

### Impact of Prehypertension and Peak Blood Pressure to Exercise on the Development of Hypertension in Children and Adolescents

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**Objective:** To determine the influence of prehypertension (PHT) and peak pressure to exercise on the development of hypertension (HT) in children and adolescents. **Methods:** A prospective longitudinal was carried out in 160 patients (73 boys and 87 girls, aged 10–18 years, mean  $14.21 \pm 2.17$  years) without history of hypertension (defined as office blood pressure–BP– measurements  $\geq 95$ th percentile for sex and age or  $>140/90$  mmHg for those  $\geq 18$  years). At baseline, office BP was taken to all patients. PHT was defined as office BP measurements  $\geq 90$ th percentile and  $<95$ th percentile for sex and age or  $>120/80$  and  $<140/90$  mmHg for those  $\geq 18$  years. All subjects entered at least the third stage with a multistage exercise treadmill test (Bruce protocol). The BP was measured immediately before testing, during each exercise stage and 4–minutes of recovery period. Peak blood pressure to exercise (PBP) was defined as the highest value of systolic blood pressure achieved during the treadmill test. All subjects, after follow-up ( $3.88 \pm 1.89$  years), were undergoing a physical examination to identify new HT. A logistic regression model was used to evaluate the influence of PHT and PSBP on the development of HT, this model included age, gender, body mass index, PSBP, familial history of HT and baseline condition of BP. **Results:** At baseline, we identified 22 patients with PHT (12.0%). After follow-up, 6.3% ( $n=10$ ) of the population developed HT, 31.8% of PHT. Variables that correlated significantly with HT were gender, baseline office systolic BP, peak systolic BP to exercise and baseline condition of BP (PHT). Logistic regression analysis showed that only PHT ( $OR=10.62$ , 95%  $CI=1.25-89.73$ ,  $P=0.03$ ) was significantly associated with new HT in the follow-up. **Conclusions:** Although peak systolic BP during to exercise was associated with new HT, PHT was the only predictor of new HT. The PHT represent a cardiovascular condition prior to the development of hypertension in children and adolescents.

### Arterial Hypertension Among Russian Men Aged 30–59 Years

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Arterial hypertension is a well-recognised risk factor for major cardiovascular events, such as myocardial infarction and stroke. In Russia, where cardiovascular morbidity and mortality are especially high, early detection and adequate treatment could significantly reduce the burden on the health care system. As a part of a longitudinal study of 1300 men aged 30–59 years sampled at random who were living in a typical Russian city west of the Ural Mountains, we assessed the prevalence of arterial hypertension, whether individuals were aware of their condition, whether it was treated and controlled, and their adherence to treatment. The physical examination included self-reported information on health status, including whether blood pressure had ever been measured, arterial hypertension diagnosed and any treatment prescribed, as well as standardised measurement of blood pressure by trained medical professionals. A very high prevalence of raised blood pressure was found, with 6 out of 10 men being classified as hypertensive and 10% having severe hypertension (blood pressure greater than 180/110 mm Hg). 38% of those found to be hypertensive had never been told they had had raised blood pressure. Among those who were diagnosed, only 65% had been prescribed treatment, with 15% of those with severe hypertension left untreated. Among men prescribed anti-hypertensives, only 60% of them took them either regularly or sometimes, among whom only 16% were normotensive at examination, while 48% had a blood pressure of 160/100 or greater. In this population at high risk of cardiovascular disease because of the high prevalence of smoking, poor diets, and hazardous drinking, steps to improve the detection and effective management of hypertension are essential.

### Predictors of Hypertension Awareness, Treatment, and Control in Rural and Urban Areas of 17 Countries (PURE Study)

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**Introduction:** Hypertension is a well recognized major determinant of cardiovascular disease (CVD) internationally yet despite this in some groups, hypertension awareness, treatment and control is poor. We examined the determinants of awareness, treatment and control of hypertension in population cohorts from urban and rural areas recruited to the Prospective Urban and Rural Epidemiological Study (PURE) in 17 countries (Canada, Sweden, UAE, Argentina, Brazil, Chile, Colombia, Poland, Turkey, Malaysia, Iran, South Africa, China, Bangladesh, India, Pakistan and Zimbabwe). **Methods:** Information on CVD risk factors was collected from ~154,000 individuals aged 35 to 70 years using standardized instruments from 41 centres in 17 countries between 2002 and 2009. Hypertension was defined as self-report and/or BP  $\geq 140/90$ . Among all with hypertension, we calculated the percent who reported being aware of having hypertension, and among the latter, the percent who were treated and among those treated, those who were

conducted a survey among all the Tibetans aged 40 years and older in December 2008 in Yangbajing, a township of Dangxiong County in Tibet at an altitude of 4300 meters. Blood pressure (BP) was measured using standardized instruments and protocol. The average of 3 measurements was used in all analyses. Other information such as history of hypertension and medication use was collected through in-person interviews. Hypertension was defined as systolic BP  $\geq 140$  mmHg, diastolic BP  $\geq 90$  mmHg, or on antihypertensive treatment in the past two weeks. Among those with hypertension, awareness, treatment, and control of hypertension was defined as self-report of any previous diagnosis of hypertension, use of BP-lowering medication in the past two weeks, and BP reading of  $<140$  mmHg (systolic) and  $<90$  mmHg (diastolic) along with pharmacological treatment. **Results:** A total of 702 adults (aged 40–89, 57% female, 95% herdsmen) were recruited. The prevalence of hypertension was much higher in men (68.1%) than in women (50.5%), and was higher with advancing ages (see Table). Among those with hypertension, only 19.2% were aware of their conditions, 5.7% were taking medication, and only 1 man (0.2%) had their blood pressure under control. **Conclusion:** Despite the high prevalence of hypertension, the awareness, treatment and control rates were unacceptably low in Yangbajing, Tibet. Effective strategies are urgently required to address the serious public health problem of hypertension in the wide pasturing areas of Tibet, China.

