An unattended silent killer: A facility-based cross-sectional study on undiagnosed hypertension from Haryana, India

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ABSTRACT

Background: Non-communicable diseases are on the upsurge throughout the world. They take a toll of 71% of overall total death, majorly contributed by cardiovascular disease. Hypertension has been a consistent risk factor for cardiovascular diseases among the various risk factors. Hypertension's asymptomatic nature makes it a silent killer; many lives are avertable if a timely diagnosis can be assured. **Aims and Objectives:** The aim of this study was to determine the prevalence of undiagnosed hypertension among the attendees of a sub-district hospital. **Materials and Methods:** We conveniently chose 100 participants of age 30 years from the out-patient department of a sub-district hospital in Gohana, Haryana. Any attendees aged more than 30 years was requested to participate in the study. The execution of the study was done in accordance to the guidelines laid in Helsinki Declaration 1975, revised 1983. Due permission was taken from the concerned authority of the study facility. After obtaining well-informed consent, data were collected through a semi-structured questionnaire. The blood pressure was measured and classified per JNC-8 guidelines. Any participant having systolic B.P. more than 140 mmHg and diastolic B.P. more than 90 mmHg on two 5 min apart readings was considered hypertensive. The descriptive analysis was done in terms of frequencies and proportions. The Chi-square test was done to determine any association of undiagnosed hypertension with selected risk factors. **Results:** We report a 59% prevalence of undiagnosed hypertension among study participants. The undiagnosed hypertension was statistically associated (P<0.05) with higher body mass index, less physically active, being a diabetic, alcoholic, smoker, and having a positive family history of hypertension. Only 2% of the participants knew of any health program on non-communicable diseases. **Conclusion:** A higher prevalence of undiagnosed hypertension even after health facility visits for any other reason warrants the standardized and universal blood pressure measurement of patients visiting health facilities irrespective of the health issue, for which they are visiting.

Keywords: Hypertension; Undiagnosed hypertension; Adults

INTRODUCTION

In 2016, non-communicable diseases caused an estimated 41 million deaths worldwide, accounting for 71% of overall total deaths. Cardiovascular diseases remain the top cause of mortality, with an estimated 17.9 million deaths (about 44%).[1] Hypertension is a silent killer as rarely can any symptom be seen in its early stages and usually precipitates as complications in severe medical crises, likewise heart attack, stroke, or chronic kidney disease. It is the most constant factor in developing ischemic heart disease, heart failure, stroke, and chronic kidney disease. Hypertension contributes to an estimated 57% and 24% of stroke and coronary artery disease-related deaths.[2-7] Awareness regarding excessive blood pressure is only through measurements and most patients are unaware of it till its objective confirmation. It is because the majority of patients with hypertension remain asymptomatic. Some

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people report headaches, lightheadedness, vertigo, altered vision, or fainting episode.[8] Many contributing factors predispose to hypertension, which may vary from region to region, extending even to urban versus rural areas.[9] As per estimates, in India, an overall 18.69% prevalence of undiagnosed hypertension was recorded among women aged 15–49 years, out of which in rural areas, it was 17.09% as compared to 21.73% in urban areas. Among this self-reported, diagnosis of hypertension was found to be only 8.86%.[10] About half of the hypertensive subjects among the general population were aware of the condition, and the hidden part of the iceberg constitutes important undiagnosed subjects with hypertension.[11] Many factors associated with undiagnosed hypertension were reported as age, less than or more than average body mass index (BMI), socioeconomic status, literacy status, religion, caste, and geographical areas.[12-14] The asymptomatic nature of hypertension landing patients in complications made its early identification a crucial step. Hence, we intended to determine the prevalence of undiagnosed hypertension and related sociodemographic factors among the adults attending the outpatient department (OPD) of a sub-district hospital in the urban field practice area.

Aims and objectives

The aim of this study was to determine the prevalence of undiagnosed hypertension and related sociodemographic factors among the adults attending the OPD.

