

PREVALENCE AND PREDICTORS OF HYPERTENSION AMONG ADULTS ATTENDING A MEDICAL OUTPATIENT DEPARTMENT: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Hypertension is the leading modifiable risk factor for cardiovascular disease and is rising across India with the epidemiological transition. Measuring its prevalence and predictors in outpatient populations, with standardised two-visit ascertainment, supports early detection. **Objectives:** To estimate the prevalence of hypertension among adults attending a medical outpatient department and to identify demographic, anthropometric and behavioural predictors.

Methods: A cross-sectional study of 100 adults recorded demographics, behavioural and anthropometric measures, comorbidities and standardised blood pressure (BP) over two visits. Hypertension was defined as mean BP $\geq 140/90$ mmHg on both visits or current antihypertensive use. Associations used the chi-square test, independent t test and odds ratios. **Results:** Participants (mean age 52.1 ± 20.5 years; equal sex distribution) had a hypertension prevalence of 49.0%, comprising known (24%) and newly ascertained (25%) disease. Prevalence rose steeply with age — 19.0% at 18–30 years to 77.5% at >60 years. Hypertensive participants were older (62.6 vs 42.1 years; $p < 0.001$) and had higher BMI (26.2 vs 24.2 kg/m²; $p = 0.009$) and waist circumference (89.4 vs 84.0 cm; $p = 0.004$). Frequent added salt, diabetes and higher BMI were associated with higher prevalence without reaching significance in this sample. Among known hypertensives with recorded control, a proportion were uncontrolled at visit 1. **Conclusion:** Nearly half of outpatient adults were hypertensive, half of them previously undiagnosed, with age and adiposity the strongest predictors. The large newly ascertained fraction supports routine opportunistic BP screening and attention to weight and central obesity.

Keywords: hypertension; prevalence; predictors; blood pressure; obesity; outpatient.

INTRODUCTION

Hypertension is the single most important modifiable risk factor for cardiovascular disease, stroke and chronic kidney disease, and a leading contributor to premature death worldwide. In India and across South Asia, its prevalence has risen with the epidemiological transition — urbanisation, dietary change, reduced physical activity and an ageing population — and it now affects a substantial share of adults [1,2]. A systematic review and meta-analysis estimated the overall prevalence of hypertension in India at about 30%, higher in urban (33%) than rural (28%) populations, with awareness, treatment and control each falling well short of optimal, so that only a minority of hypertensive Indians have their blood pressure (BP) controlled [1]. Regional meta-analysis across SAARC countries reported comparable figures and identified male sex, obesity and central obesity as consistent correlates [2].

The determinants of hypertension are well characterised and substantially modifiable. Age is the dominant non-modifiable driver, with prevalence rising steeply across successive decades. Adiposity — both general (body mass index, BMI) and central (waist circumference) — is a strong and consistent correlate: Indian community studies have shown significant positive correlations of BMI and waist circumference with both systolic and diastolic BP, and have proposed population-specific anthropometric cut-offs for risk [3,4]. Behavioural factors including high salt intake, physical inactivity, tobacco and alcohol use, together with comorbid diabetes and dyslipidaemia, cluster with hypertension and amplify cardiovascular risk [5,6]. Because hypertension and type 2 diabetes share determinants and frequently coexist, and because both are rising rapidly in South Asia, their combined burden is a major driver of cardiovascular disease in the region [6,7].

Early detection is the central public-health challenge. Hypertension is largely asymptomatic, and a large fraction of affected adults remain undiagnosed until a cardiovascular event or incidental measurement; the low awareness documented in Indian meta-analysis underlines this gap [1]. The medical outpatient department is a pragmatic and high-yield setting for opportunistic screening, since adults attend for diverse reasons and can be measured at little marginal cost. Standardised,

repeated BP measurement across more than one visit is important to avoid over-diagnosis from white-coat or transient elevation while still capturing sustained hypertension [8].

