High Blood Pressure & Cardiovascular Prevention (2022) 29:353–359
https://doi.org/10.1007/s40292-022-00519-4

ORIGINAL ARTICLE

World Hypertension Day 2021 in Italy: Results of a Nationwide Survey

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Received: 5 February 2022 / Accepted: 25 March 2022 / Published online: 13 April 2022

Abstract

Introduction Hypertension is the biggest contributor to the global burden of cardiovascular diseases and related death, but the rates of hypertension awareness, treatment, and control remain largely perfectible.

Methods During the XVII World Hypertension Day (May 17th, 2021), a nationwide cross-sectional opportunistic study endorsed by the Italian Society of Hypertension was conducted on volunteer adults ≥ 18 years to raise awareness of high blood pressure (BP). A questionnaire on major demographic/clinical features (sex, age, employment, education, BP status awareness, hypertension family/personal history, antihypertensive medications use) and BP measurement habits (≥1 BP measurement in the previous month/week) was administered. Due to the ongoing SARS-CoV-2 pandemic, BP was measured with standard procedures in a subset of participants (24.4%).

Results A total of 1354 participants (mean age 56.3 ± 15.3 years; 57.3% women; mean BP: 131.2 ± 17.5/81.6 ± 10.5 mmHg; 42.3% self-declared hypertensive; 41.4% on antihypertensive medications) were enrolled; 73.6% declared being aware of their BP status. Among treated individuals with measured BP, 26.9% showed BP levels within the predefined therapeutic goals. Interestingly, BP status awareness rates were the highest among individuals with uncontrolled hypertension (85.1%) and the lowest among those with normal measured BP (54.4%).

Conclusions This survey provides an updated insight into hypertension awareness and control in a setting of daily clinical practice, emphasizing the centricity of patients in the therapeutic alliance for a successful reduction of cardiovascular risk.

Keywords Hypertension · Blood pressure · Survey · Awareness

1 Introduction

With nearly 18 million deaths every year, approximating one third of total deaths globally, cardiovascular diseases (CVD) are the leading cause of mortality worldwide [1]. This record endured for decades and was not lost in the year 2020 [2]. According to US data, in fact, 20.6% of total deaths during the first year of SARS-CoV-2 pandemic was attributable to CVD, while the third-ranking COVID-19 outbreak accounted for a 10.3% excess mortality in the same year compared with the year before [2].

Despite the substantially steady decline in CVD mortality rates over a century in nearly all regions of the world—mostly occurring in high-income countries like North America and Europe [3], but also evident in emerging economies like India, China, and South Africa [4]—, the rising prevalence of major cardiovascular risk factors over the same period of time suggested that gains in survival would have been even greater if these risk factors had been effectively controlled.

High blood pressure (BP), or hypertension, continues to be the biggest contributor to the global burden of CVD and related death. Despite affordable and effective antihypertensive treatments being nowadays available, the rates of hypertension treatment and control remain largely perfectible [5–8], with treatment and control rates for this condition having settled at best at around 80% and 60–70%, respectively, since the mid-2000s [9–12]. Moreover, findings from previous pragmatic nationwide Italian surveys estimated that approximately one in ten individuals was

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unaware of having high BP values [5, 6, 13–15], with even higher rates among apparently healthy adults [16], thereby highlighting the relevance of awareness-raising campaigns [13, 17].

2 Methods

2.1 Study Design

During the XVII World Hypertension Day (May 17th, 2021), the Italian Society of Hypertension, in collaboration with A.S.SO.FARM (Socio-Pharmaceutical Companies and Services, "Aziende e Servizi Socio-Farmaceutici"), UTIFAR (Italian Technical Union of Pharmacists, "Unione Tecnica Italiana Farmacisti"), and the Italian Federation of Pharmacists, endorsed a nationwide, cross-sectional, opportunistic study of volunteer adults aged 18 years or more aimed at raising awareness of BP. Volunteers were recruited at local sites using convenience sampling. Specifically, individuals who entered the participating pharmacies or attended the hospital medical center affiliated with the Italian Society of Hypertension and who provided their formal consent to take part in the survey were enrolled. Herein, only data from the hypertension clinics at the 16 participating Italian hospitals are reported. Staff at participating sites received specific training on BP measurements and administered a questionnaire on major demographic and clinical features (sex, age, type of employment, education, BP status awareness, family and personal history of hypertension, whether on antihypertensive medications), as well as on participants BP measurement habits (at least one BP measurement in the previous month and week; whether BP was measured on the survey day).