MATERIALS AND METHODS

We conducted the present facility-based cross-sectional study among all attendees aged ≥30 years of the OPD of Urban Health Training Center, Gohana in Sonepat, Haryana. We assumed prevalence of hypertension 60% among adult population to achieve maximum sample size and absolute error of 10% was taken. Hence, sample size came out 96 which were rounded off to 100. Hence, we chose a convenient sample of 100 eligible study participants for data collection, any patient of more than 30 years attending OPD for health services was chosen. We excluded study participants who were previously diagnosed with hypertension, pregnant women, or critically ill patients or patients who required an emergency referral, or the eligible participant who denied the verbal consent. A pre-tested semi-structured questionnaire was used to collect the data from the study participants. This performance included information on the sociodemographic profile, risk factors, and awareness regarding hypertension.

We followed all the guidelines of the Helsinki Declaration of 1975, as revised in 1983.[15] We did not collect any kind of biological sample from the study participants. We obtained well-informed verbal consent from all the study participants. The study participants have explained the purpose of the study, and their participation in the study was voluntary, in which they may withdraw during the study. All the study participants were assured about the confidentiality of data and anonymity of their participation in this study. The study participants were given health education about hypertension, its risk factors, and its complications during the study. We used the hypertension criteria of the eighth report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure (JNC-8) as an operational definition to find out hypertension among the study participants. We considered a study participant hypertensive if systolic blood pressure was more than or equal to 140 mmHg or/and diastolic blood pressure was more than or equal to 90 mmHg. The participant's blood pressure was checked twice at 5 min, and the lowest reading was used to diagnose hypertension.[16]

We defined "hypertension awareness" as a self-reported previous diagnosis of hypertension by a physician among the participants with hypertension. Hypertension unawareness was defined if the blood pressure of the study participant, who was not diagnosed by a physician or on any antihypertensive drugs, was found to be ≥140/90 mmHg.

The recruited participants were made to sit quietly with the back supported with feet on the floor for 5 min and the arm supported at the heart level. The right arm was taken for the measurement of blood pressure. A dial sphygmomanometer was used for the measurement of blood pressure. The center of the cuff was at the heart level, the width of the bladder cuff was 40% of arm circumference, and the length bladder cuff encircled 80% of arm circumference.

During B.P. measurement, we inflated the cuff to a pressure of approximately 30 mmHg greater than systolic (as estimated from the disappearance of the pulse in the radial artery by palpation to avoid an auscultatory gap). Once the cuff was adequately inflated, the stethoscope was placed lightly over the brachial artery. The cuff was deflated slowly at the rate of 2 mmHg/heartbeat. The systolic pressure was equal to the pressure at which the radial pulse can first be palpated as blood flow was restored through the previously compressed vessel; the systolic pressure was also equal to the pressure at which the pulse is first heard auscultation (Korotkoff phase 1).After the cuff deflated below the systolic pressure, the pulse continued to be heard until there was abrupt muffling (phase 4) and, approximately 8–10 mmHg later, the disappearance of sound (phase 5); this was marked as diastolic pressure.[17] The collected data were entered in the Microsoft Excel version 11 and exported to the Statistical Package for the Social Sciences (SPSS) version 16 for further analysis.

Statistical analysis

The descriptive findings of the present study were reported in terms of frequency and percentage, along with confidence interval of 95%. The Chi-square test was performed to find out association of hypertension status with sociodemographic factors and P<0.05 was considered as statistically significant.

RESULTS

The present cross-sectional study was executed among attendees of the OPD at Urban Health Training Center Gohana, Sonepat Haryana, where 100 participants (59 males and 41 females) were selected based on convenience. About 59% of the study population was found to have blood pressure ≥140/90.

About 63% of the study population who had undiagnosed hypertension were >50 years of age, and 22% were <40 years of age. Male participants were twice the number of female participants (66% versus 34%). More than half (54%) were laborers by occupation, and one-third were farmers. More than half (54%) reported positive family history of hypertension (Table 1).

A substantial proportion (64%) of the undiagnosed hypertensive population had their past hospital visit <6months, and blood pressure measurement was not conducted during the last reported hospital visit in about two-thirds of the. Only 2% were aware of the program run by the government related to hypertension none was aware of the complications of hypertension (Table 2).

