Original Article

Opportunistic Screening, Assessment of Awareness and Proportion of Hypertension among Patients in a Tertiary Care Hospital in Vadodara

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Abstract

Background : Hypertension is one of the major risk factors and the cause of mortality and morbidity.

Aims and Objectives : To find the proportion of newly diagnosed cases and known cases of Hypertension among the patients and to assess their awareness regarding complications and control of Hypertension.

Materials and Methods : A cross-sectional study was conducted in the CPGP OPD of a Tertiary Care Hospital. 400 participants more than 18 years of age were included over a period of 5 months. Interviewer-administered pre tested semi-structured questionnaire was used.

Results : Proportion of Hypertensives and pre-hypertensives was 18% and 19.7% respectively. 53% were male of which 19.25% were Hypertensive and 23% were Prehypertensive. Among females, 16.5% were hypertensive and 16% were in the pre-hypertensive range. In 9.58% were found to be hypertensive on that visit. In 5.64%, 22.45% and 48.26% were Hypertensive in the age groups of 18-39 years, 40-59 years and above the age of 60 years respectively. 21% had never had a check-up for their Blood Pressure levels before this visit. Among the previously diagnosed Hypertensives, 60% were diagnosed at a previous hospital visit and 21.43% had stopped medication after few months of starting the medication. 31% patients had no knowledge regarding complications of uncontrolled Hypertension. Only 8.5% participants knew that Hypertension can be managed with a combination of medication and life style modifications.

Conclusion : Proportion of Hypertension was high in the studied population. Screening helped to diagnose large proportion of new cases more than 40 years of age. Awareness of Hypertension and Knowledge regarding management of Hypertension with medication and lifestyle modification was poor.

Key words : Opportunistic Screening, Hypertension, Knowledge, Awareness.

Hypertension, commonly known as High Blood Pressure (BP), is a significant public health issue affecting millions of people Worldwide. It is a leading risk factor for Cardiovascular disease, Stroke, Eye disease and Kidney failure, and is responsible for a significant burden of morbidity and mortality. Despite its high prevalence, Hypertension often goes undiagnosed and untreated.

According to American Heart Association (AHA) High Blood Pressure is when the force of blood flowing through blood vessels is consistently too high[1]. WHO has given definition of Hypertension as Systolic BP greater than 140 mm of Hg and diastolic BP greater than 90 mm of Hg. Worldwide, an estimated 1.28 billion adults aged 30-79 years Worldwide have hypertension[2]. In India, 21% of women and 24% of men of over the age of 15 years have Hypertension[3]. In Gujarat, in Western India, 20.45% adults are Hypertensive[4]. Opportunistic screening can serve as a model for other low- and middle-income countries facing similar challenges in the diagnosis and management of Hypertension.

However, there is limited information about the diagnosis of Hypertension and the perceptions and knowledge of patients about the condition in Gujarat. By understanding the perceptions about Hypertension, healthcare providers can enhance patient education leading to better self-care and improved health outcomes.

Editor's Comment :

- The proportion of hypertension in the study population was notably high. Screening efforts were effective in identifying a significant number of previously undiagnosed cases, particularly in individuals over 40. However, awareness and understanding of hypertension, including its management through medication and lifestyle changes, remain insufficient.

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This study aimed to find the prevalence of hypertension by opportunistic screening among the patients visiting Curative and Preventive General Practice Outpatient Department (CPGP-OPD) and to explore their perceptions and knowledge of patients about Hypertension in a Tertiary Care Hospital in Central Gujarat.

Materials and Methods

A Cross sectional study was conducted in the Curative and Preventive General Practice OPD (CPGP). As per hospital protocol, all patients after registering at the hospital are managed first in this OPD for primary care and screening prior to referral to speciality clinics. In 400 patients assuming that proportion of Hypertension based on pilot study. (Sample Size calculated by $4pq/L^2$)(p=20, q=80, L=5)(400)(20%) allowable error based on 20% prevalence rate) visiting CPGP were selected purposively during both morning and afternoon shifts for five months. Patients interviewed for medical history and perceptions related to hypertension as a non-communicable disease using a prevalidated semi structured questionnaire. Patients unwilling to participate, give consent or get Blood Pressure checked during their visit were excluded.

