Prevalence, Awareness, and Treatment Profile of Adult Filipino Hypertensive Individuals: Philippine Heart Association–Council on Hypertension Report on Survey of Hypertension (PRESYON-4)

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Abstract

BACKGROUND: Hypertension is one of the leading causes of cardiovascular morbidity and mortality in the Philippines. The prevalence rate of hypertension has been increasing, and this was associated with increasing comorbidities and poor control rates. The Philippine Heart Association–Council on Hypertension has been conducting the PRESYON studies since 1992 to determine the present hypertension rates. This updated PRESYON-4 aimed to know the latest numbers of hypertension cases in the country and to determine the awareness, treatment profile, and control rates of individuals afflicted with hypertension.

METHODS: PRESYON-4 is a randomized, prospective, multistage, stratified, nationwide survey conducted last January to April 2021. It included 3,437 participants; 2,796 subjects were adults aged 19 years or older, and the rest of the participants were 12 to 18 years old. The prevalence of hypertension was analyzed from the survey. Anthropometric measurements, risk factors, and comorbidity assessment were also determined.

RESULTS: The prevalence rate of hypertension in the latest survey is 37%, with more than half of the respondents aware of their disease. Utilizing the classification of the European guidelines for hypertension, 34% had grade 1 hypertension, with 26% of participants having isolated systolic hypertension. Individuals older than 50 years are aware of their elevated blood pressure (BP), but more females are aware of their disease compared with men. Current smoking and obesity are high in the hypertensive population, whereas diabetes mellitus and angina are the more common comorbidities. Most subjects utilize the oscillometric arm BP apparatus to monitor their BP. Angiotensin receptor blockers are the most used antihypertensive medication with a high compliance rate. However, there is poor control among treated patients with hypertension, as the control rate is only 39%. The prescription of a single drug is still prevalent among Filipino hypertensive individuals.

CONCLUSION: The point prevalence of hypertension in the country is at 37% based on the analysis. The need to manage risk factors such as obesity and smoking should be part of management. A multisectoral approach in the management of hypertension should be part of the strategy to lower hypertension in the country.

KEYWORDS: hypertension, prevalence, awareness, compliance, BP control

INTRODUCTION

Noncommunicable diseases, such as cardiovascular disease, are increasing at a staggering rate worldwide, and this is attributable to increasing numbers of risk factors such as obesity, diabetes, and elevated blood pressure (BP). Hypertension has become the most common and preventable risk factor of cardiovascular disease.[1,2] Persistence of the disease leads to increasing incidence of ischemic heart disease and ischemic and hemorrhagic stroke. Reports indicate that the current number of 1 billion adults living with hypertension is predicted to increase to 1.56 billion by 2025.[3]

Hypertension, defined as BP reading of 140/90 mm Hg or greater, is a multifactorial and highly complex disease, with evidence suggesting that those living with it are mostly asymptomatic, which allows the disease to remain undetected for a long period. Risk factors identified with hypertension include excessive salt intake, obesity, increased alcohol consumption, and sedentary lifestyle.[4–6] When diagnosed early, lifestyle changes and pharmaceutical intervention become part of the management. However, poor adherence and compliance to treatment can be a serious public challenge in hypertension control.[6]

Globally, the burden of hypertension is high, and based on the analysis of 135 population-based studies, which included 900,000 adults from 90 countries, the estimated prevalence of hypertension was 31.1%, with men having a higher prevalence compared with women. The lowest prevalence was seen in South Asia, whereas the highest was in Eastern Europe and China.[7] In the Progressive Urban Rural Epidemiology study, which included 153,996 adults in 17 geographies, the rate was 40.8%. In high- and middle-income economic countries, the higher prevalence of hypertension comes from urban residents; however, in lower-income countries, the prevalence of hypertension was seen in the rural areas.[8]

In 2017, the American College of Cardiology/American Heart Association Task Force redefined hypertension as ≥130/80 mm Hg, based on the findings of prospective studies and results of randomized controlled trials including the SPRINT trial.[9] When the new definition was applied to the US general population, the prevalence increased from 32% to 45.4%.[10] In Chinese data, the prevalence jumped from 23.2% to 46.4%.[11] Full implementation of the US guidelines would require a greater proportion of adults to be treated with antihypertensive agents but could be advantageous by reducing cardiovascular disease deaths.

In the Philippines, cardiovascular disease is the leading cause of morbidity and mortality, and hypertension is identified as one of the risk factors. Unfortunately, the prevalence rate of hypertension is steadily increasing, from 11% in 1992 to 25% in 2008. The Expanded National Nutrition Survey of the Food and Nutrition Research Institute (FNRI) of the Department of Science and Technology conducted a survey in 2018 that showed a reduction of the prevalence of hypertension to be 19.2%.[12] However, this is based only on a cross-sectional questionnaire with a single-visit BP measurement.

The Council of Hypertension (COH) of the Philippine Heart Association has conducted a series of nationwide surveys on the status of hypertension in the country. Tagged as PRESYON, this was conducted three times, and the most recent one was conducted in 2007. In the PRESYON-3 survey,[13] the prevalence of hypertension in adult Filipinos was 28%. We are revisiting the same methodology for the PRESYON-4 survey, with the objective of finding the prevalence of hypertension and assessing awareness, treatment profile, and control rate of hypertension management in the Philippines.

METHODS

PRESYON-4 is a randomized, prospective, multistage nationwide survey like the process of the previous PRESYON series. Field researchers, who were trained by an independent research group and retained by members of the COH, conducted the survey and screened patients for elevated BP. After a multistage randomization of qualified cohorts from all regions of the Philippines, the field researchers conducted a nationwide mass BP screening of the cohort. A target population of 3,900 participants from 300 Filipinos each of the 13 regions of the country were screened. The prevalence of hypertension and other objectives were determined during the screening process. A weighing factor was applied to the survey results to correct the disproportionate allocation of the sample. The weight of sampling was used to arrive at a total Philippine sample.[13]

The survey questionnaire is seen in Appendix 1, and items on awareness, compliance, and use of medications were included.