2.2 BP Measurement

Due to the ongoing COVID-19 pandemic, onsite BP measurement was performed in compliance with the ongoing restrictions and clinical common sense.

BP was measured using automated, validated sphygmomanometers, and BP measurements were performed according to the 2018 European Society of Cardiology/ European Society of Hypertension (ESC/ESH) guidelines [18]. Briefly, three consecutive BP measurements at 1 minute intervals were collected after a five minutes rest in the sitting position, with back and arm supported and feet flat on floor, and the average of the 2nd and 3rd measurements was recorded. Pulse rates were also automatically displayed by the device and recorded.

2.3 Definitions

BP status awareness was defined as the consciousness of having either normal BP or hypertension.

Globally, hypertension was defined as either a self-reported diagnosis or being currently treated for high BP. In the subset of individuals who underwent BP measurements on the survey day, hypertension was also defined as BP ≥ 140 and/or 90 mmHg in the absence of antihypertensive treatment. Among individuals who received antihypertensive medications, uncontrolled hypertension was defined as BP ≥ 130/80 mmHg if < 65 years of age and ≥ 140/80 mmHg if ≥ 65 years [18].

2.4 Ethical Clearance

The survey was conducted in conformity with the Helsinki Declaration. For each site, a coordinator was identified to take the responsibility of acquiring ethical clearance for the survey, if required. Data were anonymized at enrollment, making the identification of participants not possible.

2.5 Statistical Analysis

Data were entered on pre-prepared paper forms that were centralized at the Italian Society of Hypertension coordinating center, where they were transferred to a spreadsheet. All analyses were performed using R (v 4.0.2). Unpaired Student's t test and chi-squared test were used to detect differences in quantitative (mean ± standard deviation [SD]) and qualitative (N, %) data, respectively (statistical significance: $p < 0.05$). Prevalence of hypertension and BP status awareness rates were assessed overall and in the subset of individuals who underwent actual BP measurement to test for consistency between measured and self-reported data. Stratification was also performed based on sex and age tertiles (< 47; 47–67; ≥ 67 years). Data were analyzed as recorded, without imputation for missing data.

3 Results

3.1 Overall Findings

A total of 1354 adult individuals (age range 18–91 years; mean age 56.3 ± 15.3 years; 57.3% women) participated in the survey. Their demographic and clinical features are reported in Table 1. The majority of participants (59.5%) were employees, 35.9% were unoccupied/retired, and the remaining 4.6% reported being self-employed. In all,

Table 1 Demographic and clinical features of survey participants overall (n=1354) and stratified by sex

	Overall	Women	Men	p-value	Missing data, N (%)
N	1354	771	575		8 (0.6)
Age, years (mean, SD)	56.26 (15.33)	55.41 (14.90)	57.46 (15.74)	0.015	14 (1)
Employment status (%)				< 0.001	47 (3.5)
Employee	778 (59.5)	460 (61.7)	313 (56.6)		
Self-employed	60 (4.6)	15 (2.0)	45 (8.1)		
Unoccupied/retired	469 (35.9)	271 (36.3)	195 (35.3)		
Education (%)				0.024	181 (13.4)
None	11 (0.9)	7 (1.0)	4 (0.8)		
Primary school	84 (7.2)	56 (8.3)	28 (5.7)		
Secondary school	212 (18.1)	113 (16.7)	97 (19.8)		
High school	442 (37.7)	253 (37.5)	185 (37.7)		
Bachelor degree	78 (6.6)	57 (8.4)	21 (4.3)		
Master degree or above	346 (29.5)	189 (28.0)	156 (31.8)		
BP status aware, N (%)	983 (73.6)	562 (74.1)	415 (72.8)	0.629	18 (1.3)
At least one BP measurement in the previous month, N (%)	731 (54.3)	390 (51.0)	336 (58.6)	0.007	9 (0.7)
At least one BP measurement in the previous week, N (%)	387 (29.1)	198 (26.1)	186 (32.9)	0.009	22 (1.6)
BP measured on the survey day, N (%)	408 (30.6)	198 (26.2)	206 (36.1)	< 0.001	22 (1.6)
Diagnosed HTN, N (%)	568 (42.3)	294 (38.4)	271 (47.5)	0.001	9 (0.7)
On antihypertensive meds, N (%)	557 (41.4)	290 (37.8)	264 (46.3)	0.002	9 (0.7)
Family history of HTN, N (%)	791 (59.3)	477 (62.7)	310 (54.8)	0.004	19 (1.4)
SBP, mmHg (mean, SD)	131.23 (17.49)	126.62 (16.07)	135.38 (17.81)	< 0.001	1017 (75.1)
DBP, mmHg (mean, SD)	81.65 (10.51)	79.28 (9.25)	83.75 (11.12)	< 0.001	1018 (75.2)
HR, bpm (mean, SD)	74.64 (12.33)	77.61 (11.21)	72.01 (12.75)	< 0.001	1101 (81.3)