Verbal informed consent was taken from each patient prior to filling the questionnaire. All questions were asked in vernacular language in either Hindi or Gujarati. Basic demographic data such as Age, Gender, Socio-economic Condition, Occupation, Addictions, Unknown/ known case of Hypertension or not, name of Hypertensive medication if patient was already taking medication, family history of Hypertension was noted. After that patient was made sit in upright position and Blood Pressure was measured using both palpatory over the radial artery and auscultatory method on the left arm cubital fossa over the brachial artery. Calibrated Diamond Mercury Sphygmomanometer kept at the patient's heart level on a table was used to take measurements. Single reading was taken in patients found in Normotensive range. Patients who were found to be in Hypertensive range or were known Hypertensive patients, a second reading on same arm after asking the patient to sit for 10 minutes prior to reapplying Blood Pressure cuff was taken. Average of the 2 readings was taken as the final reading. Data was collected in hardcopy and kept in lock and key to maintain privacy of the patients.

Statistical analysis : Data entered and analysed using MS excel and Epi Info software version 7.2.5.0[5]. Confidence interval was calculated at 95%. Chi square was applied to find the association between risk factors and outcome.

Patients were counselled simultaneous regarding management and control of Hypertension and the need of frequent monitoring of Blood Pressure.

Study was conducted after getting due permissions from the Institutional Ethical Committee and OPD incharge.

Definitions: As per Joint National Committee (JNC) 7 classification[6].

Classification	Systolic Blood Pressure (mmHg)		Diastolic Blood Pressure (mmHg)
Normal	<120	and	<80
Pre-hypertension	120-139	or	80-89
Stage 1 HTN	140-159	or	90-99
Stage 2 STN	>160	or	>100

Results

Total of 400 participants were included in the study out of which 213(53%) (CI=48.36-58.14) were Male and 187(47%) (CI=41.86-51.64) were Female participants. Overall, 195(48.75%) (CI=43.85-53.65) participants were between 18-39 years, 147(36.75%) (CI=32.03-41.47) were between 40-59 years and 58(14.50%) (CI=11.05-17.95) participants were 60 years and above.75(18.75%) (CI=14.93-22.57) participant from the sample were Illiterate and the rest were Educated upto Primary level and above. 87(21.75%) (CI=17.71-25.79) of them were previously diagnosed with Hypertension. 210(52.5%) (CI=47.61-57.39) participants understood that there is correlation of increasing age with Hypertension while the others 190 (47.5%) (CI=42.61-52.39) answered they don't think there is association between the two.

Age wise and Gender wise distribution of participants based on Blood Pressure measurements taken during their visit to the OPD (n=400). Maximum number of Prehypertensive (12.25%) and Hypertensive (8.25%) patients were found in the age group of 40-59 years. Thus regular screening and long term management related counselling must be targeted in this age group to reduce the burden of Hypertension (Table 1).

Association between Gender and Hypertension based on Blood Pressure measurements during screening (n=400). Applying chi-square test, no association between the Gender and the Hypertension and gender was found (Table 2).

Table 1 — *Age Group and Gender wise distribution of participants based on blood pressure measurements (n=400)*

