A PILOT GENOME WIDE ASSOCIATION STUDY (GWAS) IN MULTI ETHNIC POPULATION OF MALAYSIA

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Objective
Primary aldosteronism (PA) occurs due to the presence of aldosterone-producing lesions commonly located in the adrenal gland which can thus be cured by an adrenalectomy. Studies on surgically removed tissues found somatic mutations in five genes (KCNJ5, ATP1A1, ATP2B3, CACNA1D, and CTNNB1) can cause the excess aldosterone production. Most of these studies were performed in Caucasian patients. The aim of our study is to understand the genetic background which may promote somatic mutation in these genes and to investigate the frequency and distribution of these somatic mutations in the multiethnic Asian population in Malaysia.

Method
To characterize the genetic background of PA, a pilot genome wide association study (GWAS) was performed using the Human Infinium OmniExpressExome-8 v1.4 BeadChip containing 960,919 markers to compare gDNA of PA patients with healthy controls. The Association Workflow in Partek® Genomics Suite™ was used for quality control and association analysis was performed using the Chi-square Test and reported as an odds ratio (OR). On tumour DNA, targeted sequencing of hotspots for the five causal genes were performed.

Discussion
From the pilot GWAS, two SNPs in chromosome 2 were identified to be associated with PA (OR=11.03, P-value=7.1x10⁻¹⁰, and OR=1.61, P-value=4.0x10⁻⁹). One of the SNP is within a gene, EPHA4. Interestingly EPHA4 is known to bind to Efnb3 which when knockedout in mice, causes enhanced constriction in the carotid arteries (Wang et al., 2016). As for prevalence of somatic mutations in the multiethnic population of Malaysia, the most prevalent somatic mutation is the KCNJ5 G151R mutation (76% of aldosterone-producing lesions).

Conclusion
The highest number observed in Chinese patients (91%), followed by Malay patients (67%). To note, unlike previous findings in Caucasian cohorts, KCNJ5 mutation were present equally in males and females (75% and 78%) with an average age of 56±14 years old.

Keywords: PRIMARY ALDOSTERONISM, GENOME WIDE ASSOCIATION STUDY, SOMATIC MUTATION, ALDOSTERONE-PRODUCING ADENOMAS
**Altered expression profile of IL6/STAT3-pathway genes in patients with essential hypertension in very old age**

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**Objective**

Essential hypertension (EH) is one of the most common diseases the elderly. Genetic predisposition to EH is undoubted and its influence is increased with age. Transcriptional activity (TA) of some genes was also demonstrated to decline in age-dependent fashion in general population and in diseased individuals. Therefore, we considered it interesting to evaluate TA of IL6/STAT3-pathway genes, disturbance in functioning of which leads to development of inflammation and disease formation.

Our aim was to study the expression profile of IL6/STAT3-pathway genes in healthy individuals and in patients with EH.

**Method**

All participants were women aged between 80 and 100, residents of the Republic of Bashkortostan (Russia). EH patients didn't receive antihypertensive treatment at the time of blood collection. Total RNA was isolated from peripheral blood leukocytes. The analysis of gene transcriptional activity was performed using IL6/STAT3 Signaling Pathway RT² Profiler PCR Array. ΔΔC_t-method was applied to analyze the experimental data.

**Discussion**

We found that expression levels of NFKB1 and IL18R1 genes were increased, and CCL5, CSF1, CD4, RPLP0, BCL2, SRC, IL15, CD40LG, CFS3, CDKN1A, MYC and CFS2 genes were down-regulated in patients compared to healthy individuals. Differentially expressed genes are involved in a wide range of biological processes and some signaling pathways, such as inflammatory response, apoptotic regulation, senescence, immune response, response to stimulus, cellular defense response, cytokine-mediated signaling pathway, NF-kappaB-signaling.

**Conclusion**

The results of our study indicate that IL6/STAT3-pathway genes may be implicated in the pathogenesis of hypertension in very old age.

*Keywords: essential hypertension; gene expression; IL6/STAT3-pathway; aging*
The European contribution to inheritance EH and genetic pool in Uzbek population

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Objective
To study familial character of essential hypertension (EH) and to evaluate the role of genetic pool.

Method
The study included 100 healthy volunteers and 312 patients with I-II grade of EH. For linkage disequilibrium research, have been taken microsatellite SSR-markers.

Discussion
We have studied genotype of 20 gene of cardiovascular continuum and identified 12 diagnostically significant genes. Registration of the genotyping results has identified an association SNP genes (ET,A, ENDRA T/T; ADDUCIN G/G; GNB3 C/C; ACE D/D; CYP11B2 T/T) with the risk of violations of water-salt metabolism, (PPR2Y P/P; ADRB3 T/T; AGTR1 A/A, AGTR2 G/G; β2-AR G/G) with the risk of metabolic syndrome, ENDOThEL system genes (B2BKR +9→9; eNOS; 4a/4b) with the risk of endothelial dysfunction. The heritage of hypertension in Uzbek population is estimated as: 17% of east, 33% of the western, 25% from the central Europe, 8% for Anatolia and 17% for Southeast Asia. In the analysis of mtDNA HVI region in patients with EH, we have identified six common point of nucleotide substitutions (H, T, X, I, V, L3). Comparative analysis of HVI region of mtDNA and SNP C344T in hypertension candidate gene CYP11B2, showed a definite connection with carriage of "negative" TT genotype of CYP11B2 gene with substitution in 16327 loci of HVI (OR=2.7; 95%CI=0.32-23.14). Detected N, R, J-supercusters in the Uzbek population date back to the alleged place of occurrence of the territories of South-East Asia and Western Europe. We calculated the genetic distance and determined that differences in the genome is 9-61%. We have determined that monogenic Western and hybrid Eastern population of Uzbekistan are often carriers of damaging DD-genotype of ACE gene localized in chromosome-17.

Conclusion
The functional significance of 12 genes in Uzbek population with a combination of atherosclerosis and metabolic syndrome is similar 83% in most of European heritage type of hypertension. However, a distinctive sensitivity to the exchange of sodium in these individuals is due to 17% of the Asian contribution.

Keywords: mtDNA, Linkage disequilibrium, SNP, Essential hypertension
α-Adducin Gene Promoter DNA Methylation and the Risk of Essential Hypertension

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Objective
This study was conducted to test the association between promoter DNA methylation of α-adducin (ADD1) gene and the risk of essential hypertension (EH).

Method
A total of 150 EH patients and 100 aged and gender matched controls were investigated. DNA methylation levels of five CpG dinucleotides on ADD1 promoter were measured employing bisulphate pyrosequencing technology.

Discussion
Our results showed that females have a higher ADD1 DNA methylation than males and a significantly lower CpG1 methylation level is associated with increased risk of EH among them. As for males, a significant association between lower CpG2-5 methylation levels and increased risk of EH was shown. In addition, CpG2-5 methylation was found to be a highly significant predictor for EH among male. In females, CpG1 methylation was considered a predictor of hypertension. No significant correlations were found with biochemical measures, apart from the concentration of aspartate aminotransferase (AST) which was inversely correlated with ADD1 CpG2-5 methylation levels among female controls (r= -0.703).

Conclusion
These findings highlight that ADD1 methylation may have a contributing role in the pathogenesis of EH with varying implications for both genders.
THE INVOLVEMENT OF KIDNEY DNA METHYLATION IN BLOOD PRESSURE REGULATION.

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Objective
Increasing evidence suggests that epigenetic modifications such as DNA methylation (5mC) is important to the development of essential hypertension, and that changes in DNA methylation of blood cells is associated to blood pressure (BP). So far there has been no studies of epigenetic changes in the kidney - an important effector organ in BP regulation. The aim of this study was to compare loci specific methylation in the kidney between normotensive and hypertensive subjects.

Method
We used 96 human renal samples from the TRANScriptome of RenaL HumAN TissueE (TRANSLATE) Study to measure DNA methylation. TRANSLATE consists of carefully characterised collections of "apparently healthy" specimens of human kidneys. DNA was extracted from kidney tissue using the DNeasy blood and tissue Qiagen kit and loci specific methylation status was determined using Infinium HumanMethylation 450K array (Illumina®, Australia).

Discussion
We found 505 (P=<.01) differentially methylated loci between hypertensive and normotensive kidney DNA. Included in these loci were genes previously associated to blood pressure modulation (BAT4, CASZ1, DNM3, FGGY, HEXIM2, INSR, KCNJ11, LY6G5B, PPL, SIK1, TBC1D1, THBS2, MAP3K11, EHBP1L1, XKR6). Of these, one (NR3C2) is correlated to monogenic forms of hypertension. Differentially methylated pathways include those involved with aldosterone-regulated sodium reabsorption, vasopressin-regulated water reabsorption and vascular smooth muscle contraction.

Conclusion
DNA methylation in the kidney is an important molecular mechanism for BP and hypertension in humans.

Keywords: DNA; Methylation; Epigenetics; Kidney
Epigenetic clues to the blood pressure ‘Legacy Effect’ in spontaneously hypertensive rats

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Objective
In the spontaneously hypertensive rat (SHR) the ‘legacy effect’ is the persistent reduction in blood pressure (BP) and increased lifespan after short-term treatment with an angiotensin converting enzyme inhibitor (ACEi). However, the molecular machinery involved in resetting BP is unclear. Gene, non-coding RNA and DNA methylation are potential candidates here. The aim of this study is to identify biomarkers that might represent the early changes induced by ACEi treatment in young SHR.

Method
6-week old male SHR were treated with the ACEi perindopril (1 mg/kg/d) (n = 6) or vehicle (n = 6) for 48 hours. Average global DNA methylation was quantified in renal cortices using the 5-mC ELISA Kit (Zymo Research, USA) which features a unique anti-5-methylcytosine monoclonal antibody that is both sensitive and specific for 5-mC. We also measured the expression of epigenetic regulators histone deacetylase 1 (Hdac1), solute carrier family 16 member 3 (monocarboxylate transporter, Mct3) and DNA (cytosine-5-)methyltransferase 1 (Dnmt1) using quantitative PCR.

Discussion
Global DNA methylation was reduced in the renal cortices of animals treated with ACEi (P<0.05, Figure 1). Acute treatment with perindopril did not significantly change the renal expression of Hdac1, Dnmt1 and Mct3 (P>0.05).

Conclusion
Acute treatment by ACEi results in a reduction in global DNA methylation indicating that epigenetics may play an important role in the ‘legacy effect’. Using next generation RNA sequencing we are currently investigating the long-term effect and specific genes that contribute to these changes.

Keywords: Legacy Effect; ACEi; Short-Term Treatment; Epigenetic modification;
INVESTIGATION ON THE ROLE OF MONOGENIC HUMAN CARDIOMYOPATHIES IN A POLYGENIC MODEL OF CARDIAC HYPERTROPHY AND HEART FAILURE

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Objective
We have used the hypertrophic heart rat (HHR), a unique normotensive polygenic model of cardiac hypertrophy and heart failure to investigate the role of genes previously associated with monogenic human cardiomyopathy.

Method
We selected 42 genes involved in monogenic human cardiomyopathies to study: 1) DNA sequence variants – Whole-genome sequencing of three male 13-week old HHR and three age-matched normal heart rat (NHR), its genetic control strain, using Illumina Cluster Station and Illumina HiSeq2000; 2) mRNA expression – Targeted RNA expression using Illumina TruSeq and MiSeq sequencer in left ventricles of HHR and NHR at five ages (2 days old, 4-, 13-, 33- and 50 weeks old, n=7-12/group) and compared to human idiopathic dilated data retrieved from the Gene Expression Omnibus (GEO) database, reference series GSE1145, platform Affymetrix Human Genome U133 Plus 2.0 Array; and 3) microRNA expression – Agilent rat microRNA microarray kit 16.0 in left ventricles of 2 days old male and female HHR and age-matched NHR (n=4/group). We also investigated experimentally validated microRNA-mRNA interactions using miRWalk 2.0.

Discussion
Whole-genome sequencing revealed that the unique variants are located in non-coding regions in the HHR and NHR. Only one non-synonymous variant was found in the vinculin gene coding region in the NHR. We found 29 genes that were differentially expressed in at least one age (FDR<0.1; P<0.05). Genes encoding desmoglein 2 and transthyretin (Ttr) were significantly differentially expressed at all ages in the HHR and only Ttr was also differentially expressed in human idiopathic cardiomyopathy. Lastly, only two microRNAs differentially expressed in HHR were present in our comparison to validated microRNA-mRNA interactions. These two microRNAs interact with five of our genes.

Conclusion
Our results show that genes involved in monogenic forms of human cardiomyopathies may also influence polygenic forms of the disease and deserve further investigation.

Keywords: cardiomyopathy; heart failure; cardiac hypertrophy; polygenic
CHARACTERISTICS OF ALBUMINURIA DIABETIC NEPHROPATHY LEVEL PATIENTS THAT HOSPITALIZE AT RSMH PALEMBANG FROM MARCH 2014 - MARCH 2015

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Objective
Incidence of CRF in patients with type 2 diabetes reach 40%. Hypertension and increase in urinary albumin excretion is a sign of ND. ND DM increased risk of cardiovascular disease.

Method

Discussion
Duration of DM (years) : p = 0.05; Age of subjects (years): p = 0.73; Average body weight (kg): p = 0.05; BMI index (kg / m2) p = 0.37; Systolic BP (mmHg) p = 0.01; Diastolic BP (mmHg) p = 0.9; Hb (g / dl) p = 0.03; Fasting blood glucose level (mg / dl) p = 0.47; GDPP (mg / dl) p = 0.69; HbA1C levels p = 0.06; Urea levels (mg / dl) p = 0.18; Creatinine (mg / dl) p = 0.00

Conclusion
No significant differences albuminuria in duration, age, weight, BMI, diastolic BP, BSN, BSPP, HbA1C, and urea. There significant differences in Hb normoalbuminuria to micro and macroalbuminuria, systolic BP in normo and microalbuminuria to macroalbuminuria, and creatinine in normoalbuminuria to micro and macroalbuminuria.

Keywords: type 2 diabetes mellitus, diabetic nephropathy, albuminuria
DNA Hypermethylation in Glucose Transporters 4 Gene in Hypertensive Males with Obstructive Sleep Apnea

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Objective
Obstructive sleep apnea (OSA) is a multi-factorial disease. Recent focus has been attached to the epigenetic aspects of OSA. Therefore, in the current study, we explored DNA methylation of glucose transporter 4 (GLUT4) gene and relationship with hypoxia parameters in OSA.

Method
14 Chinese males, aged 30-50 years, with OSA were selected as OSA group and 16 age-, body mass index-, and systolic and diastolic blood pressure-matched males without OSA as control group. DNA methylation of GLUT4 gene was assessed. DNA methylation locus, showing significant difference, was further detected in a larger sample of 66 cases with hypoxemia and 39 controls.

Discussion
DNA methylation of locus 2.10 and 2.14 were significantly higher in OSA subjects without diabetes than in controls [loc2.10 0.5 (0.3, 0.5) vs 3.0 (2.0, 6.5), \(p=0.014\), loc2.14 [1.5 (0.4, 4.0) vs 6.0 (2.0, 9.5), \(p=0.004\)]. Lowest saturation of oxygen was negatively correlated with DNA methylation of locus 2.10 and 2.14 \((r=-0.46, p=0.027; r=-0.51, p=0.004)\). In enlarged sample, DNA methylation of locus 2.10 and 2.14 were significantly higher in hypoxemia group than control group [loc2.10: 9.0 (4.5, 55.0) vs 4.5 (2.0, 23.0) \(P<0.05\); loc2.14: 13.5 (6.0, 40.3) vs 6.0 (2.0, 24.0) \(P<0.05\)]; DNA methylation of loci 2.3, 2.6, 2.7, 2.9, 2.13 and 2.17 was also significantly higher in hypoxemia group.

Conclusion
Non-diabetic hypertensive males with OSA exhibited higher DNA methylation at locus 2.10 and 2.14 of GLUT4, which related with hypoxia.

Keywords: DNA methylation; obstructive sleep apnea; hypoxia; GLUT 4 gene
VEGFA and CASP1 genes are associated with blood pressure levels in the population of Tatars from Russia

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Objective
Systemic low-grade inflammation is postulated to be an important mechanism in cardiovascular disease and atherosclerosis. Hypertension is a major risk factor of cardiovascular complications, such as myocardial infarction and stroke. However, it remains unclear whether inflammation and endothelial dysfunction play a causative role in the development of hypertension, or chronic blood pressure elevation is an independent coexisting condition. Additionally, cultural and environmental factors along with genetic heterogeneity may influence disease susceptibility and progression in different populations. The aim of our study was to investigate an association between genetic variants in inflammatory genes and essential hypertension in the ethnically homogenous group of Tatars from the Republic of Bashkortostan (Russian Federation).

Method
Genotyping of polymorphic loci in 40 candidate genes was performed in the study group consisting of 617 men (282 patients with essential hypertension, 335 healthy control subjects). Statistical analysis was performed using PLINK software under additive genetic models with age and body mass index as covariates.

Discussion
We detected associations between VEGFA -2549(18)I/D, CASP1 rs481736, CCL8 rs3138035, CD40LG rs715762 polymorphisms with systolic and diastolic blood pressure levels. In addition, CX3CR1 rs3732378 SNP was associated with systolic blood pressure, while CCR2 rs1799864, CCR5 rs333, VCAM1 rs3917010, EDNRA rs6842241, and EDNRB rs5351 were associated with diastolic blood pressure only. The most significantly associated with blood pressure levels were VEGFA -2549(18)I/D and CASP1 rs481736 polymorphisms (P=0.026 and P=0.027 after genomic control correction was applied).

Conclusion
The results of our study show the association between blood pressure levels and polymorphisms in genes that encode the molecules involved in the control of endothelial function and inflammation, and therefore suggest the role for the products of these genes in the development of hypertension. However, further research is needed to uncover the exact mechanism of their involvement.

Keywords: essential hypertension, systemic inflammation, association study, genetic polymorphism
GNAI2 polymorphic variance represents a clinical biomarker of the salt sensitivity of blood pressure

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**Objective**
We hypothesize that SNPs in the GNAI2 gene, which are associated with HTN in Japanese and Italian populations, represent a clinical biomarker of the salt-sensitivity of blood pressure and PVN specific G\(\alpha_i\) proteins over expression will attenuate the development of salt sensitive hypertension (HTN).

**Method**
5 SNPs identified to cover 100% of the variance in the GNAI2 gene (>5% minor allele frequency (MAF) and \(r^2>0.8\)), via tagged analysis in the 1000 Genomes database, were examined in GenSalt Affymetrix 6.0 generated dataset (N=968) for associations with the salt sensitivity of BP (increase in systolic BP of 5mmHg or greater during HS intake; N=326 subjects are salt sensitive: 172 Female, 154 male) using RSwift. Male Dahl Salt Sensitive (DSS) rats instrumented with a radiotelemetry probe (DSI; PA-C40), received a bilateral PVN shuttle or G\(\alpha_i\)2 expressing lentiviral vector microinjection (2x10\(^9\) infectious units per ml/60nl/side), were maintained on a 7-day normal 0.4% (NS) intake for baseline BP prior to 21 day high 4% NaCl (HS) intake and assessment of PVN G\(\alpha_i\)2 protein expression (immunoblotting) (N=4/gp/study).

**Discussion**
3 1000 Genome tagged GNAI2 SNPs are present in GenSalt. SNPs rs9852677 and rs2282751 did not associate with the salt sensitivity of BP. Significantly SNP rs10510755 positively correlated with the salt sensitivity of BP (MAF:6%, Z-score: 1.94, \(p<0.05\)) independently of sex. Bilateral lentivirus increased PVN G\(\alpha_i\)2 protein levels 3 fold (\(p<0.05\)) on both NS and HS intake and attenuated DSS rat HTN (Day 21 HS MAP [mmHg] shuttle 163±4 vs. G\(\alpha_i\)2 142±4, \(P<0.05\)).

**Conclusion**
These data suggest that GNAI2 polymorphic variance represents a clinical biomarker of the individual salt sensitivity of blood pressure and a critical role of PVN G\(\alpha_i\)2 proteins in countering the pathophysiology of Dahl salt sensitive HTN.

*Keywords: salt sensitive hypertension, clinical biomarker, GNAI2, polymorphic variance*
Adducin and ouabain-related genetic polymorphisms are associated with hypertension and coronary artery disease in a Taiwanese population

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Objective
Adducin and ouabain play essential roles in the pathogenesis of hypertension and related cardiovascular diseases. However, whether single-nucleotide polymorphisms (SNPs) of the adducin subtypes and ouabain-related genes are associated with hypertension and cardiovascular diseases remains controversial. We investigated the potential associations of 20 SNPs of adducin and genes involved in ouabain synthesis, transportation and metabolism with hypertension and/or coronary artery disease (CAD) in 1493 unrelated Taiwanese participants from the TAiwan Coronary and Transcatheher intervention Study.

Method
The 1493 study participants were composed of 148 normal healthy controls, 293 hypertensive subjects without CAD, 332 normotensive subjects with CAD, and 720 hypertensive subjects with CAD, with a mean age of 63.6 ± 10.2 years.

Discussion
Compared to normal healthy controls, there were significant associations between hypertensive subjects without CAD and polymorphisms of the alpha-adducin (ADD1) gene rs4961 (TT vs. GT+GG, odds ratio: 1.96, 95% CI: 1.10-3.47, P=0.022), angiotensin II receptor type 1(AGTR1) gene rs2131127 (GG+GA vs AA, odds ratio: 2.23, 95% CI: 1.31-3.79, P=0.003) and lanosterol synthase (LSS) gene rs914247 (AA vs AG+GG, odds ratio: 2.45, 95% CI: 1.17-5.12, P=0.017) after adjustments for age and gender. ADD1 TT genotype (odds ratio: 1.99, 95% CI: 1.11-3.55, P=0.021) and AGTR1 GG+GA genotypes (odds ratio: 1.82, 95% CI: 1.08-3.04, P=0.024) were significantly associated with normotensive subjects with CAD, compared to normal controls. For hypertensive subjects with CAD, ADD1 TT genotype (odds ratio: 1.97, 95% CI: 1.15-3.38, P=0.013), AGTR1 GG+GA genotypes (odds ratio: 1.60, 95% CI: 1.02-2.51, P=0.040), and LSS AA genotype (odds ratio: 2.04, 95% CI: 1.00-4.13, P=0.048) were significantly more prevalent compared to normal controls, after adjustments for age and gender.

Conclusion
The ADD1 rs4961, AGTR1 rs2131127, and LSS rs914247 polymorphisms are significantly associated with hypertension and CAD, respectively. This finding lends support for the pathogenic roles of adducin and ouabain in hypertension and CAD in Asians.

Keywords: Hypertension, coronary artery disease and adducin
Identifying sites in the brain responsible for the increase in muscle sympathetic nerve activity in hypertension

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Objective
High blood pressure is the most common of all the conditions of the circulatory system. It is estimated that more than 3 million adult Australians have hypertension. Muscle sympathetic nerve activity (MSNA) is greatly elevated in patients with hypertension, but the underlying mechanisms for the increase in vasoconstrictor drive are poorly understood. By recording MSNA concurrently with functional Magnetic Resonance Imaging (fMRI) we are aiming to identify the central processes responsible for the sympathoexcitation.

Method
Spontaneous fluctuations in MSNA will be recorded via tungsten microelectrodes inserted into the common peroneal nerve in 30 patients and 30 healthy control participants while lying in a 3T MRI scanner. Blood Oxygen Level Dependent (BOLD) contrast gradient echo, echo-planar images will be continuously collected in a 4 s ON, 4 s OFF (200 volumes) sampling protocol. MSNA burst amplitudes are going to be measured during the OFF periods and BOLD signal intensity was measured during the subsequent 4 s period to allow for neurovascular coupling and nerve conduction delays.

Discussion
Using this approach, we have identified structures in the brain, including the brainstem, that are involved in the generation of sympathetic outflow to muscle at rest in healthy normotensive subjects (1) and patients with obstructive sleep apnoea (2,3), another disease associated with greatly elevated MSNA and high blood pressure.

Conclusion
Here we shall be comparing changes in the brain associated with sympathoexcitation seen in essential and renovascular hypertension.

Excess sympathetic nervous system activity increases NCC activity via an alpha1 adrenoceptor mediated pathway to evoke hypertension

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Objective
Excess SNS release of norepinephrine (NE) increases NCC activity, via an a1 adrenoceptor pathway, to drive the development and maintenance of salt-sensitive and neurogenic hypertension (HTN).

Method
Groups of male Sprague-Dawley (SD) rats received a continuous s.c. saline or NE infusion (600ng/min) and a 28-day NS (0.6% NaCl) or HS (4% NaCl) intake, on day 14 sub groups of rats were switched to a co NE(600ng/min)–terazosin(10mg/kg/day) s.c. infusion. Groups of male Spontaneously Hypertensive Rats (SHR) received s.c. saline or terazosin for and NS intake for 14 days. Endpoint measurements (day 14 SHR or 28 SD) were basal MAP and NCC activity (peak natriuresis to iv hydrochlorothiazide (HCTZ; 2mg/kg) infusion and phosphoNCCT58 immunoblotting) and expression (via immunoblotting) was assessed (N=4-6/gp).

Discussion
α1-adrenoceptor antagonism (confirmed pharmacologically) lowers BP (Day 14 MAP [mmHg] SHR s.c. saline NS 164±3 vs. s.c. terazosin NS 135±4, p<0.05) and reduces NCC activity (Peak ΔUNaV to HCTZ [μeq/min] SHR s.c. saline 18.8±1.2 vs. s.c. terazosin 12±1.5, p<0.05) in established SHR HTN. α1-adrenoceptor antagonism abolished the salt sensitivity of BP (Day 28 MAP [mmHg] SD s.c. saline HS 123±4 vs. s.c. NE HS 174±6 vs. s.c. NE-terazosin 146±4,p<0.05) and restores sodium-evoked suppression of NCC activity (Day 28 Peak ΔUNaV to HCTZ [μeq/min] SD s.c. saline HS 6.4±1.3 vs. s.c. NE HS 10.2±1.2 vs. s.c. NE-terazosin 6.6±0.7,p<0.05) and expression (data not shown) in established NE-evoked SS HTN in SD rats.