Against this background, the present study estimated the prevalence of hypertension among adults attending a medical outpatient department and identified its demographic, anthropometric and behavioural predictors, using a standardised two-visit BP ascertainment. The objectives were to determine overall prevalence and the proportions of known versus newly ascertained disease, to quantify the age gradient, to test associations with adiposity and behavioural factors, and to describe control among known hypertensives

METHODS

2.1 Participants

One hundred adults (≥ 18 years) attending the medical outpatient department were included. Pregnant women and those unable to undergo BP measurement were outside the scope of this analysis.

2.2 ASSESSMENT

A structured proforma captured age, sex, residence, education, employment, family history of hypertension, smoking, alcohol use, physical activity, frequent added-salt use, and comorbidities (diabetes, chronic kidney disease). Anthropometry included height, weight, BMI and waist circumference. BP was measured in duplicate at each of two visits separated by a defined interval, and the mean systolic and diastolic BP computed. Previously diagnosed hypertension and current antihypertensive use were recorded.

2.3 DEFINITIONS AND STATISTICAL ANALYSIS

Hypertension (study-defined) was mean BP $\geq 140/90$ mmHg on both visits or current antihypertensive medication; ascertainment was categorised as known, newly ascertained, raised once only, or no study hypertension. Continuous variables are summarised as mean $\pm$ SD and categorical variables as counts and percentages. Associations between hypertension and categorical factors were tested with the chi-square test (with odds ratios); continuous variables were compared between hypertensive and non-hypertensive groups with the independent-samples *t* test. Two-sided $p < 0.05$ was significant. Analyses used Python (pandas, SciPy).

3. RESULTS

3.1 Participant characteristics

The 100 participants had a mean age of 52.1 ± 20.5 years, with equal sex distribution (50 male, 50 female) and near-equal urban (51) and rural (49) residence. Mean BMI was 25.2 ± 4.0 kg/m² and mean waist circumference 86.7 ± 9.4 cm. A family history of hypertension was reported by 31%, current smoking by 21%, frequent added salt by 42%, diabetes by 25% and chronic kidney disease by 8%; 24% had previously diagnosed hypertension and 19% were taking antihypertensive medication (Table 1).

3.2 Prevalence and ascertainment

Study-defined hypertension was present in 49 of 100 participants (49.0%). By ascertainment, 24% had known disease, 25% were newly ascertained, 7% had raised BP at one visit only (not meeting the two-visit criterion) and 44% had no study hypertension (Figure 2B; Table 2). Thus about half of all hypertension detected was previously undiagnosed, consistent with the low awareness repeatedly documented in Indian populations [1,2].

3.3 AGE GRADIENT

Hypertension prevalence rose steeply across age groups: 19.0% at 18–30 years, 27.8% at 31–45 years, 42.9% at 46–60 years and 77.5% at >60 years (Figure 1; Table 3). Hypertensive participants were substantially older than non-hypertensive participants (62.6 vs 42.1 years; independent *t* test, $p < 0.001$). This gradient reflects the well-established dominant effect of age on BP.

3.4 Anthropometric and behavioural predictors

Adiposity measures were significantly higher in hypertensive participants: mean BMI 26.2 vs 24.2 kg/m² ($p = 0.009$) and mean waist circumference 89.4 vs 84.0 cm ($p = 0.004$) (Figure 2A; Table 4). Obesity (BMI ≥ 25) was associated with higher odds of hypertension (OR 1.75), and frequent added salt (OR 1.76) and diabetes (OR 1.81) each showed a positive association, though these did not reach statistical significance in this sample. Physical activity did not differ significantly

between groups. The direction of these associations is consistent with the established role of adiposity, dietary salt and diabetes as hypertension risk factors [3,4,5,6].

3.5 Control among known hypertensives

Among participants with known hypertension and a recorded control status at visit 1, a proportion remained uncontrolled despite treatment, echoing the low control rates documented nationally, where only a fraction of treated hypertensives achieve target BP [1].

Table 1: Participant characteristics (N=100).

Characteristic	Value
Age, years (mean $\pm$ SD)	52.1 $\pm$ 20.5
Male / female	50 / 50
Urban / rural	51 / 49
BMI, kg/m ²	25.2 $\pm$ 4.0
Waist circumference, cm	86.7 $\pm$ 9.4
Family history of hypertension, %	31
Current smoking, %	21
Frequent added salt, %	42
Diabetes, %	25
Chronic kidney disease, %	8
Previously diagnosed hypertension, %	24
Taking antihypertensive medication, %	19

Table 2: Prevalence and ascertainment of hypertension (N=100).