HTN hypertension, *BP* blood pressure, *SBP* systolic blood pressure, *DBP* diastolic blood pressure, *HR* heart rate, *SD* standard deviation

p-value for between-sexes comparisons is presented

36.1% were highly educated (6.6% bachelor degree; 29.5% master degree or above).

In the overall sample, 73.6% of participants reported being aware of their BP status, 42.3% reported a diagnosis of hypertension, and 41.4% were taking antihypertensive medications. In addition, 59.3% declared a family history of hypertension. No difference in BP status awareness was recorded between men and women (72.8% versus 74.1%, p = 0.629) (Table 1); conversely, BP status awareness increased with age, and so did the prevalence of self-reported hypertension (S Table 1). The prevalence of self-reported hypertension was also greater in men than women, and men reported more often than women having measured BP in the previous week/month (Table 1).

3.2 BP Status Based on Actual BP Measurements

Among the 408 individuals who underwent BP measurement on the survey day, 330 (24.4% of total; 51.5% men and 48.5% women, p = 0.584) had both valid BP values and complete data on age and antihypertensive treatment use and were therefore analyzed for their BP profile. Their mean systolic and diastolic BP were 131.2 ± 17.5 and 81.6 ± 10.5 mmHg, respectively. Nearly one third of them (31.5%) were taking antihypertensive medications, and only 8.5% showed BP levels within the predefined therapeutic goals (mean BP 122.1 ± 13.0/69.9 ± 5.3 mmHg) (Fig. 1), while 48.2% had normal BP values in the absence of BP-lowering drugs (mean BP 120.7 ± 10.2/76.9 ± 6.4 mmHg) (Table 2). Mean systolic and diastolic BP of treated hypertensive individuals with BP levels above the predefined therapeutic goals (23%) were 143.9 ± 15.2 and 87.0 ± 9.5 mmHg, respectively. Interestingly, BP status awareness rates were the highest among individuals who had uncontrolled hypertension (85.1%), followed by those with controlled hypertension (77.8%).

Among untreated participants with elevated BP (n. 67; 20.3%), 59.7% declared being aware of their BP status, but only 6.2% reported a diagnosis of hypertension, and a proportion as large as 40.3% were unaware of their BP status. Globally, their mean BP was 146.4 ± 14.7/92.0 ± 9.3 mmHg. Only 54.4% of normotensive individuals reported being aware of their BP status. The majority of participants with high/uncontrolled BP were in the age range of 47–67 years. Conversely, individuals with normal and controlled BP were mostly below and above the same age range, respectively (Table 2).

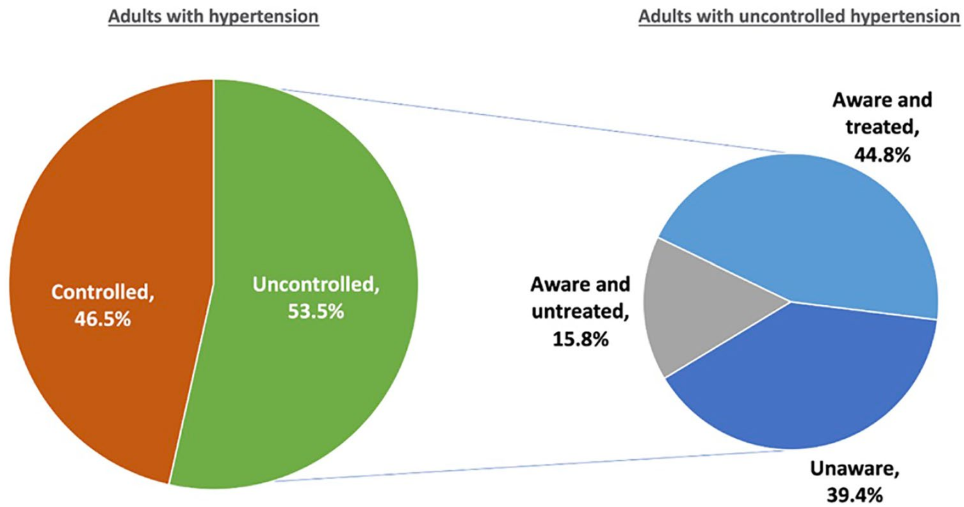

Fig. 1 Rates of achieved normal or elevated BP values during antihypertensive treatment (left) and awareness rates of elevated BP (right) among treated individuals with measured BP values