Conclusion
SNS activation of the NCC by NE occurs in rat models of neurogenic and SS HTN. Our data demonstrates antagonism of α1-adrenoceptors lowers BP and NCC activity in established SS and neurogenic HTN and suggests α1-antagonists as a therapeutic option in sympathetically mediated forms of HTN.
Angelica acutiloba Kitagawa extract improved blood flow regulation in stroke-prone spontaneously hypertensive rats

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Objective
Angelica acutiloba Kitagawa (Yamato Toki) is a kind of traditional Chinese medicine to improve the blood circulation. To observe the change in blood flow using the stroke-prone spontaneously hypertensive rats (SHRSP).

Method
Single dose administration: 12 weeks old SHRSP (n=24) were divided into 4 groups: one group of rats was orally administered 200 mg/kg body weight of a water extracted Yamato Toki (Yamato Toki W), second group was orally administered 200 mg/kg of an 50% ethanol extract of Toki (Yamato Toki E), the third group was treated with an equal volume of saline as a control (Control), and fourth group was 30 mg/kg Nicardipine. Another 12 weeks old SHRSP (n=12) were divided into 2 groups: one group of rats was orally administered 30 mg/kg Captopril, second group was treated with equal volume of saline. Upon isoflurane anesthesia, a blood flow probe (ST-NEX, Omega flow, OMEGAWAVE, Japan) was subsequently placed on the instep of the hind paw. Cutaneous blood flow was then monitored continuously: 0, 1, 3, 6, and 24 hours after treatment.

Discussion
Yamato Toki E significantly increases blood flow in the instep of the hind paw in SHRSP at 1, 3 and 24 hour after a single administration. Captopril treatments did not change the blood flow during observation period.

Conclusion
An ethanol extracted of Yamato Toki from Nara administrated orally can increase blood flow in SHRSP. This increase was not effect of Angiotensin II.

Keywords: Angelica acutiloba kitagawa; Yamato Toki; blood flow; SHRSP
Novel Furosemide loaded self nano emulsifying drug delivery system (SNEDDS) improves diuresis in rats

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**Objective**
Poor water solubility is one of the reasons for erratic absorption after oral administration of furosemide (FSM), an antihypertensive loop diuretic. Self nano emulsifying drug delivery system (SNEDDS) is a novel drug delivery system utilized to improve the water solubility, permeability and ultimately bioavailability.

**Method**
FSM solubility was determined in various vehicles oils, surfactants and co surfactants. Self emulsification region for the rational design of SNEDDS formulations was identified by pseudoternary diagrams. Developed formulations were characterized by zeta potential determination, droplet size analysis, dilution test, viscosity determination, in vitro dissolution studies and in vivo pharmacodynamic evaluation.

**Discussion**
A remarkable increase in dissolution was observed for the optimized SNEDDS when compared with the plain FSM and marketed formulation by in vitro dissolution studies. The pharmacological effect of FSM was improved by SNEDDS formulation as compared to plain FSM.

**Conclusion**
The study confirmed that the SNEDDS formulation can be used as a possible alternative to traditional oral formulations of FSM to improve its bioavailability.

**Keywords:** Furosemide, Diuretic, SNEDDS
Effect of esaxerenone, a non-steroidal selective mineralocorticoid receptor antagonist, on blood pressure and renal injury in high salt-treated type 2 diabetic mice

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Objective
Previous studies have shown beneficial effects of steroidal mineralocorticoid receptor (MR) antagonists, i.e., spironolactone and eplerenone in hypertensive patients. Here, we aimed to examine the effect of esaxerenone, a novel non-steroidal selective MR antagonist, on blood pressure and renal injury in high salt-treated type 2 diabetic KKAy mice.

Method
Male 11-week-old type 2 diabetic KKAy mice were treated with normal salt diet (NS: 0.3% NaCl, n=5), high salt diet (HS: 4% NaCl, n=8), HS + esaxerenone (1 mg/kg/day, p.o., n=8), or HS + a steroidal non-selective MR antagonist, spironolactone (20 mg/kg/day, p.o., n=7) for 8 weeks. Renal oxidative stress was evaluated by dihydroethidium fluorescence intensity assay.

Discussion
At 19 weeks of age, HS-treated diabetic KKAy mice showed higher blood pressure and greater albuminuria, glomerular injury (glomerular PAS staining-positive area), tubulointerstitial fibrosis (Azan staining-positive area), renal oxidative stress as compared with NS-treated KKAy mice. Treatment with esaxerenone and spironolactone decreased blood pressure to a similar extent in HS-treated KKAy mice. On the other hand, esaxerenone caused greater attenuation of albuminuria, glomerular injury and tubulointerstitial fibrosis as compared with spironolactone. These renoprotective effects of esaxerenone were associated with reduction in renal oxidative stress.

Conclusion
These data indicate that esaxerenone elicits significant antihypertensive and renal protective effects during the development of salt-dependent hypertension and renal injury in type 2 diabetes.

Keywords: mineralocorticoid receptor blocker; diabetes; hypertension; renal injury
Cardioprotective effects of Mangiferin on myocardial ischemia reperfusion injury in diabetic rats.

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Objective
To investigate the cardioprotective effects of Mangferin on myocardial ischemia-reperfusion injury in streptozotocin induced diabetic rats.

Method
The study was conducted in accordance with the protocol reviewed and approved by the institutional animal ethical committee (813/IAEC/14). A single injection of STZ (70 mg/kg; i.p.), freshly prepared in ice-chilled citrate buffer (0.1 M, pH 4.5), was administered to overnight fasted rats to induce diabetes. After 3 days of injection, rats with FBG level> 250 mg/dl were considered as diabetic and included in the study. Diabetic rats were given vehicle (2 ml/kg; i.p.) and mangiferin (40 mg/kg; i.p.) for 28 days. On 28th day, left anterior descending coronary artery of rats were ligated for 45 min. and reperfused for 60 min. to induce myocardial injury. After completion of surgery, the rats were sacrificed, hearts removed and processed for biochemical, morphological, and molecular studies.

Discussion
Mangiferin improved cardiac function, suppressed oxidative stress and maintained morphologic alterations. The treated groups had lower levels of cardiac injury markers and inhibited AGE/RAGE and MAPK activation in myocardium. In addition, it also attenuated apoptosis by reducing the levels of proapoptotic proteins (Bax and Caspase-3), TUNEL positive cells, and increasing the level of antiapoptotic proteins (Bcl-2).

Conclusion
These findings suggest that Mangiferin significantly attenuated myocardial injury in diabetic rats by ameliorating oxidative stress and inflammation through modulation of AGE/RAGE/MAPK pathway.

Keywords: mangiferin; myocardial ischemia-reperfusion injury; rat; diabetes; apoptosis; oxidative stress
Study on the cardioprotective effect of Irbesartan, an Angiotensin II receptor blocker on experimental model of myocardial ischemia-reperfusion (IR) injury

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Objective
To study the effect of Irbesartan on hemodynamic profile, oxidant-antioxidant markers, histopathological and ultrastructural parameters in ischemia reperfusion injury in rat heart.
To decipher the molecular mechanisms of irbesartan in ischemia reperfusion injury in rat heart by studying its effect on apoptotic markers and myocardial protein expression levels.

Method
The study was conducted in accordance with the protocol reviewed and approved by the institutional animal ethical committee (426/IAEC/08). Male wistar albino rats were divided into SHAM, I/R control, Irbesartan 15mg/kg + I/R, Irbesartan 30mg/kg + I/R and Irbesartan 60mg/kg + I/R groups and treated with corresponding doses for a period of 15 days, and, on the 15th day, ischemia was produced by ligation of left anterior descending coronary artery for 45 min followed by reperfusion for 60 min. After completion of surgery, the rats were sacrificed; hearts removed and processed for biochemical, morphological, and molecular studies.

Discussion
Irbesartan, dose dependently ameliorated IR injury evidenced by improvement in cardiac function, suppression of oxidative stress and preservation of morphologic alterations. The treated groups had lower levels of cardiac injury markers, upregulation of αβ-crystallin, β catenin and cyclin D1 levels. In addition, it also attenuated apoptosis by reducing the levels of proapoptotic proteins (Bax and Caspase-3), TUNEL positive cells, and increasing the level of antiapoptotic proteins (Bcl-2).

Conclusion
Irbesartan protected against IR injury by suppressing oxidative stress and apoptosis by upregulation of αβ-crystallin, β catenin and Cyclin D1.

Keywords: Irbesartan; ischemia reperfusion injury; rat; heart; oxidative stress
Pharmacological and Molecular Approaches to investigate the effect of Dipeptidyl peptidase-4 inhibitor, Saxagliptin, in Ischemia-Reperfusion model of Myocardial Infarction in Streptozotocin-Induced Diabetic Rats.

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**Objective**
1. To find out the optimal dose of “Saxagliptin” in Isoproterenol (ISO)-induced myocardial necrosis in rats for hemodynamic profile, antioxidant and histopathological parameters in the rat heart.
2. To evaluate the optimal dose of “Saxagliptin” in ischemia-reperfusion model of myocardial infarction in diabetic rats for hemodynamic profile, antioxidant parameters, histopathological, ultrastructural, apoptotic marker and protein expression levels in heart.

**Method**
All experimental work was started after getting approval from Central Animal House Facility of All India Institute of Medical Sciences, New Delhi, India. Male albino wistar rats were orally administered vehicle (CMC) once daily, Saxagliptin (10 mg/kg; oral) and GW (10 mg/kg; oral) for 27 days. On 28th day, the IR-control and treatment groups were subjected to one–stage left anterior descending (LAD) coronary artery ligation for 45 minutes followed by a 60 minutes of reperfusion.

**Discussion**
Saxagliptin pretreatment significantly improved cardiac function and maintained morphological changes in diabetic rats. They also attenuated oxidative stress and apoptosis by suppressing the expression of proapoptotic proteins (Bax and caspase-3), reducing TUNEL-positive cells, and increasing the level of antiapoptotic proteins (Bcl-2). The MAPK-based molecular mechanism revealed suppression of active JNK and p38 proteins concomitant with the rise in ERK1/ERK2, a prosurvival kinase. Additionally, a reduction in the level of inflammatory markers (TNF-α, IL-6, and NF-κB) was also observed.

**Conclusion**
The pathogenesis of diabetic associated macro- and microvascular complications is complex and is not a consequence of just one mechanism. The beneficial effects of DPP-4 inhibitors (SAX), PPAR β/δ agonist (GW) and drug combination (SAX + GW) against the development of diabetes associated macro- and microvascular complications can be attributed to its hypoglycemic, antioxidant, and anti-inflammatory properties.

**Keywords:** Saxagliptin, Dipeptidyl peptidase-4 inhibitor, Myocardial Infarction, Ischemia, Reperfusion
Pharmacological and Molecular Approaches to investigate the effect of Febuxostat in experimental model of Myocardial Infarction in Streptozotocin-Induced Diabetic Rats

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Objective
To evaluate the effect of febuxostat (5, 10 and 20 mg/Kg) on hemodynamic variables, biochemical parameters, histopathological alterations and protein expression in Ischemia reperfusion injury in rat heart.

Method
The experiments were conducted following the animal ethics approval from the Institutional Animal Ethics Committee (IAEC No. 893/IAEC/15 ). Male Wistar rats were orally administered vehicle (CMC) once daily (sham and IR + control), febuxostat (10 mg/kg/day; FEB10 + IR), or allopurinol (100 mg/kg/day; ALL100 + IR) for 14 days. On the 15th day, the IR-control and treatment groups were subjected to one-stage left anterior descending (LAD) coronary artery ligation for 45 minutes followed by a 60-minute reperfusion.

Discussion
Febuxostat and allopurinol pretreatment significantly improved cardiac function and maintained morphological alterations. They also attenuated oxidative stress and apoptosis by suppressing the expression of proapoptotic proteins (Bax and caspase-3), reducing TUNEL-positive cells, and increasing the level of antiapoptotic proteins (Bcl-2). The MAPK-based molecular mechanism revealed suppression of active JNK and p38 proteins concomitant with the rise in ERK1/ERK2, a prosurvival kinase. Additionally, a reduction in the level of inflammatory markers (TNF-α, IL-6, and NF-κB) was also observed.

Conclusion
The changes observed with febuxostat were remarkable in comparison with those observed with allopurinol. Febuxostat protects relatively better against IR injury than allopurinol by suppressing inflammation and apoptosis mediating the MAPK/NF-κBp65/TNF-α pathway.

Keywords: Febuxostat, Ischemia, Re-perfusion, Myocardial Infarction, Allopurinol
Depressor Effect of Chymase Inhibitor in Mice with High Salt-Induced Moderate Hypertension

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Objective
The aim of the present study was to determine whether long-term high salt intake in the drinking water induced hypertension in wild-type (WT) mice and whether a chymase inhibitor or other antihypertensive drugs could reverse the increase of blood pressure.

Method
Eight-week-old WT male mice were supplied with drinking water containing 2% salt for 12 weeks (high-salt group) or high-salt drinking water plus an oral chymase inhibitor (TPC-806) at 4 different doses (25, 50, 75, or 100 mg/kg), or captopril (75 mg/kg), losartan (100 mg/kg), HCTZ (3 mg/kg), eplerenone (200 mg/kg), or amlodipine (6 mg/kg). The control groups were given normal water with or without the chymase inhibitor.

Discussion
Blood pressure and heart rate gradually showed a significant increase in the high-salt group, while a dose-dependent depressor effect of the chymase inhibitor was observed. There was also partial improvement of hypertension in the losartan and eplerenone groups, but not in the captopril, HCTZ, and amlodipine groups. A high salt load significantly increased chymase-dependent Ang II-forming activity in the alimentary tract. In addition, the relative contribution of chymase to Ang II formation, but not the actual average activity, showed a significant increase in skin and skeletal muscle, while ACE-dependent Ang II-forming activity and its relative contribution were reduced by high salt intake. Plasma and urinary RAS components were significantly increased in the high-salt group, but were significantly suppressed in the chymase inhibitor group.

Conclusion
In conclusion, 2% salt water drinking for 12 weeks caused moderate hypertension and activated the RAS in WT mice. A chymase inhibitor suppressed both elevation of blood pressure and the heart rate, indicating definite involvement of chymase in the salt-sensitive hypertension.

Keywords: mouse; high salt; hypertension; renin-angiotensin system; chymase inhibitor
Inhibition of the Brain Renin Angiotensin System in ISIAH rats with stress induced arterial hypertension

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Objective
Multiple changes in the functioning of the brain renin angiotensin system (RAS) may be one of the key links in the formation of the hypertensive phenotype in ISIAH rats (Inherited stress-Induced arterial hypertension). Activation of brain RAS in young ISIAH rats was shown earlier. The development of a non-invasive technique for chronic inhibition of certain elements of the central RAS based on antisense oligonucleotides immobilized on nanoparticles can be important for the future therapy of hypertension disease (HD). Nanocomposites based on titanium dioxide are able to penetrate the blood-brain barrier, and enter the brain cells located in nervous centers responsible for blood pressure (BP) control.

Method
To test this possibilities and find suitable therapeutic targets among the brain RAS, we performed a 14 days blockade of certain genes of the brain RAS with losartan (AT1 receptor blocker) and benazepril (ACE inhibitor). For the i.c.v. injection we used Alzet osmotic minipumps. We worked with adult (6 months) male ISIAH rats.

Discussion
In the treated ISIAH rats, a significant reduce in BP was achieved after AT1 brain receptors blocking (17 mmhg decrease), whereas use of an the ACE inhibitor did not cause any decrease in the BP and did not have any noticeable effect in comparison with control animals.

Conclusion
The technique we used in the study (minipumps and cannulation) is invasive and cannot be used in clinical practice. Nevertheless, it allowed to establish the key element of the brain RAS cascade for subsequent inhibition with non-invasive antisense methods, and some positive preliminary data on this way were obtained. Thus, we believe that the brain mRNA of the AT1 receptor gene may be possible target for the therapy of hypertension using TiO2-based nanocomposites containing antisense oligonucleotides.

The work was supported by the Russian Science Foundation, grant 16-15-10073

Keywords: ISIAH rats; nanoparticles;
Renal Denervation Promotes Atherosclerosis in Hypertensive Apolipoprotein E-Deficient Mice Infused with Angiotensin II

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Objective
To determine the effect of renal denervation (RDN) on the severity of atherosclerosis and aortic aneurysm in hypertensive mice.

Method
Hypertension, atherosclerosis and aortic aneurysm were induced by subcutaneous infusion of angiotensin II (1 µg/kg/min) for 28 days in apolipoprotein E-deficient mice. RDN was conducted using combined surgical and local chemical denervation. The norepinephrine concentration in the kidney was measured by high-performance liquid chromatography. Blood pressure was measured by the tail-cuff method. Atherosclerosis was assessed by Sudan IV staining of the aortic arch. The aortic diameter was measured by the morphometric method. The mRNA expression of genes associated with atherosclerosis and aortic aneurysm were analyzed by quantitative PCR.

Discussion
RDN decreased the median norepinephrine content in the kidney by 93.4% (n=5-7, P=0.003) five days after the procedure, indicating that the RDN procedure was successful. RDN decreased systolic blood pressure in apolipoprotein E-deficient mice. Mice that had RDN had more severe aortic arch atherosclerosis (median percentage of Sudan IV positive area: 13.2% in control mice, n=12, and 25.4% in mice having RDN, n=12, P=0.028). The severity of the atherosclerosis was negatively correlated with the renal norepinephrine content (spearman r=-0.6557, P=0.005). RDN did not affect the size of aortic aneurysms formed or the incidence of aortic rupture in mice receiving angiotensin II. RDN significantly increased the aortic mRNA expression of matrix metalloproteinase-2 (MMP-2).

Conclusion
RDN promoted atherosclerosis in apolipoprotein E-deficient mice infused with angiotensin II associated with upregulation of MMP-2. The higher MMP-2 expression could be the results of the greater amount of atheroma in the RDN mice. The findings suggest further research is needed to assess potentially deleterious effects of RDN in patients.

Keywords: Angiotensin II; aortic aneurysm; atherosclerosis; blood pressure; matrix metalloproteinase-2; renal denervation
Differential transcriptome profile and the effect of exercise capacity in cardiac remodeling by pressure overload versus volume overload

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Objective
Gene expression profiling has not been reported for in an animal model of volume overload (VO). We compared the gene expression profiles in the hypertrophied myocardium of rats subjected to pressure overload (PO) and VO using the DNA chip technology and the effect of exercise capacity with treadmill test.

Method
Constriction of the abdominal aorta and mitral regurgitation made a hole in the mitral leaflet were used to induce PO [n=20] and VO [n=16], respectively. Serial echocardiographic studies and exercise were performed at 2-week intervals and invasive hemodynamic examination by a pressure-volume catheter system was done at 12 weeks after the procedure. The gene expression profiles of the left ventricle (LV) 12 weeks after the procedure were analyzed by DNA chips.

Discussion
There were comparable increases in the left ventricular weight/body weight ratio in rats subjected to PO and VO. LV wall thickness increased in PO compared to VO whereas LV ejection fraction (EF) and E/E’ did not change. In hemodynamic analysis, LV end diastolic pressure and the EDPVR slope were greater in PO group than in VO group. When we compared LV remodeling and exercise capacity, cardiac fibrosis and exercise intolerance were developed in PO group but not in VO group [exercise duration, 434.0±80.3 vs 497.8±49.0 seconds, P<0.05, respectively]. Transcriptional profiling of cardiac apical tissues revealed that gene sets related with inflammatory response, DNA damage response, apoptosis, and cellular signaling pathways were significantly enriched by genes in VO group, whereas cardiac fibrosis and cytoskeletal pathway and G-protein signaling were enriched in PO group.

Conclusion
We found that many genes were regulated in PO, VO or both and there are different regulation by cardiac remodeling. Cardiac fibrosis and cytoskeletal pathway were important pathway to PO group and influence on exercise capacity. Before reduced LV function, cardiac fibrosis might be associated with exercise capacity.
Fisetin protects against oxidative stress and apoptotic damage in experimental model of isoproterenol-induced cardiac toxicity in rats

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Objective
To find the optimal dose of (Flavonoid) Fisetin using isoproterenol (ISO) induced myocardial necrosis and oxidative stress model through haemodynamic and biochemical parameters, as well as protein expression, histopathological and ultrastructural alterations in rats.

Method
Male Wistar rats (n = 36) were administered fisetin (10, 20 & 40 mg/kg/day, orally.) or vehicle for 28 days with ISO, 85 mg/kg, subcutaneously, for 2 consecutive days was also administered at 24 h interval on the 27th and 28th days. On the 29th day, rats were anaesthetized and right coronary artery was cannulated to record hemodynamic parameters. Later on blood sample was collected and heart was removed to estimate biochemical histopathological, ultrastructural and immuohistochemical studies, tunel and western blotting respectively.

Discussion
ISO-treated rats showed a significant reduction in arterial pressure, maximum rate of development of left ventricular pressure and increase in left ventricular end-diastolic pressure. Also, there was a significant decrease in antioxidant enzyme levels such as superoxidizedismutase, catalase and glutathione and increase in the level of malondialdehyde and serum TNF-α and IL-6 levels. In addition, the cardiac injury markers such as CK-MB and LDH were increased in the serum. Furthermore, immunohistochemistry revealed an increased Bax/Bcl-2 ratio in the myocardium. In these two doses of Fisetin (10, 20 mg/kg) dose dependently restored hemodynamic, left ventricular functions, decreased cardiac injury marker e increased antioxidant levels, reduced lipid peroxidation and TNF-α level and apoptosis. At higher dose of fisetin 40 mg/kg it has shown damaged and cardiac toxicity effect.

Conclusion
The present study revealed that Fisetin mitigates myocardial damage in ISO induced cardiac injury. Low dose of fisetin are protective in rat myocardium whereas high concentrations cause DNA damage and apoptosis. It may be concluded that a diet containing Fisetin may be beneficial in those who are at the risk of myocardial injury.

Keywords: Fisetin, Myocardial Injury, Isoproterenol, Flavonoid, Heart
OVEREXPRESSION OF CARDIAC (P)RR AND PLC-β3 IN HYPERTENSION RATS WITH AORTIC CONSTRITION

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Objective
The renin-angiotensin system (RAS) plays an important role in cardiac remodeling. Ang II induces cardiac hypertrophy and fibrosis in hypertension. Recently, some findings support the (pro)renin-(Pro)renin receptor (P)RR interaction at exceptionally high (pro)renin levels in vitro. However, the precise mechanisms of the (P)RR signaling in the heart remain obscure. The aim of this study was to investigate the roles of cardiac (P)RR and its downward signals on mean arterial pressure (MAP) in rats with abdominal aortic constriction, following treatment of handle region peptide (HRP) and phospholipase C-β3 (PLC-b3) inhibitor, U73122.

Method
Seventy-five SD rats were divided into 5 groups (n=15 each group) as following: sham operated (SO), rats with the aortic ligation (AL), AL rats were given HRP (4µg kg\(^{-1}\) d\(^{-1}\), SC), AL rats given U73122 (40µg kg\(^{-1}\) d\(^{-1}\), SC) and AL rats given HRP+U73122. MAP was recorded using a tail-cuff method. After 4 weeks of treatment, levels of (P)RR, PLC-b3, PKC-a, ERK1/2 and Raf-1 in the heart were examined by RT-PCR and western blot.

Discussion
The levels of (P)RR and PLC-b3 significantly increased in the left ventricle in hypertensive rats (P<0.01), respectively. MAP rose markedly (P<0.01). HRP decreased the level of (P)RR and U73122 suppressed PLC-b3 expression. Treatment of both HRP and U73122 significantly decreased levels of PKC-a, ERK1/2 and Raf-1 in the heart (P<0.001). Meanwhile, MAP was decreased after treatment.

Conclusion
This study demonstrates that (P)RR inhibitor, HRP and PLC-b3 inhibitor, U73122 decreased levels of (P)RR, PLC-b3, PKC-a, ERK1/2 and Raf-1 in the heart. Meanwhile, administration of both reagents lowered MAP. These findings indicate that cardiac (P)RR may activate PLC-b3, PKC, ERK1/2 and Raf-1 signals and lead to hypertension. This study was supported by Science and Technology Department of Shandong Province (No.2016GSF201207) and the Natural Science Foundation of China (No. 81270336). *Correspondence.

Keywords: renin-angiotensin system; cardiac hypertrophy; hypertension; heart
HYDRONEPHROSIS CAUSES CHANGES IN CARDIAC ACE2 AND MAS RECEPTOR EXPRESSION IN MICE

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Objective
Hydronephrosis is characterized by substantial loss of tubules and affects renin secretion in the kidney. This implicates reciprocal interactions between the heart and kidney for cardiovascular regulation mediated by the RAS. However, whether alterations of angiotensin converting enzyme (ACE), ACE2 and Mas receptor in the heart are observed in hydronephrosis is unknown. Thus, we assessed these components in hydronephrotic mice treated with AT1 receptor blockade and ACE inhibitor.

Method
Hydronephrosis was induced by left ureteral ligation in Balb/C mice except sham-operated animals. Blood pressure was measured by the tail-cuff method using photoelectric volume oscilometry. A whole heart was cut longitudinally and snap-frozen in isopentane/dry ice for immunohistochemical studies after treatment of losartan or enalapril. The expression levels of cardiac ACE, ACE2 and Mas receptor were measured by RT-PCR and Western blot.

Discussion
Hydronephrosis led to an increase of ACE level and a decreased of ACE2 and Mas receptor in the heart. Losartan decreased cardiac ACE level, but ACE2 and Mas receptor levels significantly increased in hydronephrotic mice ($P < 0.01$). Enalapril increased ACE2 levels ($P < 0.01$), but did not affect Mas receptor in the heart. Plasma Ang II decreased in hydronephrotic mice, but Ang I and II significantly increased after treatment of losartan or enalapril.

