 (9.9) 209 (12.0) 1409 (78.1)	383 (11.8) 459 (16.7) 1786 (71.4)	0.032
Tobacco use (4)	Current	551 (13.4)	433 (23.2)	118 (4.0)	< 0.001
Alcohol use (1)	Past month binge drinking	463 (13.6)	392 (24.9)	71 (2.7)	< 0.001
Type 2 diabetes (319)	Yes	149 (2.7)	48 (2.3)	101 (3.1)	0.149

IQR = interquartile range; SD = standard deviation.

Table 2 **Predictors of hypertension among adults in the Kenya STEPS Survey, 2015 (unweighted *n*=4035)**

Variable	COR (95% CI)[a]	P	AOR (95% CI)[b]	P
Sociodemographic factors				
Age, yr				
18–29	1 (reference)	< 0.001	1 (reference)	< 0.001
30–44	1.91 (1.40–2.62)		1.61 (1.16–2.24)	
45–59	4.49 (3.33–6.05)		3.77 (2.86–4.98)	
60–69	6.50 (4.81–8.80)		6.45 (4.50–9.23)	
Sex				
Female	1 (reference)			
Male	1.05 (0.85–1.39)	0.635		
Education				
Primary school complete or more	1 (reference)		1 (reference)	
No schooling/primary school incomplete	0.65 (0.56–0.79)	<0.001	0.76 (0.61–0.95)	0.018
Wealth quintile				
Poorest/Second	1 (reference)	0.004	1 (reference)	0.187
Middle	1.43 (1.11–1.85)		1.22 (0.94–1.60)	
Fourth/Richest	1.47 (1.16–1.86)		0.95 (0.72–1.26)	
Residence				
Urban	1 (reference)			
Rural	1.11 (0.88–1.39)	0.370	—	
Body weight status and health behaviour				
Body mass index				
Normal	1 (reference)	< 0.001	1 (reference)	<0.001
Underweight	0.51 (0.37–0.71)		0.52 (0.37–0.72)	
Overweight	1,73 (1.31–2.29)		1.72 (1.28–2.29)	
Obese	2.60 (1.96–3.45)		2.60 (1.95–3.48)	
Salt or salty sauce (every/most meals) (base=sometimes (every week) or rarely or never)	0.96 (0.70–1.30)	0.782	—	
Spices instead of salt when cooking (Yes) (base = no)	0.83 (0.58–1.19)	0.315	—	
Add sugar to beverages (every day/drink) (base = <every day/drink)	0.94 (0.78–1.13)	0.495	—	
Soft drinks (6–7 d/wk) (base= <6–7 d/wk)	0.96 (0.44–2.10)	0.912	—	
Processed food high in sugar (daily, every meal) (base=<daily or never)	1.23 (0.77–1.95)	0.386	—	
Fruit and vegetable consumption (< 5 servings) (base = 5 or more)	0.83 (0.68–1.02)	0.071	0.87 (0.70–1.08)	0.198
Physical activity				
Low	1 (reference)	0.918	—	
Moderate	0.97 (0.63–1.48)			
High	0.86 (0.58–1.34)			
Current tobacco use (base = no)	0.86 (0.65–1.15)		—	
Past month binge drinking (base = no)	1.53 (1,12–2.08)	0.008	1.82 (1.31–2.51)	<0.001
Type 2 diabetes (base = no)	3.57 (2.18–5.83)	<0.001	3.48 (2.10–5.76)	<0.001

[a]*Adjusted for age;* [b]*adjusted for all covariates.*
AOR = adjusted odds ratio; CI = confidence interval; COR = crude odds ratio.

(P < 0.001). Current tobacco use and past month binge drinking prevalence were significantly higher in men (23.2% and 24.9%, respectively) than in women (4.0% and 2.7%, respectively) (P < 0.001).

Associations between risk factors and hypertension

Table 2 shows associations (odds ratios) between independent variables and the prevalence of hypertension. In the fully adjusted model, older age, higher education, overweight and obesity, past month binge drinking, and type 2 diabetes were positively associated with hypertension. In contrast, being underweight was negatively associated with hypertension.