Age group	Normotensive	Pre-hypertensive	Hypertensive	Total
18-39	164(41%)	20(5%)(CI=0.030-0.076)	11(2.75%)(CI=0.01-0.05)	195(48.75%)(CI=0.437-0.537)
40-59	65(16.25%)	49(12.25%)(CI=0.092-0.158)	33(8.25%)(CI=0.057-0.11)	147(36.75%)(CI=0.32-0.416)
60 and above	20(5%)	10(2.5%)(CI=0.092-0.158)	28(7%)(CI=0.047=0.099)	58(14.50%)(CI=0.112-0.183)
Total	101(25.25%)	79(19.75%)(CI=0.159-0.239)	72(18%)(CI=0.143-0.221)	400
Gender	**Normotensive**	**Pre-hypertensive**	**Hypertensive**	**Total**
Male	123(30.75%)	49(12.25%)(CI=0.092-0.158)	41(10.25%)(CI=0.074-0.136)	213(53.25%)(CI=0.482-0.582)
Female	126(31.5%)	30(7.5%)(CI=0.051-0.105)	31(7.75%)(CI=0.0533-0.108)	187(46.75%)(CI=0.417-0.5177)
Total	249(62.25%)	79(19.75%)(CI=0.159-0.239)	72(18%)(CI=0.143-0.221)	400

Table 2 — *Association between Gender and Hypertension based on Blood Pressure measurements during screening (n=400)*

Gender	Hypertension		Total	χ^2=0.317 p=0.5732 at degree of freedom=1
	Present	Absent		
Male	41(10.25%)	172(43%)	213	
Female	31(7.75%)	156(39%)	187	
Total	72 (18%)	328 (82%)	400	

Proportion of Old and New cases and Blood Pressure findings during screening (n=400). In 4(13.33%) (CI=1.17-25.50) of the new cases were diagnosed from the 30-39 years of age group while 14(46.67%) (CI=28.81-64.52) and 12(40%) (CI=22.47-57.53) new cases were diagnosed from the 40-59 years of age group and ≥60 years of age group respectively (Table 3).

Association between family history of Hypertension and diagnosed case of Hypertension. On applying Chi-square test, no association was found the association between family history and hypertensive status (Table 4).

122(30.50%) (CI=25.99-35.01) participants said that they understood the terms Systolic and Diastolic Blood Pressure. However, only 39(9.75%) (CI=6.84-12.66) participants knew that Systolic BP of more than 140mmHg and 54(13.5%) (CI=10.15-16.85) participants knew that Diastolic BP more than 90 means Hypertension. Upon asking whether BP remains constant or variable throughout the day, 71.25%(CI=66.81-75.69) knew that it is variable.

Table 3 — *Proportion of Old and New cases and Blood Pressure findings during screening (n=400)*

	New case	Old case	Total(n=400)
Normotensive	226 (56.5%)	23 (5.75%)	249(62.25%)
Prehypertensive	57 (14.25%)	22 (5.5%)	79(19.75%)
Hypertensive	30 (7.5%)	42 (10.5%)	72(18%)
	(CI= 0.051- 0.105)	(CI= 0.076-0.139)	
	Total New Case = 313 (78.3%)	Total Old cases 87 (21.7%)	

Table 4 — *Association between family history of Hypertension and diagnosed case of Hypertension*

Any known case of Hypertension in family	Hypertensive	Non-hypertensive	Total	χ^2=0.594 p=0.4407 at degree of freedom=1
Yes	30 (7.5%)	118 (29.5%)	148	
No	42 (10.5%)	210 (52.5%)	252	
Grand Total	72	328	400	

Time (n=400) and place of previous Blood Pressure for known Hypertensive patients (n=313) check-up by the participants. 60%(CI=55.20-64.80) were diagnosed at a hospital visit while 19%(CI=15.16-22.84) were diagnose coincidentally at their work place or homes while 21%(CI=17.01-24.99) had never checked their BP previously.

Knowledge of participants regarding complications of uncontrolled Hypertension (n=400). On questions regarding complications of uncontrolled Hypertension, 51.25% (CI=46.35-56.15) answered Dizziness, 29.5% (CI=25.03-33.97) answered Heart attck while 30.75%(CI=26.23-35.27) had no idea, other answers were Stroke (23.25%)(CI=19.11-27.39), Kidney failure (5.75%)(CI=3.47-8.03), Memory loss (6.75%) (CI=4.29-9.21), Rupture of arterties (9.75%)(CI=6.84-12.66), Eye damage (8.5%) (CI=5.77-11.23), all of the given options (4.75%)(CI=2.67-6.83) and None of the given options (3.25%)(CI=1.51-4.99).