Conclusion
Hydronephrosis increased cardiac ACE, suppressed ACE2 and Mas receptor levels. AT1 blockade caused sustained activation of cardiac ACE2 and Mas receptor, but ACE inhibitor had the limitation of such activation of Mas receptor in hydronephrotic animals. This work was supported by Science and Technology Department of Shandong Province (No.2016GSF201207) and the National Natural Science Foundation of China (No. 81270336). *Correspondence.
The Inhibitory Effect of Eplerenone on Cell Proliferation in the Contralateral Kidneys of Rats with Unilateral Ureteral Obstruction

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Objective
The unilateral ureteral obstruction (UUO) model not only induces renal interstitial fibrosis in the obstructed kidney, but also induces injury in the contralateral kidney. We hypothesized that activation of the mineralocorticoid receptor may induce fibrosis in the early stage of UUO.

Method
Thirty male Sprague Dawley rats weighting 200 ± 10 g were used in this study and randomly divided into three groups: a UUO group, a UUO and eplerenone group, and a sham group. The contralateral kidney and plasma were harvested for further study 10 days after surgery.

Discussion
The level of plasma aldosterone (869.95 ± 55.851 pg/mL) was significantly higher in the UUO group than that in the sham group (478.581 ± 36.186 pg/mL vs. UUO, P < 0.05). The infiltrated inflammatory cells (F4/80) and deposited collagens were increased significantly in the contralateral kidneys in the UUO group compared to those in the sham group, which were decreased by eplerenone. However, proliferating cell nuclear antigen (PCNA) was increased 2.47 times in the UUO group compared to the sham group in the contralateral kidney (P < 0.01), and those changes are attenuated by eplerenone. The expression of SGK-1 protein and mRNA were upregulated in the contralateral kidney in the UUO group, which is suppressed by eplerenone treatment. NF-κB pathway effecters were also changed markedly in the contralateral kidney in the UUO group and partly reversed by eplerenone.

Conclusion
Aldosterone induces inflammatory cell proliferation via the MR/SGK-1 and NF-κB pathways and eventually leads to fibrosis in the contralateral kidney.
An essential role for the IL-6 trans-activation in aldosterone-induced cardiac fibrosis

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Objective
We investigated whether aldosterone induces the expression of IL-6 and thereby contributes to the fibrotic process.

Method
We prospectively enrolled 25 patients with primary aldosteronism (PA) and 26 patients with essential hypertension (EH). We measured plasma IL-6 levels and evaluated echocardiographic parameters including tissue Doppler and backscatter analysis, and investigated the possible molecular mechanism by which aldosterone induces IL-6 secretion in the cell and then further affects collagen production in cardiac fibroblasts. To further investigate the role of IL-6 trans-signaling in aldosterone-induced cardiac fibrosis, we measured the severity of myocardial fibrosis in aldosterone infusion mice models including an IL-6 chemical inhibitor and Sgp130 Knockin Transgenic Mice.

Discussion
The PA patients had higher plasma IL-6 levels, left ventricular mass index, degree of myocardial fibrosis, and more impaired diastolic function than the EH patients. Plasma IL-6 levels were positively correlated with 24-hour urinary aldosterone and echocardiographic parameters. In human umbilical vein endothelial cells, the expressions of IL-6 protein and mRNA were significantly increased by aldosterone. Intracellular signaling occurred through the mineralocorticoid receptor/PI3K/Akt/NF-kB pathway. In cardiac fibroblasts, IL-6 trans-signaling played a critical role in aldosterone-induced IL-6 enhanced fibrosis-related factor expression. Furthermore, both mice receiving recombinant soluble gp130 and Sgp130 Knockin Transgenic Mice prevented myocardial fibrosis and cardiac hypertrophy by aldosterone infusion.

Conclusion
IL-6 trans-activation plays a critical role in aldosterone-induced cardiac fibrosis.

Keywords: aldosterone; IL-6; trans-activation; gp130; fibrosis
Adipose tissue angiotensin II type 1 receptor-associated protein prevents diet-induced visceral obesity and insulin resistance

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Objective
Angiotensin II type 1 receptor (AT1R) is a major player in the signal transduction of Renin-angiotensin system (RAS), and the overactivation of this signaling contributes to the progression of visceral obesity. We have shown that the AT1R-associated protein (ATRAP) promotes AT1R internalization along with the suppression of overactivated tissue AT1R signaling. However, the mechanism whereby ATRAP modulates diet-induced visceral obesity has not been elucidated yet.

Method
To investigate the pathophysiology of ATRAP in the development of visceral obesity, we generated two types of genetically modified mice. First, we generated systemic ATRAP deficient mice (KO) using the targeted gene deletion method, and KO and their littermate control (WT) were fed either a low-fat diet (LFD) or a high-fat diet (HFD). Although the physiological phenotypes between the two genotypes fed a LFD were comparable, HFD-induced insulin resistance in KO was significantly exacerbated along with the significant increase of adipose macrophage infiltration. Next, we generated adipocyte-specific ATRAP transgenic mice (TG) using the microinjection method with a 5.4-kb adiponectin promoter, and TG and WT were fed either a LFD or a HFD. Although the physiological phenotypes of the two genotypes fed a LFD were comparable, TG exhibited significant protection against HFD-induced adiposity, adipocyte hypertrophy, and insulin resistance concomitant with an attenuation of adipose inflammation, macrophage infiltration, and adipokine dysregulation. In addition, when mice were fed a HFD, the adipose expression of glucose transporter type 4 was significantly elevated and the level of adipose phospho-p38 mitogen activated protein kinase was significantly attenuated in TG compared with WT.

Discussion
Adipose ATRAP plays protective role against the development of diet-induced visceral obesity and insulin resistance through improvement of adipose inflammation and function via the suppression of overactivated adipose AT1R signaling.

Conclusion
Adipose tissue ATRAP is suggested to be an effective therapeutic target for the treatment of visceral obesity.

Keywords: Adipose tissue, insulin resistance, obesity, receptor, renin–angiotensin system
The relationship between levels of aldosterone, estradiol and serum markers of endothelial dysfunction in hypertensive women

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Objective
Objective: to study the relationship between plasma levels of aldosterone, estradiol and serum markers of endothelial dysfunction such as stable nitric oxide metabolites NO²⁺NO³⁻ (NOx), endothelin-1(ET-1), homocysteine (HC), von Willebrand factor (vWF) in nondiabetic women with essential hypertension (EH).

Method
Methods: We examined 79 hypertensive, nondiabetic women (mean age 51.4±6.5y, mean EH duration 8.5±7.6y). 28% of the group were smokers, 54% were obese, 76% - with dyslipidemia. Regular menstrual function had 30% of the women, the rest of the group – postmenopausal (median duration of postmenopause was 5.7 ± 3.5y). Circulating NOx levels were studied by spectrophotometry, ET-1, HC, vWF levels – by immunoenzyme assay, aldosterone and estrogen levels - by immunoenzyme assay. Statistical analysis was done using the Statistica 8.0 software.

Discussion
Discussion: We compared the levels of ED markers in women with a normal (56%), and elevated levels of aldosterone (44%), as well as in women with a normal (62%) and low levels of estradiol (38%). Women with hiperaldosteronemia had higher concentration of NOx (45.3 ± 17.6 and 38.8 ± 16.5 mmol/l, respectively, p <0.05), E-1 (1.4 ± 1.1 and 0.9 ± 0.8 fmol/l, respectively, p <0.05) and vWF (1.6 ± 0.8 and 1.3 ± 0.9 mg/dl, respectively, p <0.05). Aldosterone levels correlated with NOx (r=0.36, p <0.05), E-1 (r = 0.3, p <0.05) and vWF (r = 0.34, p < 0.05) levels. Women with hypoestrogenemia had higher NOx (46.3 ± 16.9 and 37.5 ± 16.0 mmol/l, respectively, p<0.05), E-1 (1.5 ± 1.1 and 0.8 ± 0.4 fmol/l, respectively, p<0.05) and vWF (1.6 ± 0.9 and 1.2 ± 0.7 mg/dl, respectively, p<0.05) levels as well. Estradiol levels correlated with NOx (r = -0.6, p <0.05) and vWF (r = -0.5, p <0.05) levels.

Conclusion
Conclusion: Our results suggest that women in perimenopausal period demonstrate hormonal disorders with elevation of aldosterone level and decline of estrogen level, which are related to the increase of a number of substances considered as the markers of endothelial dysfunction.

Keywords: markers of endothelial dysfunction, nitric oxide, aldosterone, estradiol
EFFECT OF PLACENTAL GROWTH FACTOR ON TROPHOBLAST INTEGRATION INTO ENDOTHELIAL CELL NETWORKS

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Objective
PIGF is deficient in early pregnancy in women who subsequently develop preeclampsia. The process of maternal spiral arteriole invasion by trophoblast is vital for normal placentation. The role of PIGF in influencing trophoblast interactions with endothelial cells is not known.

Method
24-well tissue culture plates were coated with 300 μL of undiluted Matrigel and allowed to gelatinise at 37°C for 30 minutes. Fluorescent labelled HTR8/SVNeo cells and uterine myometrial microvascular endothelial cells were co-cultured (1 X 10⁵ per well) for 20 hours at 21% or 2% oxygen (to replicate physiological oxygen conditions in first trimester pregnancy) treated with PIGF 10 ng/mL or 100 ng/mL. HTR8/SVNeo cells were also cultured singly under the same conditions. Images were captured by fluorescence microscopy and analysed using ImageJ. Experiments were repeated 5 times, data was analysed using SPSS v24.

Discussion
Integration of HTR8/SVNeo cells into endothelial cell networks expressed as % of control was unaffected by addition of PIGF at both 10 ng/mL and 100 ng/mL concentrations [p = 0.61]. Network formation of trophoblast cells on matrigel was enhanced by addition of PIGF [p = 0.01].

Conclusion
PIGF improves trophoblast network formation but does not affect integration of HTR8/SVNeo cells into uterine endothelial cell networks in vitro.

Keywords: Placenta, preeclampsia, endothelial cell, trophoblast, placental growth factor
**Ganoderma lucidum Polysaccharide Peptides: A Potent Protective Endothelial Dysfunction in Hypertensive Patients**

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**Objective**
Hypertension is cardiovascular events risk factor, that is the cause of coronary heart disease. The occurrence of hypertension associated with endothelial dysfunction, which can disrupt the balance between relaxation and contraction factors of blood vessels' smooth muscles. *Ganoderma lucidum* is a type of mushroom that has been used for thousand years throughout Asia. This study was aimed to evaluate the effects of polysaccharide peptides (PSP) of *Ganoderma lucidum* on circulating endothelial cells (CECs), endothelial progenitor cells (EPCs) and nitric oxide (NO) as the hallmark of endothelial vascular injury.

**Method**
It is a prospective study with pre- and post-test design on patients with stable angina pectoris and high-risk patients based on the Framingham Score. The primary endpoint was the change in CECs and EPCs levels, also systolic and diastolic blood pressure. We also evaluated the level NO, lipid profile, TNF alpha, IL-6. The patients were given PsP 750 mg/day divided into 3 doses for three months as adjuvant therapy to previous medications.

**Discussion**
The administration of PsP in stable angina group (n=34) reduced CEC level to 0.71±1.41 (p=0.000), however it was followed by EPC reduction. Systolic and diastolic blood pressure decreased with PsP although the results did not statistically significant; similarly, in high-risk group (n=37), the reduction of CEC level to 0.66±0.66 (p=0.000) was followed by EPC (p=0.010). The reduction of systolic blood pressure and diastolic blood pressure was not statistically significant either. The reduction of NO occured in both groups, following the decrease of TNF alpha and IL-6. Total cholesterol and LDL levels in both treatment groups reduced after 3-month treatment.

**Conclusion**
Polysaccharide peptide (PsP) demonstrates a potent protective vascular effect by significantly improving endothelial dysfunction, thus the reduction of systolic and diastolic blood pressure. Further studies are required to explore its long-term efficacy as a promising adjuvant therapy to reduce cardiovascular events.

**Keywords:** *Ganoderma lucidum*; hypertension; endothelial dysfunction; CEC; EPC
Upregulation of SFRP4 promotes brown fat cells differentiation in skin-derived mesenchymal stem cells

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Objective
Our study aimed to determine whether skin-derived mesenchymal stem cells (S-MSCs) could differentiate into brown fat cells (BFCs) and the Wnt antagonist SFRP4 was functionally involved in this differentiation.

Method
S-MSCs were grown in brown adipocytes differentiation medium for 10 days to differentiate into BFCs and checked by microscope. Real-time PCR (RT-PCR) or Western Blot (WB) was used to analysis brown adipocytes markers expression and wnt signaling major factors. Bisulfite conversion of genomic DNA of differentiated BFCs from S-MSCs were processed with an EpiTect Fast Bisulfite Kit. The mixed sample was used for library construction and sequenced on an Illumina MiSeq System using the MiSeq Reagent Kit v3. Barcode-separated pairs of FASTQ files were obtained from the Illumina MiSeq Reporter. The FASTQ files were transformed into FASTA format before methylation analysis at http://quma.cdb.riken.jp/. Blood pressure (BP) was measured by tail-cuff method every 2 days and vascular injuring, scapula fat was checked by hematoxylin and eosin (H&E) or Masson trichrome staining in Ang II-infused hypertention mice.

Discussion
S-MSCs readily differentiated into brown-type adipocytes in vitro. During the S-MSCs to BFCs differentiation process, wnt signaling gatekeeper SFRP4, UCP-1, PGC-1α and wnt signaling major factors GSK-3β, C/EBP and PPAR-2 expression were significantly increased, wnt11 and wnt5A expression were decreased. Mechanistically, block of wnt signaling and recombinant mouse SFRP4 (rmSFRP4) could facilitate S-MSCs to BFCs differentiation process. Aberrant promoter methylation resulted in epigenetic upregulation of SFRP4 and the faster differentiation of S-MSCs to BFCs. AngII-induced hypertension mice carried the change of scapula brown fat to white fat.

Conclusion
Epigenetic upregulation of SFRP4 by CpG island demethylation could control the differentiation of S-MSCs to BFCs by regulating wnt signaling, and the differentiated BFCs might contribute to improve blood pressure in hypertention mice.

Keywords: skin-derived mesenchymal stem cells, brown fat cells, SFRP4, differentiation, hypertention
Preliminary comparison of cerebral cortex miRNAs levels in hypertensive mice and control subjects by small RNA sequencing

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Objective
The pathogenesis of hypertension-related cognitive impairment has not been sufficiently clarified, current therapies for this disease are inadequate and new molecular targets are needed. MicroRNAs (miRNAs) are small, noncoding RNAs that function in complex networks to regulate protein expression. In the brain, they are involved in development and synaptic plasticity. In this study, we aimed to identify miRNAs with a differential expression in cerebral cortex from hypertensive mice and control subjects using small RNA sequencing.

Method
We used subcutaneous mini-pumps containing a concentration of Ang II that induces malignant hypertension or a saline solution for 28 days. Blood pressure was carefully monitored by a non-invasive tail-cuff method every week throughout the experiment. Spatial memory was assessed using the Morris water maze test. Total RNA was extracted from cerebral cortex. MiRNAs expression profiles were respectively determined by the sequencing analysis.

Discussion
Compared to control group, the treatment of Ang II significantly raised the systolic blood pressure constant throughout the experiment in adult male mice (p < 0.05). The percentage of time spent in the target quadrant in probe test were significantly reduced in Ang II-dependent hypertensive mice(p<0.05). 25 miRNAs were screened out to be significantly up-regulated compared to that of control mice, and 14 miRNAs were screened out to be remarkably down-regulated compared to that of control mice (P value < 0.05 and Fold change >2). These differentially expressed miRNAs were predicted to target a large number of genes that involved in long-term potentiation, wnt signaling pathway, neurotrophin signaling pathway and other cellular bio-functions.

Conclusion
Memory were impaired in angiotensin II-dependent hypertensive mice, the abnormal expression of several miRNAs in cerebral cortex of hypertensive mice suggests some of them may be involved in the pathogenesis of hypertension-related cognitive impairment, which requires further analysis and study.

Keywords: hypertension; cognitive dysfunction; miRNAs; sequencing
Burden of Hypertension and Prehypertension and other associated lifestyle risk factors in the permanently settled tribals in tribal area and in urban areas of the northern state of sub-Himalayan region of India

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Objective
Objectives: To determine the prevalence of Hypertension and Prehypertension and evaluate associated risk factors in traditional tribal individuals residing in tribal areas and migrated tribes in urban areas of the northern state of sub-Himalayan region of India.

Method
It was a population based cross sectional study. The population studied were the tribals representing the traditional people settled in mountainous terrain centuries ago. Some of them settled in urban areas. Men and women above 20 years were considered as eligible subjects. A Probabilistic proportionate sampling method was used. The final sample of 8000 individuals consisting of 4000 subjects each of tribal and urban tribals were evaluated.

Discussion
Urban tribals had mild physical activity in 19.3% vs 8.6% in tribal tribals (p=0.00) whereas tribal tribals had significantly more heavy physical activity (23%) vs 7.3% in urban tribals (p=0.00). In urban tribals central obesity was seen in 59% of cases vs 43.3% in tribal tribals (p=0.00). Stage 1 hypertension and stage 2 hypertension was seen in 22.8% and 5.3% respectively in urban tribals which is statistically higher than seen in tribal tribals (10.2% and 0.9% respectively) (p=0.00). The age distribution of prevalence of hypertension was high amongst urban tribals of more than 65 years (54%) followed by 51 to 56 years (48.3%) and 36 to 50 years of age (34.2%). Diabetes mellitus was significantly higher in urban tribals (7.8%) vs 3.9% in tribal tribals (p=0.00). Prehypertension and impaired fasting glucose was statistically more often seen in tribal tribals (78.8% and 2.4%) vs 58.2% and 0.7% respectively in urban tribals (p=0.00).

Conclusion
In conclusion prevalence of Hypertension, Prehypertension, central obesity, diabetes mellitus and physical inactivity was higher in urban tribals. On contrary prehypertension and impaired fasting glucose was significantly higher in tribal areas which should alarm the policy makers and necessitate a need for early preventive intervention.

Keywords: hypertension, prehypertension, tribal, nomadic, lifestyle
Add +10 Min/day Exercise for Your Health: evidence from a national cohort study of 330,487 individuals

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Objective
To examine the association of different levels of leisure time PA and risk of all-cause, cardiovascular disease (CVD) and cancer mortality in a nationally representative sample of US adults.

Method
Data from 13 waves of the National Health Interview Surveys (1997-2009) linked to the National Death Index records through 31 December, 2011 were used to conduct this study. A total of 330,487 eligible adults who were followed up for 8.2 years were included. Cox proportional hazards regression model was used to assess the association between PA and mortality by calculating the hazards ratios (HRs) and 95% confidence intervals (CIs).

Discussion
Compared with inactive individuals, those performing less than 60 min/week of light to moderate-intensity leisure time PA had 23% lower risk of all-cause mortality (HR=0.77, 95%CI=0.73-0.82), 36% lower risk at 1-2 times the recommended minimum by the PA guidelines (HR=0.64, 95%CI=0.61-0.67), and 41% lower risk at 2-3 times the recommended minimum (HR=0.59, 95%CI=0.55-0.62). The optimum threshold for health benefits appeared at about 3.5 times the recommended minimum (about 525 min/week or 75 min/day) and there were similar benefits beyond this point. In addition, the continued benefits were observed among those performing leisure time PA 10 times or more the recommended minimum (HR=0.54, 95%CI=0.48-0.61). Similar dose-response associations were observed for CVD and cancer mortality.

Conclusion
A minimum of about 10 minutes/day (60 minutes/week) of light to moderate-intensity PA was associated with significantly lower risk of mortality. Individuals doing more exercise could achieve additional health benefits. In addition, there was still benefit rather than excess risk at the highest level of leisure time PA.

Keywords: Physical activity; Mortality; Prospective
**J-shaped curve exists: Alcohol consumption and risk of all-cause, cardiovascular disease- and cancer-specific mortality in prospective study of 333,247 US adults**

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**Objective**
This study aimed to examine the association between alcohol consumption and risk of mortality from all cause, cancer and cardiovascular disease (CVD) in the US adults.

**Method**
Data was obtained by linking thirteen waves of the National Health Interview Surveys conducted during 1997-2009 to the National Death Index records through 31 December, 2011. Alcohol consumption was self-reported. Main outcome was mortality from all cause, cancer and CVD. A total of 333,247 participants who were nationally representative of US adults ≥18 years were included. Cox proportional hazards regression model was used to estimate the hazards ratio (HR) and 95% confidence interval (CI) adjusting for potential confounders.

**Discussion**
After a median follow-up of 8.2 years (2.7 million person-years), 34,754 participants died from all-causes, of which 8,947 were CVD-related deaths and 8,427 were cancer-specific deaths. Compared with lifetime abstainers, those who were light or moderate alcohol consumers were at reduced risk of mortality for all-cause (light: HR=0.79, 95%CI=0.76-0.82; moderate: HR=0.78, 95%CI=0.74-0.82) and CVD (light: HR=0.74, 95%CI=0.69-0.80; moderate: HR=0.71, 95%CI=0.64-0.78), respectively. In contrast, significantly increased risk of mortality for all-cause (HR=1.11, 95%CI=1.04-1.19) and cancer (HR=1.27, 95%CI=1.13-1.42) were found in adults with heavy alcohol consumption than those who never consumed. Binge drinking≥1 days/week was associated with increased risk of mortality for all-cause (HR=1.13, 95%CI=1.04-1.23) and cancer (HR=1.22, 95%CI=1.05-1.41).

**Conclusion**
Light and moderate alcohol intake might have a protective effect on all-cause and CVD-specific mortality in US adults. Heavy or binge drinking was associated with increased risk of all-cause and cancer-specific mortality.

Keywords: Alcohol consumption, Mortality, Prospective study, J-shaped curve
Effectiveness of an intervention, delivered by health-workers, to improve control of hypertension in rural India

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Objective
In rural India, where there is inadequate access to health services, control of hypertension is poor. We aimed to determine the effectiveness of a health-worker-led intervention to improve control of blood pressure (BP) by encouraging self-management and supporting patients to adopt beneficial lifestyle changes.

Method
In 2014-2015 we conducted a community-based survey in three regions in rural India; Trivandrum district in Kerala, West Godavari District, Northern Andhra Pradesh and Rishi Valley region in Southern Andhra Pradesh. BP was measured according to a strict protocol; hypertension was defined as BP≥140/90 mmHg or taking antihypertensive medications. In each region, wards/villages were randomised to receive either intervention or usual care (UC) in a 1:2 ratio. Health workers were provided training to deliver a six bi-weekly group-based intervention to people with hypertension. The program included education about hypertension, and its risk factors, and support for healthy lifestyle change, such as weight loss and adherence to medications. Participants had their BP and weight measured at each session to assist in self-management. Final outcome (BP, anthropometry and lifestyle) was assessed approximately 2 months after the end of the intervention period, with control of hypertension being the main outcome measure.

Discussion
The prevalence of hypertension ranged from 23% (Rishi Valley) to 33% (Trivandrum), 37.9% of whom had their BP controlled. Overall 450 people with hypertension lived in villages randomised to the intervention and 1,012 to UC. We have 80% power (two-sided α=0.05) to detect an 8% difference in control of hypertension between groups (to 46%). Data lock will occur in July 2017.

Conclusion
With this sample size, we have ample power to determine whether the intervention results in improved control of hypertension. If effective this readily applicable program will enable people with hypertension who have poor access to health services to effectively self-manage their BP.

Keywords: community-based; intervention; task-shifting; self-management; poverty
**Association between commuting modes to school and blood pressure levels in children and adolescents**

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**Objective**
The association between commuting modes to school and elevated blood pressure (BP) was explored to provide evidence for the preventive measures of elevated BP among children and adolescents.

**Method**
Data were from four cycles of cross-sectional surveys named the China Health and Nutrition Survey (CHNS) which were conducted between 2004 and 2011. A total of 4651 children and adolescents aged 6-17 years who had the completed data on sex, age, region, height, weight, physical activity and BP were included in the final data analysis. After adjusted for age, region, body mass index (BMI) and level of physical activity, sex-stratified multivariate liner regression was used to examine the relationship between the commuting modes to school and BP levels.

**Discussion**
There were significant differences in systolic blood pressure (SBP) and diastolic blood pressure (DBP) levels among students of different genders, ages, regions, BMI and commuting modes to school (P<0.010). In the analysis of combined commuting modes, boys who commuted via bus/subway (β=2.85, P=0.007) or taxied/private cars (β=3.59, P=0.007) had higher SBP compared to those walking to school. Similarly, compared to boys who walked to school, those who commuted via bus/subway (β=1.90, P=0.016) or taxied/private cars (β=2.51, P=0.011) had higher DBP. In girls, the differences in the SBP and DBP levels were not significant in those who had different commuting modes (P>0.050).

**Conclusion**
Walking commuting is associated with reduced BP in students, especially in boys, and taking motorized vehicle to school has negative effect on boys’ BP levels.

*Keywords: Habits; Commuting mode; Blood pressure; Students; Health education*
Effect of optimized dosage of flaxseed Blended oil in lowering circadian variations of Ambulatory Blood Pressure in Patients with Essential Hypertension

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Objective
Omega 3 fatty acid lowers blood pressure by acting on potassium and calcium depending channels. for vegetarians Flax seed is the only source of these essential fatty acids along with source of ALA, lignans, fiber, protein, vitamin and minerals. Aim of the study is to access the effect of Oxidative stable blended flaxseed oil containing natural lignans on 24 hour 7 day circadian variations of blood pressure in subjects with essential hypertension. 50 subjects with Coronary Artery Disease and Essential hypertension and 50 control healthy subjects were registered for the study.

Method
50 subjects with Coronary Artery Disease and Essential hypertension and 50 control healthy subjects were registered for the study. Each study participant was supplemented with blended flaxseed oil (30ml/day) for the period of six month. Twenty four hour seven days continuous ambulatory blood pressure monitoring, Lipid Profile was done initially and after six month of Flaxseed oil supplementation.