Sample Generation

PRESYON-4 follows a seven-step sampling proportional to the population size:

- Step 1: Arrange the provinces comprising a particular region alphabetically
- Step 2: Arrange the towns in each province alphabetically
- Step 3: Arrange the barangays in each town alphabetically
- Step 4: Add barangay population cumulatively from one to *n*th (entire region)
- Step 5: Determine the sampling points (or spots) given the following assumptions: total interview quota per region (n = 300), interview quota per spot (n = 12), and number of spots needed (n = 300/12 = 25 spots)
- Step 6: Select sample households based on the determined sampling points
- Step 7: Select probability respondent in each sample household using the Kish grid method.

The study design ensures that all socioeconomic strata and both urban and rural populations would be represented. Only one household member is selected to answer the survey, and if more members are eligible, the use of the Kish grid method was

implemented to identify the respondent. The Kish grid method was described in the PRESYON-3 methodology[13] and has been proven over time as an effective instrument in producing a sample that conforms to the natural socioeconomic demographic profile.

BP Measurement
Blood pressure was obtained using a validated and calibrated oscillometric BP apparatus (OMRON HEM-7120), with the cuff at least 80% encircling the left arm. A pediatric cuff was used for the adolescent participants or for those with smaller arm circumference. The participants were asked to refrain from drinking caffeine, exercising, or smoking at least 30 minutes prior to measurement. They were made to sit and rest for 5 minutes, with their back supported, legs uncrossed, and the arm at the heart level. Systolic BP was measured at which the first of two or more Korotkoff sounds were heard, and the disappearance of the Korotkoff sound (phase 5) was used to determine the diastolic BP.[13]

Three BP measurements were performed during the survey: before, during, and at the end of the interview. The first BP measurement was discarded, and the average of the last two measurements was recorded as the subject's BP. This lowers the possibility of false BP elevations. The radial pulse rate was also recorded together with the BP measurement.

Blood Pressure Classification
The PRESYON-4 defined hypertension as having a systolic BP of 140 mm Hg or greater and/or diastolic BP of 90 mm Hg or greater. This is based on the 2018 European Society of Cardiology/European Society of Hypertension definition of hypertension, which is based on the evidence of multiple randomized controlled trials.[14] Isolated systolic hypertension is defined as an elevation of systolic BP of 140 mm Hg or greater but with normal diastolic pressures of less than 90 mm Hg. This is usually observed in the elderly population.[14]

Awareness, Compliance, and Treatment Control Definitions
Awareness was defined as the knowledge and recognition that the individual is hypertensive based on history and elevation of BP and may or may not experience symptoms such as headaches, nape pains, dizziness, or other symptoms.

Unawareness was the denial of the parameters of awareness, but whose BP on two separate occasions during the survey was 140/90 mm Hg or greater.[13]

Compliance was defined as the regular intake of medications prescribed by their personal physicians, whereas noncompliance is the irregular intake of medications or the discontinuation of intake for a long period after initiating treatment.[13]

Treatment control was defined as the ability of the maintenance medications to lower the BP to less than 140/90 mm Hg.

Untreated was defined as the condition in which there is no history of drug intake despite diagnosis of hypertension, or intake of alternative or traditional medications to lower BP.[13]

RESULTS

The survey was conducted in January 2021 and completed in April 2021. A total of 3437 subjects participated in the study; 2,796 participants were age 19 years and older. Like the previous study, Filipino adolescents 12 to 18 years old were included in the survey and comprised 19% of the sample size.

Baseline Characteristics
Table 2 signifies the baseline characteristics of the adult participants of PRESYON-4. A total of 3,437 were screened and included in the study; 81% of the participants were more than 19 years old and above. Half of the respondents were males, and most were in the 20- to 29-year age range. Fifty percent lived in the urban area and belonged to classes D and E socioeconomic status. More than half of the respondents were working and belonged to the skilled agricultural workers.

Angina and diabetes mellitus were the two most common concomitant risk factors of the survey population. Smoking was relatively prevalent among the survey participants. Approximately 40% of the surveyed participants were obese based on the Asia-Pacific body mass index (BMI) classifications.

Prevalence of Hypertension in the Philippines
Results for the pediatric age group are not reported in this article and will be reported separately.The prevalence of hypertension with a BP of 140/90 mm Hg or greater among adults was 37%, with 19% of the participants having high

Table 1. Classification of Office Blood Pressure Used in PRESYON-4[14]

Category	Systolic Blood Pressure, mm Hg		Diastolic Blood Pressure, mm Hg
Normal	120–129	and	80–84
High normal	130–139	and/or	85–89
Grade 1	140–149	and/or	90–99
Grade 2	150–159	and/or	100–109
Grade 3	≥160	and/or	≥110
Isolated systolic hypertension	≥140	and	<90

PRESYON=Philippine Heart Association–Council on Hypertension.

Table 2. Baseline Characteristics of Participants in PRESYON-4

Characteristics	Number	Percentage(%)
Age, y*		
12–18	641	19
18–19	157	5
20–29	817	24
30–39	629	18
40–49	497	14
50–59	359	10
60–69	209	6
70–79	97	3
≥80	31	1
Sex		
Male	1728	50
Female	1710	50
Work status		
Working	1512	54
Nonworking	522	19
Housewives	525	19
Students	236	8
Urbanity		
Urban	1401	50
Rural	1395	50
Marital status		
Single	734	26
Married	1425	51
Divorce	24	1
Widow/widower	189	7
Cohabitation	423	15
Socioeconomic data		
Class AB/upper C	21	1
Class broad C	322	12
Class D	1292	46
Class E	1161	42
Concomitant risk factors		
Diabetes mellitus	140	5
Angina	221	8
Heart attack	13	1
Stroke	43	3
Peripheral artery disease	0	0
Smoker	709	25
BMI, kg/m^2		
<23	1474	44
23–24	503	15
25–29	938	28
≥30	603	13
Mean waist circumference, cm	82.8	
Central obesity	602	16

BMI=body mass index; PRESYON=Philippine Heart Association–Council on Hypertension.