Table 2 BP profile, awareness, and measurement habits in the examined subset of survey participants (n=330). See text for details

	Uncontrolled HTN	Controlled HTN	Normal BP	Untreated HTN	p-value
N	76	28	159	67	
Men, N (%)	41 (53.9)	19 (67.9)	64 (40.3)	46 (70.8)	< 0.001
Age, years (mean, SD)	64.55 (13.22)	70.75 (12.94)	48.31 (12.80)	54.76 (11.28)	< 0.001
Employment status (%)					< 0.001
Employee	35 (48.6)	10 (35.7)	111 (75.5)	53 (84.1)	
Self-employed	2 (2.8)	0 (0.0)	7 (4.8)	4 (6.3)	
Unoccupied/retired	35 (48.6)	18 (64.3)	29 (19.7)	6 (9.5)	
Education (%)					< 0.001
None	11 (15.7)	4 (16.0)	1 (0.7)	2 (3.4)	
Primary school	1 (1.4)	1 (4.0)	16 (11.5)	2 (3.4)	
Secondary school	19 (27.1)	2 (8.0)	51 (36.7)	23 (39.0)	
High school	12 (17.1)	8 (32.0)	14 (10.1)	7 (11.9)	
Bachelor degree	2 (2.9)	0 (0.0)	3 (2.2)	2 (3.4)	
Master degree or above	25 (35.7)	10 (40.0)	54 (38.8)	23 (39.0)	
BP status aware, N (%)	63 (85.1)	21 (77.8)	86 (54.4)	40 (59.7)	< 0.001
At least one BP measurement in the previous month, N (%)	57 (75.0)	19 (67.9)	39 (24.7)	23 (34.3)	< 0.001
At least one BP measurement in the previous week, N (%)	30 (40.5)	14 (50.0)	11 (6.9)	13 (19.4)	< 0.001
BP measured on the survey day, N (%)	39 (51.3)	8 (28.6)	62 (39.2)	39 (58.2)	0.011
Diagnosed HTN, N (%)	74 (97.4)	26 (92.9)	2 (1.3)	4 (6.2)	< 0.001
On antihypertensive meds, N (%)	76 (100.0)	28 (100.0)	0 (0.0)	0 (0.0)	< 0.001
Family history of HTN, N (%)	59 (78.7)	17 (63.0)	76 (48.1)	37 (55.2)	< 0.001
SBP, mmHg (mean, SD)	143.86 (15.18)	122.14 (13.00)	120.66 (10.18)	146.45 (14.67)	< 0.001
DBP, mmHg (mean, SD)	86.99 (9.54)	69.89 (5.33)	76.87 (6.45)	92.01 (9.27)	< 0.001
HR, bpm (mean, SD)	75.39 (13.85)	70.00 (17.29)	73.87 (11.08)	77.29 (12.05)	0.136
Age range, N (%)					< 0.001
< 47 years	6 (7.9)	1 (3.6)	76 (47.8)	14 (20.9)	
47–67 years	38 (50.0)	7 (25.0)	72 (45.3)	45 (67.2)	
≥ 67 years	32 (42.1)	20 (71.4)	11 (6.9)	8 (11.9)	

HTN hypertension, *BP* blood pressure, *SBP* systolic blood pressure, *DBP* diastolic blood pressure, *HR* heart rate, *SD* standard deviation

3.3 BP Measurement Habits

Globally, participants reporting at least one BP measurement in the previous month and week were 54.3% and 29.1%, respectively, while 30.6% underwent a BP measurement on the day of enrollment in the study. Higher rates of BP assessment in the previous month and week were reported by men compared with women (previous month: 58.6% versus 51%, $p = 0.007$; previous week: 32.9% versus 26.1%, $p = 0.009$), as well as by older individuals compared with younger individuals (S Table 1). Similarly, at least one BP measurement in the previous month and week was reported more frequently among individuals with treated BP and less frequently among normotensive individuals (Table 2).