Discussion
Significant change (p<0.05&p, 0.01) was noted in lipid profile, Ambulatory blood pressure parameters like MESOR, ACROPHASE, Hyperbaric Indexes and CHAT. Circadian hyper amplitude tension (CHAT) incidence decreased after Flaxseed oil supplementation. Study results suggest that optimized dose of 30 ml/day blended flaxseed oil have required amount ALA as per guidelines of AHA. Blended flaxseed oil administration is potent antihypertensive and effective in maintaining Omega 3 and Omega 6 ratio,

Conclusion
This process reduce the percentage of unsaturated lenoleic and linolenic acids of Flaxseed oil with Palm oil in stabilized ratio which helps in maintaining the overall oxidative stability and have proper ratio of Omega 3, omega 6 and omega 9 content in the Blended product. Circadian analysis of blood pressure by four to Seven day continuous ambulatory blood pressure monitoring and assessment of CHAT (circadian hyper amplitude tension) is the best marker for cardiovascular function.

Keywords: Falxseed oil, Hypertension, ABPM, CHAT,
Effect of Lifestyle Intervention Program on Health Status of Hypertensive Adults in Kuala Lumpur

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1Public Health/ Adventist University of the Philippines/ Philippines

Objective
This study aimed to determine the effect of lifestyle intervention program on the health status of hypertensive adults in adults in Kuala Lumpur. There were 60 participants, 30 were assigned as the experimental group, and 30 were assigned as the control group. The lifestyle promotion program was implemented for one month to the participants of the experimental group. Pre-test showed high food consumption for the experimental group especially on meats, dairy products and canned or packet foods, moderate physical activity, hypertension II, overweight in terms of BMI and body fat at 26-35%. The post intervention results showed changes in dietary habits (eating more wholegrains, vegetable and fruits), decrease in Blood Pressure and decrease in body fat percent. Comparing the results of pre and post intervention for both groups it was found a non-significant difference for the control group in the dietary habits, physical activity and BMI, but a significant difference in BP and body fat. For the experimental group a significant difference was seen in the health related practices such dietary habits and physical activity and health status' BMI, BP and body fat. Comparing the gain score between the two groups, the lifestyle promotion program was found to be effective in improving dietary habits, physical activity and BP.

Keywords: hypertension, lifestyle intervention, diet plan, physical activity, BMI, dietary habit
Assess the Effect of Yogic Asana in the management of hypertension and improve quality of life

Narsingh VERMA
1

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Objective
The aim of this study was to assess the effect of yogasana, as an adjunct to pharmacotherapeutic treatment in hypertension stage-1 (Systolic Blood Pressure 140–159 mmHg and Diastolic Blood Pressure 90–99 mmHg) and Hypertension stage-2 (Systolic Blood Pressure ≥160 mmHg and Diastolic Blood Pressure ≥100 mmHg) patients.

Method
The study was conducted on 50 hypertensive patients aged 40-50 years. They were randomized into two groups: control group and study group. The study group practiced yoga for 45 min, 5 day/week for 3 months. The control group did not practice any type of yogic asana or relaxation techniques. Systolic blood pressure (mmHg), diastolic blood pressure (mmHg), and pulse rate (beats per minute) of all patients were assessed at baseline and 3 months.

Discussion
There were significant reduction in mean values of systolic blood pressure (121.12±8.18), diastolic blood pressure (77.04±3.35), and pulse rate (69.52±2.84) after 12 weeks of yogic practices in study group as compared to control group in whom mean values of the systolic blood pressure (138.16±12.98), diastolic blood pressure (94.24±12.32), and pulse rate (98±3.13) was noted after 12 weeks. From the present study it was observed that a significant reduction in the systolic blood pressure, diastolic blood pressure and pulse rate occurs in subjects practicing yoga (p<0.001). The results of present study indicate that yoga has beneficial effect on reduction of high blood pressure & dose of anti-hypertensive drug also.

Conclusion
Yoga and meditation should be recommended as an adjuvant therapy along with medication (anti-hypertensive drugs) to tilt the autonomic balance to parasympathetic dominance to obtain reassured from hypertensive symptoms

Keywords: Yogic Exercise, Hypertension, Blood Pressure and Pulse Rate
Assess the Effect of Yogic Asana in the management of hypertension and improve quality of life

Vandana Awasthi¹; Narsingh VERMA¹
¹Physiology/ King george’s medical university/ India

Objective
The aim of this study was to assess the effect of yogasana, as an adjunct to pharmacotherapeutic treatment in hypertension stage-1 (Systolic Blood Pressure 140–159 mmHg and Diastolic Blood Pressure 90–99 mmHg) and Hypertension stage-2 (Systolic Blood Pressure ≥160 mmHg and Diastolic Blood Pressure ≥100mmHg) patients.

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Conclusion
Yoga and meditation should be recommended as an adjuvant therapy along with medication (anti-hypertensive drugs) to tilt the autonomic balance to parasympathetic dominance to obtain reassured from hypertensive symptoms

Keywords: Yogic Exercise, Hypertension, Blood Pressure and Pulse Rate
Important roles of socio-economic position and diet in the development of hypertension in a setting of disadvantage

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Objective
Poor diet quality and low socio-economic position (SEP) are established risk factors for hypertension in high income and urban populations. However, there is limited evidence for the relationship between diet, SEP and blood pressure (BP) in disadvantaged rural populations. We aimed to assess the association between SEP and diet on hypertension in a disadvantaged rural population in South India.

Method
In a case-control study of hypertension conducted in 58 villages in rural Andhra Pradesh, 300 cases were age and sex-matched to 300 controls. BP and anthropometry were measured using a strict protocol. Salt and potassium were measured from 24-hour urine samples. Participants were interviewed to obtain information about their demographics, SEP, lifestyle and diet. Conditional logistic regression was used to determine factors associated with hypertension (BP ≥ 140/90 mmHg).

Discussion
The median age of the sample was 60 years (Quartile 1 (Q1) 50; Quartile 3 (Q3) 70); 56% were men. Median salt excretion did not differ significantly between cases and controls (7.2 vs. 7.3 grams/day, P = 0.9). The median urinary sodium-to-potassium ratio was greater in cases (5.0, Q1 3.7, Q3 6.4) than controls (4.7, Q1 3.6 Q3 5.7; P = 0.01). In multivariable analyses, high SEP (odds ratio (OR) 3.2, 95% confidence interval (CI) 1.3–7.8, P = 0.009), physical inactivity (OR 3.1, 95% CI 2.0–4.8 P < 0.001), and high sodium-to-potassium ratio (OR 1.5, 95% CI 1.0–2.3, p = 0.05) were associated with a greater odds of hypertension. In men only, polygamy (OR 2.7, 95% CI 1.1–6.7, P 0.03) was also associated with a greater odds of hypertension.

Conclusion
The main factors associated with hypertension in this population are SEP, sodium-to-potassium ratio and lifestyle factors such as physical inactivity. Therefore strategies to promote a diet rich in potassium, along with improving lifestyle behaviours may help reduce the burden of hypertension in this disadvantaged Indian population.

Keywords: Socio-economic position; diet; hypertension; disadvantage; India
Comparison of differing measures of adiposity and their association with hypertension in low- to middle-income countries

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Objective
Adiposity is an established risk factor for hypertension in urban regions of many low-to-middle-income countries, but its importance is less established in rural and disadvantaged regions. Many established methods for measuring adiposity are not feasible to use in rural areas, so it is important to establish the reliability of feasible methods in these settings. We aimed to compare various methods for assessing adiposity and to compare the associations between these measures and hypertension.

Method
Staff were trained in carefully measuring skinfold thickness, waist and hip circumference, height, weight and electrical bio-impedance analysis (BIA). They were also trained in measuring blood pressure (BP) according to a strict protocol. Screening camps were held in rural villages in south western Andhra Pradesh, India. Adiposity was calculated by transforming skinfold thickness using age-specific and general equations, calculating body mass index (BMI), and waist-hip ratio (WHR). Hypertension was defined as a BP ≥140/90 mmHg. Logistic regression was used to determine the association between each measure of adiposity (BIA, WHR, waist circumference (WC), BMI, and skinfolds) and hypertension.

Discussion
A total of 1026 adults were assessed. The mean age was 41 years (SD 16) and 33% had a BMI<18 kg/m², a marker of disadvantage. All methods for measuring adiposity were associated with the risk of hypertension. BMI ≥25 kg/m² was associated with a 3.5-fold increased risk of hypertension. The coefficient of determination (r²) was greatest between systolic BP and WC (0.061) and WHR (0.060). Of all measures of adiposity, WC ranked best in explaining hypertension, with WHR and BMI the next most favourably rank. Skinfold thickness ranked least, but required the most training.

Conclusion
WC and WHR explained the largest amount of variability in indicators of hypertension. Our findings confirm that central obesity is strongly associated with hypertension, even in a rural, disadvantaged region of India.

Keywords: adiposity; risk factors; electrical bio-impedence; rural; poverty
C-Reactive Protein is a marker for hypertension in men, but not women, in a rural, disadvantaged Indian population

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Objective
There is some evidence that low grade inflammation is associated with an increased risk of hypertension in high income countries and urban regions of low- to middle-income countries, but there is limited evidence in rural disadvantaged populations. We aimed to determine the risk of hypertension associated with high sensitivity C-reactive protein (hs-CRP), a marker of inflammation, in a rural population living in poverty.

Method
In a case-control study in 58 villages in southwestern Andhra Pradesh, India, 300 cases with hypertension were age- and sex-matched to 300 controls without hypertension. Blood pressure (BP) was measured according to a strict protocol, and hypertension was defined as BP≥140/90 mmHg. We categorised hs-CRP (Immulite 2000xpi) into three groups: <1 mg/L (reference category), 1 to ≤3 mg/L, and >3 mg/L. Conditional logistic regression was used to determine associations between CRP and hypertension, adjusted for income, smoking, physical activity, alcohol intake, central obesity, and residual effects of age.

Discussion
In this population, 34% of participants had CRP levels below 1 mg/L and 31% had levels >3 mg/L. We were unable to detect an association between hypertension and CRP levels of 1 to ≤3 mg/L (Odds Ratio (OR) 1.43, 95% Confidence Interval (95%CI) 0.87–2.33) or CRP >3 mg/L (OR 1.25, 95%CI 0.75–2.09). When these analyses were stratified by sex, hs-CRP was associated with hypertension in men at serum levels of 1 to ≤3 mg/L (OR 2.21, 95%CI 1.12–4.36) and levels >3 mg/L (OR 2.32, 95%CI 1.09–4.93), but not in women (levels of 1 to ≤3 mg/L [OR 0.69, 95%CI 0.33–1.47] and >3 mg/L [OR 0.61, 95%CI 0.29–1.32]).

Conclusion
In this disadvantaged population, we found an association between hs-CRP and hypertension in men, but not in women. Adding hs-CRP into risk prediction tools may improve the prediction of future cardiovascular disease in rural communities, particularly in men.

Keywords: hsCRP; epidemiology; case-control study; rural; poverty
An assessment of Hypertension and risk factors among law enforcement personnel in Jodhpur, India.

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Objective
1. Assessment of Hypertension and associated risk factors among law enforcement personnel in Jodhpur, India.

Method
A cross-sectional study was conducted among law enforcement personnel of Jodhpur city of Rajasthan for 2 months (Aug-Sep 2016). A total 5 camps were conducted in the project to cover 280 study participants from all 23 stations/posts on pre-defined dates. The standard WHO-STEPwise approach for NCD surveillance was incorporated as data collection strategy. Data collection process included: A structured interview, physical and biochemical measurements coupled with a health promotion session. Multivariate logistic regression analysis was done to test significant risk association. Requisite permissions, informed consents and institutional ethical clearance (IEC) were obtained for the study.

Discussion
The study participants had a mean age of 39.09 years, most 266 (95.0%) were men and more than half 162 (57.8%) had received college education. Risk assessment revealed high burden of: Tobacco 83 (29.6%) & Alcohol 94 (33.6%) intake, inadequate fruit-vegetable intake 243 (86.8%) & high salt intake 29 (10.4%), inadequately physically activity 212 (75.8%) & obesity 116 (44.3%) and past history of disease i.e CVDs 21 (7.5%), Hypertension 82 (14.64%), Hypercholesterolemia 16 (21.62%) and Diabetes 29 (10.59%). The mean BP reading of participants was 115.8±11.5 mmHg (Systolic) and 80.4±4.9 mmHg (Diastolic). Screening tests suggested that 82 (29.28%) and 213 (76.1%) had Hypertension and Pre-Hypertension respectively. On multivariate logistic regression analysis, hypertension was significantly associated with tobacco(OR:3.7,p=0.045) & alcohol(5.2,0.023), obesity/overweight(5.2,0.023), lower education(3.9,0.041)and diabetes(5.9,0.014). Study participants were found to have poor knowledge and health behaviour in respect of Hypertension and risk factors.

Conclusion
Present study reflects a heavy burden of Hypertension and risk factors among the law enforcement personnel coupled with poor awareness and lifestyle and treatment seeking behaviour. Therefore It’s highly pertinent for stakeholders to develop health promotion policy for risk reduction and prevention and control of NCDs.

Keywords: Hypertension; Law enforcement; Police; NCD; Lifestyle; Occupational Health.
DETERMINANTS OF HYPERTENSION IN RURAL DELHI, INDIA

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Objective
INTRODUCTION: Hypertension is an important public health challenge in both economically developing and developed countries. It is one of the risk factors for cardiovascular mortality. Data is available on hypertension in urban population but few studies are reported in rural areas. OBJECTIVE: To find burden and determinants of hypertension in a rural area in Delhi.

Method
MATERIALS AND METHODS: It was a community based cross sectional study Conducted in two rural areas in Delhi. Study was conducted on 1005 adults aged 18 years and above selected by systematic random sampling method over a period of one year from July 2013 to June 2014. A pretested, predesigned, semi-structured questionnaire schedule was used in local language. WHO STEPS approach was used to study the profile of the hypertension in the population.

Discussion
The prevalence of hypertension was 14.1\% (142/1005) among study subjects. Hypertension was significantly higher in individuals more than 35 years as compared to those less than 35 years. No significant difference with tobacco intake; both present and past tobacco use. Hypertensive was significantly higher in those who take alcohol, in subjects with raised total cholesterol levels, triglycerides levels and among obese (p value = 0.01). In multivariate analysis only age, education and cholesterol levels were independently associated with hypertension.

Conclusion
Age, education and cholesterol levels were independent risk factors of hypertension. Education level of people should be raised and cholesterol levels should be cut down using approaches of behaviour change communication in the community.

Keywords: Hypertension; Risk factors, Education, alcohol
Blood pressure among young adults within 3 years’ follow-up: Beijing Blood Pressure Cohort Study

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Objective
To observe the change of blood pressure level and prevalence of hypertension among young adults from Beijing Blood Pressure Cohort study (BBS).

Method
We use data from the BBS cohort, where 862 subjects aged 6-18 years old were followed over 27 years from childhood(1987) to early or middle adulthood(2014). Anthropometric and BP were obtained at the baseline(2011) and follow examinations(2014), report of diagnose and advice on hypertension was supplied to each participants. Hypertension was defined as SBP/DBP≥140/90mmHg or currently taking antihypertensive medications. The participants with hypertension diagnosed in the cohort examination

Discussion
The sample was aged from 29-43(mean=34.5) years and 52.8% were male(433); The mean SBP and DBP were 112 and 72 mmHg at the baseline while 113 and 76 mmHg during the follow examination and the differences were significant with P<0.05(t=2.469 and 11.077); level of SBP and DBP in the follow examination decreased by 8.9 and 6.2 mmHg for the participants who were diagnosed hypertension at the baseline while for thosen normotensive participants increased by 2.3 and 5.1 mmHg; 42 subjects had been diagnosed hypertension before the baseline examination in 2011; The prevalence of hypertension at baseline was 12.6%(male:20.9% vs female:3.0%) and the prevalence of hypertension was 18.2% (male:23.5% vs female:6.8%) in 2014; Hypertension control rate of the participants who were diagnosed hypertension at baseline was 48.6%(male:52.6% female:41.7%) while national hypertension control rate was 6% among adults in China. 10.6% (male:15.8% vs female:5.7%) of participants were newly developed hypertension during an average 3.8 years of follow-up.

Conclusion
The blood pressure level and prevalence of hypertension increased in young adults within 3 years follow-up, especially in male. Research-based blood pressure management which including BP measurement and report increase hypertension control rate, can be expanded to population blood pressure management.

Keywords: blood pressure, cohort study, young adults
Prevalence, awareness and risk factors of hypertension among working population in China: A multicenter cardiovascular epidemiological study

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Objective
The health of the work force is directly related with economic and social development. However, most epidemiological studies of hypertension in China have been conducted among the elderly community population, no large-scale national data are available on the working population. We aimed to investigate the prevalence, awareness, and risk factors of hypertension among Chinese employees.

Method
A cross-sectional survey was conducted in 50 workplaces selected by 21 medical coordination centers located in 14 provinces of China from 2012-2013, a cluster sampling method was used to obtain the occupational sample. Totally, 42,968 employees aged 18 to 60 years were recruited. Questionnaires, physical examinations, and laboratory measurements were administrated on each subject. Considering the hierarchical nesting of data, a multilevel logistic model was built to identify the risk factors of hypertension.

Discussion
The age-standardized prevalence of hypertension and prehypertension, using the 2010 China population census, was 22.7% (95%CI: 21.9%-23.5%) and 39.2% (95%CI: 38.2%-40.1%), respectively. Multilevel logistic model indicated that men (OR=2.03, 95 %CI: 1.90-2.17), increasing age (OR=1.07, 95 %CI: 1.06-1.08), overweight or obesity (OR=2.29, 95 %CI: 2.17-2.41), manual workers (OR=1.34, 95 %CI: 1.25-1.43), current smoking (OR=1.08, 95%CI: 1.02-1.14), family history of hypertension (OR=2.61, 95 %CI: 2.47-2.77), dyslipidemia (OR=1.97, 95 %CI:1.83-2.11), and occupational stress (OR=1.13, 95%CI: 1.06-1.19) was significantly associated with hypertension. Among the hypertensives (n=10,757), 57.3% were aware of their condition, 30.9% were being treated and 11.2% had their blood pressure controlled. Hypertension awareness was greater among men, older ages, non-manual employees, overweight and obese subjects, individuals working at colleges and public institutions, and those living in South China (all P<0. 001).

Conclusion
There is a high prevalence of hypertension and prehypertension in Chinese working population, but with a low level of awareness, treatment, and control. Interventions for increased awareness about hypertension and lifestyle modification are urgently warranted in the workplaces.

Keywords: Hypertension; Risk factors; Working population; Epidemiology
PREVALENCE, AWARENESS, TREATMENT, AND CONTROL OF HYPERTENSION AMONG YOUNGER ACADEMIC COMMUNITY OF YOGYAKARTA DUTA WACANA CHRISTIAN UNIVERSITY

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Objective
Hypertension is one of the most common disease worldwide and contributes highly to morbidity and mortality. Study about hypertension among younger population is limited. This study aims to determine the prevalence, awareness, treatment, and control of hypertension among younger academic community of Yogyakarta Duta Wacana Christian University.

Method
This was cross-sectional study and used proportional sampling method. The questionnaire and anthropometric measure protocols were adapted from internationally recommended surveys.

Discussion
There were 241 samples of this study. The prevalence of hypertension among younger academic community of Yogyakarta Duta Wacana Christian University is about 10.79% (26 of 241). Prevalence of hypertension by sex was found to be 88.46% in men and 11.54% in women. The proportion of hypertension is highest in the 18-24 group of age. About 26 samples with hypertension completed a WHO MONICA questionnaire to assess the awareness, treatment and control of hypertension. Seven in twenty-six of the hypertension group have been informed by the doctor that they have hypertension and classified as aware group. Only one in twenty-six of the hypertension group were taking anti hypertension drug class ACE inhibitor in the last two weeks. About ten in twenty-six of hypertension group control their hypertension by measuring their blood pressure in the last year.

Conclusion
This study has demonstrated inadequate knowledge of hypertension among younger academic community of Yogyakarta Duta Wacana Christian University. Almost all of hypertension group are untreated, unaware and do not control their blood pressure. The efforts to improve the prevention, early detection, and better treatment for hypertension is needed.

Keywords: Hypertension; Prevalence of Hypertension; Awareness of Hypertension; Younger Community; Academic Community.

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Objective
To investigate the trends in average blood pressure levels, and the prevalence, awareness, treatment and control of hypertension and associated factors in a rural area of northeast China from 2007 to 2015.

Method
We conducted two cross-sectional surveys of Chinese adults between 2007 and 2015 in a rural area of Lanxi, in northeast China. A total of 5,272 (2,539 males, 2,733 females) and 2,020 (864 males, 1,156 females) participants were included in the two surveys, respectively. Hypertension was defined as systolic blood pressure 140 mm Hg, diastolic blood pressure 90 mmHg, and/or current treatment with antihypertensive medications. Hypertension awareness and treatment were assessed with a standardized questionnaire. Hypertension control was defined as blood pressure measurements of less than 140/90 mmHg.

Discussion
The prevalence of hypertension was almost equal between 2007 and 2015 (30.52% and 29.21%, respectively) in Lanxi. The rates of hypertension awareness, treatment and control all significantly increased from 38.66% to 66.44%, 33.56% to 55.76%, and 6.96% to 21.53%, respectively, from 2007 to 2015. The status of hypertension, awareness, treatment and control were significantly associated with age, sex, BMI, smoking habit, drinking habit, educational level, history of hypertension and cardiovascular disease.

Conclusion
The prevalence of hypertension has not increased among Chinese adults in a rural area of Lanxi in recent years. The awareness, treatment and control of hypertension, while significantly improving, still need to be enhanced. Public health programs and treatment strategies are required to improve the awareness, treatment, and control rates, reducing disease burden of hypertension in northeast China.

Keywords: Hypertension; Blood Pressure; Epidemiology; China; Trends
The relationship between BMI changes and blood pressure changes from childhood to adulthood in a general Chinese population: 26 years cohort follow-up study

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Objective
The aim of this epidemiological study was to estimate the relationship between baseline BMI and BMI as a time-dependent covariate with the blood pressure in a population cohort of childhood and mid-adult in Hanzhong rural areas (City in province Shannxi of China).

Method
Body weight, height, waist circumference and blood pressure were measured during baseline survey (in March and April 1987) and three follow-up periods (in March and April of 1992, 1995, 2013, respectively). Overweight and obesity were defined according to sex- and age- specific Chinese reference data. We analyzed the increment of BMI and the change trend of BP. Cox proportional hazards models were fitted to examine the effects on blood pressure of the increment BMI as a time-dependent covariate. Hazard ratio (HR) and 95% confidence intervals (CIs) of different BMI categories for high BP, average age were also calculated.

Discussion
Comparing with baseline, 26-years-follow-up later, 50.55% and (to) 40.04% for boys 41.49% and (to) 31.91% for girls had experienced progression to a higher blood pressure stage and 32.42% and (to) 53.3% had developed high DBP for boys, thus 23.4% and (to) 28.72% for girls. And also, either Overweight or Obesity, the average age of high SBP and high DBP in male earlier than female.

Conclusion
The change of BMI was an independent predictor of blood pressure progression. These findings underscore the urgent need for public health measures to prevent increasing Overweight and Obesity. Targeting intervention in adolescence may be a critical method for preventing high BP in later life.

Keywords: Body mass index; Blood pressure; Cohort follow-up
Prevalence and factors associated with hypertension in Hormozgan, Iran

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Abstract

Objective
Hypertension is an important public health challenge in both developing and developed countries. The aim of this study was to determine the prevalence of hypertension and its associated factors among residence of Hormozgan province in Iran.

Method
A community-based cross-sectional study was conducted using cluster random sampling method. Participants were interviewed regarding their history of hypertension, diabetics, hyperlipidemia, tobacco smoking and socio-demographic characteristics. The data were analyzed using SPSS Version 19. Frequency and percentage were used to describe the data, Chi-square test and Odds Ratio with 95% Confidence Interval were used to assess the association between dependent and independent variables.

Discussion
The mean age of participant was 34.48 (standard deviation of 11.96) with range between 15 and 89 years. In general, the prevalence of hypertension was 12.5%, (in male 13.6% and female 11.4%). Hypertension was significantly higher in rural (17.1%), compared to urban area (10.3%), p= 0.001. Hypertension was significantly higher in those who worked at farm or had private business (14.3%) as well as in who married (14.1%). Moreover, hypertension increased with age and low education level. In the univariate analysis, living in the rural area, Odds Ratio = 1.8, (95% CI, 1.3-2.4), low level education OR=3.6, (95%CI,2.60-5.01), smoking tobacco in any type, OR=3.0, (95%CI, 2.17-4.14), cigarette smoking OR=4.36, (95%CI, 3.14-6.06), history of hyperlipidemia OR=9.46, (95%CI, 6.71-13.33) and history of diabetics OR=9.11, (95%CI, 6.25-13.26), were associated with having hypertension.

Conclusion
Hypertension was found to be more prevalent in the rural area, low level education group, tobacco consumers, subjects with history of diabetes and hyperlipidemia. Hence, increasing awareness of hypertension in the community and its risk reduction is very important for intervention. Moreover, there should also be a local strategy for early detection and treatment of hypertension, diabetes, hyperlipidemia and planning to force to quit smoking in community, mostly in rural area.

Keywords: Hypertension, prevalence, risk factors, Iran
Early detection and management of hypertension – A community based approach

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Objective
Hypertensive people in resource poor setting usually do not seek treatment until a complication develops. Early detection and management of hypertension along with community awareness may help prevent complications. We conducted community-based screening and intervention study with the aim to create awareness, detect and manage hypertension and that ultimately expected to prevent cardiovascular complication.

Method
A collaborating network among health centers along with community-based volunteer program was created. The main strategies of intervention were public and health professional education, intersectoral collaboration, community participation and organization and early detection and management of hypertension. General health status and lifestyle habit, physical examination and blood pressure were assessed. The subjects were closely monitored by community volunteers to pursue follow-up and adherence to prescribed treatment. Achievement of blood pressure control was assessed.