***Note:** The count in the people surveyed is 3,437. There is an overlap in the age group of 12-18 and 18-19 years old

normal BP (130–139/80–89 mm Hg) (Figure 1). This is higher from the previous PRESYON-3 survey 8 years ago. One-third of the participants with hypertension were in grade 1 category, whereas a portion of the population surveyed had isolated systolic hypertension, defined as systolic BP of 140 mm Hg or greater but with a diastolic BP of 80 mm Hg or less (Figure 2). If we compare hypertension prevalence per urban compared with rural, there are comparable rates in the prevalence for both urban (38%) and rural areas (37%). Most of the population with hypertension was seen in the broad C socioeconomic status (41%), with classes E and AB/upper C with 37%. Regions 1 (52%), 6 (42%), 2 (41%), and the National Capital Region (40%) had the highest prevalence rates based on geographical regions.

Awareness Among Filipino Adults With Hypertension

Awareness was relatively low, as only 52% of the population was aware that they had hypertension, whereas the rest were unaware of their condition (Figure 3). If we zoom in to age groups, younger patients were unaware of their conditions compared with the people older than 50 years (Figure 4). Females were more aware (22%) compared with men (17%).

Concomitant Risk Factors

Smoking was highly prevalent among those with hypertension identified in PRESYON-4, with 37% male smokers. Diabetes mellitus and angina were the two most common concomitant cardiovascular risk factors of hypertensive subjects. Most of the subjects with hypertension in the survey were obese I with an average BMI of 26.4 kg/m^2 and waist circumference of 90 cm (Table 3).

Hypertension Control

Among the subjects with hypertension, 67% were on antihypertensive medications with a high compliance rate,

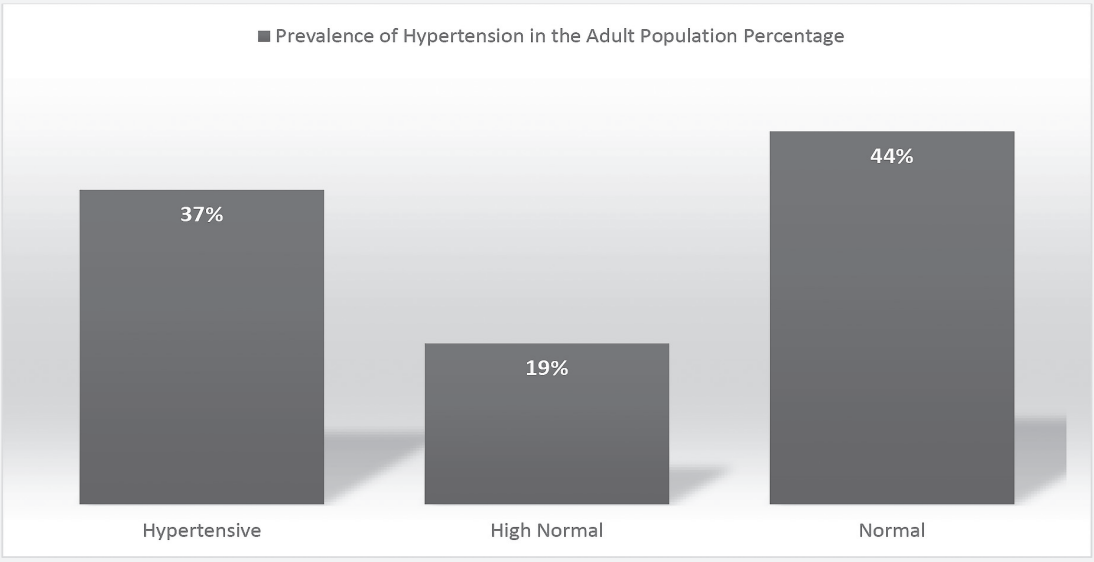

Figure 1. Prevalence of hypertension in adult Filipinos based on PRESYON-4

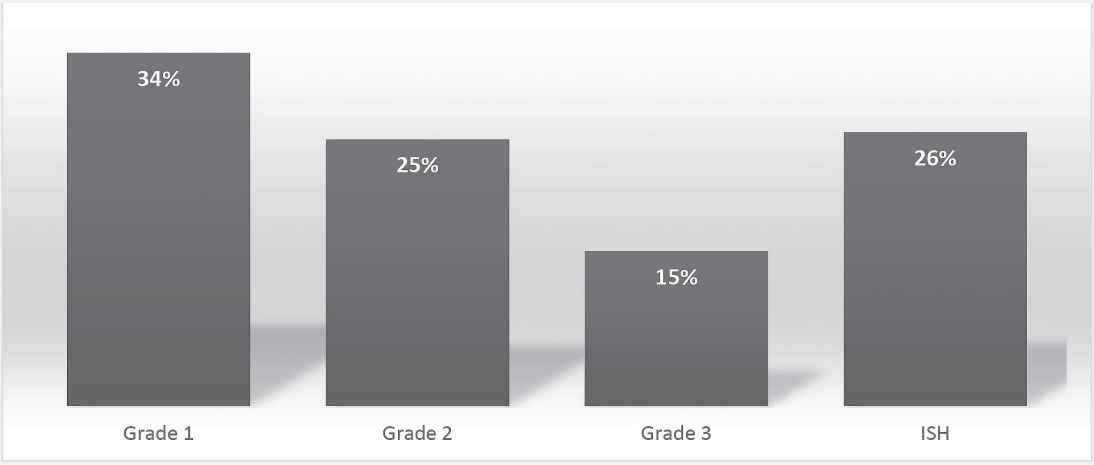

Figure 2. Percentage of hypertensive Filipino adults based on BP grade categories. PRESYON, Philippine Heart Association–Council on Hypertension