In 55(13.75%) (CI=10.38-17.12) need more salt than the rest of the family and add salt on top of their food while eating.

Among the 42(10.5%) (CI=7.50-13.50) known cases of Hypertension, 30(75%) (CI=57.87-85.09) patients were taking daily medication as prescribed, 4(9.52%) (CI=0.65-18.40) said they took medicine whenever they remembered to take it and 9(21.43%) (CI=9.02-33.84) had stopped medication after few months of starting the medication. 248(62%) (CI=57.24-66,76) participants think that there are side effects to anti-hypertension medication.

Regarding duration of antihypertensive medication,

126(31.5%) (CI=26.96-36.05) said the medication should be taken lifelong, 129(32.25%) (CI=27.67-36.83) had no idea about duration, 59(14.75%) (CI=11.27-18.23) thought it should continue as long as symptoms persists, 45(11.25%) (CI=8.15-14.35) said as much as mentioned in the prescription and there is no need to followup with the doctor, 35(8.75%) (CI=5.98-11.52) said no symptoms means no medication, while 5(1.25%) (CI=0.16-2.34) and 1(0.25%) (CI=0.00-0.74) said one month and two months respectively.

Knowledge of participants regarding alternate methods/ ways to control Hypertension (n=400). 9.75% mentioned that Hypertension does not need any sort of treatment. Only 8.5% participants that Hypertension can be managed with a combination of diet changes, exercise, stress control and yoga/ meditation along with medication.

Discussion

The World Health Organization (WHO) has estimated that 46% of the adults Worldwide are unaware that they have Hypertension and only 42% (less than half) adults are diagnosed and treated. Despite treatment only 21% of the patients of Hypertension have it under control[2]. This projects the magnitude of Global burden of disease which is a silent killer.

Opportunistic screening in our study found 18% patients to be Hypertensive out of which 10.25% were Men and 7.75% were Women. 12.25% Men and 4.29% Women were found to be pre-hypertensive. National Family Health Survey-5 (NFHS-5) conducted between 2019-2021 revealed that 21% of women and 24% of Men over 15 years of age in India have Hypertension while 49% Men and 39% Women were found to be prehypertensive[3].

19.24% of the male participants and 16.57% of the female participants from our study were found Hypertensive. However, association between Gender and the Hypertension status between the two was not found significant in our study. A study conducted in rural South Gujarat also concluded that there was no significant relation of Gender with Hypertension[7]. A review article published in 2018 to explore emerging trends of Hypertension in India used two of the surveys NFHS-4 and DLHS-4 (District Level Household Survey). In which, DLHS-4 had found 27.4% prevalence of Hypertension in Men and 20.0% in Women. NFHS-4 had showed 13.8% prevalence in Men and 8.8% prevalence in Women[8]. One such study conducted at OPD at Tertiary Care Centre in Jodhpur city of India resulted in prevalence of Hypertension 6.38% and 8.8% in Men and Women respectively[9]. In Gujarat, one such study was conducted in Rajkot to assess prevalence of Hypertension in Bank employees, which found 27.63% of Men to be Hypertensive and 2.75% of the women to be hypertensive[10]. A systematic review and meta-analysis conducted in Bangladesh published in 2020 showed that weighed pooled prevalence among males was 17% and among the Females was 21%[11]. A pooled analysis of 1201 Worldwide studies found that in 2019, age-standardized prevalence of Hypertension in the age group of 30-79 years of age was 34% in Men and 32% in Women[12]. Prevalence was almost similar in the Males while Females have lower prevalence in our study population.