Discussion
A total of 25,000 people from 4 districts of Eastern Nepal were evaluated. Mean age of screened population was 39.5 years. Hypertension was found in 22% of the screened population, respectively. 40% of hypertensive were newly detected during the screening. Two or more cardiovascular risk factors were present in 29.6% of the screened population. Subjects positive at screening entered an intervention program by combining lifestyle modifications and pharmacological management with cheap drugs. 3240 patients reached 6 to 30-month follow-up. Blood pressure control (<140/90 mmHg) was achieved in 73%. The prevalence of participants with a predicted 10 year cardiovascular risk of 10% or more was 28% at baseline and decreased to 17% after 3 years.

Conclusion
Community-based program for early detection and intervention to reduce complication related to hypertension is feasible with fewer resources. Networking of health care setup and engaging community helped to adhere follow-up and treatment at low cost.

Keywords: Hypertension, Community, volunteer, Treatment, Adherence

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Objective
Hypertension is a common public health problem worldwide and a well-known risk factor strongly associated with increased risk of cardiovascular diseases, contributing to high morbidity and mortality. However, there is no systematic review and meta-analysis that has been done in a multi-ethnic population like Malaysia. This systematic review aims to determine the current prevalence of hypertension in Malaysia.

Method
A systematic review of hypertension was conducted using international databases, including PubMed, Science Direct, Scopus, Ovid, Cumulative Index to Nursing and Allied Health Literature, Google Scholar and Malaysia Citation Centre. The searched keywords were “prevalence”, “incidence”, “hypertension”, “high blood pressure”, “raised blood pressure” and “Malaysia”. All original articles in English published from 1980 to 2017 were included. After data extraction, heterogeneity between studies and publication bias was assessed and effect size was pooled by the random effect model.

Discussion
Out of 222,778 initial searched articles, twenty-six studies with a total of 111,813 subjects were included. The prevalence of hypertension varied all around Malaysia ($I^2 = 99.7\%$). The overall pooled prevalence of hypertension was 33% (95%CI: 22.0 – 39.0). For subgroup analysis, the prevalence of hypertension in male was 16% (95%CI: 12.0 - 20.0) (n=11,973) and 18% in female (95%CI: 13.0 – 23.0) (n=13,761). The prevalence of hypertension among the ethnic groups were 27% in Malays (95%CI: 18.0 – 37.0) (n=10,475); 4.4% in Chinese (95%CI 1.7 – 8.1) (n=3785) and 2.7% in Indians (95%CI: 1.7-3.9) (n=1000). A non-significant publication bias was found in this review (p value = 0.7564).

Conclusion
According to this study, hypertension is a common health problem in Malaysia. One in three adults were found to be hypertensive. A concerted effort is needed to reduce the prevalence of hypertension and improve the management of people with hypertension.

Keywords: prevalence, hypertension, Malaysia, high blood pressure, raised blood pressure, systematic review, meta-analysis
Objective
It is too much easier and cheaper to combat obesity, than in the future to treat its complications. It is too much easier and cheaper to combat obesity, than in the future to treat its complications.

Method
We used an online system for patient education based on the video lessons, full of humor, pictures, and cartoons to convey the necessary information on good nutrition, necessary to do exercises and the need for exposure to the sun to our patients.

Discussion
Watching the short movies, the patients formed the habits of good nutrition during the first month already, which includes a diet with restriction of fat, digestible carbohydrates and daily consumption of low-fat dairy products, slow carbohydrates, protein and fiber. Were also presented recommendations for compliance with the physical activity, as well as vitamin D consumption. A patient was in touch with a doctor-endocrinologist, if he has any additional questions. We examined data from a survey of 380 patients registered in the online system and 80 patients control group who were given the same recommendations on the appointment. Surprisingly, persistent decrease in body weight by an average of 6.5 kg over six months was demonstrated in all patients of the main group, the consumption of milk and dairy products increased by 2.6 times, compared with patients in the control group. The exposure to the sun was observed 15 to 30 minutes daily, compared with the control group 5-10 minutes. Regular physical activity were the main group of 260 minutes per week, in control group 80 minutes per week. We also found it out that blood pressure decreased by 6-8 mmHg, compared with patients in the control group.

Conclusion
Mobile and wireless technology helps physicians to combat obesity and be a part of the treatment of Hypertension and we need to improve the quality of information material, including using online technologies to improve the quality and duration of life of our patients.

Keywords: Hypertension, online technology, IT in hypertension, obesity
Clinical decision support systems controller and DNA databases: potential mistakes

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Objective
Software design for cardiovascular genetics laboratories.

Method
Software design and development for adaptive accompaniment of CDS, being based on standardized protocols and benchmarks for the diagnosis and treatment of essential hypertension EH. Encryption-Advanced Encryption Standard AES

Discussion
We have developed GeneSecure software package supporting CDS technologies within the EMR, supply module status CardioHealth and access to a local DNA database. This triangulation has allowed to stratify and prioritize patient information as to determine the dynamics of the EH clinical development. We have developed two independent solutions for the CDS - Modeling of the EH risk assessment - risks, events, actions and their consequences over time, 2) Drawing up recommendations based on mutations in twenty one genes of cardiovascular continuum. During the CDS testing, we were obtained epidemiological data of clinical development EH in the Uzbek population. For example, 91.2% of participants with EH were structural changes in the heart with a disease duration of 5.4 ± 4.41 years (LVMI 159.8 ± 35.55). The highest blood pressure was recorded on a level of 220/130 mm Hg (0.5% of the sample). Registration of the genotyping results has identified an association ENDOTHEL system genes (B2BKR/±9/-9; eNOS /4a/4b) with the risk of endothelial dysfunction. However, in some cases, the CDS are not always able to clearly determine the synergistic and intergenomic effect of analyzed genes. These issues occur when the volume of new data exceeds the amount of file memory, leading to the appearance of these areas, which are very difficult to manage. The polygenic nature of EH and incomplete update patient records significantly reduce diagnostic effect of the CDS

Conclusion
As a result of CDS system testing revealed significant deficiencies. First of all it concerned the lack of coordination between the EMR, the DNA database and CDS controller due to the autonomy of some clinical modules architecture. Another problem has been related with the understanding and use of the tool. Is not uncommon the CDS conclusion does not coincide with the findings of the clinician. Perhaps the reason for this controversy is the effect of syntropy and differences between the standards of norms of laboratory parameters, or forms of treatment standards in the care process.

Keywords: Advanced Encryption Standard AES, Blood pressure BP, DNA
Effectiveness of mobile health (mHealth) intervention on enhancing the self-management of blood pressure control among hypertensive patients: A systematic review and meta-analysis

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Objective
To identify the effectiveness of mobile health (mHealth) interventions on enhancing self-management of blood pressure control among hypertensive patients.

Method
This study was performed by analyzing the Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, Embase, JBI EBP Database, MEDLINE(R), and Ovid Nursing Database during 1990 to 2016. Only systematic reviews and randomized controlled trials published in English were eligible. The population was composed of adults with essential hypertension, and the intervention was hypertension self-management that uses mHealth interventions, such as mobile application and mobile-based websites. The characteristics of eligible mobile devices include interactive wireless communication capability, operating web-based applications, and high portability. The outcomes were blood pressure change, medication adherence, and lifestyle modification. The JBI Randomized Controlled Trials Checklist was used to qualitatively assess the studies.

Discussion
Four out of five identified studies were conducted in USA, and one study was conducted in South Korea. The mean age of participants in five studies ranged from 54.5 to 60 years old. Compared with the usual care, the mHealth interventions showed significantly positive effect on reducing SBP (5 studies, $P < 0.05$, mean difference [MD] = −6.78, 95% CI = −9.83 to −9.74) and DBP (5 studies, $P < 0.05$, mean difference [MD] = −2.50, 95% CI = −4.43 to −0.57) on medication adherence and sodium intake as measured by the Hill-Bone Compliance Scale (1 study). These interventions also reduced the alcohol and smoking intake as measured by the self-designed questionnaire (1 study).

Conclusion
mHealth intervention has a positive effect on BP reduction. However, a well-designed mHealth for the self-management of hypertension is needed to further examine the effectiveness of mHealth and provide more effective and reliable evidence for the development of mHealth on hypertension self-management, particularly among Asian Chinese hypertension population regarding to the increasing hypertension population and unique culture.

Keywords: hypertension; mHealth; self-management
Screening for hypertension by Community Health Workers and Effects of SMS technology and written instructions on utilization of healthcare services

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Objective
The burden of non communicable diseases is affecting the poor and disadvantaged disproportionately. Hypertension is of major public health importance, particularly in urban areas but there is evidence of considerable lack of awareness, under-diagnosis, treatment, and control. We sought to assess the impact of written lifestyle modification instructions plus mobile phone SMS on clinic attendance and on blood pressure control in hypertensive participants in Kibera slum in Nairobi and to determine the feasibility of using community health workers (CHWs) to screen for hypertension.

Method
Trained CHWs used a modified WHO STEPS instrument to screen for and refer participants with elevated blood pressure. Those with confirmed hypertension were randomized to receive written lifestyle modification instructions plus text message appointment reminders. Controls received verbal instructions and written appointment reminders. Outcome measures were appointment adherence and blood pressure control. (Follow-up still ongoing)
Of 3278 participants screened, 391 (11.9%) had elevated blood pressure. Of the 187 enrolled into the study, only 89(48%) attended the first visit to the health facility. 54(61%) were interventions and 35 were controls. The odds of missing the visit was significantly higher in the controls compared to the interventions OR 0.4861, (95%CI 0.2711 to 0.8716), P = 0.0155. (Full results available by August 2017)

Discussion
Preliminary data indicates that written instructions and SMS reminders have a positive impact on hospital attendance for management of hypertension. We have also demonstrated the feasibility of using CHWs for screening for hypertension in a low resource setting. There is very poor hospital attendance following diagnosis in this population. There is need for context specific research to understand the reasons behind this.

Conclusion
CHWs can effectively detect hypertension. They offer an alternative to improve hypertension management in poor areas where trained health workers are scarce. SMS technology has potential to improve hospital attendance for hypertension in urban slums. However, further research is needed to unravel the factors behind poor healthcare utilization following diagnosis for hypertension.
Different Adherence to Prestroke Antihypertensives between Sexes

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Objective
Awareness and treatment of hypertension are still challenges for stroke prevention. The aim of this study was to investigate prestroke status of hypertension treatment and its sex difference.

Method
Among 29,064 patients registered with a first ever ischemic stroke or transient ischemic accident between April 2008 and May 2015 in a multicenter stroke registry, we identified patients having hypertension and reviewed adherence of antihypertensives before stroke. Awareness and adherence of medications were assessed according to sexes and age groups.

Discussion
Of 18,372 patients diagnosed as having hypertension, 9.3% (95% CI, 8.7%-9.9%) of women and 12.2%(95% CI, 11.6%-12.8%) of men were unaware of their hypertension before stroke. Prevalence of unawareness was highest in women (25.7%; 95% CI 18.4-34.6%) and men (24.3%; 95% CI 20.7-28.4%) with < 45 years of age, but was similar between sexes in patients less than 65 years of age. Men were more likely than women to be untreated despite awareness of hypertension (9.3%; 95% CI, 8.7%-9.9% vs. 3.9%; 95% CI, 3.5%-4.4%, p<0.001). Prevalence of irregular medications was higher in men (3.9%; 95% CI, 3.5%-4.4) than women (2.7%; 95% CI, 2.3%-3.1%), which was consistent across age groups except < 45 years of age.

Conclusion
This study suggests that primary prevention of stroke still has a room for improvement by facilitate public education and campaign for hypertension treatment.

Keywords: Stroke, Adherence, Prevention, Antihypertensives, Awareness
Stroke Prediction with CHA2DS2-VASc Score in Patients with Mesenteric Ischemia without Atrial Fibrillation- Insights from a Nationwide Cohort

WS HU

CARDIOLOGY/CMUH/ Taiwan (台灣)

Objective
The study aimed to investigate the association of mesenteric ischemia, CHA2DS2-VASc Score and ischemic stroke.

Method
The study participants included patients aged ≥ 18 years with a new diagnosis of mesenteric ischemia during hospitalization between January 1, 2000 and December 31, 2011. Individuals with atrial fibrillation (AF) or atrial flutter during the study period were excluded. The study participants were followed up until the ischemic stroke appeared or they were censored due to withdrawal from this program, mortality, or the end of the study period, whichever came first. Cox proportional hazards regression models were applied for ischemic stroke risk stratification in the study participants by CHA2DS2-VASc score. Receiver operating characteristic (ROC) analysis was applied to assess the accuracy of CHA2DS2-VASc score for ischemic stroke prediction.

Discussion
A total of 24039 study participants were enrolled. Ischemic stroke incidence increased from 1.54 % in CHA2DS2-VASc score of 0 to 9.23% in CHA2DS2-VASc score of 6 or more. Moreover, the Kaplan–Meier curve with a log rank test demonstrated that patients with a higher CHA2DS2-VASc score were associated with an increased cumulative incidence rate of ischemic stroke during the follow-up period (p< 0.001). The discriminatory performance of the CHA2DS2-VASc score resulted in C-statistics of 0.65 (95% CI=0.63-0.66) for the prediction of ischemic stroke in patients with mesenteric ischemia without AF.

Conclusion
In conclusion, CHA2DS2-VASc score is demonstrated to be predictive of ischemic stroke in patients with mesenteric ischemia without AF. However, a modest predictive value of CHA2DS2-VASc score was found. Further prospective studies are required to confirm our findings.

Keywords: CHA2DS2-VASc Score, Cohort, Ischemic Stroke, Mesenteric Ischemia
Assessment of CHA2DS2-VASc score in bidirectional risk prediction between venous thromboembolism and ischemic stroke: a nationwide cohort study

WS HU

1CARDIOLOGY/ CMUH/ Taiwan (台灣)

Objective
The study aimed to explore the role of CHA2DS2-VASc score in bidirectional risk prediction between venous thromboembolism (VTE) and ischemic stroke.

Method
The current study was analyzed from the inpatient claims data extracted from the Taiwan National Health Insurance Research Database. We identified the subjects diagnosed with VTE (for Study 1) or ischemic stroke (for Study 2) from January 1, 2000 to December 31, 2011 to observe the occurrence of ischemic stroke (for Study 1) and VTE (for Study 2), respectively. We used the CHA2DS2-VASc score to evaluate the risk of ischemic stroke among VTE patients (for Study 1) and to measure the risk of VTE among ischemic stroke patients (for Study 2). The predictive ability of CHA2DS2-VASc score was assessed based on standard C-statistics and receiver operating characteristic (ROC) analysis.

Discussion
A total of 56996 patients with VTE (Study 1) whereas a total of 688556 patients with ischemic stroke (Study 2) were identified. Among VTE patients, the C-statistic of CHA2DS2-VASc score predictive of ischemic stroke was 0.66 (95% CI = 0.65-0.67) whereas the C-statistic of the score predictive of VTE was 0.55(95% CI=0.54-0.55) in patients with ischemic stroke.

Conclusion
In summary, our study is the first to assess the performance of CHA2DS2-VASc score in predicting the bidirectional risk between VTE and ischemic stroke. Furthermore, we found that the CHA2DS2-VASc score was performing better on the VTE population in predicting ischemic stroke as compared to the ischemic stroke population in predicting VTE.

Keywords: CHA2DS2-VASc Score, Ischemic Stroke, Venous thromboembolism
THE CLINICAL SYMPTOMS AND TIME TO HOSPITAL IN STROKE PATIENTS WITH HYPERTENSION: COMPARISON BETWEEN ISCHEMIC AND HEMORRHAGIC STROKE

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Objective
This study aimed to compare the clinical symptoms and time to hospital between ischemic stroke and hemorrhagic stroke.

Method
This study is a nested case control study. The subjects were ischemic and hemorrhagic stroke patients from March 2016 to March 2017. All subjects had a hypertension as the comorbidity. Their data were recorded in electronic stroke registry at Bethesda Hospital, Yogyakarta, Indonesia. After sampling calculation, the sample were took by simple random sampling.

Discussion
There were total 716 subjects. After sampling calculation, there were 356 subjects, divided into 178 ischemic stroke patients and 178 hemorrhagic stroke patients. The subjects were matched for age and gender. Ischemic stroke subjects mostly came to the hospital >12 hours after the onset (55.6%), whereas hemorrhagic stroke subjects came to the hospital within 12 hours (60.7%). Patients who came to the hospital within 12 hours are most likely suffered from hemorrhagic stroke (OR: 1.650, 95% CI: 1.084-2.513, P: 0.019). The commonest symptom was limb weakness and the rarest symptom was face drooping, both in ischemic stroke (70.8% and 7.3%) and hemorrhagic stroke (61.8% and 4.5%). Bivariate analysis showed slurred speech (OR: 1.392, 95% CI: 1.119-1.731, p: 0.008) and face drooping (OR: 4.596, 95% CI: 1.286-16.419, p: 0.011) were a significant symptoms in ischemic stroke. Decrease of consciousness was the only significant symptoms in hemorrhagic stroke (OR: 10.389, 95% CI: 5.673-19.025, p: <0.0001).

Conclusion
Most of ischemic stroke subjects were came to the hospital >12 hours after the onset, showed slurred speech and face drooping as the significant symptoms. Most of hemorrhagic stroke subjects were came to the hospital within 12 hours from the onset and showed decrease of consciousness as the significant symptom. An education to community about various stroke symptoms and the importance to bring stroke patients to the hospital as soon as possible are necessary.

Keywords: stroke; symptom; time to hospital; hypertension
IS HYPERTENSION INFLUENCE THE OUTCOME OF STROKE? COMPARATIVE STUDY BETWEEN ISCHEMIC AND HEMORRHAGIC STROKE

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Objective
This study aims to compare impact of ischemic and hemorrhagic stroke with hypertension on clinical outcomes

Method
This comparative study identified 346 patients over 40 years old who had hypertension and were first time ischemic stroke or hemorrhagic stroke patients recorded in the Bethesda Hospital Yogyakarta Stroke Registry (2015-2016). Clinical outcomes were measured using the modified Rankin Scale (mRS). The data was analyzed using univariate and bivariate analysis followed by the chi-square test and independent t-test

Discussion
From the 346 patients with 173 acute ischemic stroke, consist of ninety-two male (53.2%), and eighty-one female (46.8%). Fifty four patients (31.2%) were fifty-one until sixty years old. Sixty two of those patients (35.8%) experienced poor functional outcome (mRS ≥2). Compare to 173 hemorrhagic stroke patients, consist of one hundred and three male (59.5%), and seventy female (40.5%). Forty seven patients (27.2%) were fifty one until sixty years old, 128 of those patients (74%) experienced poor functional outcome (mRS ≥2). Bivariate analysis showed that hemorrhagic stroke patient with hypertension were significantly associated with poor clinical outcomes (RR: 2.06, 95% CI: 1.66-2.56, p< 0.001).

Conclusion
Hemorrhagic stroke gives poor prognosis compare to acute ischemic stroke in patient with hypertension

Keywords: ischemic, hemorrhagic, stroke, hypertension, outcome
Clinical background of stroke patients at the time of onset and modified Rankin Scale scores before and after stroke

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Objective
Stroke is a major cause of bedridden state, dementia, and other disorders. We evaluated the clinical background of stroke patients at the time of onset and following treatment.

Method
Of 266 stroke patients admitted to our hospital between March 2015 and April 2016, 10 had subarachnoid hemorrhage, 33 had transient ischemic attack (TIA), 131 had ischemic stroke, and 59 had hemorrhagic stroke. Antiplatelet agents/anticoagulants were used at onset in 1 patient with subarachnoid hemorrhage, and in 48% with TIA, 31% with ischemic stroke, and 21% with hemorrhagic stroke (Figure 1). Modified Rankin Scale scores showed that all stroke types except for TIA had persistent severe neuropathy at hospital discharge (Figure 2).

Discussion

Conclusion
As stroke can significantly lower quality of life, the appropriate use of anticoagulants is important.
**Conclusion**
As stroke can significantly lower quality of life, the appropriate use of anticoagulants and strict blood pressure control are important.

*Keywords: stroke, mRS, anticoagulants, blood pressure*
Relations of Aspirin Resistance and Stroke Outcome in Patients with Ischemic Stroke

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Objective
Aspirin is an antiplatelet agent that is often used in patient with ischemic stroke. However, about 15-20% patients known to developed aspirin resistance. Resistance can be due to hypertension allegedly suffered by patients which causes platelet aggregation and increasing in blood viscosity, thus it's reducing effectiveness of aspirin. In this study, we assessed relation between aspirin resistance and stroke outcome in patient with ischemic stroke.

Method
This study is cohort retrospective study. We collected patient's data with diagnosis ischemic stroke from August 2009 to April 2017. This study compared groups of patient's outcomes with ischemic stroke who were aspirin resistance and who were non aspirin resistance. The resistance was measured based on the results of VerifyNow Aspirin System in the form of the value of aspirin reaction units (ARU). Patients were classified into aspirin resistant group when the ARU value was ≥550. The outcomes were measured using Modified Rankin Score (mRS). mRS≤2 indicated good outcome whereas mRS>2 indicated poor outcome. The results were analysed by using bivariate chi square test.

Discussion
Total 74 patients with ischemic stroke had VerifyNow test and 22 (29.7%) of them were patients with aspirin resistance. The result of bivariate analysis showed patients with aspirin resistance group has higher risk to have poor outcome (OR=1.716; CI95% 0.619–4.757), even though it is not statistically significant (p=0.297). Among 74 patients with ischemic stroke, we found that 46 (62.2%) patients had history of hypertension. We conducted subgroup bivariate analysis among ischemic stroke patient with hypertension comorbidity. The result of bivariate analysis showed that aspirin resistance had no effect on stroke outcome in ischemic stroke patients with hypertension comorbidity. Although it was not statistically significant, but hypertension comorbidity increase risk to have poor outcome (p=0.477; OR=1.818; CI95% 0.455–7.262).

Conclusion
Aspirin resistance and hypertension comorbidity do not have any effect to stroke outcome.

Keywords: Hypertension; aspirin resistance; ischemic stroke
Multi domain cognitive impairment on chronic exposure to high altitude and its association with high blood pressure and arterial stiffness resulting in cerebral hypoperfusion.

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Objective
Chronic exposure to high altitude (HA) results in mild cognitive impairment (MCI). We investigated the association between hypertension and arterial stiffness with MCI at HA.

Method
This cross sectional study was conducted on 162 participants with mean age 27.77±3.45 years staying in Ladakh (4200-4600 m above MSL) for >12 months. MCI was screened using neuropsychological test battery and volunteers with Mini Mental State Examination (MMSE) score < 25 were categorized as mild cognitive impairment participants (MCIP). Neurophysiological activity was recorded by electroencephalography (EEG). Blood pressure was determined and cardio ankle vascular index (CAVI) was considered as a measure for arterial stiffness. Single Photon Emission Computed Tomography (SPECT) was performed to determine cerebral perfusion pattern in MCIP. Association of MCI with hypertension and arterial stiffness was determined by multivariable adjusted logistic regression analysis.

Discussion
MCI at HA was significantly associated with hypertension and arterial stiffness (OR 7.46, 95% CI 2.48-18.37, p=0.0001 and OR 4.32, 95 % CI 1.04-13.81, p=0.043 respectively). While hyperlipidemia and hyperhomocysteinemia (hHCY) were major contributing factor for hypertension, arterial stiffness was associated with high oxi-LDL and hHCY. EEG analysis shows high alpha amplitude in parietal and temporal regions and SPECT analysis revealed diffused cerebral perfusion in fronto-parietal region of MCIP with hypertension.

Conclusion
Our results indicate that high prevalence of MCI at HA could be an outcome of reduced cerebral perfusion due to hypertension and arterial stiffness. Hence, hypertension and arterial stiffness could be considered as important diagnostic indicator risk factor for MCI at HA. Keywords: HIGH ALTITUDE; HYPERTENSION; ARTERIAL STIFFNESS; CEREBRAL HYPOPERFUSION; MILD COGNITIVE IMPAIRMENT
Hypertension and Other Characteristics of Acute Ischemic Stroke in Anutapura General Hospital, Palu, Central Sulawesi, Indonesia

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Objective
The aim of this study was to determine distribution of age, hypertension, diabetes and clinical features of acute ischemic stroke in Anutapura General Hospital, Palu, Central Sulawesi, Indonesia.

Method
We chose and obtain 63 stroke patients during September to October 2016 with purposive sampling method. The data obtained from ischemic stroke first attack patient.

Discussion
We obtain 63 stroke patients, 23 men (36.5%) and 40 women (63.5%). With age categories was teenager 1.6%, adulthood 15.9%, late adulthood 63.5% and geriatrics 19% {mean age 55.37 (SD 11.246)}. For hypertension on ischemic stroke patients was 42 samples (66.7%) and without hypertension 21 samples (33.3%). For diabetes mellitus and without diabetes risk factor was 39.7% versus 60.3%, respectively. For clinical features in ischemic stroke patients who were in Anutapura Hospital, motoric disturbane was 68.3%, sensory disturbance 44.4%, dysarthria or aphasia 38.1%, headache 20.6%.

Conclusion
Hypertension in ischemic stroke patients still one of the clinical features and risk factor, even though there were patients without increased blood pressure in acute phase. Another risk factor, patients without diabetes was more than with diabetes. Motoric disturbance was most common clinical features of acute ischemic stroke in this study.

Keywords: ischemic stroke, hypertension, diabetes mellitus, clinical features
Implementation experiences of a nationwide program for building capacity of primary care physicians in the management of hypertension and its complications

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Objective
To improve the knowledge and skills of primary care physicians in the management of hypertension and related complications using a multiple stakeholder model for capacity building.