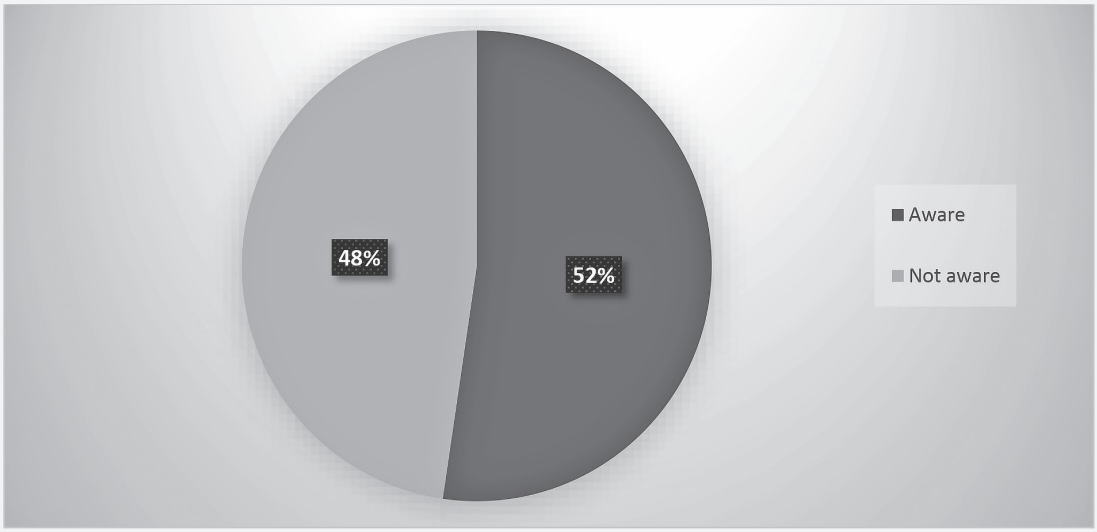

Figure 3. Awareness of hypertension among Filipino individuals

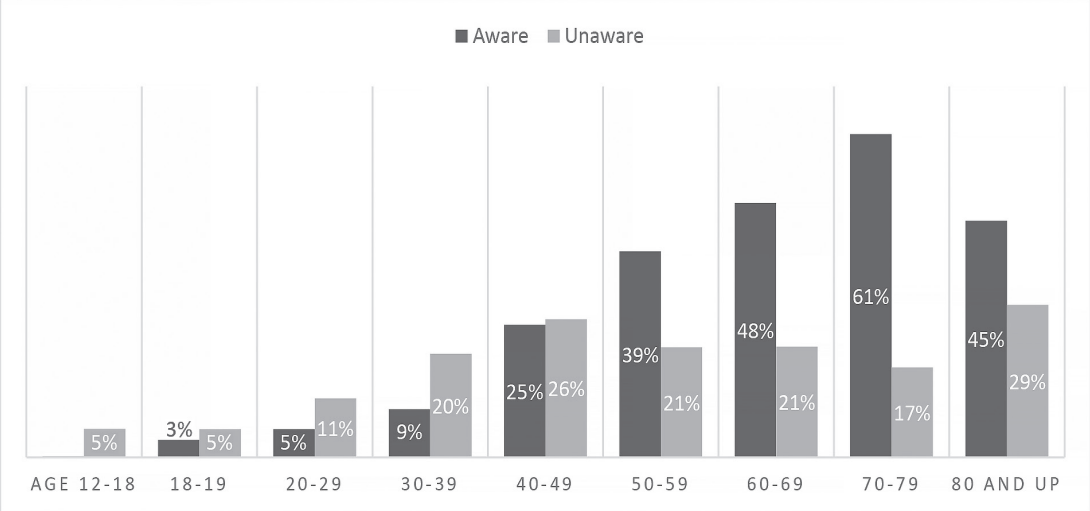

Figure 4. Hypertension awareness per age group

Table 3. Concomitant Risk Factors of Filipino Adults With Hypertension

Risk Factors	Total	Male	Female
Diabetes mellitus	4%	3%	5%
Angina	7%	5%	10%
Heart attack	0.4%	1%	0.3%
Stroke	1%	2%	1%
PAD	0	0	0
Current smokers	22%	37%	7%
BMI, kg/m^2			
<23	24%	38%	36%
23–24	17%	17%	17%
25–29	37%	32%	31%
≥30	21%	13%	17%
Central obesity	32%	9%	33%
Mean BMI, kg/m^2	26.4		
Mean arm circumference, cm	30.8		
Mean waist circumference, cm	90		

BMI=body mass index; PAD=peripheral artery disease.

described as daily regular intake of medications (87%). Most participants with hypertension used the oscillometric BP monitor and had their BP taken at their health centers. However, we see that there was poor control among individuals on treatment, with 61% of participants with uncontrolled hypertension (Figure 5).

Pharmacologic Management

In terms of pharmacologic treatment, most subjects with hypertension used an angiotensin receptor blocker (ARB) and a calcium-channel blocker. Seventy-eight percent of those treated were on a single pill (Figure 6). There was a relatively high compliance in patients taking the medications (Table 4); however, control rates were poor (Figure 6).