One of the major findings of our study was that 48.26% of the elderly participant (60 years and older) were found Hypertensive, while 22.45% of the 40-59 years of age group were found Hypertensive and it decreased even further in the age group 18-39 years (5.64%). Data from National Health and Nutrition Examination Survey conducted in US (United States) found that prevalence of Hypertension was 22.4% in the age group of 18-39 years, 54.5% in 40-59 years of age group and 74.5% in 60 years and above age group[13]. Comparing the data from the two studies we can understand that prevalence of Hypertension was higher in each age group in the US. NFHS-5 found that 49.25% of the elderly (60 years and above) have Hypertension, 33.67% of the 40-59 years of age group were Hypertensive and 10.68% of the 20-39 years of age group were Hypertensive[3]. The data from NFHS-5 resonated with the findings of our study except for the younger age group and middle age group where the prevalence was found slightly higher in the NFHS-5, prevalence in the elderly population was almost identical in our study and the NFHS-5 data.

Our study was OPD based study, in which 21.75% of participants were previously diagnosed with Hypertension. Data from the Longitudinal Ageing Study in India (LASI) found that age-sex adjusted self-reported Hypertension was 25.8% with significant variation within states[14]. Another study conducted at a referral hospital in North-West Ethiopia had observed 21% of participants previously diagnosed with Hypertension[15]. It implies that proportion of previously diagnosed/self-reposted Hypertensive

patients are almost equal in the studies reviewed Globally.

On assessment of Knowledge regarding management and compliance to treatment, we found 75% and 13.5% participants knew about upper limits of Systolic BP and Diastolic BP respectively. A study conducted at community Psychiatry Clinics in Haryana and Punjab found that 81.1% of individuals had knowledge that BP above 140/90 mm of Hg is considered higher[16]. A Knowledge, Attitude and Practice (KAP) study among community in Shanghai, China concluded that 55.5% of the participants exactly knew about the diagnostic criteria for Hypertension[17] which indicates less knowledge about the diagnostic criteria of Hypertension in our study population.

Our study also found that 53.25% of participants were of the opinion that Hypertension is correlated with age. One such study conducted in Rural community Psychiatry Clinic in Haryana and Punjab found that 28.33% participants correctly answered to the question about the correlation of Hypertension with age and the need of taking medication with regard to it[16]. A study conducted in Iran to evaluate health literacy and awareness about Hypertension showed that 62.9% of the participants linked increasing age with Hypertension[18] which is similar to our study findings.

One study conducted in Chennai, India to find adherence to the anti-hypertensive medication found that 72% of the diagnosed individuals were taking their medication daily[19]. A study conducted in Sri Lanka showed 74% of all diagnosed patients were adherent to their Anti-Hypertensive medicine[20]. Our study found that 75% of the previously diagnosed patients were taking medicine as per prescription which is almost equal compared to the studies in Chennai and in Sri Lanka.

41.67% of the participants diagnosed with Hypertension had family history of Hypertension suggestive of association of Hypertension with positive family history, but no significant association was found between the two in our study. In a study conducted in Varanasi district of India, 30.7% of the hypertensive participants had positive family history and with no significant association was found[21]. A case control study done in Pakistan found 49.5% of the Hypertensive patients had positive family history[22]. Another study of Jordan found 44% Hypertensive participants having positive family history if Hypertension[23]. So, the percentage of Hypertensive patients having positive family history of the same is relatively equal in the articles reviewed with no significant association between the two.

Of the newly diagnosed cases, 40% of them were from the 60 years and above age group while 46.67% were from the age group of 40-59 years.

On questioning on knowledge about anti-hypertensive medication, 14.75% participants answered that as long as symptoms persists, they have to take medication, 11.25% said that medication should be taken till the time mentioned in the prescription and no longer further, 31.5% answered that it should be taken lifelong, 32.75% had no idea about the time duration of medication intake, while very few of them answered one month, two months and if no symptom is there no medication should be there. So, it can be seen easily that there is very little awareness about anti-hypertensive medication among the participants. A study from Chennai, India found that 23% participants thought that medication was the best effective way to control Hypertension, 43% answered that medication should be stopped from time to time and 52% answered that medication was one of the three best ways to control Hypertension[19]. In the study conducted in Iran where they used Hypertension Knowledge Level Scale (HK-LS) prepared by Erkoc, *et al*[24], 69.4% correctly answered to the question that Hypertensive individuals should only take medication when they fell ill. 81.8% correctly answered to the question that medication to the Hypertensive individuals should be continued throughout their life and 62.9% individuals correctly answered to the question that Hypertension is related to ageing so that taking medication is unnecessary[18]. So, it can be understood that the knowledge regarding antihypertensive medication is poor among our participants and in the article we reviewed, it can be seen that awareness is better compared to our participants.