Method
Public Health Foundation of India, International Society of Hypertension, British Hypertension Society and Centre for Chronic Disease Control jointly developed and delivered a countrywide program for PCPs. The curriculum was developed by international societies and contextualized by a panel of national experts. This was later delivered by cardiologists at 25 centres across the country. The course had a strong built-in monitoring and evaluation component that assured standardized delivery and quality of the program.

Discussion
A total of 612 participants with an average age of 43 years were enrolled in the first cycle of the course. Of these, 36% were post graduate (MD and MS) and 18% were MBBS with DNB or PhD. The participants had an average of 16 years of clinical experience and one third of the total enrolled were affiliated to government institutions.

Conclusion
Building capacity of primary care physicians could help reduce the burden on the tertiary care system. The model presented can be easily adopted in other low and middle income countries with similar health system settings, but needs evaluation with pre-specified outcomes.

Keywords: Capacity Building, Training, Hypertension, Primary care physicians
Nationwide capacity building programs for primary care physicians in chronic conditions: Implementation experiences over the last six years

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Objective
To describe the implementation experiences from nationwide capacity building programs tailored for PCPs in management of chronic conditions.

Method
An analysis was performed on the capacity building model in order to identify the strengths, weaknesses and best practices of the program. The partnership model implemented comprised of Public Health Foundation of India (PHFI), Delhi and academic partners supported by an educational grant. The evidence based curriculum was developed by academic partners and was later reviewed by a panel of national-level experts. Specialists were identified at the training centres spread across the country for the standardized delivery of course content. These initiatives were supported by an in-built monitoring and evaluation component.

Discussion
Over the last 6 years, seven initiatives have been implemented in more than 90 cities spread across 32 States & Union Territories covering 452 of the 676 districts (67%). A total of 17,009 participants have been trained in these initiatives till date. The strong monitoring and evaluation framework, pan India presence, updated and evidence-based course content and standardized delivery were identified as strengths of the program. The high compliance rate of over 90% can be attributed to the once –a-month contact based design of the program that allows flexibility and opportunities for interaction. Improvement in knowledge levels and self-reported increase in confidence levels amongst the PCPs in the management of chronic conditions was observed. Other modalities of engagement such as e-learning platforms need to be explored to improve scale and sustainability of the program. Impact of the programs need to be evaluated by measuring patient outcomes.

Conclusion
Implementation experiences from this successful model in the Indian setting may be used to institute similar programs in LMIC for strengthening of health systems in the midst of the rising NCD epidemic.

Keywords: Capacity Building, Training, Primary care physicians, Health Systems Strengthening
CORRELATION BETWEEN DURATION OF HEMODIALYSIS AND NUTRITIONAL STATUS OF CHRONIC KIDNEY DISEASE (CKD) PATIENTS AT HEMODIALYSIS UNIT IN DR. H. ABDUL MOELOEK HOSPITAL BANDAR LAMPUNG

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Objective
The purpose of this study is to know the correlation between duration of hemodialysis and nutritional status in CKD patients.

Method
It was a cross-sectional study which held on October to November 2016 in hemodialysis unit of Dr. H. Abdul Moeloek Hospital, Lampung Province. The subjects were taken by consecutive sampling. Nutritional status scoring was using Body Mass Index (BMI). Duration of hemodialysis was using 2 years cut off. Chi-Square test was used for statistic analysis.

Discussion
Total sample were 92 patients. The mean duration of hemodialysis was 25 months with range of 1-132 months. Nutritional status of patients who had underweigh were 10 patients (10,9%), normoweight patients were 48 patients (52,2%), and 34 patients (37,0%) were overweight, no patients were in obese status. Statistic analysis showed no correlation of BMI status with duration of hemodialysis (p = 0,189).

Conclusion
There was no correlation between the duration of hemodialysis and nutritional status in CKD patients.

Keywords: chronic kidney disease; hemodialysis; nutritional status
Socioeconomic Characteristics of Hypertension Patients in Jatinangor 2014

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Objective
The prevalence of hypertension in Jatinangor, West Java, Indonesia, is higher than the national prevalence. This study is aimed to identify socioeconomic characteristics of hypertensive patients in Jatinangor 2014 based on actual hypertension prevalence and hypertension awareness conditions.

Method
This study is using secondary data which is obtained from Community Health and Wellness Study Center Faculty of Medicine, Universitas Padjadjaran, Indonesia. The variables used are age, sex, income, and education. Data were processed using Microsoft Excel 2016 and STATA 12.

Discussion
Hypertensive patients is more prevalent in the group with lower education or income. Those with higher education or income have higher hypertensive awareness. Probit regression analysis shows that income is positively associated with actual hypertension prevalence, but not education. Meanwhile, income and education do not show a significant relationship with hypertension awareness.

Conclusion
Hypertension afflicts all socioeconomic classes. It seems that hypertension awareness is not viewed seriously by the public, even for people who have higher income. This suggests that a campaign is needed to increase awareness and medical knowledge about prevention and treatment of adult's hypertension.

Keywords: hypertension; awareness; socioeconomic status; Jatinangor
Cost Analysis of Health Post (Posyandu) as Non Communicable Diseases Prevention Program in Jatinangor, West Java, Indonesia

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Objective
Hypertension prevalence in Jatinangor, West Java, Indonesia is higher than both provincial and national prevalence. Indonesia itself has the second highest hypertension prevalence in South East Asia Region. Hypertension diagnostic may act as one of the efforts to prevent non-communicable diseases and its complication. Providing such service in health post (Posyandu) may become crucial as it is the closest health facility to the community. This research analyzed the cost and benefit of providing such service in Posyandu.

Method
This research used cost-benefit analysis method. The cost estimation is used as a base to develop the estimation of the cost of scaling up the hypertension diagnostic in Posyandu in Indonesia. The scale up cost is then compared with (avoidable) medical cost data to show the feasibility of implementing such service in Posyandu.

Discussion
The average cost per Posyandu is about US$ 1,155 each using Rp 13,295/US$ exchange rate (US$ 721 without opportunity cost calculation). Scaling up the services in Posyandu all over Indonesia may amount to approximately US$ 549 million (high estimate), while the estimated avoidable medical cost is around US$ 2.8 billion.

Conclusion
Providing hypertension diagnostic services in Posyandu may hinder the much higher medical cost (more than five times higher). Thus, it seems that providing such service in Posyandu is warranted.

Keywords: Hypertension, Non Communicable Diseases, Cost-Benefit Analysis, Posyandu, Jatinangor
Universal Health Coverage for Non-communicable Diseases: A sustainable patient-led initiative to increase access to hypertension medication in low resource settings.

Lilian Mbau

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Objective
Non-communicable Diseases (NCD) led by cardiovascular diseases continues to be the world’s biggest killers. In Kenya, only 33% of patient with chronic disease such as hypertension have access to medicines due to the erratic supply of essential drugs at public health facilities. This affects adherence and retention of these clients leading to poor outcomes. Kenya adopted the Bamako Initiative in 1987 where countries were called to explore self-financing by encouraging communities to participate directly in funding of essential drug supplies. The objective of this study is to document the outcomes of initiating a patient-led revolving fund community pharmacy aimed at improving supply of NCD medication in an urban informal settlement.

Method
Amref Health Africa has been supporting the provision of hypertension services at Kibera DO Health Centre, a public health facility within the Kibera informal settlement. In order to enhance sustainability and consistency of drug supply, a patient-led revolving fund community pharmacy was established. Patients at the facility registered a Community Based Organization (CBO) to oversee running of the pharmacy with support the facility. Initial capital was contributed by the CBO with drug donations from the Nairobi County government and Amref. Drugs were provided to patients at a highly subsidized cost with profits used to sustain its operations and support the facility.

Discussion
Three months after initiation of the pharmacy, the supply of medication successfully transitioned from partner-driven to community led. Supply of quality and affordable medication remained consistent. Additional staffs were not required in the pharmacy operations. The community members were willing to fund and manage this initiative.

Conclusion
Patient-led revolving fund community pharmacies are sustainable and cost-effective means of increasing availability of affordable and quality hypertension medications. They should be implemented at all busy public health facilities to improve supply of essential NCD drugs.

Keywords: hypertension; community; pharmacy; patient; medication
Predictors of Cardiovascular Disease in A Rural Population of Malaysia Using Framingham Risk Scores

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Objective
Definitive identification of risk factors for cardiovascular disease (CVD) will inform preventive measures in at-risk individuals. Given that CVD is becoming more prevalent among the rural communities in Malaysia, such a determination and an estimation of the overall CVD burden and risk is urgently required. The aim of this study was to determine these CVD risk factors and using Framingham Risk Score (FRS) to estimate the overall CVD risk.

Method
This community-based study involving 436 adults (58.3% females) was conducted within several rural communities in the district of Raub, Malaysia between 2010-2011. Demographic data, anthropometric measurement and fasting blood assays were obtained. The CVD risk was calculated using the “Framingham Heart Study online calculator.”

Discussion
Among the 436 rural subjects, 58.3% were females. The mean age was 58.4 years (SD±10 years). According to FRS, 42.4% of the respondents were at high risk for developing CVD in the next 10 years. All cardiovascular risk factors excluding total cholesterol (p<0.001) were significantly associated with FRS. Predictors of high FRS were waist-hip ratio (WHR) (b=13.37; 95% CI (6.18-28.9)); hypertension (b=2.44; 95% CI (2.17-2.74)); smoker (b=2.38; 95% CI (2.01-2.81)); diabetes (b=1.82; 95% CI (1.59-2.08)) and high LDL (b=1.23; 95% CI (1.11-1.38)).

Conclusion
As a result of rapid development, rural people were urbanized. WHR is the main predictor for high FRS and should be incorporated in future studies assessing CVD risk among the individuals be it rural or urban in an effort to curb CVD.

Keywords: cardiovascular risk factors; Framingham risk scores; hypertension; predictors of cardiovascular diseases; rural.
Costs and costs-effectiveness of ambulatory blood pressure monitoring – a systematic review

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Objective
To review the cost and cost-effectiveness of using ambulatory blood pressure monitoring (ABPM) by a systematic review.

Method
The electronic databases of Medline and Embase databases were searched from their inception to the January 2017 with keywords related to “cost”, “cost-effectiveness” and “ambulatory blood pressure monitoring. Further hand searching using the reference lists of included papers was carried out. The quality of the included studies was assessed using the Drummond's guideline.

Discussion
In total, 1001 papers were identified and 13 studies were finally included, with 1 randomized controlled trial, 6 observational studies and 6 model-based or hybrid studies. Among the included studies, 4 were conducted in US, 1 in Australia, 7 in Europe and 1 in Asia. Most studies (9 studies) agreed that ABPM was cost saving compared to CBP with delayed drug treatment or reduced treatment intensity, two studies showed no difference and two studies showed that ABPM costed more. The extent of the cost-effectiveness varied by different countries, follow-up years and the purpose of using ABPM.

Conclusion
Existing evidence supports the cost-effectiveness of using ABPM. However, whether ABPM can reduce healthcare costs depends largely on the local strategy for hypertension management, treatment plan and available reimbursement. The cost-effectiveness of ABPM, thus, may differ greatly from country to country and the models generated from other countries may not be valid for directly use in local population.

Keywords: Cost; Cost-effectiveness; Ambulatory blood pressure monitoring
Objective
The present study was aimed to investigate effect of rotating night shift on 24 hours chronomics of BP/HR in terms of Acrophase & Hyperbaric index and its relation with circadian rhythm of salivary cortisol & 6-sulfatoxy melatonin in night shift nurses and actual day workers.

Method
56 night shift nurses, aged 20–40 years, performing day and night shift duties were recruited from the Trauma Center, KGMU, India, and 56 age sex matched day workers were also enrolled as actual controls. BP & HR were recorded by ABPM at every 30 min intervals in day time and each hour in night time along with circadian collection of saliva and urine samples during their shift duties. Cortisol and Melatonin levels were tested by ELISA Method.

Discussion
Hyperbaric index (HBI) of mean SBP was increased at 00–03 am (midnight) during night work while during day shift, peak was found at 06–09 am. HBI of mean HR was found to be increased at 18–21 pm during night shift while in controls, peak was found at 09–12 & again 15–18 pm of SBP, DBP & HR. Alterations in Acrophase of BP/HR were very common among night shift workers and it was clinically significant. Ecphasia was found in few nights shift workers. Difference was found in night cortisol levels among night (4.08 ± 3.28) vs day shift (2.62 ± 2.37), while in comparison to night shift or day shift with controls (1.82 ± 1.18) these difference was significant (p < 0.05). As compare to night melatonin, Morning melatonin level were significantly increased during Night shift work.

Conclusion
Reverse pattern of Acrophase and HBI of BP & HR along with salivary cortisol & 6 sulfatoxy melatonin level during night shift represents desynchronization. It indicates that the circadian rhythm was disrupted during the night shift and recovery occurs during day shift.

Keywords: Rotating Night Shift; Circadian rhythm; Salivary Cortisol; Urinary Melatonin; ABPM
Six years changes of dietary salt intake and blood pressure control in hypertensive individuals under antihypertensive treatment.

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Objective
Excess salt intake is one of the most important causes of hypertension. Salt restriction is a key strategy in the management of hypertension and, thus, should be instructed for hypertensive patients under medical treatment. We investigated recent changes in blood pressure (BP) levels and dietary salt intake in hypertensive patients.

Method
Total of 10,547 hypertensive subjects (male 70.8%, 64.5±9.2 year-old) under medical treatment who visited our hospital for a physical checkup from 2010 to 2015 were enrolled. They were divided into 3 groups according to the number of antihypertensive drugs prescribed (1, 2 and ≥3). Cross-sectional analyses were performed using data in each year and changes during the 6 years were investigated. Individual salt intake was estimated using a spot urine by a previously reported method.

Discussion
BP levels and the accomplishment rate of the target BP (<140/90mmHg) were improved in each group during the 6 years without significant difference among the groups (Overall 2010 to 2015; BP 132.9±13.6/80.1±8.9 to 129.9±13.2/77.1±9.1 mmHg and accomplishment ratio 65.4 to 76.4%). However, individual salt intake was gradually increased in all groups (Overall 2010 to 2015; 11.8±3.7 to 12.2±3.9 g/day) and the accomplishment rate of salt restriction (<6g/day) was significantly reduced in subjects with increased number of antihypertensive drugs (3.5, 2.9, and 2.4% in groups with 1, 2, and ≥3 drugs, respectively). The accomplishment rate of the target BP was higher in patients who achieved salt restriction than in those who did not achieve salt restriction in all groups (Overall; 81.2 vs. 72.8%).

Conclusion
The control of BP in individuals with antihypertensive medications was improved in the last 6 years. However, salt restriction has not been successfully achieved especially in hypertensive patients with multiple antihypertensive medications. Excess salt intake may induce resistance to antihypertensive treatment and, thus, increases the number of antihypertensive drugs for BP control.

Keywords: salt; blood pressure; hypertension; antihypertensive medication
**Effect of self-monitoring urinary salt excretion using a simple electrical device for salt reduction: A single-blinded cluster randomized trial**

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**Objective**

One of the most effective strategies for salt reduction is to accurately evaluate daily salt intake. Recently, a simple, self-monitoring device that estimates salt intake by analyzing data in overnight urine, has been developed and recommended as a useful tool by The Japanese Society of Hypertension. The aim of the current study was to investigate the effect of the device for salt reduction.

**Method**

The study was a single-blinded, family-based, cluster randomized controlled trial. Families were randomly assigned to either the intervention or the control group. Participants in both groups attended lectures about salt reduction by a general physician and a registered dietitian. In the intervention group, participants used the self-monitoring device for estimating daily salt intake. The main outcome measure was the difference in the estimated daily salt intake by spot urine between the intervention and control groups 4 weeks after the intervention. The secondary outcome measure was the difference in blood pressure between the two groups after intervention.

**Discussion**

A total of 118 families (158 participants) were randomized. The mean daily salt intake was 9.04 (standard deviation [SD] 1.77) g/day in the control group and 9.37 (SD 2.13) g/day in the intervention group at baseline. Four weeks after the intervention, the mean salt intake was 8.97 (SD 1.97) g/day in the control group and 8.60 (SD2.25) g/day in the intervention group. The mean difference was -0.50 g/day (95% confidence interval [CI] -0.95, -0.05; P = 0.030). And the mean difference in systolic blood pressure was -4.4 mmHg (95% CI -8.7, -0.1; P = 0.044).

**Conclusion**

Using the self-monitoring device for estimating daily salt intake showed significant reduction in daily salt intake and systolic blood pressure. This is the first study to demonstrate the effectiveness of the device by a randomized controlled trial design.

**Keywords:** salt reduction; self-monitoring; randomized controlled trial
Development and validation of a clinical prediction rule for excessive salt intake among community dwelling adults

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Objective
Salt excess is widely known as the strong cause of hypertension, cardiovascular events, gastric cancer and so on. However, a simple tool for identifying adults with excessive salt intake is scarce. The aim of this study was to develop and validate a clinical prediction rule for excessive salt intake among community dwelling adults.

Method
This is a population-based cross-sectional study consecutively involving participants who received annual health checkup 2016 in Tanagura town, Fukushima, Japan. Candidate predictors for excessive salt intake were extracted using the delphi method by an expert panel consisting of 21 physicians and 2 nutritionists. The main outcome measure was excessive salt intake defined as that the daily salt intake estimated from morning urine was more than 2SD of the average value in Tanagura town. First, candidate predictors were chosen by clinical expertise, and then narrowed down by stepwise backward selection using. A final model for excessive salt intake was developed using a coefficient-based multivariable logistic regression scoring method and internally validated by a bootstrapping technique.

Discussion
Of 1101 participants included in the analysis, 173 (15.7%) were diagnosed with excessive salt intake (Male: salt intake ≥12.2g/day, Female: salt intake ≥11.4 g/day). At the conclusion of the deviation process, age, gender, obesity, hypertension being treated, the frequency of soup consumption such as miso soup, the degree of saltiness of home meal, the abundance of knowledge on technique of salt reduction, the frequency of eating out were retained. Their β-coefficients were transformed into integer-based scores. The area under the receiver operating characteristic curve (AUC) for the internal validation using bootstrap methods was 0.71 (95% Confidence Interval: 0.69-0.72).

Conclusion
We developed and validated a simple clinical prediction rule for excessive salt intake among Japanese community dwelling adults.

Keywords: Clinical Prediction Rule; salt excess; excessive salt intake; epidemiology; population based
DAILY URINARY SALT EXCRETION AND BNP IN PATIENTS WITH ATRIAL FIBRILLATION

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Objective
Dietary salt consumption is closely associated with level of blood pressure, and excess salt increases the risk of cardiovascular disease. We retrospectively studied the association between the change in daily urinary NaCl excretion and the change in blood pressure or serum BNP in patients with chronic atrial fibrillation.

Method
Daily urinary NaCl excretion was estimated by spot urine method (Tanaka 2002 J Hum Hypertens) twice with one year interval. Twenty-seven patients (67.7±6.3 years, 129.2±14.8/80.3±10.7 mmHg) were divided into three groups, such as decreased NaCl excretion (D group, n=8), increased NaCl excretion (I group, n=6) and unchanged NaCl excretion (U group, n=13).

Results: In D group, daily NaCl excretion was decreased from 11.8±2.5 g to 8.5±2.4 g (p<0.0001) with slight decrease in BNP (127.3±61.4 pg/ml to 109.9±41.8 p=0.17). In I group, daily NaCl excretion was increased from 7.9±2.4 g to 10.7±2.5 g (p<0.001) with significant increase in BNP (123.1±16.6 to 160.6±33.2, p<0.05). In U group, daily NaCl excretion did not change (9.0±3.3 to 9.0±3.0) with unchanged BNP (141.4±72.1 to 123.2±58.0). Systolic blood pressure slightly decreased in each group but it was not statistically significant. Urinary NaCl excretion in the first estimation was positively correlated with systolic blood pressure in all patients. There were no significant differences in age, body mass index and ejection fraction on echocardiography among groups.

Conclusion
Change in daily salt intake may affect the level of serum BNP in patients with chronic atrial fibrillation.

Keywords: atrial fibrillation, brain natriuretic peptide, hypertension, salt
Effect of salt intake and potassium supplementation on serum renalase in Chinese adults

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Objective
Renalase is a recently discovered enzyme released by the kidneys, which breaks down catecholamines in the blood and thus may regulate blood pressure. Animal studies have suggested that increased dietary salt might reduce circulating and renal tissues renalase levels. The aim of our study was to assess serum renalase levels during strict dietary interventions of salt or potassium intake and their relationship with blood pressure in humans.

Method
42 normotensive and hypertensive subjects (28 to 65y old) were selected from a rural community of northern China. All of the people were sequentially maintained on a low-salt diet for 7 days (3g/day, NaCl), then a high-salt diet for 7 days (18g/day), and high-salt diet with potassium supplementation for another 7 days (4.5g/day, KCl).

Discussion
Serum renalase was significantly increased from baseline to low-salt intake and decreased from the low-salt to high-salt diet, whereas dietary potassium could prevent the high-salt diet-induced increase in serum renalase. There was a significant inverse correlation between the serum renalase and 24h urinary sodium excretion. Unfortunately, no significant correlation was found between renalase and blood pressure in different dietary intervention.

Conclusion
Our study indicates that variation in dietary salt intake and potassium supplement affect the serum renalase concentration in Chinese subjects.

Keywords: renalase; salt; potassium; catecholamines; blood pressure
The relationship of depression with the level of blood pressure in population based KSHS study

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Objective
There has been increasing recognition about psychosomatic relationship between mood disorder and blood pressure (BP). However, it is still debatable how depression is associated with the variation of BP. Thus, this study was to investigate the association of depression with the level of BP.

Method
90,643 men and 68,933 women were enrolled in this study. They were stratified into 4 groups (normal, prehypertension, newly diagnosed hypertension and recognized hypertension) according to their BP and the history of hypertension. Center for epidemiological studies-depression (CES-D) was used to evaluate depressive symptom, and each cut-off of CES-D was used to subdivide the degree of depression (mild: 16-20, moderate: 21-24, severe: ≥25). Multiple logistic regression was used in calculating odd ratios (ORs) for depression according to BP levels, with adjustment for multiple confounding factors. Subgroup analysis was conducted for gender and age.

Discussion
Characteristics of the study population are listed in Table 1. The adjusted ORs for depression tended to decrease from normal to newly diagnosed hypertension, but significantly increased in recognized hypertension. [normal: reference, prehypertension: 0.85 (0.80-0.91), newly diagnosed hypertension: 0.75 (0.65-0.86), recognized hypertension: 1.11 (1.03-1.20)] (Table 2). Subgroup analysis showed similar pattern of relationship, and in particular, male and middle aged subgroup showed more prominent findings than any other subgroups (Table 3).

Conclusion
Depression was inversely associated with elevated BP from normal to newly diagnosed hypertension. However, recognized hypertension had the increased risk of depression. These findings suggest that the association between depression and BP may be mediated by the chronicity of hypertension.

Keywords: Depression, blood pressure, Hypertension
Depression is associated with cardiovascular events in Japanese treated hypertensive males, and is not associated with antihypertensive medications: the Japan Morning Surge Home Blood Pressure Study

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Objective
The aim of this study was to clarify the associations among depression, antihypertensive medication use and cardiovascular events in Asian treated hypertensive individuals and the gender differences.

Method
We enrolled 3,189 treated hypertensive Japanese patients (1,542 males, 1,647 females) from the Japan Morning Surge Home Blood Pressure Study. We administered the Beck Depression Inventory (BDI). Depression was defined as having a BDI score ≥10. Clinic blood pressure (BP) was measured at two clinic visits. The primary endpoints were fatal/nonfatal cardiovascular events (myocardial infarction, stroke, hospitalization for heart failure, aortic dissection).

Discussion
The BDI scores and the prevalence of depression were significantly higher in the women compared to the men (BDI scores: 10.1±7.4 vs. 7.5±6.3, p<0.001, prevalence of depression: 46.4% vs. 29.1%, p<0.001). The mean follow-up period was 48±24 months, and 157 patients suffered primary endpoints. The clinic systolic BP values were similar in the depressed and nondepressed patients among both genders (males: 141.4±15.5 vs. 140.8±15.1 mmHg, p=0.70; females: 141.0±16.4 vs. 141.3±16.7 mmHg, p=0.51). A Cox proportional hazards model including age, history of dyslipidemia and diabetes, and clinic systolic BP revealed that depression was a significant, independent predictor of primary endpoints in the males (hazard ratio [HR] 1.52, 95% confidence interval [CI] 1.01–2.27, p=0.044), but not in the females (HR 1.05, 95% CI 0.63–1.75, p=0.86). The numbers of antihypertensive medications used were similar between the depressed and nondepressed patients among both genders (males: 2.02±0.94 vs. 2.02±0.94, p=0.95; females: 1.92±0.96 vs. 1.92±0.93, p=0.97). The usage of calcium channel blockers, angiotensin receptor blockers, angiotensin-converting enzyme inhibitors, beta blockers, and diuretics were also similar between the depressed and nondepressed patients among both genders.

Conclusion
Depression is associated with cardiovascular events in Japanese treated hypertensive males, and is not associated with the number and types of antihypertensive medications used.

Keywords: depression, cardiovascular events
Use of CHA2DS2-VASc score to predict new-onset atrial fibrillation in patients with chronic obstructive pulmonary disease: a nationwide cohort study

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Objective
This study sought to assess the accuracy of CHA2DS2-VASc score in predicting incident atrial fibrillation (AF) in patients with chronic obstructive pulmonary disease (COPD).

Method
We obtained a COPD cohort from the Longitudinal Health Insurance Database 2000 (LHID 2000). Cox models were used to assess the incident AF risk associated with CHA2DS2-VASc score in COPD patients. The area under the receiver operating characteristic (ROC) curve was employed to express the ability of the CHA2DS2-VASc score in predicting new-onset AF in patients with COPD.

Discussion
A total of 50430 patients with COPD were enrolled in this study. Compared to the COPD patients with a CHA2DS2-VASc score of 0, risk of incident AF increased from 1.25 (95% CI = 1.01–1.54) in those with a CHA2DS2-VASc score of 1 to 2.25 (95% CI = 1.69–2.99) in those with a CHA2DS2-VASc score of 6 or above (trend test, P < 0.001). Moreover, the area under the ROC curve for CHA2DS2-VASc score in predicting new-onset AF among patients with COPD was 0.69 (95% CI=0.68-0.70).