DISCUSSION

Elevation of BP has been shown to increase the risk of cardiovascular morbidity and mortality, thus the need to control and manage hypertension globally. The PRESYON program of the Philippine Heart Association has shown that despite the several treatment options available in the country, the point prevalence of subjects with hypertension is increasing, from 28% in 2013 to 37% in 2020, which is an increase of 9%. This is also higher in the cross-sectional study conducted by FNRI

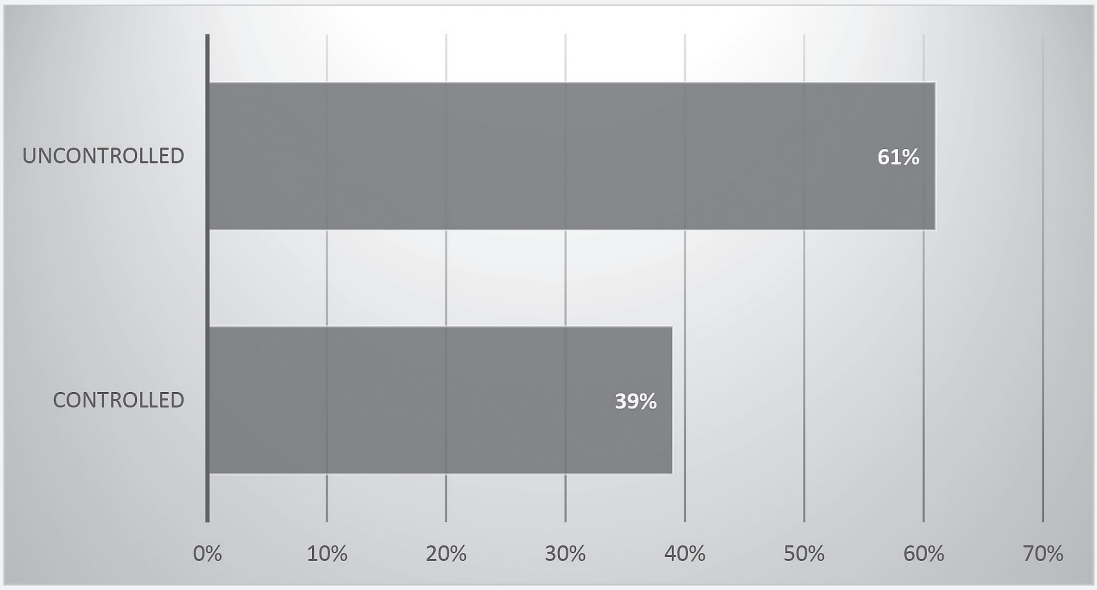

Figure 5. Control rates in treated Filipino hypertensive individuals

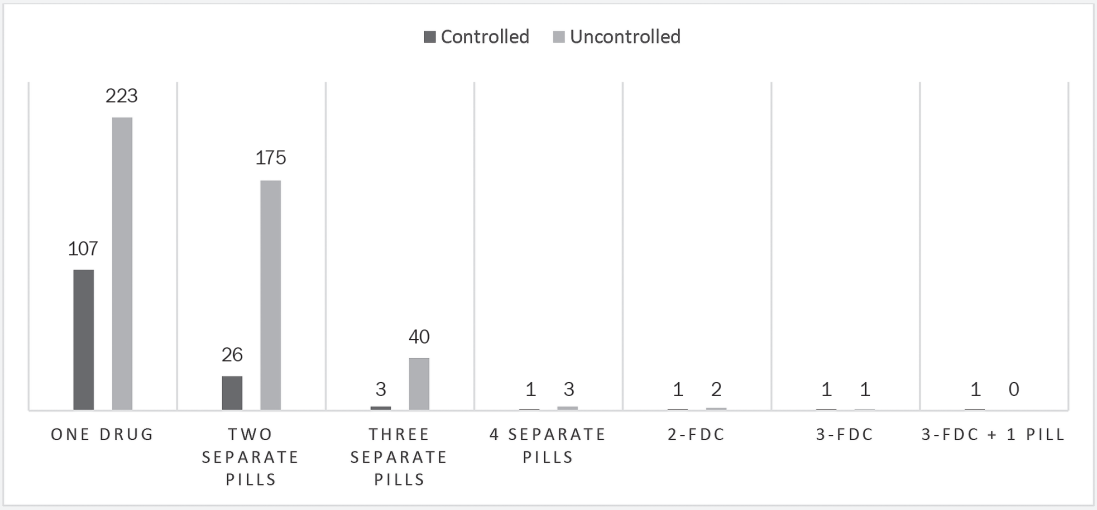

Figure 6. Hypertension control rates in adult Filipino hypertensive patients on different antihypertensive medications

Table 4. Medications Used and Compliance of Adult Filipinos With Hypertension

Antihypertensive Class	Percent Usage	Compliance
Angiotensin-converting enzyme inhibitor	3%	78%
Angiotensin antagonist	67%	89%
β-Blocker	6%	98%
Calcium antagonist	42%	87%
Diuretic	1%	79%
Direct vasodilator	0.3%	100%
Others	6%	83%

in 2018, which was 19.2%. The methodology between the PRESYON cohorts and the FNRI is different; thus, we expect a difference in the prevalence rate. The prevalence of this study is close to the rate of the International Society of Hypertension's May Measurement Month (MMM), in which the Philippines also participated. In the 2017 MMM, the prevalence rate was 34.9%. Several factors may have an impact on the increase of the prevalence rate in the country such as increasing numbers of modifiable risk factors of obesity and smoking, poor health-seeking behavior of patients, the self-pay health care system of the country, and other factors. We hope that the Universal Health Care program of the government will help in answering some of these problems in the health care system of the country.