In our study, upon questioning on when the participants last measured their Blood Pressure their responses were, few years ago (13%), never (21%), one week ago (4%), within this month (27%), within this week (9%) and within the same year (26%). And further questioning of the last place where they get their BP measured, the answers were, at home (3.5%), at work/educational institute (15.75%) and during last hospital visit (60%). We can see here that participants were irregular regarding their BP check-

up and mainly they get their BP checked during hospital visits. To overcome this limitation, in this digital era, we have wearable devices available to us which can be worn on wrist or arm and thus Blood Pressure can be measured at any place or time. There are certain advantages and disadvantages related to the use of this devices. Advantages include correct diagnosis of Masked Hypertension and White-coat Hypertension, large number of collections of BP measurements, well acceptance by participants and usefulness in long term monitoring. Disadvantages includes its price which could not be affordable by many in the country like India[25,26]. There is a need of study in the country like India to identify the need of these new devices in the population of India and its effectiveness in the Indian population. Not much studies are available on self Blood Pressure monitoring devices available in the Indian market.

On assessing the knowledge of the participants regarding complications of uncontrolled Hypertension, the answers were, No idea (30.75%), Stroke (23.25%), Sexual dysfunction (0.25%), Kidney failure (5.75%), Memory loss (6.75%), Heart attack (29.5%), Rupture of arteries (9.75%), Eye damage (8.5%), Dizziness (51.25%), all of the above (4.75%) and none of the above (3.25%). We can see that the most known complications were dizziness, heart attack and stroke, while a large number (30.75%) of participants had no idea about the complications. A study conducted in a Health Centre in Wroclaw, Poland used HK-LS questionnaire for knowledge assessment, which found that regarding comorbidities following Hypertension, 40.8 % and 36.1% participants had low and high knowledge respectively about Diabetes Mellitus, 34.0% and 33.7% had low and high knowledge respectively regarding Chronic Obstructive Pulmonary Disease (COPD), 31.3% and 15% had low and high knowledge respectively about Ischemic Heart Disease and 23,1% and 30.2% had low and high knowledge respectively about Kidney Failure[27]. This implicates that there is little awareness about complications/comorbidities of Hypertension in our participants.

In our study, when asking question on knowledge on other ways to control Hypertension apart from using medication, participants answered that diet like cutting down on salty and oily food intake (10.25%), Exercise (12.5%), Stress control (8.5%), yoga/meditation (5.25%), none of the given option (9.75%) and all of the given option (8.5%). A study conducted in 3 districts of 3 states (Gujarat, Rajasthan and Bihar) concluded that Ayurveda medication along with lifestyle management and Yoga effectively controls Systolic and Diastolic BP and helps in reducing or discontinuing antihypertensive medication in the patients of essential Hypertension[28]. In one of the study conducted in Ghana, on asking how can the participant prevent Hypertension, the answers were, by Exercise (4.3%), by checking Diet (72.3%), by checking BP regularly (13.8%), by taking enough rest (2.7%) and by reducing Stress (2.7%)[29]. In both the studies we can see that awareness regarding BP control is not proper in both the populations.

All the data was collected by the same interviewer, by using the same calibrated instrument after standardization thus eliminating bias.

Since the diagnosis has been made in our study using WHO guidelines, 24-hour ambulatory BP method which is gold standard for the diagnosis of Hypertension was not used, so the White Coat Hypertension and masked Hypertension cannot be ruled out. Generalizability of the data is difficult.

Conclusion

Proportion of Hypertension was high in the studied population. Screening helped to diagnose large proportion of new cases more than 40 years of age. Awareness of Hypertension and knowledge regarding management of Hypertension with medication and lifestyle modification was poor.

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