Conclusion
In conclusion, this study is the first to assess the use of CHA2DS2-VASc Score for incident AF prediction in COPD patients. Furthermore, among patients with COPD, risk of developing new-onset AF was found to be increased in parallel with increasing CHA2DS2-VASc score.

Keywords: COPD, AF, CHA2DS2-VASc Score
Objective
We conducted the study to assess the role of the CHA2DS2-VASc score in predicting the subsequent ischemic stroke risk in systemic lupus erythematosus (SLE) patients without atrial fibrillation (AF).

Method
We selected the SLE patients from the Registry of Catastrophic Illnesses Patient Database (RCIPD) in Taiwan. We excluded the SLE patients with AF or atrial flutter. The patients was followed until the occurrence of ischemic stroke, or until the subjects were censored because of death, withdrawal from NHI system, or the end of follow-up. Cox models were adopted to address the hazard ratios (HRs) and the 95% confidence intervals (CIs) of ischemic stroke associated with the CHA2DS2-VASc score. Receiver operating characteristic (ROC) curve was generated to evaluate the predictive ability of CHA2DS2-VASc score for ischemic stroke in SLE patients without AF.

Discussion
A total of 11,962 non-AF SLE patients were enrolled. The incidence of ischemic stroke increased from 4.00 per 1,000 person-years for patients with a CHA2DS2-VASc score of 0 to 87.4 per 1,000 person-years for those with a CHA2DS2-VASc score ≥6. Furthermore, patients with a higher CHA2DS2-VASc score (≥2) had a higher rate of ischemic stroke than those with a lower score (<2) (p < 0.001, log-rank test). ROC curve analysis of the CHA2DS2-VASc score showed a moderate discrimination for ischemic stroke development with a c-statistic of 0.65 (95% CI=0.62-0.69).

Conclusion
This study is the first to show that CHA2DS2-VASc score could predict the subsequent ischemic stroke events among SLE patients without AF. However, the CHA2DS2-VASc score showed a moderate predictive ability. More investigations are suggested to clarify our findings.

Keywords: CHA2DS2-VASc Score, Ischemic Stroke, Systemic Lupus Erythematosus
Comparison of visceral and body fat indices and anthropometric measures for predicting the clustering of cardiometabolic risk factors by gender among adults in Tibet and Xinjiang area

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Objective

To compare the efficiency of bioelectrical indices (percentage body fat, PBF; visceral fat index, VFI) and various anthropometric measures (body mass index, BMI; waist circumference, WC; waist-to-height ratio, WHtR) in detecting the clustering of cardiometabolic risk factors (CCRF) among population aged 35-80 years in Tibet and Xinjiang area.

Method

We conducted the community-based cross-sectional survey during 2015 to 2017 in 13 sample sites selected by stratified multistage random sampling method from Tibet and Xinjiang area. 7,564 residents aged 35-80 years were included and 5,558 (73.48%) participants were eligible for analysis. CCRF was defined by the existence of 2 or more of high blood pressure, hyperglycemia, high TG level, and high HDL-C level.

Discussion

The prevalence of clustering was 18.33%. In both genders, VFI and PBF tended to rise with age (all \( P < 0.05 \)). However, for each age-specific group, women consistently had significantly greater PBF than men (all \( P < 0.01 \)) and men had considerably higher VFI (all \( P < 0.01 \)). Both PBF and VFI were significantly associated with CCRF. The area under the ROC curves (AUCs) for BMI, WC, WHtR, PBF, and VFI, respectively, were 0.673, 0.683, 0.665, 0.627, 0.672 in men and 0.649, 0.664, 0.670, 0.643, 0.669 in women. In men, AUCs for VFI in detecting CCRF was not significantly higher than that for BMI, WC, and WHtR; in women, AUCs for VFI was significantly higher than that for BMI (\( P < 0.01 \)), but not for WC and WHtR; however, PBF had the lowest AUCs in both gender. Additionally, BMI yielded the greatest Youden index in identifying CCRF in men (0.27) and VFI yielded the greatest in women (0.26), respectively. Optimal cutoffs for VFI were 12 and 9 in men and women, respectively.

Conclusion

VFI was a better screening tool for identifying CCRF in women than BMI, but not superior to BMI in men.

Keywords: Clustering of cardiometabolic risk factors; Visceral fat index; Body mass index; Waist circumference; Waist-to-height ratio
Examining Disparities in Impact of Community Hypertension Education Program across Age, Gender, Race, and Housing Type

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Objective
Disparities in socio-demographic factors have been observed in hypertension awareness, treatment, and control. Health promotion intervention is considered most effective in reducing health disparities, but differing intervention impacts across socio-demographic groups may persist. This study investigates the extent to which hypertension education program efficacy on children and adults in Singapore may differ across gender, race, and housing type (as proxy for income).

Method
Based on data from the Blood Pressure Initiative @Schools program over a three-year period, where children act as socialization agents for family members on blood pressure (BP) management, pre- and post-program survey responses on BP knowledge and beliefs from 9,647 grade five students and post-program responses from 4,941 adult family members were evaluated. Survey measures were largely grounded on the protective motivation theory.

Discussion
Female students were more likely to obtain better BP knowledge and beliefs, and performed BP screening on more family members. Compared to Chinese students, Malays had lower levels of BP knowledge and attitudes, while Indians possessed stronger attitudes. Malay and Indian students performed BP measurement on more family members. Program efficacy among students in the most affordable housing was the least favorable.

Among the adult family member sample, Malays and Indians had higher self-confidence and intention to measure their BP than the Chinese, probably because Indians felt more likely to suffer from hypertension while Malays believed more strongly that hypertension could cause heart attack. Adult respondents in the most affordable housing possessed the least favorable beliefs toward BP measurement. Older adults, men, Malays, and smaller housing residents had higher odds of being found with hypertension when screened by the students at home.

Conclusion
Disparities in the program impact were apparent in both student and adult sample across race, housing type, and, to a lesser extent, gender. Future hypertension education intervention designs should consider these disparities closely.

Keywords: hypertension; children; health education; disparities; impact
Predictability of obstructive sleep apnea (OSA) risk using anthropometric adiposity indices: the Cardiovascular and Metabolic Disease Etiology Research Center (CMERC) Cohort

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Objective
To compare different explanatory roles of various adiposity indices in reflecting OSA risk

Method
In the Cardiovascular and Metabolic Disease Etiology Research (CMERC), a total of 2465 Seoul or Goyang city residents aged between 30 and 64 years underwent anthropometric measurements, including body mass index (BMI), fat mass (FM), fat free mass (FFM), percent body fat (PBF), waist circumference (WC) and hip circumference (HC) between 2013 and 2015. Exclusion criteria included current pregnancy, history of transient ischemic attack, myocardial infarction, angina pectoris, heart failure, malignant tumor and moderate, severe or extreme depression. Berlin Questionnaire classified each participant to either low or high risk group for OSA.

Discussion
In men, all adiposity indices were significantly correlated with Berlin risk score for OSA, whereas in women, BMI, WC, FM and FFM (p<0.05). The receiver operating characteristic (ROC) curves were constructed for each anthropometric variable to evaluate their diagnostic power to OSA risk. In men, WC yielded the largest AUC value of 0.675, followed by BMI (AUC=0.660), FM (AUC=0.646), FFM (AUC=0.617), PBF (AUC=0.6020) and HC (AUC=0.565). In women, BMI embodied the largest AUC value of 0.667, followed by WC (AUC=0.662), FM (AUC=0.642), PBC (0.618), HC (AUC=0.582) then FFM (AUC=0.580). In male, only WC remained statistically significant to OSA risk score (OR 1.058, 95% CI: 1.008-1.112, p=0.023) and in female, BMI (OR 1.217, 95% CI: 1.059-1.400, p=0.006) and HC (OR 0.885, 95% CI: 0.828-0.946, p=0.0003) remained statistically significant.

Conclusion
Different adiposity indices can supplement the current understanding of its association with OSA risk level.

Keywords: OSA; Adiposity; Predictability
Gene polymorphism in essential hypertension & its relation to environmental factors in North Indians

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Objective
We aimed to determine genotype and allele frequencies of angiotensinogen (AGT) and alpha adducing (ADD1) polymorphisms in patients with essential hypertension.

Method
We recruited total 205 subjects. In which 105 were essential hypertensive and 100 were Healthy controls. DNA samples for each individual were isolated from peripheral blood by standard phenol/chloroform method analyzed by polymerase chain reaction & enzymatic digestion. Lipid profile was analyzed by VITROS ̊ 250 Dry Biochemistry Fully auto-analyzer (Gonson & Gonson Company). Electrolytes (in serum & urine) were measured by ion-selective electrodes (Roche Hitachi MODULAR, Hitachi Ltd) in Clinical lab of Biochemistry.

Discussion
Variable responses to different genotypes may be the result of genetic factors. A significant association has been proven in South China, especially Hans, Mongolian and North Indian population and those reported in some meta-analysis, which support our study results. In another study conducted on Caucasians and Asians, no significant association of G460W polymorphism with age was found. The cause of controversial results from different areas of the world is due to the difference in race, living style and may be due to different gene pool and the findings of my study is as followa The distribution for each ADD1 genotypes were 61.96% for GG (69), 33.51% for GT (21) and 4.53% for TT(11) in the essential hypertensive group; 82.72% for GG (91), 16.46% for GT (9) and 0.82% for TT in the control group. The distribution of AGT genotypes was found significantly different between groups ($\chi^2 = 10.00$: df = 2; $P = 0. 006$). The frequencies for each of the AGT genotypes were found as 44.66% for MM (43), 44.33% for GT (49), and 11% for TT (9) in essential hypertensive group; 64% for MM (66), 32% for GT (36), and 4% for TT (3) in healthy control group. The distribution of AGT genotypes did not highly significant as compared to AGT between the groups. We suggest that AGT and ADD1 gene polymorphism play a role for development of essential hypertension ($\chi^2 = 9.767$: df = 2; $P = 0.007$).

Conclusion
Patients with essential hypertension exhibited higher levels of Serum cholesterol, LDL Cholesterol & TG than in control subjects. Taken together the genotype and biochemical parameters & considering the restrictive selection criteria used, the present results suggest a relationship between these gene polymorphism and essential hypertension in North Indians.

Keywords: essential hypertension, genotype, alpha adducin
Hypertensive geriatric patients with multimorbidity clinical problems: cognitive impairment and medical rehabilitation

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Objective
The demographic situation in the World characterized by a continuous increase of elderly persons: by 2030 they will be more than 30% of the population and 10-30% of them develop cognitive impairment (CI).

Method
Analysis of the distribution, structure and correction strategy of cognitive impairment in hospitalized therapeutic profile hypertensive elderly patients with multimorbidity to improve the results of the medical rehabilitation and quality of life.

148 hypertensive elderly patients of the hospital therapeutic department with multimorbidity pathology (average age - 67.8±4.1 years) underwent a comprehensive examination in accordance with the standard protocols, as well as a neuropsychological examination with an assessment of cognitive functions using the MoCA (The Montreal Cognitive Assessment) test and the quality of life - “SF-36 HEALTH STATUS SURVEY” technique.

Discussion
Analyzing cognitive functions using the MoCA test, it had been established that CI formed the psycho-physiological profile in older patients, while 14.6% - had mild CI, 64.6% - moderate CI and 20.8% - mild dementia. Especially in elderly patients, social functioning suffered and its level was 44.54±13.01 points, while the levels of overall health and vitality were 50.82±15.73 and 56.36±15.83, respectively. The indicator of mental health was 60.36±15.10 points, the level of emotional and role functioning - 48.55±14.08, physical functioning - 80.91±16.07 points. Better results of medical rehabilitation depend on individual planning additional treatment of the CI by modern relatively safe fixed combined nootropic drugs.

Conclusion
The problems of medical rehabilitation in therapeutic profile hypertensive elderly patients with multimorbidity pathology is cognitive impairment which depends on number of associated diseases, largely determine the effectiveness of treatment, further quality of life, behavior and benefit in the family and society.

Keywords: multimorbidity pathology, cognitive impairment, elderly
PROBABILITY OF HYPERTENSION CURE IN PRIMARY ALDOSTERONISM USING A JAPANESE NORMOGRAM IN A SOUTH EAST ASIAN COHORT

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Objective
Early diagnosis and treatment minimizes the progression of hypertension-mediated vascular damage in primary aldosteronism. Normograms have been developed to help predict hypertension cure following surgery (1,2,3). The aim of the study was to assess hypertension cure in endocrine hypertension following surgery using a Japanese normogram.

Method
Retrospective cohort study of 79 patients who underwent adrenalectomy for endocrine hypertension. Demographic, pathological and treatment related details were collected. Hypertension cure was defined as a blood pressure of less than 140/90 mmHg without any antihypertensive drugs at 12 months postoperatively or at last follow up. The predicted cure rate was calculated using the normogram proposed by Utsumi et al.

Discussion
The mean age of the cohort 51.75 (±54) years with a male: female ratio of 1:1. The mean systolic BP preoperative was 142 (±22) mm Hg with 31 (30%) patients on a single class of antihypertensive medication, 41 (40%) on 2 classes and the 36 (30%) on 3 or more classes of drugs. Cure was achieved in 66 (84%) of patients, 5 (6%) with reduction in the number and dosage of medications. The probability of cure with laparoscopic adrenalectomy in this cohort using the normogram model was 45% and this is consistent with published series.

Conclusion
The Japanese normogram is fairly accurate in predicting hypertension cure in patients with primary aldosteronism. The achieved cure rate in this cohort is comparable to established series.

Keywords: Hypertension; Primary aldosteronism; Japanese normogram; laparoscopic adrenalectomy; cure rate
Hypokalemic Paralysis Complicated by Concurrent Hyperthyroidism and Hyperaldosternoism

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Objective
Thyrotoxic periodic paralysis (TPP) is commonly observed in patients with acute paralysis and hyperthyroidism. However, there is a possibility of secondary causes of hypokalemia in such a setting. Herein, we present the case of a 42-year-old man with untreated hypertension and hyperthyroidism.

Discussion
He presented with muscle weakness, nausea, vomiting, and diarrhea since two weeks. The initial diagnosis was TPP. However, biochemistry tests showed hypokalemia (2.5 mmol/L) with metabolic alkalosis (pH 7.53, HCO3 28 mEq/l) and renal potassium wasting. Moreover, a suppressed plasma renin level and a high plasma aldosterone level were noted, which was suggestive of primary aldosteronism. Abdominal computed tomography confirmed this diagnosis.

Conclusion
Therefore, it is imperative to consider other causes of hypokalemia (apart from TPP) in a patient with hyperthyroidism but with renal potassium wasting and metabolic alkalosis. This can help avoid delay in diagnosis of the underlying disease.

Keywords: secondary hypertension, hypokalemic paralysis, metabolic alkalosis
Clinical characteristics of different types of primary aldosteronism combined with cerebrovascular accident

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Objective
To investigate the differences in cerebrovascular accident among different types of primary aldosteronism (PA) patients.

Method
The clinical data of 208 PA patients who were hospitalized at hypertension department of people’s hospital in Xinjiang from February 2008 to February 2011 were retrospectively analyzed. All patients were divided into three groups according to adrenal computed tomography (CT) scan and adrenal vein sampling (AVS): unilateral adenoma group (UAG), unilateral hyperplasia group (UHG) and bilateral hyperplasia group (BHG). The types of cerebral complications, biochemistry data, plasma renin activity and plasma aldosterone concentration were compared between the three groups.

Discussion
There were no differences between the three groups in age, hypertension duration, abdominal circumference, blood pressure level, creatinine, urine potassium, and plasma aldosterone concentration after saline infusion test. The serum potassium [3.43±0.84] vs [3.72±0.28] and [3.73±0.39] mmol/L, renin activity in sitting position [0.16 (0.10~0.20)] vs [0.51 (0.26~0.83)] and [0.48 (0.24~1.10)] µg/(ml.h), and the renin activity before saline infusion test [0.18 (0.09~0.22)] vs [0.29 (0.17~0.55)] and [0.42 (0.24~0.93)] µg/(ml.h) of UAG were lower than that of UHG and BHG (all P<0.05). The level of plasma aldosterone concentration in sitting position [20.03 (13.57~30.00)] vs [14.19 (9.88~20.98)] and [15.73 (11.75~21.57)] ng/dL was higher than that of UHG and BHG (both P<0.05). The risk of hemorrhagic cerebrovascular accident in UAG was higher than that in BHG and UHG (28.6% vs 4.3%, 6.1%, both P<0.05).

Conclusion
Different type of PA patients have different risk of cerebrovascular accident, and the UAG PA patients are more easily combined with hemorrhagic cerebrovascular accident.

Keywords: primary aldosteronism; cerebrovascular accident; adrenal vein sampling
Clinical characteristics of different types of primary aldosteronism combined with cerebrovascular accident

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Conclusion
Different type of PA patients have different risk of cerebrovascular accident, and the UAG PA patients are more easily combined with hemorrhagic cerebrovascular accident.

Keywords: primary aldosteronism; cerebrovascular accident; adrenal vein sampling
An Analysis of the Location of the Right Adrenal Vein Orifice: 575 Cases of Adrenal Venous Blood Sampling

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Objective
To determine the distribution characteristics of the right adrenal vein orifices to improve the success rate of right adrenal vein catheterization.

Method
We collected 575 patients with a confirmed diagnosis of primary aldosteronism and successful adrenal venous blood sampling who were admitted to the Hypertension Treatment Center of People’s Hospital in the Xinjiang Uygur Autonomous Region between January 2006 and October 2013. A SIM-ADS V4.2 medical imaging workstation was used to analyze the characteristics of the right adrenal vein orifices. The SPSS 11.5 software package was used for statistical analysis. The significance level was set at alpha=0.05.

Discussion
1) Right adrenal vein orifices were mainly located between the upper edge of Th12 and the middle edge of Th12 (C group), followed by the middle edge of Th10 to the lower edge of Th11 (A group) and the lower edge of Th11 to the upper edge of Th12 (B group). These three groups accounted for 79.5% of all cases. The upper edge of L1 to the middle edge of L1 (F group) contained a minimum number of orifices, accounting for only 3.5% of all cases. 2) Distributions of the right adrenal vein orifices were significantly different based on gender, height, weight, body mass index, and abdominal circumference. 3) The distributions of right adrenal vein orifices were not significantly different based on age or ethnicity.

Conclusion
A comprehensive evaluation of gender, height, weight, body mass index, and abdominal circumference differences will contribute to more accurate localization of adrenal vein orifices and subsequently successful surgeries.

Keywords: Primary aldosteronism; Adrenal vein sampling; Adrenal venous orifice
UPUSPS improves diagnostic specificity of ARR for primary aldosteronism

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Objective
The aldosterone-to-renin ratio (ARR) is a validated tool for the screening of primary aldosteronism (PA). ARR is highly sensitive but only moderately specific. We developed a simple formula that allows estimating the state of aldosterone activity. Addition of UPUSPS (urinary potassium to urinary sodium divided by serum potassium to serum sodium) to ARR may improve its specificity.

Method
We retrieved 265 suspected PA patients. Patients underwent measurement of Na⁺ and K⁺ in serum and 24-h urine, sitting plasma renin activity, and aldosterone at baseline and after saline infusion test (SIT). Area under the receiver operator characteristic (ROC) curves (AUCs) of the UPUSPS and ARR and and plasma aldosterone concentration (PAC) after the SIT were used for estimating the accuracy for diagnosing PA. Patients who screened positive for ARR were stratified by UPUSPS level. Predictive parameters (sensitivity, specificity, positive and negative predictive values) for ARR and UPUSPS and SIT were calculated.

Discussion
119 patients were diagnosed with PA. The Bland-Altman plot showed mean bias but no significant heteroscedasticity between ARR and UPUSPS. AUC for diagnosing PA was higher than 0.50 for UPUSPS and ARR and post-infusion PAC. The optimal cutoff value for UPUSPS was 8.1. Specificity of ARR at a cutoff value of 22.5 was 74.7%, and with addition of UPUSPS ≥8.1 to ARR ≥22.5, the specificity improved to 89%.

Conclusion
In this study, combining the UPUSPS with ARR enhances the specificity for diagnosing PA beyond that of just the ARR ratio.

Keywords: Primary aldosteronism, aldosterone, renin activity, potassium, sodium
Aldosterone and urinary potassium loss associated diabetes mellitus prevalence in hypertensive patients with primary aldosteronism

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Objective
The relationship between aldosterone and diabetes mellitus (DM) prevalence is controversial. This study aimed to evaluate some contributing factors on the prevalence of DM in hypertensive patients with primary aldosteronism (PA).

Method
790 hypertensive in-patients were enrolled from Hypertension Center of the People’s Hospital Of Xinjiang, China. DM participants included patients with known or newly-diagnosed diabetes. All of them entered a protocol for screening PA. The positive criteria of the initial screening test was defined on plasma aldosterone concentration (PAC) / renin activity (ARR) ≥20 ng/dL per ng/mL/h. The confirmatory diagnostic criteria of PA was according on ARR≥20 ng/dL per ng/mL/h plus PAC≥10 ng/dL after saline infusion test. Body mass index (BMI) have been measured and baseline characteristics were collected including blood pressure, lipoids, plasma renin activity, PAC, serum potassium and 24 h urine potassium levels.

Discussion
In 340 patients with ARR ≥20 ng/dL per ng/mL/h, some factors related with the prevalence of DM including gender, age, systolic blood pressure (SBP), triglyceride (TG), 24 h urine potassium levels and PAC. Multinomial logistic regression analysis was performed to determine that some risk factors respectively associated with DM prevalence in patients with ARR ≥20 ng/dL per ng/mL/h including age tertile (OR 3.505, 95%CI 1.984-6.603, p<0.0001), 24h urine K⁺ tertile (OR 2.221, 95%CI 1.251-3.942, p<0.01), and PAC tertile (OR 1.728, 95%CI 1.091-2.737, p<0.05), independent of BMI, SBP and TG. Compared with 86 age- and sex-matched patients without PA, participants with PA had significantly higher PAC (22.3±11.9 vs 12.6±5.7, p<0.0001), lower 24 h urine potassium levels (46.2±29.9 vs. 35.9±15.2, p<0.01), and higher DM prevalence (29.1% vs. 9.3%, P<0.01).

Conclusion
DM is highly prevalent in hypertensive patients with PA, and both PAC and 24 h urine potassium loss are significantly associated with the prevalence of DM.

Keywords: aldosterone, urinary potassium loss, diabetes mellitus, hypertension
The Value of Plasma renin activity changes with different posture on Identification of Primary Aldosteronism.

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Objective
The aim of this study was to evaluate the diagnostic ability of primary aldosteronism (PA) via observing the changes of primary renin activity (PRA) with postural variation in hypertensive patients.

Method
307 patients have performed the detection of PRA, aldosterone level on basal sitting posture and after 2 hours on upright, sitting and supine posture, and collection of other biochemistry measurements. PA group was defined according on aldosterone/renin activity ≥20ng/dL·[ng/ (mL·h)] AND plasma aldosterone concentration ≥10ng/dL after saline infusion test, remains were named as no-PA group. Related parameters were calculated to show the sensitivity and specificity, and so on.

Discussion
In PA group, the level of PRA_ upright, sitting, supine  【0.61 (0.30,1.24) ng/ (mL·h) ,  0.62 (0.24,1.17) ng/ (mL·h) ,  0.31 (0.19,0.50) ng/ (mL·h) 】 was lower than that 【1.42 (0.51,1.42) ng/ (mL·h) ,  1.18 (0.50,2.54) ng/ (mL·h) ,  0.51 (0.27,1.12) ng/ (mL·h) 】 in no-PA group, and the difference was statistically significant 【F=11.465, 12.052, 10.296; P=0.001】. The level of PRA_ upright-PRA_ supine  【0.24 (0.11,0.69) ng/ (mL·h) 】 in PA group was lower than that 【0.78 (0.26,1.76) ng/ (mL·h) 】 in no-PA group, and the difference was statistically significant 【F=8.303; P=0.004】. The sensitivity of PRA_ upright <1.0 ng/ (mL·h) or PRA_ upright-PRA_ supine <0.6 ng/ (mL·h) to diagnose PA were respectively 64% and 70%; the specificity of that were 62% and 68%; the negative predictive values were 91% and 93%, respectively. Using PRA_ upright<1.0 ng/ (mL·h) AND PRA_ upright-PRA_ supine <0.6 ng/ (mL·h) as diagnostic criterion of PA, the sensitivity and specificity are 45% and 88%, respectively.

Conclusion
There is a low efficacy using the changes of PRA via posture alteration as a diagnostic standard, but it’s brief and safe, it can provide some referenced information to doctors on the identification of PA.

Keywords: Hypertension; Renin activity; Aldosterone
Rapid screening of primary aldosteronism by a novel chemiluminescent immunoassay

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Objective
Measurement of plasma aldosterone and renin concentration, or activity, is useful for selecting antihypertensive agents as well as detecting hyperaldosteronism in hypertensive patients. However, it takes several days to get results when measured by radioimmunoassay and development of more rapid assays has been long expected. In the present study, we characterized recently developed fully-automated chemiluminescent enzyme immunoassay (CLEIA) for plasma aldosterone concentrations (PAC) and active renin concentrations (ARC), which can be measured simultaneously in 10 minutes and 20 seconds, and clinical validation of their diagnostic abilities for detecting PA from hypertensive patients was also performed in this study.

Method
We characterized the CLEIA measurement of both PAC and ARC using antibody-immobilized magnetic particles with quick aggregation and dispersion, and we also performed clinical validation of diagnostic ability of this newly developed assay-based screening of 125 patients with primary aldosteronism from 97 patients with essential hypertension.