Factors affecting awareness, treatment and control of hypertension

Only 44.1% of the population sample indicated that they had ever their BP measured by a healthcare worker; this increased from 38.3% among those aged 18–29 years to 54.0% among those aged 60–69 years (P < 0.001) (Table 3). Of individuals aware of their hypertension status, only 22.1% indicated that they were currently taking antihypertensive medication; this was 4.4% among those aged 18–29 years and 46.7% among those aged 60–69 years. A few of the participants (2.7%) who were aware of their hypertension status had ever consulted a traditional healer for their hypertension problem, and 1.1% were currently

Table 3 Awareness and treatment pattern for hypertension by age group among 4500 adults in the Kenya STEPS Survey–2015

Total sample	Age groups in years					
	Total	18–29	30–44	45–59	60–69	*P*
	n (%)	*n* (%)	*n* (%)	*n* (%)	*n* (%)	
Ever blood pressure measured by healthcare worker	2218 (44.1)	658 (38.3)	846 (45.6)	477 (54.9)	237 (54.0)	< 0.001
Ever previously diagnosed with raised blood pressure or hypertension	484 (19.3)	89 (11.9)	143 (16.8)	160 (32.6)	92 (37.0)	< 0.001
Hypertension measured	1241 (25.0)	225 (14.5)	405 (25.6)	378 (45.3)	233 (52.3)	< 0.001
Hypertension measured, diagnosed and/or treated	1428 (28.6)	285 (17.7)	475 (29.2)	413 (49.1)	255 (58.3)	< 0.001
Of hypertensives						
Aware	475 (29.6)	88 (25.8)	139 (25.8)	156 (36.4)	92 (34.4)	0.042
Treated (drugs, medication)	115 (6.5)	7 (1.1)	20 (5.5)	48 (10.1)	40 (14.4)	< 0.001
Controlled	187 (12.5)	60 (18.0)	70 (12.4)	35 (7.6)	22 (10.2)	0.027
Aware of hypertension						
Treated (drugs, medication)	118 (22.1)	7 (4.4)	22 (22.5)	49 (27.6)	40 (46.7)	0.002
Ever traditional healer	18 (2.7)	1 (1.3)	5 (2.4)	8 (2.6)	4 (7.0)	0.228
Currently taking herbal or traditional remedy	12 (1.1)	1 (0.1)	2 (1.2)	6 (0.8)	3 (3.9)	0.033
Of treated						
Controlled	38 (39.2)	5 (34.6)	5 (45.6)	15 (36.1)	13 (38.1)	0.919

taking a herbal or traditional remedy for their hypertension. Among participants who were using antihypertensive medication, overall, 39.2% were controlled; this was the highest among those aged 30–44 years (45.6%).

Associations between risk factors and awareness, treatment and control of hypertension

In logistic regression analysis adjustment for age, sex, education, wealth quintile, residence status and BMI, being obese and having type 2 diabetes were associated with greater awareness and being male with poorer awareness of hypertension (Table 4). The odds for treatment of hypertension were higher among participants who were aged ³ 45 years, women, or underweight or obese. The odds of controlled hypertension decreased with age and were lower among men, while individuals with type 2 diabetes were more likely to have controlled hypertension.

Discussion

In this first nationally representative population-based survey on hypertension in Kenya, we found a high prevalence of hypertension (28.6%), with low awareness, treatment and control of hypertension in adults aged 18–69 years. The prevalence of hypertension is similar to the pooled prevalence of hypertension in Africa (*2*) and the global prevalence (*1*), but higher than the prevalence in individuals in sub-Saharan Africa aged 50–60 years (*3*), and in previous surveys in slum areas in Nairobi, Kenya (*4,5*).

We found that older age was associated with hypertension, which agrees with previous studies (*7–15*). Higher education level and, in bivariate analysis, greater wealth increased the risk of hypertension, whereas, in a previous meta-analysis, lower socioeconomic status (income, education and occupation) was associated with hypertension (*28*). There are, however, studies in Africa showing a positive association between education and hypertension, for example, in Ghana (*29*). It is possible that in some low-income countries, such as Kenya, the epidemiological transition is affecting the better-educated segments of society first before reaching the lower-educated population. Previous studies have found an association between urban residence and hypertension (*9,13,15*), while we did not find such an association. The absence of an urban–rural difference in the prevalence of hypertension in the current study may indicate equalization of the urban–rural divide in noncommunicable diseases and their risk factors, compared to older studies (*30*).