Low- to medium-income countries have low awareness and control of hypertension. Only 45.6% of individuals were aware of their disease, and 13.8% were able to control their BP.[8,15] We fare better as we have more than 50% awareness rates and 39% control rates. This is also better compared with the previous PRESYON[13] survey, where the awareness rate was 42% and control rate was 20%. There is still a lot of work to do in terms of patient awareness and control of hypertension.

There is a shift in the drug of choice among Filipino hypertensive patients. In the recent PRESYON-3, β-blockers were the most prescribed antihypertensive medication followed by calcium-channel blockers. The latest survey showed that the ARBs are now the most prescribed by Filipino physicians to their patients. This shift may be an influence of international guidelines,[9,12] making the renin–angiotensin–aldosterone system blockers as one of the first-line drugs for treatment. Other reasons why ARBs are becoming popular in the country are the availability of generic formulations, having a benefit of lowering hypertension, and having demonstrated favorable tolerability.[16] Unfortunately, several Filipino hypertensive patients are still on monotherapy. This is not aligned with international guidelines, which promote at least two drugs to lower BP to targets. There is also a low usage of diuretics, with only 1% of the subjects using them for BP lowering. The benefit of thiazide and thiazide-like diuretics, such as chlorthalidone[17] or indapamide,[18] or aldosterone receptor blockers, such as spironolactone[19] and eplerenone,[20] in BP lowering is not maximized by Filipino doctors. These factors may explain why control rates are high despite compliance to medications.

LIMITATIONS OF PRESYON-4

The study may have certain limitations. It is likely that a larger and systematic study may give a better understanding in the prevalence and underlying risk factors among the Filipino hypertensive population. A longer follow-up may be needed to better understand the true prevalence of the population. Lastly, the survey did not investigate other risk factors such as diet, lack of physical exercise, alcohol consumption, and other modifiable risk factors that may have an impact on hypertension treatment.

CONCLUSION

The prevalence of hypertension in the Philippines is 37%, with only 52% of those with elevated BP aware of their diagnosis. Modifiable risk factors such as obesity and current smoking are high among subjects with hypertension, thus leading to the increasing prevalence. Most of the subjects are on single pill use, with ARB as the most commonly used medication. However, there is still a high number of individuals with uncontrolled hypertension. There is a need for a multisectoral approach to bring the prevalence rates down in the country.

REFERENCES

1. Bina JJ, Noublap JJ. The rising burden of non-communicable diseases in sub-Saharan Africa. *Lancet Glob Health* 2019;7(10e):1295–1296.
2. Masilela C, Pearce B, Ongole JJ, Adeniyi OV, Mongi Benjeddou M. Cross-sectional study of prevalence and determinants of uncontrolled hypertension among South African adult residents of Mkhondo municipality. *BMC Public Health* 2022;20:1069.
3. Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension: Analysis of worldwide data. *Lancet* 2005;365:217–223.
4. Messerli FH, Williams B, Ritz E. Essential hypertension. *Lancet* 2007;376:391–603.
5. Dahlof B. Prevention of stroke in patients with hypertension. *Am J Cardiol* 2007;100:17J–24J.
6. Gao Y, Chen G, Tian H, et al. Prevalence of hypertension in China: A cross-sectional study. *PLoS One* 2013;8(6):e65938.
7. Mills KT, Bundy JD, Kelly TN, et al. Global disparities of hypertension prevalence and control: A systematic analysis of population-based studies from 90 countries. *Circulation* 2016;134:441–450.
8. Chow CK, Teo KK, Rangarajan S, et al. Prevalence, awareness, treatment and control of hypertension in rural and urban communities in high-, middle-, and low-income countries. *JAMA* 2013;310:959–968.
9. Whelton PK, Carey RM, Aronow WS, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA. Guideline for the prevention, detection, evaluation and management of high blood pressure in adults: A report of the American College of Cardiology/American Heart Association task force on clinical practice guidelines. *Circulation* 2018;138:e484–e594.
10. Bundy JD, Mills KT, Chen J, Li C, Greenland P, He J. Estimating the association of the 2017 and 2015 hypertension guidelines with cardiovascular events and deaths in US adults: An analysis of nation data. *JAMA Cardiol* 2017;2:775–781.
11. Wang Zm Chen Z, Zhang L, et al. Status of hypertension in China. *Circulation* 2018;137:2344–2356.
12. 2013 8th National Nutrition Survey of the Food and Nutrition Research Institute, Department of Science and Technology. https://drive.google.com/file/d/1D6tbN4poyg3WkAFRBboO3L16o2bd__W_/view

13. Philippine Heart Association-Council on Hypertension. Philippine Heart Association—Council of Hypertension Report on Survey of Hypertension (PRESYON 3): A profile on prevalence of hypertension, awareness and treatment profile. *Phil J Cardiol* 2013;41(1):43–48.
14. Williams B, Mancia G, Spiering W, et al. 2018 ESC/ESH guidelines in the management of arterial hypertension. *Eur Heart J* 2018;00:1–98.
15. Mills K, Stefanescu A, He J. The global epidemiology of hypertension. *Nat Rev Nephrol* 2020;16(4):223–237.
16. Ostroff J, Wolff M. An overview of generic angiotensin receptor blockers. *US Pharm* 2016;41(6)(generic suppl):44–50.
17. Ernst ME, Carter BL, Goerdt CJ, et al. Comparative antihypertensive effects of hydrochlorothiazide and chlorthalidone on ambulatory and office blood pressure. *Hypertension* 2006;47:352–358.
18. Chalmers J, Mourad JJ, De Champvallins M, Mancia G. Benefits of indapamide-based treatment on mortality: A systematic review and meta-analysis. *J Hypertens* 2009;37:p357.
19. Williams B, MacDonald TM, Morant S, et al. Spironolactone versus placebo, bisoprolol and doxazosin to determine the treatment for drug-resistant hypertension (PATHWAY-2): A randomized, double-blind, crossover trial. *Lancet* 2015;386:2069.
20. Pitt B, Williams G, Remme W, et al. The EPHESUS trial: Eplerenone in patients with heart failure due to systolic dysfunction complicating acute myocardial infarction. Eplerenone post AMI heart failure efficacy and survival study. *Cardiovasc Drugs Ther* 2001;15:79–87.