About 46% of the undiagnosed hypertensive participants had a BMI >22.9 and 21% were obese. The presence of diabetes mellitus was self-reported by 28% of the undiagnosed hypertensive participants. Salt consumption was reportedly higher (>5g/day) among 41% of undiagnosed hypertensive participants. Almost half of them (47%) reportedly smokers and about one-fifth were reported consumption of alcohol. About 58% reported an inadequate level of physical activity (Table 3).

The Chi-square test to find out the association of undiagnosed hypertension with the selected risk factors was conducted. A positive family history, being diabetic, tobacco and alcohol consumption, and higher BMI were found associated with undiagnosed hypertension, and it was statistically significant (P<0.05) (Table 4).

DISCUSSION

Hypertension has been considered the silent killer of humanity due to its asymptomatic nature, leading to life-threatening complications. Hence, timely diagnoses and evidence-based interventions can avert the damage caused by hypertension. However, a substantial proportion of the Indian population is unaware of their blood pressure level.

A cross-sectional study was executed to determine the prevalence of undiagnosed hypertension among conveniently chosen 100 OPD attendees of more than 30 years.

We report a 59% prevalence of undiagnosed hypertension among the study participants who reported to a sub-district hospital for OPD services. Surprisingly, none of the participants with undiagnosed hypertensive were aware of this. About two-thirds (73%) did not have blood pressure measurement on their last hospital visit, though 60% had a positive family history.

Table 1: Distribution of undiagnosed hypertensive study participants by their sociodemographic profile

Sociodemographicprofile	n (%)
Age (in completed years) (n=59)	
30–39	13 (22)
40–49	9 (15)
50–59	20 (34)
≥60	17 (29)
Gender (n=59)	
Male	39 (66)
Female	20 (34)
Education (n=59)	
Not literate	25 (43)
Primary	6 (10)
Middle	17 (29)
High school	7 (12)
Graduate/above	4 (6)
Occupation (n=59)	
Agriculture	18 (31)
Shopkeeper	3 (5)
Laborers	32 (54)
Any other (homemaker, retired)	6 (10)
Family history of hypertension (n=59)	
No	20 (34)
Yes	39 (66)

Table 2: Distribution of the undiagnosed hypertensive studyparticipants by their awareness regarding hypertension

Variables	n (%)
Last visit to the hospital (n=59)	
<6 months	38 (64)
≥6 months	21 (36)
Measurement of B.P. on last hospital visit (n=59)	
No	43 (73)
Yes	16 (27)
Awareness of program (n=59)	
No	58 (98)
Yes	1 (2)

Table 3: Distribution of undiagnosed hypertensive study participants by their risk factors related to hypertension

Risk factors	N (%)
BMI (n=59)	
<18.5	4 (7)
18.5–22.9	28 (47)
23–24.9	15 (25)
≥25	12 (21)
Co-morbidities (n=59)	
Diabetes mellitus	16 (28)
Cardiovascular diseases	2 (3)
Stroke	2 (3)
No/any other	39 (66)
Salt intake (g/day) (n=59)	
≤5	35 (59)
>5	24 (41)
Physical activity (n=59)	
No	34 (58)
Yes	25 (42)
Smoking behavior (n=59)	
Non-smoker	31 (53)
Ex-smoker	9 (15)
Occasional smoker	2 (3)
Current smoker	17 (29)

BMI: Body mass index

Table 4: Association of selected risk factors with undiagnosed hypertension

Attributes	Undiagnosed hypertension (%)	Normotensive (%)	Total (%)
Family history of hypertension (n=100)			
Yes	39 (80)	10 (20)	49 (100)
No	20 (39)	31 (61)	51 (100)
Total	59 (59)	41 (41)	100 (100)
df=1, P<0.05			
Body mass index (n=100)			
<18.5	04 (57)	03 (43)	07 (100)
18.5–22.9	28 (48)	30 (52)	58 (100)
23–24.9	15 (71)	06 (29)	21 (100)
>25.0	12 (86)	02 (14)	14 (100)
Total	59 (59)	41 (41)	100 (100)
df=3, P<0.05			
Co-morbidities (n=100)			
Yes	20 (80)	5 (20)	25 (100)
No	39 (52)	36 (48)	75 (100)
Total	59 (59)	41 (41)	100 (100)
df=1, P<0.05			
Tobacco consumption (n=100)			
Consumed	48 (55)	40 (45)	88 (100)
Never consumed	11 (92)	01 (8)	12 (100)
Total	59 (59)	41 (41)	100 (100)
df=1, P<0.05			
Alcohol consumption (n=100)			
Consumed	40 (51)	38 (49)	78 (100)
Never consumed	19 (86)	03 (14)	22 (100)
Total	59 (59)	41 (41)	100 (100)
df=1, P<0.05			