Overweight and obesity increased the odds of having hypertension, which agrees with previous studies (*7–11,15*). Obesity may be correlated independently with hypertension but it is also possible that obesity is mediated through an unhealthy diet and insufficient physical activity (*12*). Other metabolic risk factors for hypertension include diabetes (*9,16*), which was confirmed in the present study.

Consistent with previous studies (*6,7,31*), we found that binge drinking was associated with hypertension. Heavy drinking, especially binge drinking, is linked to higher mortality from cerebral thrombosis, cerebral haemorrhage and coronary artery disease, although the role of alcohol-related hypertension is not well established (*32*). While a number of previous studies (*13,15*) have found an association between low physical activity and hypertension, we did not find such an

Table 4 Adjusted odds ratios for hypertension awareness, treatment and control among hypertensives in the Kenya STEPS Survey, 2015 (unadjusted *n*=1324)

Variable	Hypertension					
	Aware		treated		Controlled (*n* = 1324)	
	AOR (95% CI)1	*P*	AOR (95% CI)a	*P*	AOR (95% CI)a	
Age, yr						
18–29	1 (reference)	< 0.001	1 (reference)	< 0.001	1 (reference)	< 0.001
30–44	0.85 (0.52–1.40)		4.58 (1.00–20.96)		0.57 (0.31–1.05)	
45–59	1.16 (0.74–1.81)		6.52 (1.52–28.01)		0.22 (0.10–0.48)	
60–69	1.28 (0.69–2.35)		13.73 (3.06–61.61)		0.31 (0.15–0.63)	
Sex						
Female	1 (reference)		1 (reference)		1 (reference)	
Male	0.35 (0.23–0.52)	< 0.001	0.37 (0.16. 0.83)	0.017	0.22 (0.12–0.42)	< 0.001
Education						
Primary school complete or more	1 (reference)		1 (reference)		1 (reference)	
No schooling/primary school incomplete	0.98 (0.62–1.54)	0.928	0.82 (0.39–1.72)	0.601	1.41 (0.85–2.35)	0.181
Wealth quintile						
Poorest/Second	1 (reference)	0.180	1 (reference)	0.302	1 (reference)	0.290
Middle	1.17 (0.77–1.80)		1.55 (0.69–3.51)		1.05 (0.59–1.89)	
Fourth/Richest	1.63 (0.97–2.71)		1.46 (0.53–4.03)		1.38 (0.74–2.58)	
Residence						
Urban	1 (reference)		1 (reference)		1 (reference)	
Rural	1.12 (0.71–1.76)	0.635	1.73 (0.92–3.24)	0.089	1.27 (0.70–2.33)	0.428
Body mass index						
Normal	1 (reference)	< 0.016	1 (reference)	0.072	1 (reference)	0.275
Underweight	1.08 (0.53–2.21)		3.76 (1.14–12.41)		2.06 (0.78–5.45)	
Overweight	1.38 (0.91–2.10)		2.00 (0.86–4.65)		1.16 (0.67–2.02)	
Obese	1.94 (1.23–3.05)		2.64 (1.15–6.04)		0.67 (0.31–1.43)	
Type 2 diabetes (base = no)	3.50 (1.41–8.67)	0.007	1.90 (0.80–4.51)	0.146	3.19 (1.51–6.72)	0.002

[a]*Adjusted for all covariates. AOR = adjusted odds ratio.*

association. Unlike previous studies (*17–19*), we did not find an association between hypertension and intake of fruit and vegetables, saturated fat, fast food and salt. It is possible that participants with diagnosed hypertension adopted better lifestyle practices (diet and physical activity) to control BP (*33*). Current tobacco use is a significant risk factor for hypertension (*20*). However, we found no association. It is possible that the impact of current tobacco use on hypertension is delayed, and thus, current tobacco use may not be closely correlated with hypertension (*34*). Gao et al. (*34*) found that number of cigarettes smoked per day was negatively associated with risk of hypertension; however, the increase in life-course-adjusted number of cigarettes smoked per day was associated with higher risk of hypertension.