4 Discussion

The results of this pragmatic, nationwide, cross-sectional survey of Italian adults screened for their BP features and measurement habits at hypertension clinics indicate that, while nearly three quarters of total participants declared being aware of their BP status, awareness was the highest among individuals with BP levels above the predefined therapeutic goals and the lowest among those with normal measured BP values. In fact, nearly 9 in 10 treated individuals who did not achieve the BP target recommended by guidelines were aware of their BP status, compared with only half of those with normal measured BP. Although similar findings were also observed in previous surveys performed with the same methodology [11–15], our analysis provides some new evidence regarding the actual rate of hypertension awareness and control in the real world practice.

First of all, treated individuals with BP levels above the predefined therapeutic goals declared more frequently than others to have measured BP at least once in the previous month and week, suggesting that they had been sensitized to the importance of BP monitoring. In keeping with this, our survey was performed during the global pandemic of SARS-CoV-2, which heavily limited periodic BP assessment and clinical consultations in hypertension units or outpatients clinics, due to regulatory rules for home isolation or health restrictions. Paralleling these observations, BP status awareness increased with self-reported hypertension. Interestingly, the relatively high rate of BP status awareness among untreated participants with elevated BP did not translate into substantial changes in home BP measurement habits. In fact, the proportion of participants in this group reporting monthly and weekly BP measurements was half that of treated participants having BP levels above the predefined therapeutic goals. This finding might reflect an increased motivation of treated patients to monitor the effectiveness of therapy, possibly as a consequence of an effective, patient-centered communication strategy. In the lack of an active patient involvement in the therapeutic alliance, in fact, adherence to BP self-monitoring might decrease.

The importance of individuals' active involvement in the management of chronic health conditions, like hypertension, has been dramatically emphasized during the COVID-19 pandemic [19]. Frail individuals, including elderly people and those with underlying medical problems such as high BP and CVD, are more susceptible to develop a more severe form of COVID-19. In keeping with this, recent evidence from 45418 adults with hypertension (mean age 67 years; 44.7% men) indicates that those with more advanced atherosclerosis and target organ damage were at increased risk of dying from COVID-19 than those without [20]. This observation strengthens the need for multimodal cardiovascular preventive strategies that disrupt and reverse the progression of cardiovascular remodeling and related disease, aiming at achieving a good control of major cardiovascular risk factors like hypertension as early as their diagnosis. In parallel, recent observational evidence on a cohort of 464,585 US individuals (53.5% women, mean age 45.7 years) assessed for their BP by trained personnel for three consecutive years before and after the pandemic sprout (2018–2020) reveals that larger BP increases were seen in the period from April to December 2020 than in 2019, a finding that was not explained by weight changes and that was more pronounced in women than in men [21]. In this context, before the implementation of telemedicine becomes effective [22], home BP monitoring (HBPM) represents an invaluable resource that improves medication adherence and BP control [18]. By providing largely reproducible BP data as well as enabling the detection of white-coat and masked hypertension, the information gained through HBPM increases BP awareness and strengthens the doctor-patient alliance through the active involvement of the latter in the therapeutic process, with increased success rates [18, 23, 24].

As reported for previous studies [11–15], also this study has some limitations. Due to the ongoing COVID-19 pandemic, only about one quarter of participants underwent onsite BP measurement, and data was mostly self-reported. No information on antihypertensive medications type, dosage, and compliance with treatment, as well as on possible conditions affecting BP profile [25–28] was available. Similarly, data on concomitant cardiovascular risk factors (dyslipidemia, diabetes, smoking habits) was not available. The observation of a slightly higher prevalence of self-reported hypertension in comparison with the national average [29], as well as that of high rates of uncontrolled hypertension, might be the expression of a selection bias in a survey that was conducted on self-referred volunteers at hypertension clinics, which limits the generalizability of the findings. Nevertheless, this study provides an updated insight into BP awareness across the spectrum of BP and hypertension control, emphasizing the centricity of patients in the therapeutic alliance for a successful reduction of cardiovascular risk.

In conclusion, to the best of our knowledge, this is the first nationwide, pragmatic survey aimed at addressing hypertension awareness, treatment, and control in a setting of real practice during COVID-19 pandemic in Italy. Our analysis showed that BP status awareness rates were higher in older (male) than in young individuals and in uncontrolled versus controlled hypertension.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s40292-022-00519-4.

Acknowledgements We wish to thank the participating staff at the hypertension clinics affiliated with the Italian Society of Hypertension, who made the collection of data possible.

Declarations

Conflict of interest None declared.

Data availability Data can be made available upon reasonable request to the corresponding author.

Funding Open access funding provided by Università degli Studi dell'Aquila within the CRUI-CARE Agreement.

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