APPENDICES

Appendix 1. Prevalence Rates of Hypertension in PRESYON-4

		TOTAL
Base - effective total interviews (18 & up)		2796
		100%
Hypertensive		1038
		37%
	Aware	543
	%	*19%*
	Not aware	495
	%	*18%*
Not hypertensive		1758
		63%
	Pre-hypertensive	521
	%	*19%*
	Normal	1237
	%	*44%*

Appendix 2. Prevalence Rates of Hypertension Based on Gender

		TOTAL	MALE	FEMALE
Base - effective total interviews (18 & up)		2796	1399	1398
		100%	*100%*	*100%*
Hypertensive		1038	542	497
		37%	*39%*	*36%*
	Aware	543	231	312
	%	*19%*	*17%*	*22%*
	Not aware	495	311	185
	%	*18%*	*22%*	*13%*
Not hypertensive		1758	857	901
		63%	*61%*	*64%*
	Pre-hypertensive	521	295	226
	%	*19%*	*21%*	*16%*
	Normal	1237	562	675
	%	*44%*	*40%*	*48%*

Appendix 3. Prevalence Rates per Region

		Total	Region 1	Region 2	Region 3	Region 4	Region 5
Base - effective total interviews (18 and up)		2796	168	122	322	490	148
		100%	*100%*	*100%*	*100%*	*100%*	*100%*
Hypertensive		1038	86	51	99	165	46
		37%	*51%*	*42%*	*31%*	*34%*	*31%*
	Aware	543	45	23	47	83	28
	%	*19%*	*27%*	*19%*	*15%*	*17%*	*19%*
	Not aware	495	41	28	52	82	18
	%	*18%*	*24%*	*23%*	*16%*	*17%*	*12%*
Not hypertensive		1758	82	71	222	325	102
		63%	*49%*	*58%*	*69%*	*66%*	*69%*
	Pre-hypertensive	521	31	23	78	108	10
	%	*19%*	*19%*	*19%*	*24%*	*22%*	*7%*
	Normal	1237	51	48	144	217	92
	%	*44%*	*30%*	*40%*	*45%*	*44%*	*62%*

Region 6	Region 7	Region 8	Region 9	Region 10	Region 11	Region 12	NCR
251	164	117	94	194	135	207	385
100%	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*
108	67	43	34	60	46	79	154
43%	*41%*	*37%*	*37%*	*31%*	*34%*	*38%*	*40%*
52	42	24	15	20	26	41	96
21%	*26%*	*21%*	*16%*	*10%*	*19%*	*20%*	*25%*
56	25	19	19	40	20	38	59
22%	*15%*	*16%*	*21%*	*21%*	*15%*	*18%*	*15%*
142	97	74	59	133	89	129	231
57%	*59%*	*63%*	*63%*	*69%*	*66%*	*62%*	*60%*
46	30	20	21	6	23	45	80
18%	*18%*	*17%*	*22%*	*3%*	*17%*	*21%*	*21%*
96	67	54	38	127	66	84	151
38%	*41%*	*46%*	*41%*	*66%*	*49%*	*41%*	*39%*

Appendix 4. Prevalence Rates per Age Group

		Total	Adolescent (12-18)	Adults (18+)	Elderly (60+)	18-19	20-29	30-39	40-49	50-59	60-69	70-79	80 and up
Base - effective total interviews (12 and up)		3351	641	2796	337	157	817	629	497	359	209	97	32
		100%	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*
Hypertensive		1061	33	1038	243	14	134	180	254	214	144	75	23
		32%	*5%*	*37%*	*72%*	*9%*	*16%*	*29%*	*51%*	*60%*	*69%*	*78%*	*73%*
	Aware	543	1	543	173	5	43	57	124	140	100	59	14
	%	*16%*	*	*19%*	*51%*	*3%*	*5%*	*9%*	*25%*	*39%*	*48%*	*61%*	*45%*
	Not aware	518	31	495	69	8	91	123	130	75	44	16	9
	%	*15%*	*5%*	*18%*	*21%*	*5%*	*11%*	*20%*	*26%*	*21%*	*21%*	*17%*	*29%*
Not hypertensive		2289	608	1758	95	144	683	449	243	145	65	21	8
		68%	*95%*	*63%*	*28%*	*91%*	*84%*	*71%*	*49%*	*40%*	*31%*	*22%*	*27%*
	Pre-hypertensive	556	41	521	37	15	181	140	98	51	29	6	1
	%	*17%*	*6%*	*19%*	*11%*	*9%*	*22%*	*22%*	*20%*	*14%*	*14%*	*7%*	*3%*
	Normal	1733	567	1237	58	129	502	309	145	94	36	15	7
	%	*52%*	*88%*	*44%*	*17%*	*82%*	*61%*	*49%*	*29%*	*26%*	*17%*	*15%*	*24%*

** Less than 0.5%*

Appendix 5. Prevalence Rates of Hypertension Per Working Group

		Total	Working	Non-working	Student	Housewife
Base - effective total interviews (18 and up)		**2796**	**1512**	**522**	**236**	**525**
		100%	***100%***	***100%***	***100%***	***100%***
Hypertensive		1038	605	232	23	179
		37%	***40%***	***44%***	***10%***	***34%***
	Aware	543	296	145	7	95
	%	***19%***	***20%***	***28%***	***3%***	***18%***
	Not aware	495	309	87	16	84
	%	***18%***	***20%***	***17%***	***7%***	***16%***
Not hypertensive		1758	908	290	214	347
		63%	***60%***	***56%***	***90%***	***66%***
	Pre-hypertensive	521	298	89	24	110
	%	***19%***	***20%***	***17%***	***10%***	***21%***
	Normal	1237	609	201	190	237
	%	***44%***	***40%***	***38%***	***80%***	***45%***