Of those who had hypertension, only 29.6% were aware, 6.5% were using antihypertensive medication and 12.5% had controlled their BP. Similar low hypertension awareness rates have been found across Africa (*2,3*), in slum areas in Kenya (*4,5*), and in low- and middle-income countries (*1*). The rate of using antihypertensive medication was lower in this study than in some of the previous studies (*1,3*) and the proportion of individuals who had controlled their BP was higher in the present study. The low levels of awareness, treatment and control of hypertension may be have been due to insufficient public health interventions, which have focused on infectious rather than noncommunicable diseases and their risk factors (*7*). The large number of hypertension cases left untreated and uncontrolled increases the risk for comorbidity, such as cardiovascular disorders, stroke and cardiac failure (*35*). Therefore, early identification, early and improved management, and regular follow-up of hypertension are urgently needed (*35*).

The awareness and treatment of hypertension in this study was greater among women than men, as found previously (*13,26*). This is probably related to better health-seeking behaviour among women than men (*34*). We also found that older age or being underweight or obese increased the odds for treatment of hypertension and decreased the odds of control of hypertension. Similar results were found in previous studies (*13,14*). These findings seem to suggest awareness and treatment of hypertension needs to be improved, especially among men and younger population groups. Contrary to a previous study (*34*), we found an association between type 2 diabetes and controlled hypertension, which may have been related to better management of comorbid hypertension and type 2 diabetes.

A strength of the present survey was that it used a sampling design that permitted nationally representative estimates by sex (male and female) and residence (urban and rural areas). Apart from blood chemistry, anthropometric and BP measurements, 1 study limitation was that all the other information assessed in this analysis was based on self-reporting. It is possible that

certain behaviours were over- or under-reported. It is possible that the over-reporting of physical activity led to a nonsignificant association with hypertension. Furthermore, it was a cross-sectional study and causal relationships between risk factors and the development of hypertension could not be established.

Conclusion

We found a high prevalence of hypertension in a representative sample of the general adult population in Kenya. Less than one third of individuals with hypertension were aware of their condition and a minority were treated and controlled. Several risk factors, including sociodemographic variables (older age and completion of primary school), body weight status (obesity), health behaviour (binge drinking), and type 2 diabetes were identified, which can help in guiding intervention programmes. Interventions programmes operating at multiple levels are urgently needed that can increase awareness of hypertension, and access to BP treatment and community-wide health behaviour interventions that have been identified and are known to be effective in reducing high BP. Conducting targeted screening of high-risk groups, such as those with overweight or obesity and with type 2 diabetes, and treatment of all persons (where indicated) attending healthcare facilities is recommended. Interventions aimed at reducing binge drinking, especially among high-risk groups, should be integrated into health services.

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Prévalence, connaissance, traitement et maîtrise de l'hypertension chez les adultes au Kenya : enquête transversale nationale en population

Résumé

Contexte : L'hypertension constitue un problème de santé publique majeur qui connaît une forte expansion en Afrique.

Objectifs : Déterminer la prévalence de l'hypertension et évaluer le degré de sensibilisation à cette pathologie, ainsi que le niveau de traitement et de maîtrise de l'hypertension au Kenya.

Méthodes : Une étude transversale nationale fondée sur un échantillonnage aléatoire en grappes stratifiées a été réalisée en 2015. L'échantillon total comprenait 4500 individus kényans âgés de 18 à 69 ans (60,0 % de femmes ; âge médian de 38,0 ans, intervalle interquartile 29-52 ans). Nous avons utilisé l'approche STEPS de l'Organisation mondiale de la Santé : étape 1, entretien par questionnaire ; étape 2, mesures anthropométriques et mesure de la tension artérielle ; et étape 3, examens biochimiques. L'analyse de régression logistique a été utilisée pour étudier les déterminants de l'hypertension (tension artérielle systolique/diastolique à 140/90 mm Hg ou recours aux médicaments antihypertenseurs), ainsi que la sensibilisation, le traitement et la maîtrise.