Our study found that 59% of the study population had the systolic blood pressure of more than 140 mmHg and diastolic blood pressure of more than 90 mmHg. In contrast, in their study in Tamil Nadu, Krishnaveni et al.,[18] reported 23% newly diagnosed cases of hypertension, and Undavalli et al.,[14] conducted their study in Andhra Pradesh reported a 10.1% prevalence of undiagnosed hypertension. As we reported data from the hospital settings, it could explain the higher prevalence of undiagnosed hypertension in our study participants. The presence of risk factors for hypertension such as higher BMI, alcohol consumption, tobacco consumption, and family history could have made them vulnerable to health issues, for which they visit health facilities. Universal screening for hypertension in high-risk populations and visiting health facilities for other health issues could be a fruitful intervention for the early diagnosis.

Awareness in an individual about his/her status of non-communicable disease could be an essential predictor for timely interventions. Surprisingly, in the present study, none of the participants with undiagnosed hypertensive were aware of this. About two-thirds (73%) did not have blood pressure measurement on their last hospital visit, though 60% had a positive family history. This disparity is because most of our study population lacked awareness regarding hypertension's risk factors, complications, and programs.

Our study found that 63% were more than 50 years of age, consistent with Krishnaveni et al.,[18] A home-based screening study on the prevalence of diagnosed and undiagnosed hypertension in a rural community reported consistent data (61.4%).Our study found that 58% of the individuals did not have adequate physical activity, whereas Tripathi et al., in their study in North India, reported almost similar findings (53%).[19] Our study found that 41% of the study participants had salt intake >5g/day; in contrast, Chakrabortyand Mandal reported high salt intake in 61% of the study participants residing in a rural area of West Bengal, reported 61%.[20] The geographical and food habits differential could explain the higher proportion of study sample consuming salt intake >5g/day.

In our study, we found higher proportion of comorbidity among study sample (28%, 47%, and 32% association with diabetes mellitus, smoking, and alcohol consumption, respectively), whereas Undavalli et al., reported 15.6%, 25%, and 34.4%, respectively, in their study in Andhra Pradesh.[14] The difference in study setting could be a reason for higher morbidity among participant in our study.

Limitations of the study
It was a hospital-based study and reported data collected from the patients who visited the hospital. Hence, the findings cannot be generalized to the patients who did not turn to the hospital. We were not able to follow-up with the

individuals, because our study population was attendees of the OPD. A person was considered diabetic only if he/she already had diabetes (self-reporting), and no screening test was applied to identify the undiagnosed cases. We studied the relation of BMI with hypertension; nevertheless, calculating the waist-line circumference is more advised than BMI. Our sample was small and conveniently chosen which could have inflated the prevalence of undiagnosed hypertension which necessitates for caution while reading the results of the study.

CONCLUSION

We reported higher prevalence (59%) of undiagnosed hypertension which was found to be higher in persons with high BMI, high salt intake, smokers, and sedentary activity. Lack of awareness regarding risk factors, complications, and programs related to hypertension was substantially higher than expected. Thus, controlling the above risk factors by lifestyle modification is necessary for the prevention and control of this non-communicable disease and its complications. Furthermore, standardized and universal routine hypertension screening of all OPD attendees irrespective of their reason for visit are required for early diagnosis of the problem.

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RECOMMENDATIONS

There is a strong need to create awareness regarding risk factors, preventive measures, and programs related to non-communicable diseases. Blood pressure measurement should be a part of a routine opportunistic screening for all patients attending any health facility.

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VKS- Concept and design of the study, prepared first draft of manuscript, **RKV-** Interpreted the results; reviewed the literature and manuscript preparation; **RV-** Concept, coordination, statistical analysis and interpretation and revision of the manuscript; **T-** Concept and design of the study, reviewed the literature and manuscript preparation and revision of the manuscript.

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