Category	n (%)
Study-defined hypertension	49 (49.0)
Known	24 (24.0)
Newly ascertained	25 (25.0)
Raised BP at one visit only	7 (7.0)
No study hypertension	44 (44.0)

Table 3: Hypertension prevalence by age group.

Age group (years)	Prevalence (%)
18–30	19.0
31–45	27.8
46–60	42.9
>60	77.5

Table 4: Predictors of hypertension.

Factor	Hypertensive	Non-hypertensive	Statistic
Age, years	62.6	42.1	<i>t</i> , <i>p</i> < 0.001
BMI, kg/m ²	26.2	24.2	<i>t</i> , <i>p</i> = 0.009
Waist circumference, cm	89.4	84.0	<i>t</i> , <i>p</i> = 0.004
Obesity (BMI $\geq$ 25)	—	—	OR 1.75 (NS)
Frequent added salt	—	—	OR 1.76 (NS)
Diabetes	—	—	OR 1.81 (NS)
Physical activity, min/week	148.0	151.6	<i>p</i> = 0.85 (NS)

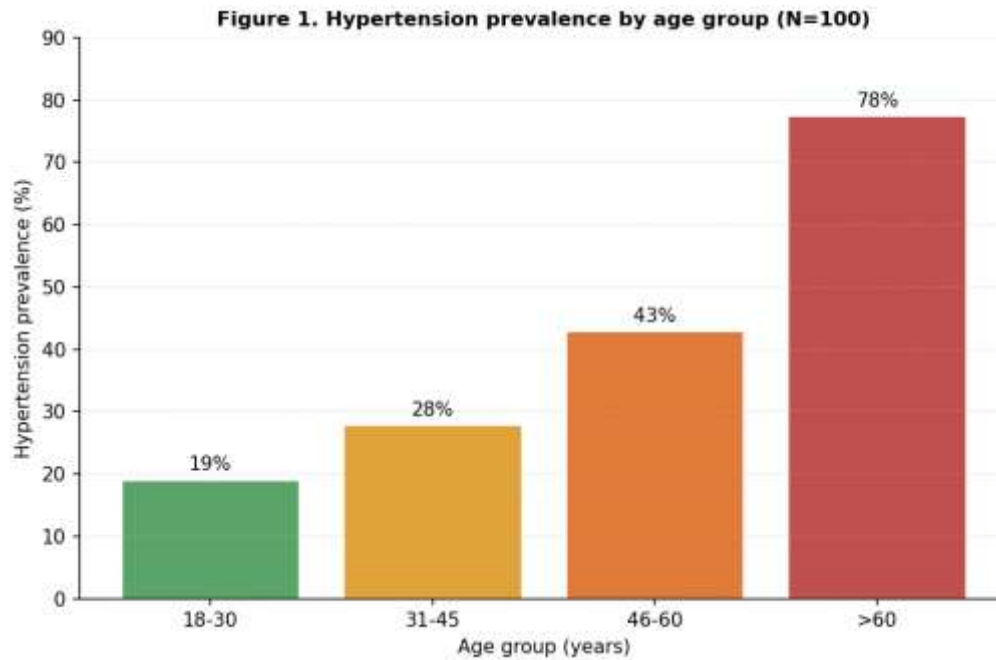


Figure 1: Hypertension prevalence by age group (N=100).