Résultats : Dans l'ensemble, 28,6 % de la population souffrait d'hypertension, dont 29,2 % des hommes et 27,9 % des femmes, 17,7 % des 18-29 ans et 58,3 % des 60-69 ans. Parmi les hypertendus, 29,4 % étaient conscients de leur état, 6,5 % prenaient des médicaments antihypertenseurs et 12,5 % avaient maîtrisé leur tension artérielle (< 140/90 mmHg). Dans le modèle entièrement ajusté, l'âge avancé, l'éducation supérieure, le surpoids et l'obésité, la consommation excessive d'alcool au cours du mois qui précède la réalisation de l'étude et le diabète de type 2 étaient positivement associés à l'hypertension. En outre, il existe une association négative entre le déficit pondéral et cette pathologie.

Conclusions : On a constaté une forte prévalence de l'hypertension chez les adultes au Kenya, avec de faibles taux de connaissance, de traitement et de maîtrise de cette affection. Une intervention de santé publique devrait être menée sous la forme d'une action intégrée et globale ciblant les principales maladies non transmissibles dans le pays.

انتشار ارتفاع ضغط الدم بين البالغين في كينيا، والتوعية بشأنه وعلاجه ومكافحته: مسح وطني مقطعي قائم على السكان

سوبا بنجبيد، كارل بيلتزر

الخلاصة

الخلفية: يُعتبر ارتفاع ضغط الدم مشكلة رئيسية ومتنامية في مجال الصحة العامة في أفريقيا.

الأهداف: هدفت الدراسة إلى تحديد مدى انتشار ارتفاع ضغط الدم وتقييم مستويات الوعي به، وعلاجه، ومكافحته في كينيا.

طرق البحث: في عام 2015، أُجريت دراسة مقطعية على المستوى الوطني استناداً إلى أخذ عينة عشوائية طبقية. وبلغ مجموع الأفراد الذين شملتهم العينة 4500 شخصاً أعمار تتراوح بين 18–69 عاماً من كينيا، (60.0٪ منهم من الإناث؛ بمتوسط عمر 38.0 عاماً، وتراوح المدى الربعي بين 29–52 عاماً). وقد استخدمنا نهج منظمة الصحة العالمية التدريجي للترصد، كالتالي: الخطوة 1: مقابلة عن طريق الاستبيان، الخطوة 2: القياسات الأنثروبومترية وقياسات ضغط الدم، الخطوة 3: الاختبارات البيوكيميائية. واستُخدم الانحدار اللوجستي للوقوف على مُحدِّدات ارتفاع ضغط الدم: ضغط الدم (الانقباضي/ الانبساطي) 140/ 90 ملم زئبق أو استخدام الأدوية المضادة لارتفاع ضغط الدم المفرط، والتوعية بشأنه، وعلاجه ومكافحته.

النتائج: بلغ إجمالي نسبة السكان المصابين بارتفاع ضغط الدم 28.6٪، منهم 29.2٪ من الرجال، و27.9٪ من النساء، ووصلت نسبة السكان المُصابين بارتفاع ضغط الدم الذين تتراوح أعمارهم بين 18–29 عاماً، وبين 60–69 عاماً إلى 17.7٪، و58.3٪ على التوالي. ومن بين المصابين بارتفاع ضغط الدم، كان 29.4٪ منهم على علم بإصابتهم، و6.5٪ كانوا يستخدمون حالياً أدوية مضادة لارتفاع ضغط الدم المرتفع، و12.5٪ استطاعوا التحكم في ضغط الدّم لديهم (أقل من 140/ 90 ملم زئبق). وفي النموذج المُصحح بالكامل، ارتبط بارتفاع ضغط الدم السن الأكبر، والمستوى التعليمي الأعلى، وزيادة الوزن، والسمنة، وتعاطي الكحول بصورة متكررة على مدار الشهر السابق للدراسة، والنمط 2 من داء السُّكري. بالإضافة إلى ذلك، كان هناك ارتباط سلبي بين نقص الوزن وارتفاع ضغط الدم.

الاستنتاجات: تبين انتشار ارتفاع ضغط الدم بمعدَّلات مرتفعة بين البالغين في كينيا، مع انخفاض الوعي بشأنه، وضعف معدلات علاجه ومكافحته. ولابد من استجابة الصحة العامة في شكل إجراء متكامل وشامل لاستهداف الأمراض غير السارية الأساسية في البلد.

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