Prevalence, awareness, treatment and control of **hypertension** in 628 rural and urban communities from 17 high, middle and low income countries

**The PURE Hypertension report**

(*Prospective Urban Rural Epidemiology*)

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*On behalf of the PURE investigators*

*No conflict of interest to declare*
Aim of this report

To assess hypertension prevalence, awareness, treatment and control in urban & rural communities in multiple countries.
153,996 individuals from 628 communities in 17 countries from 5 continents

143,830 (93.4%) had complete measures of BP and are included in these analyses
Selection of communities and subjects

- **Rural and urban** (high, middle and low income economies) communities.
- Communities selected to **capture diversity** and not necessarily representative of the country.
- Community **stability** also a factor in selection (to facilitate long-term follow-up).
- **Larger countries contribute more communities** from multiple regions and more individuals (e.g. India and China).
- Within each community an **unbiased sample of households** were recruited and all individuals 35 to 70 yrs eligible for study.
BP measurement & analysis

Average of two resting BP readings by trained personnel using an automatic digital blood pressure monitor

- **Hypertension** = average \( SBP \geq 140 \text{ mmHg} \) OR \( DBP \geq 90 \text{ mmHg} \) OR self-reported medical diagnosis of HT & on BP lowering meds

- **HT awareness** = \% of patients with HT reporting a medical diagnosis of HT

- **HT treatment** = \% of patients with HT reporting BP lowering treatment

- **HT control** = \% of patients with HT with \( SBP < 140 \text{ and } DBP < 90 \text{ mmHg} \)

Analyses: Age, gender, region and if relevant education adjusted

Region: World bank economic groups 2006
Main characteristics of the population

- The **mean age** of participants was 50.4 years
- 58% female
- 10% were from HIC, 28% from UMIC, 39% from LMIC and 23% from LIC
- 46% were from rural communities
BP (mean / SD & prevalence) in different regions

SBP = 131.23 ± (22.4)
DBP = 81.99 ± (15.4)
## Stages of Hypertension (%)
*(measured at examination)*

<table>
<thead>
<tr>
<th></th>
<th>Optimal BP</th>
<th>Pre-HT</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=40,083</td>
<td>N=52,931</td>
<td>N=31,521</td>
<td>N=12,903</td>
<td>N=6,389</td>
</tr>
<tr>
<td>HIC</td>
<td>25.4</td>
<td>41.6</td>
<td>23.1</td>
<td>7.6</td>
<td>2.3</td>
</tr>
<tr>
<td>UMIC</td>
<td>22.8</td>
<td>35.3</td>
<td>25.3</td>
<td>10.7</td>
<td>5.9</td>
</tr>
<tr>
<td>LMIC</td>
<td>27.3</td>
<td>37.0</td>
<td>21.7</td>
<td>9.4</td>
<td>4.5</td>
</tr>
<tr>
<td>LIC</td>
<td>36.1</td>
<td>35.8</td>
<td>17.7</td>
<td>6.7</td>
<td>3.7</td>
</tr>
<tr>
<td>ALL</td>
<td>27.9</td>
<td>36.8</td>
<td>21.9</td>
<td>9.0</td>
<td>4.4</td>
</tr>
</tbody>
</table>
Hypertension prevalence, awareness, treatment & control

*N = 143,830*

*among all patients with hypertension*
Prevalence of Hypertension

Urban vs Rural

Female vs Male

Low education vs Middle education vs High education
Awareness, treatment and Control by urban-rural location

**Awareness**
- HIC: 45%, 45%
- UMIC: 50%, 50%
- LMIC: 40%, 60%
- LIC: 45%, 65%

**Treatment**
- HIC: 50%, 50%
- UMIC: 60%, 60%
- LMIC: 45%, 45%
- LIC: 40%, 40%

**Control**
- HIC: 15%, 15%
- UMIC: 20%, 20%
- LMIC: 10%, 10%
- LIC: 5%, 5%
Awareness, treatment and Control by gender

**Awareness**

- HIC: 40%
- UMIC: 50%
- LMIC: 30%
- LIC: 20%

**Treatment**

- HIC: 60%
- UMIC: 50%
- LMIC: 40%
- LIC: 30%

**Control**

- HIC: 16%
- UMIC: 12%
- LMIC: 8%
- LIC: 4%

By gender:

- Female
- Male
Prevalence, awareness, treatment and control of hypertension amongst those with and without other cardiovascular risk factors

Risk factors include diabetes, current or former smoker, obesity, >65 years and male
Use of $\geq 2$ BP lowering medications

<table>
<thead>
<tr>
<th>Region</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIC</td>
<td>15.65%</td>
</tr>
<tr>
<td>UMIC</td>
<td>13.07%</td>
</tr>
<tr>
<td>LMIC</td>
<td>12.95%</td>
</tr>
<tr>
<td>LIC</td>
<td>1.62%</td>
</tr>
</tbody>
</table>
Conclusions: Hypertension in PURE

- Highly prevalent in all communities
- Awareness is low
- Once aware, substantial proportion are treated but BP control is poor
- Few people with HT are on ≥2 BP lowering therapies
- Alternative strategies to detect (systematic screening) by simplified algorithms and early use of combination therapies (polypill) are critical to control this global epidemic
Countries & Investigators

Argentina – R Diaz
Bangladesh – O Rahman
Brazil – A Avezum
Canada – G Dagenais, S Lear, A Wielgosz, K Teo
Chile – F Lanas
China – Liu Lisheng, Li Waei
Colombia – P. Lopez-Jaramillo
India – M Vaz, P Mony, V Mohan, R Gupta, C R Soman, R Kutty, K Vijayakumar, R Kumar
Iran – R Kelishadi
Malaysia – K Yusoff, N H Ismail
Pakistan – R Iqbal
Poland – W Zatonski, A Szuba
S Africa – A Kruger, T Puoane
Sweden – A Rosengren
Turkey – A Oguz
UAE – A Yusufali
Zimbabwe – J Chifamba

Population Health Research Institute
S Yusuf, K Teo, S Anand, CK Chow, S Rangarajan, S Islam, M Zhang, C Kabali, M Dehghan, A Mente
Prevalence, awareness, treatment & control in different published cohorts

- PURE BP 2005/09
- THAI NHES 2009
- CHINA 33 commun.
- CHINA Institutional Beijing
- NHANES 2010
- CANADA 2009

**Graph:**
- **X-axis:** PREVALENCE, AWARENESS, TREATED, CONTROLLED
- **Y-axis:** Percentage (0 to 100)

The graph compares the prevalence, awareness, treatment, and control of hypertension in different populations across various studies.
382,341 individuals from 107,599 households in 628 communities of 17 countries on five continents

- 185,009 individuals not eligible (0.48)

197,332 (52%) individuals between 35 and 70 years were eligible. Of these 153,996 adults participated

- 10,166 individuals without complete measures (0.06)

143,830 (93.4%) had complete measures of systolic and diastolic blood pressure and are included in these analyses
Lower education was strongly associated with awareness, treatment and control in LIC.