Appendix 6. Prevalence Rate of Hypertension Per Urbanity

		Total	Urban	Rural
Base - effective total interviews (18 and up)		**2796**	**1401**	**1395**
		100%	***100%***	***100%***
Hypertensive		1038	527	511
		37%	***38%***	***37%***
	Aware	543	286	257
	%	***19%***	***20%***	***18%***
	Not aware	495	241	254
	%	***18%***	***17%***	***18%***
Not hypertensive		1758	874	883
		63%	***62%***	***63%***
	Pre-hypertensive	521	274	247
	%	***19%***	***20%***	***18%***
	Normal	1237	601	636
	%	***44%***	***43%***	***46%***

Appendix 7. Prevalence Rate of Hypertension Per Socio-economic Status

		Total	AB/Upper C	Broad C	D	E
Base - effective total interviews (18 and up)		**2796**	**21**	**322**	**1292**	**1161**
		100%	***100%***	***100%***	***100%***	***100%***
Hypertensive		1038	8	132	468	430
		37%	***37%***	***41%***	***36%***	***37%***
	Aware	543	6	71	255	210
	%	***19%***	***30%***	***22%***	***20%***	***18%***
	Not aware	495	1	61	213	220
	%	***18%***	***6%***	***19%***	***16%***	***19%***
Not hypertensive		1758	13	190	824	731
		63%	***63%***	***59%***	***64%***	***63%***
	Pre-hypertensive	521	6	35	243	237
	%	***19%***	***31%***	***11%***	***19%***	***20%***
	Normal	1237	7	155	581	494
	%	***44%***	***33%***	***48%***	***45%***	***43%***

Appendix 8. Rate of Hypertensive Individuals on Medication

Base - Effective total aware sufferers	**Total**
	543
	100%
With medication	363
%	***67%***
Without medication	180
%	***33%***

Appendix 9. Control Rates of Treated Hypertensive Individuals

Base - Effective total aware sufferers with medications for BP (18 & up)	**TOTAL**
	363
	100%
Controlled BP (<140/90)	140
%	**39%**
Uncontrolled BP (>140/90)	223
%	***61%***

Appendix 10. Control Rates of Individuals on Medications

Base - Effective total aware sufferers, compliant with medications	**TOTAL**
	315
	100%
Controlled BP (<140/90)	125
%	***40%***
Uncontrolled BP (>140/90)	190
%	***60%***

Appendix 11. Location where Patients have their BP taken

Base - Effective total aware who have their blood pressure checked	**TOTAL**
	497
	100%
Health center	225
%	***45%***
Home	124
%	**25%**
Clinic	82
%	**17%**
Hospital	39
%	**8%**
Others*	45
%	***9%***

**Mostly from their neighbors*
***Multiple response, total may not add up to 100%*

Appendix 12. Types of BP Machines Used by Filipino Hypertensive Individuals

Base - effective total awarers who monitor their blood pressure at home	TOTAL
	124
	100%
Digital, arm	55
%	*44%*
Digital, wrist	21
%	*17%*
Aneroid	20
%	*16%*
Mercury	9
%	*7%*
Others	19
%	*15%*

Appendix 13. Compliance Rates on the Different Antihypertensive Medications

	Total	Ace-inhibitor	Angiotensin antagonist	Beta-blocker	Calcium antagonist	Diuretic	Direct vasodilator	Others
Base - aware sufferer, with medication	363	11	241	22	153	5	1	23
	100%	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*
Compliant	315	9	216	22	133	4	1	19
	87%	*78%*	*89%*	*98%*	*87%*	*79%*	*100%*	*83%*
Non-compliant	48	3	26	0	20	1	0	4
	13%	*22%*	*11%*	*2%*	*13%*	*21%*	*0%*	*17%*

Appendix 14. Prevalence of Comorbidities among Adult Hypertensive Individuals

Base - all effective interviews, adults 18+		Total	Male	Female
		2796	**1399**	**1398**
		100%	***100%***	***100%***
Diabetes	Yes	140	55	85
	%	***5%***	***4%***	***6%***
	No	2594	1319	1274
	%	***93%***	***94%***	***91%***
	Don't know	63	24	38
	%	***2%***	***2%***	***3%***
Currently smoking	Yes	709	597	112
	%	***25%***	***43%***	***8%***
	No	1984	716	1269
	%	***71%***	***51%***	***91%***
	Don't know	6	5	1
		*	*	*
	Stopped smoking	97	81	15
	%	***3%***	***6%***	***1%***
Chest pain / angina	Yes	221	83	138
	%	***8%***	***6%***	***10%***
	No	2567	1313	1254
	%	***92%***	***94%***	***90%***
	Don't know	8	2	6
		*	*	*
Heart attack	Yes	13	8	4
	%	*	***1%***	*
	No	2774	1389	1385
	%	***99%***	***99%***	***99%***
	Don't know	10	1	8
		*	*	***1%***
Stroke	Yes	43	27	16
	%	***2%***	***2%***	***1%***
	No	2741	1365	1375
	%	***98%***	***98%***	***98%***
	Don't know	13	7	6
		*	*	*
Peripheral Arterial Disease	Yes	0	0	0
	%	***0%***	***0%***	***0%***
	No	2781	1391	1390
	%	***99%***	***99%***	***99%***
	Don't know	15	7	8
	%	***1%***	***1%***	***1%***

** Less than 0.5%*