Table. Prevalence, Awareness, Treatment and Control of Hypertension in Yangbajing, Dangxiong, Tibet, 2008

Age group	Number of participants	Prevalence (%)	Awareness (%)	Treatment (%)	Control (%)
<b>Male</b>					
40–49	127	50.4	14.1	4.7	1.6
50–59	72	79.2	29.8	5.3	0.0
60–69	67	73.1	26.5	6.1	0.0
70–	35	100.0	22.9	11.4	0.0
Total	301	68.1	22.9	6.3	0.5
<b>Female</b>					
40–49	159	24.5	15.4	7.7	0.0
50–59	85	49.4	16.7	9.5	0.0
60–69	90	71.1	20.3	3.1	0.0
70–	66	86.4	8.8	1.8	0.0
Total	400	50.5	15.3	5.0	0.0
<b>Total</b>					
40–49	286	36.0	14.6	5.8	1.0
50–59	157	63.1	24.2	7.1	0.0
60–69	157	72.0	23.0	4.4	0.0
70–	101	91.1	14.1	5.4	0.0
Total	701	58.1	19.2	5.7	0.2

### Efficacy of Home Blood Pressure Monitoring on Blood Pressure Control: A Randomized Controlled Trial

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**Introduction:** High blood pressure (BP) is the main risk factor for cardiovascular disease worldwide, however its control rates are unsatisfactory. Home Blood Pressure Monitoring (HBPM) with automatic oscillometric devices has been used to detect white-coat hypertension, as a co-adjuvant intervention to improve therapeutic compliance and to guide treatment decisions. In this trial we evaluated the effect of HBPM in BP control measured by 24h ambulatory blood pressure monitoring (ABPM). **Methods:** A factorial randomized controlled trial enrolled 121 adult hypertensive patients under drug treatment but with uncontrolled office BP and 24h ABPM  $\geq 130/80$  mmHg. Participants were assigned to HBPM ( $n=36$ ), pharmacist care ( $n=35$ ), HBPM and pharmacist care ( $n=32$ ) or usual care ( $n=33$ ) using a stratified randomization, based on hypertension severity in 24h ABPM—mean 24h systolic  $\geq 140$  mm Hg, and remained without medication change during the trial. Follow-up visits were conducted at 7 and 30 days after randomization, and at 60 days to assess the outcome. 24h ABPM was repeated at the end of follow up and deltas between baseline and final ABPM measurements were calculated for systolic and diastolic 24 hours, daily and nightly periods. Additional analysis for 24h ABPM was carried in which a term for the HBPM+PC interaction was included in the model to test whether there was a multiplicative effect of these 2 interventions. Statistical significance was set at a probability level of  $<0.05$  and  $<0.1$  for interaction. The analysis was by intention to treat. **Results:** Of 558 patients screened, 136 fulfilled the eligibility criteria and were randomized, 121 (89%) completed the trial. Stratified randomization resulted in assignment of about half of patients to the systolic BP  $\geq 140$  mmHg in 24h ABPM (53% of usual care and 52% to HBPM). The average of the delta for 24h systolic blood pressure (SBP) differed between HBPM ( $8.8 \pm 12.9$  mmHg) and control ( $3.4 \pm 11.6$  mmHg) groups ( $p=0.018$ ), as well as for 24h diastolic blood pressure (DBP) ( $5.5 \pm 8.3$  and  $1.0 \pm 7.9$  mmHg, respectively;  $p=0.003$ ). The deltas for the overall differences between HBPM and control were 24h SBP= $5.4$  ( $0.9-9.8$ ) mmHg ( $p=0.018$ ); Daily Systolic= $4.4$  ( $-0.1-8.8$ ) mmHg ( $p=0.055$ ); Nightly Systolic= $6.0$  ( $1.3-10.7$ ) mmHg ( $p=0.012$ ); 24-h Diastolic= $4.5$  ( $1.6-7.4$ ) mmHg ( $p=0.003$ ); Daily Diastolic= $3.4$  ( $0.4-6.3$ ) mmHg ( $p=0.025$ ); and Nightly Diastolic= $5.8$  ( $2.5-9.0$ ) mmHg ( $p=0.001$ ). At the end of the trial 18.6% of patients in HBPM and 8.1% in the control group had BP  $<130/80$  mmHg ( $p=0.08$ ). **Conclusion:** HBPM reduced BP assessed by ABPM for systolic and diastolic BP among hypertensive patients and improved the control rate.