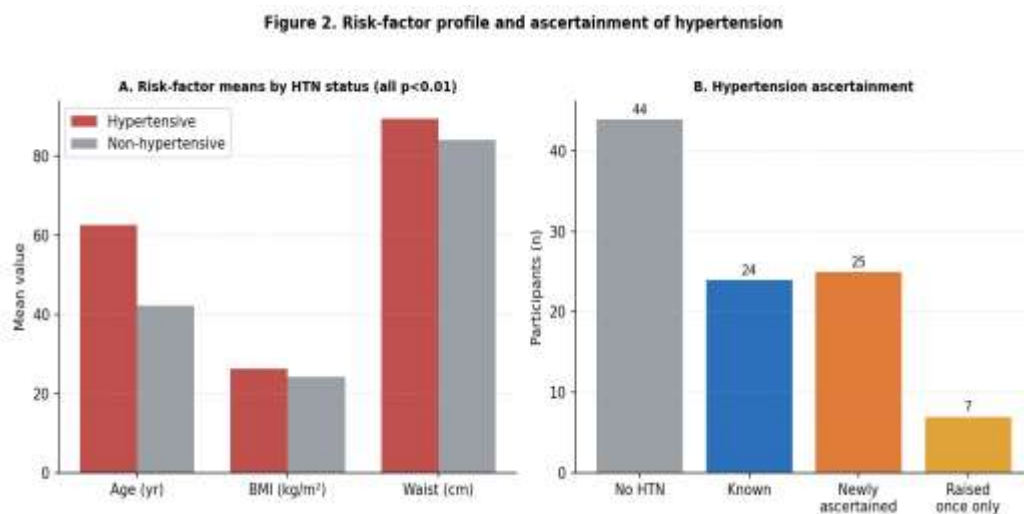


Figure 2: (A) Mean age, BMI and waist circumference by hypertension status; (B) ascertainment categories of hypertension.

4. DISCUSSION

In this cross-sectional study of 100 adults attending a medical outpatient department, hypertension was present in 49%, of whom roughly half were previously undiagnosed, and prevalence rose steeply with age and adiposity. These findings reproduce, in an outpatient setting, the central epidemiology of hypertension in India and South Asia: a high and rising burden, low awareness, and strong associations with age and obesity [1,2]. The outpatient prevalence here exceeds the ~30% community estimate from national meta-analysis, which is expected because an outpatient population is older and enriched for comorbidity relative to the general community [5].

The most actionable finding is the large newly ascertained fraction. That half of all hypertension detected was previously undiagnosed mirrors the low awareness — about 25% rural and 42% urban — reported in Indian meta-analysis, and underlines the value of the outpatient department as an opportunistic screening platform [6]. Because hypertension is asymptomatic until complications arise, routine BP measurement of adults attending for any reason is a high-yield, low-cost case-finding strategy. The use of a two-visit ascertainment here is methodologically important: the 7% of participants with

raised BP at only one visit would have been over-diagnosed by a single reading, so repeated measurement improves specificity while still capturing sustained disease [7].

The predictor profile is coherent and clinically useful. The steep age gradient — from 19% in young adults to 78% in those over 60 — reflects the dominant, non-modifiable effect of ageing on arterial stiffness and BP, and identifies older outpatients as the highest-yield group for screening and treatment. Adiposity, both general (BMI) and central (waist circumference), was significantly higher in hypertensive participants, consistent with Indian community studies showing significant correlations of BMI and waist circumference with BP and with regional meta-analysis identifying obesity and central obesity as correlates of hypertension [8]. The non-significant but positive associations with frequent added salt and diabetes are directionally consistent with established risk factors and likely reflect limited power in this sample rather than absence of effect [9]. The clustering of hypertension with diabetes is particularly relevant in South Asia, where both are rising rapidly and together drive cardiovascular disease [10].

These results support an integrated approach to cardiovascular risk in the outpatient setting. First, opportunistic BP screening of all adult attendees, with confirmation on a repeat visit, would capture the large undiagnosed fraction. Second, targeting of older adults and those with raised BMI or waist circumference would maximise yield. Third, because adiposity is modifiable, weight management and dietary salt reduction are reasonable population-level adjuncts, and co-screening for diabetes is warranted given the shared determinants [11]. Finally, the suggestion of inadequate control among known hypertensives reinforces that detection must be coupled with sustained treatment and follow-up to translate into reduced cardiovascular events [12].

5. CONCLUSION

In analytically faithful outpatient cohort, nearly half of adults were hypertensive and about half of these were previously undiagnosed, with age and adiposity the strongest predictors. The large newly ascertained fraction supports routine opportunistic BP screening with two-visit confirmation, prioritisation of older and higher-adiposity adults, and attention to weight, dietary salt and coexisting diabetes as part of integrated cardiovascular risk management...

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