Discussion
Results of this novel assay significantly correlated with the results of radioimmunoassay (aldosterone, active renin concentration and renin activity) and liquid chromatography-tandem mass spectrometry (aldosterone). The analytical sensitivity of this particularly novel active renin assay was 0.1 pg/mL, which was better than that of radioimmunoassay (2.0 pg/mL). The ratio of aldosterone-over-renin concentrations of 6.0 (ng/dL per pg/mL) provided 92.0% sensitivity and 76.3% specificity as a cut-off for differentiating primary aldosteronism from essential hypertension.

Conclusion
This novel measurement is expected to be a clinically reliable alternative for conventional radioimmunoassay and to provide better throughput and cost-effectiveness in diagnosis of hyperaldosteronism from larger numbers of hypertensive patients in clinical settings.
THE PREVALENCE OF ARTERIAL HYPERTENSION IN WOMEN OF WORKING AGE WITH IMPAIRED CARBOHYDRATE METABOLISM

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**Abstract**

Objective
Well known, that people suffering from long-term arterial hypertension (AH) and the greater frequency of developing myocardial infarction, stroke, vascular changes in the fundus and chronic renal failure. The combination of AH with diabetes mellitus (DM) is 5 times increase the risk of cardiovascular complications. To study the detection rate of AH in the presence and absence of disorders of carbohydrate metabolism (DCM) according to epidemiological studies in women.

Method
The study included 952 women aged 20-59 years. 4 groups depending on age were identified: 20-29, 30-39, 40-49, 50-59 years. The subjects filled in a questionnaire, which is part of the section devoted to establishing the presence of DCM. We studied a 2-fold blood pressure was measured at rest, after a 10-minute rest. AH recorded in the presence of systolic blood pressure SBP≥140 mmHg and / or diastolic blood pressure DBP≥90 mmHg, and if the examinee in the previous week took antihypertensive drugs prescribed by a doctor. All women were measured in capillary blood glucose levels. With average of 6.1 mmol/l and more established the presence of diabetes. The presence of pre-diabetes or impaired fasting glucose (IFG) is set at values of 5.6-6.1 mmol/l.

Discussion
The prevalence of AH was higher in the presence of DCM as a whole compared with its absence of (45.4±5.1% and 27.6±1.5%, respectively, r<0.001). In the absence of DCM incidence of hypertension increased progressively from 4.4±1.5% in the 20-29 years to 62.3±3.3% in 50-59 years (r<0.001). In the presence of a particular DM 2 incidence of AH was higher than in its absence (54.7±6.8% and 27.9±1.5%, r<0.001). In groups of 20-29 and 30-39 years old with DM 2, AH absent, while here in the absence of DM 2 was a high incidence of AH 4.3±15.1% and 14.1±2.1%. In the absence of DM 2 incidence of AH showed a statistically significant age dynamics from a minimum of 20-29 years (4.3±1.5%) to a maximum of 50-59 years (61.6±3.2%, r<0.001). If you have type 2 diabetes, AH was detected in 2 older age groups and was established positive dynamics 47.1±12.1% and 72.4±8.3% (r<0.05). In the presence of IFG frequency of AH increased progressively to 9.1 ± 8.7% in the 30-39 years to 50.0 ± 14.4% in 50-59 (r<0.01). In the absence of IFG increased incidence of AH since the age of 20-29 years (4.3± 1.5%) to 50-59 years (63.5±3.1%, r<0.01).

Conclusion
1. Registration of AH in women in both the presence and absence of DCM was high.
2. The maximum values of AH have been reported in older age groups in patients with DM 2 and IFG in particular.
3. In the absence of DCM AH was detected from the age of 20-29 years, which suggests that AH is an independent risk factor for cardiovascular disease and the presence of DCM increases their development.

Keywords: arterial hypertension, women, diabetes mellitus, disorders of carbohydrate metabolism
STRUCTURAL ANALYSIS OF ARTERIAL HYPERTENSION IN WOMEN WITH CORONARY HEART DISEASE IN DIFFERENT AGE GROUPS

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Objective
Many studies have clearly demonstrated that the coronary heart disease (CHD) in female population often registered in menopause and post menopause period. In the same period, there is growth and arterial hypertension (AH) - as a major risk factor for CHD.
To study the structure of AH in women with CHD in different age groups.

Method
The survey passed 200 women with CHD aged 20-59 years, among which the 99 revealed in epidemiological survey - I group and 101 women in inpatient and outpatient treatment - II group. All completed questionnaires surveyed Rose used in epidemiological studies, starred ECG in 12 standard leads, and conducted a three-fold measurement of blood pressure (BP) by Korotkov. For AH takes a value equal to or greater than 140/90 mm Hg At the same time were counted in heart rate (HR), both by palpation and by ECG.

Discussion
Among surveyed in reproductive age women was 79, and menopause-121. From them in I group - 55 women and 24 to II-nd was reproductive age, while in postmenopausal I group was 44, while the II-nd was - 77 patients. When analyzing the structure of the AH it found that normal BP was detected in 56 women of childbearing age - 70.8% and 55 postmenopausal women - 45.4%, while AH was detected in 23 (29.1%) fertile age and 66 women (55.4%) in menopause. In both groups, as the values of systolic (SBP) and diastolic blood pressure (DBP) was higher in postmenopausal women, SBP -152.6±4.0 mm Hg against 141.3±2.7 mm Hg (p˂0.001) and DBP vs. 89.1±1.7 mm Hg and 85.6±1.4 mm Hg, (p˂0.05), respectively. HR in general, in both age groups as in I (80.4±1.4 and 79.3±2.2, p>0.05), and in group II (79.3±2.2 and 81.4±1.3, p>0.05) was not significantly different between the fertility age and menopause.

Conclusion
1. In fertile age AH detected in 1/3 of the patients, while in menopause every second.
2. In both study groups as the values of SBP and DBP were higher in postmenopausal women.

Keywords: arterial hypertension, women, fertility age, menopause
Indications of plasma DNA concentration for pregnancy-induced hypertension

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Objective
To assess maternal plasma free DNA as a possible predictive factor of hypertension during gestation.

Method
Blood samples were collected from 192 subjects, in the second trimester 20-24 weeks of pregnancy from Obstetrics and Gynecology Clinic at Queen Mary's Hospital, King George's Medical University (KGMU) at Lucknow, India. DNA was extracted from plasma and quantified by measuring $A_{260}$ on Warburg formula (BioPhotometer) followed by Polymerase Chain Reaction (PCR).

Discussion
Gestational or pregnancy-induced hypertension is defined as the development of arterial hypertension in pregnant women, after 20 weeks of gestation without the presence of protein in urine. In such cases blood pressure returns to normal by 12 weeks post-partum. Maternal free DNA concentrations may use for early detection of preeclampsia and other pregnancy related complications.

Conclusion
Genome equivalents (GE) for free plasma DNA concentration of 81 samples was $576.78\pm152.40$ and $258.40\pm99.24$ in remaining 111 samples. The difference was found to be highly significant ($P< 0.001$). Twenty three out of 81 mothers (28.4%) were found to be hypertensive during follow-up. Our results confirmed that concentrations of maternal free DNA may be used as a possible early predictive marker for gestational hypertension.

Keywords: plasma DNA, hypertensive, genomic equivalent, pregnancy
Comparison Risk of Developing Cardiovascular Disease among Hypertensive Women with High versus Moderate-to-Low Risk Levels

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Objective
(1) to stratify risk level of developing CVD, and (2) to compared CVD risk score and individual risk factors among high versus moderate-to-low risk levels.

Method
We used secondary data analysis from two cross-sectional studied in women with hypertension (n=582). The Framingham Cardiovascular Risk Profile was used to estimate risk of developing CVD. There was 6 major risk factors included age, high-density lipoprotein (HDL), cholesterol, systolic blood pressure (SBP), smoker, and diabetes. CVD risk score ranged from $\leq 2$ to $\geq 21$ with estimated % of <1 to >30%. Risk levels are low (score 4-2 to 9), moderate (score 10-17) and high (score 18). Data were analyzed using $t$-test by compared total CVD risk score, and CVD risk factors among high versus moderate-to-low risk groups.

Discussion
High, moderate and low risks of CVD were 35.4%, 57.9%, and 6.7%, respectively. Compared to the moderate-to-low risk group, women in high risk group had significantly ($p<0.001$) higher total CVD risk score and predicted percent. High risk group had significantly ($p<0.001$) higher score on 5 risk indexes included age, HDL, cholesterol, SBP, and diabetes. When compared others individual risk factors, we found similar results. Women in high risk group was 7 years older ($p<0.001$), had significantly ($p<0.001$) higher SBP, cholesterol, triglyceride, LDL and fasting plasma glucose, while they had lower HDL and body mass index.

Conclusion
Clinicians should be more focused on the target management of blood pressure reduction, lipid lowering, and diabetes control in the high risk group. Weight lowering should be more considered in both high and moderate-to-low risk groups.

Keywords: cardiovascular risk; women health; Framingham risk score
EVALUATION OF CARDIAC AUTONOMIC FUNCTIONS IN PREECLAMPSIA

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Objective
Preeclampsia (PE) is one of the most common diseases worldwide, complicating 5% of all pregnancies. Unfortunately, the exact pathophysiology of this multisystem disorder is still poorly understood. The autonomic nervous system may be an important pathophysiological factor in the development of PE. The present study was designed to evaluate cardiovascular autonomic functions in preeclamptic pregnant women and compare them with normotensive pregnant and normotensive non-pregnant controls.

Method
The study population comprised of 40 preeclamptic pregnant women (Group –I) and 40 normal pregnant females (Group –II) along with 40 age matched non pregnant women (Group- III) as controls. Cardiovascular reflex tests and short term heart rate variability (HRV) were assessed. Cardiovascular reflex tests included deep breathing test (DBT) and lying to standing test (LST). Normally distributed continuous variables were compared using ANOVA. The Kruskal Wallis test was used for those variables that were not normally distributed.

Discussion
The main findings of the study are augmented cardiac sympathetic activity associated with a parasympathetic deficit in patients of preeclampsia. Compared to group II and III, preeclamptic women showed reduced parasympathetic reactivity as measured by heart rate response in DBT and LST. Among HRV parameters, lower values of high frequency (HF) spectral power, RMSSD (root-mean square differences of successive R-R intervals) and higher values of low frequency (LF) spectral power and LF: HF ratio in preeclamptic women compared to group II and III point to sympathetic hyperactivity associated with parasympathetic withdrawal in preeclampsia.

Conclusion
Patients with PE showed more pronounced autonomic deficit. A mild decrease of sympathetic reactivity and tone was observed in normotensive pregnant females compared to non pregnant females also. Therefore autonomic disturbances of pregnancy are exaggerated in the state of PE with facilitation of sympathetic regulation and attenuation of parasympathetic influence on heart.

Keywords: PREGNANCY, PREECLAMPSIA, CARDIAC AUTONOMIC FUNCTIONS, CARDIOVASCULAR REFLEX TESTS, HEART RATE VARIABILITY
Absolute height-specific method for identifying elevated blood pressure in
Chinese children and adolescents

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Objective
To evaluate the performance of absolute height-specific thresholds for identifying children and adolescents with elevated blood pressure (BP) in urban region of Jinan, and to provide evidence for the selection of simplified childhood hypertension screening method.

Method
Data was from the twelfth five-year National Science and Technology Support Program named “Early warning, diagnosis and treatment of childhood cardiovascular disease” conducted in Jinan. A total of 7840 children and adolescents aged 6-17 years were included in our study. Compared with the 2004 Fourth Report (“the golden standard”), the sensitivity, specificity, positive predictive values, negative predictive values, and area under the ROC curve of the absolute height-specific simplified method were calculated to assess its performance.

Discussion
According to the Fourth Report, the prevalence of pre-elevated BP and elevated BP in urban region of Jinan was 14.4% and 9.4%, respectively. Based on the absolute height-specific method, the corresponding prevalence was 13.4% and 8.5%, respectively. The two approaches showed almost perfect agreement, with high weighted kappa coefficient (0.89). Compared with the “the golden standard”, the absolute height-specific simplified method performed well in our study, with high sensitivity (0.82), high specificity (0.99), high positive predictive values (0.90), high negative predictive values (0.98) and large AUC (0.90). It also performed well among subgroups by gender, age and BMI group.

Conclusion
Absolute height-specific simplified method performs well for screening elevated BP in children and adolescents, and it should be recommended in clinical practice.

Keywords: Children and adolescents; Elevated blood pressure; Absolute height-specific thresholds
Prevalence of elevated blood pressure among children and adolescents aged 6-17 years old in urban region of Jinan, China

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Objective
To report the prevalence of elevated blood pressure (BP) among children and adolescents aged 6-17 years old in urban region of Jinan and to provide the basic data for the establishment of strategies for the prevention and control of elevated BP in children and adolescents.

Method
Data was from the 12th Five-Year National Science and Technology Support Program named “Early warning, diagnosis and treatment of childhood cardiovascular diseases”. A total of 7846 urban children and adolescents aged 6-17 years (boys, 52.1%) were included in the present study. Elevated BP was defined according to three criteria. The prevalence of elevated BP was described in different age groups, and the trends in the prevalence were assessed using the Cochran-Armitage trend test.

Discussion
Based on the Chinese, American and International criteria, the prevalence of elevated BP in children and adolescents was 17.2%, 9.4% and 15.0%, respectively. The prevalence among boys was 20.5%, 12.1% and 19.2%, respectively. The prevalence among girls was 13.5%, 6.4% and 10.4%, respectively. The prevalence increased rapidly with age in adolescents after 12 years old while it kept stable before 12 years old.

Conclusion
The prevalence of elevated BP in children and adolescents in urban region of Jinan was much high, especially after puberty. More attentions should be paid to this period.

Keywords: Elevated blood pressure; Prevalence; Children; Adolescent
Role of waist circumference in predicting elevated blood pressure among children and adolescents with normal body mass index

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Objective
To examine if the waist circumference (WC) may predict elevated blood pressure (BP) among children and adolescents aged 7-17 years old who have normal body mass index (BMI), in order to provide scientific evidence for prevention and intervention of elevated BP in children and adolescents.

Method
Data were combined from the China Health and Nutrition Survey, which was conducted during the period of 1993-2011. A total of 9038 children and adolescents aged 7-17 years old who had normal BMI were included in the final data analysis. Data were on gender, age, WC, systolic blood pressure (SBP), diastolic blood pressure (DBP), and the prevalence of elevated BP. After adjusted for sex and age, the multiple linear regression model was used to analyze the trend in mean BP with increase of WC levels. Logistic regression model was conducted to examine the trend in elevated BP prevalence and the risk of elevated BP with increase of WC levels.

Discussion
Both the mean value of BP and prevalence of elevated BP showed up trends with the increase of WC levels among children and adolescents with normal BMI (SBP/DBP ranged from 96.0/63.1 mmHg to 102.4/68.0 mmHg; prevalence of elevated BP ranged from 6.9% to 21.8%, all P<0.001), independently of age and sex. Using WC<P₂₅ as the referent group, the risk for elevated BP were 1.39, 1.70, 2.21 and 3.10, for groups of WC≥P₂₅ and WC<P₅₀, WC≥P₅₀ and WC<P₇₅, WC≥P₇₅ and WC<P₉₀, and WC≥P₉₀, respectively, independently of age and sex (P<0.01).

Conclusion
WC can be used as an important predictor of elevated BP in children and adolescents. BMI should be in combined with WC in order to more effectively prevent risk of elevated BP in children and adolescents.
Hypertension and its correlates among school adolescents in Delhi

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Objective
To determine the prevalence of hypertension amongst urban school adolescents and its correlation with anthropometric measurements.

Method
A cross-sectional study was conducted in a school in Central Delhi involving all 315 students of 9th and 11th standard. A preforma was filled by the students and anthropometric measurements along with blood pressure (BP) measurements were taken for each student. Data was analyzed using Epi-info 2005 and SPSS 16.0.

Discussion
Out of the total 315 students, 208 (66%) were boys and 107 (34%) were girls and the mean age was 14.31 ± 0.96 years. Overall prevalence of malnutrition was 24% and boys were found to be more obese as compared to girls. There were 5 students (1.6%) who were found to have systolic hypertension while 17 (5.4%) were found to have diastolic hypertension while 4.1% (n = 13) of the participants were systolic pre-hypertensive and 26% (n = 82) were in stage of diastolic pre-hypertension. Body mass index and gender were found to be independent predictor for systolic hypertension.

Conclusion
Prevalence of hypertension and pre-hypertension was high amongst the school children. BP check-up for children and adolescents is thus recommended to take remedial action on time.

Keywords: Body mass index; diastolic hypertension; malnutrition; pre-hypertension; systolic hypertension
Inflammation and obesity are important risk factors for elevated blood pressure in young Australian females

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Objective
There is evidence to support an association between inflammation, obesity and elevated blood pressure. However, there are limited data for these relationships in adolescent females. We aimed to investigate the association between obesity, high sensitivity C-reactive protein (hs-CRP) and elevated blood pressure in young Australian females.

Method
Women aged 16-25 years living in Victoria, Australia were randomly recruited via targeted Facebook advertising. Socio-demographic information was collected via a web-based questionnaire. Anthropometric and blood pressure measurements were conducted by trained staff. Hs-CRP was assessed using the Abbott Architect assay.

Discussion
Demographic data were collected from 639 females (mean ±SD age: 22±3 years). Blood pressure data were available for 502 participants. Approximately 28% had elevated blood pressure (defined by a blood pressure reading ≥120-139/80-89 mmHg for adults and > 90th and <95th percentiles for age, sex and height for adolescents). Approximately 24% had hs-CRP levels >3.0 mg/L and 30% were overweight or obese. Additionally, 65% of those who were obese had hs-CRP levels >3.0 mg/L. In multivariable logistic regression analyses, obese females were more likely to have elevated blood pressure compared with those with a body mass index (BMI) in the normal range (OR 5.5, 95% CI 2.4−12.5, p <0.001). Elevated hs-CRP levels were associated with an increased odds of elevated blood pressure (OR 3.4, 95% CI 1.8−6.3, p <0.001). However, this association was no longer significant after adjustment for BMI.

Conclusion
Findings from this study demonstrate that BMI may be moderating the relationship between hs-CRP and elevated blood pressure in young females. Thus our findings may promote further research into the underlying mechanisms of these associations and related long term risks to health.

Keywords: elevated blood pressure; obesity; C-reactive protein; females; Australia
Target organ damage among children and adolescents with elevated blood pressure in China

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Objective
To report the prevalence of target organ damage (TOD) among children and adolescents aged 6-17 years old with hypertension in Jinan, China.

Method
Data was from the twelfth five-year National Science and Technology Support Program named “Early warning, diagnosis and treatment of childhood cardiovascular disease” conducted in Jinan during the period of 2012.09-2013.10. A total of 333 children and adolescents aged 6-17 years with hypertension identified over three different occasions were examined on TOD. Left ventricular mass index (LVMI), relative wall thickness calculated by total wall (RWTm), relative wall thickness calculated by posterior wall (RWTp) were indicators of left ventricular hypertrophy. Carotid intima-media thickness (cIMT), fatty liver and urine microalbuminuria (U-MAU) were indicators for early vascular, liver and renal damage, respectively. The prevalence of TOD was described in different sexes, age groups and BMI groups.

Discussion
The prevalence of elevated LVMI, RWTm, RWTp, cIMT, abnormal U-MAU and fatty liver in children and adolescents with hypertension were 26.0%, 27.5%, 35.8%, 11.8%, 7.3% and 11.4%, respectively. The prevalence of fatty liver was higher in boys than girls (14.3% vs. 4.2%, P<0.05). The prevalence of elevated LVMI, RWTm, RWTp, and cIMT were significantly higher in younger children than in adolescents. Compared with normal weight children and adolescents, those with obesity were more likely to have higher prevalence of TOD (33.3% vs. 6.0% for LVMI, 32.9% vs. 12.0% for RWTm, 38.6% vs. 24.0% for RWTp, and 15.8% vs. 8.9% for cIMT).

Conclusion
The prevalence of TOD among children and adolescents with hypertension was much high in Jinan, China, especially in those aged 6-13 and those with obesity. Effective measures should be taken to identify children and adolescents with hypertension in order to prevent and reduce the risk of TOD.

Keywords: Target organ damage; Children and adolescents; Hypertension
Prevalence of hypertension among children and adolescents aged 6-17 years based on three repeated BP measurements

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Objective
To report the prevalence of hypertension on three repeated blood pressure (BP) measurements and explore the influencing factors of hypertension in pediatric population.

Method
Data was from the 12th Five-Year National Science and Technology Support Program named “Early warning, diagnosis and treatment of childhood cardiovascular diseases”. A total of 7846 urban children and adolescents aged 6-17 years (boys, 52.1%) were recruited in the present study. Children with blood pressure ≥95th percentile on the first visit were reassessed on the second visit, and those still had elevated BP were confirmed on the third visit. The effects of body mass index, parental history of hypertension, parental education level, sleep time, puberty, birth weight, sedentary time and commuting to school on hypertension were estimated by multiple logistic regression model.

Discussion
The prevalence of elevated BP was 17.2%, 9.9% and 6.0% on the first, second and third visits, respectively. Isolated elevated systolic BP was the main type of elevated BP, accounting for 65.4%, 71.2% and 75.1% of all hypertension on the three visits, respectively. Children with overweight (OR and 95%CI: 3.70 [2.55, 5.36]) and obesity (18.03 [13.19, 24.64]) were more likely to have hypertension than those with normal weight. Parental history of hypertension was associated with a higher risk of hypertension (OR: paternal:1.54 [1.08, 2.18]; maternal: 2.39[1.47, 3.88]).

Conclusion
The prevalence of elevated BP decreased substantially on the subsequent visits. Therefore, repeated BP measurements are necessary to confirm the true hypertension in children and adolescents. Overweight/obesity and parental history of hypertension are two main risk factors for hypertension in children and adolescents.

Keywords: Hypertension; Repeated measurements; Risk factors
Performance of the waist circumference and waist-to-height ratio in predicting elevated blood pressure among children and adolescents

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Objective
The study aimed to examine the performance of waist circumference (WC) and waist-to-height ratio (WHtR) in predicting elevated blood pressure (BP) in children and adolescents aged 7-17.

Method
A total of 6853 children and adolescents aged 7-17 (boys: 52.8%) from the China and Nutrition Survey (CHNS) conducted during 2000 to 2011 were included in this study. The area under the receiver operating characteristic curve (AUC) was used to compare the effects of WC and WHtR for predicting elevated BP. Logistic regression model was conducted to examine the risk of abdominal obesity defined using WC and WHtR for predicting elevated BP.

Discussion
The AUCs of WC for predicting BP were 0.64 (95%CI=0.62-0.67) and 0.63 (95%CI=0.61-0.65) for boys aged 7-11 and 12-17, respectively; and 0.55 (95%CI=0.53-0.58) and 0.59 (95%CI=0.57-0.62) for girls, respectively; the corresponding values of WHtR were 0.62 (95%CI=0.60-0.65), 0.60 (95%CI=0.57-0.62), 0.51 (95%CI=0.49-0.54) and 0.58 (95%CI=0.55-0.60), respectively. There was a significant difference for the AUCs of the two predictors in all groups except the boys aged 7-11 (P<0.05). Abdominal obesity defined using WC and WHtR was the risk factor of elevated BP. The odd ratios (ORs) of abdominal obesity defined by WC in boys aged 7-11 and 12-17, and in girls aged 7-11 and 12-17 were 3.14 (2.00-4.93), 2.61 (1.94,3.52), 2.19 (1.33,3.60) and 2.64 (1.90,3.67), respectively, which were slightly higher than the corresponding values of WHtR (2.51 (1.73,3.63), 2.25 (1.69,3.00), 1.54 (1.03,2.32) and 1.93 (1.45,2.58), respectively).

Conclusion
WC and WHtR are both important predictors for elevated BP in children and adolescents. The effect of WC is slightly better than WHtR in predicting elevated BP. However, considering the simplicity and remembering of WHtR cutoff values (boys:0.48, girls:0.46), it may be an useful indicator for early screening of elevated BP in children and adolescents.

Keywords: Elevated blood pressure; waist-to-height ratio; waist circumference; Forecasting; adolescents
Hypertension is the most common trigger factor of posterior reversible encephalopathy syndrome in patients with chronic kidney disease

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Objective
Posterior reversible encephalopathy syndrome (PRES) is characterized by a clinical and radiological entity with rapid onset of seizures, headache, altered consciousness and visual disturbance with neuroimaging findings of reversible vasogenic subcortical edema. It is postulated to have a pathogenesis similar to hypertensive encephalopathy, although correlation with elevated blood pressure has not been demonstrated in chronic kidney disease (CKD).

Method
Our goal was to describe the clinical features, triggering factors, neuro-imaging findings in a cohort with CKD. We retrospectively analyzed the medical records of 22 patients with the diagnosis of PRES between January 2005 and December 2015 at the Inha University Hospital, Korea.

Discussion
There were 22 PRES patients with CKD. The most common co-morbid conditions is on maintenance dialysis in 63% (14/22). The most common clinical presentation was generalized tonic-clonic seizures. The most common identified trigger of PRES was ongoing uncontrolled hypertension (>200/120 mmHg) in 86% (19/22) on seizure; 77% (17/22) patients had estimated glomerular filtration rate under 15ml/min/1.73m²; 50% (9/18) had left ventricular hypertrophy. Two of the 22 patients had recurrent PRES episodes, three episodes each. Atypical brain magnetic resonance imaging (MRI) findings were more prevalent in the imaged cases (62% vs 25%, P < 0.05). All the brain computerized tomography (CT) scans were normal, despite the positive MRI findings in seven cases when both types of imaging was used. All the episodes had total clinical resolution with anticonvulsants and rapid control of blood pressure with addition of intravenous antihypertensive drugs.

Conclusion
Despite the diverse initial trigger factors of PRES, uncontrolled hypertension seems to be the common pathogenic pathway for PRES in CKD. For prevention of PRES in CKD patients, more intensive antihypertensive drugs should be prescribed if blood pressure is not under control.

Keywords: Posterior reversible encephalopathy syndrome, Uncontrolled hypertension, Chronic kidney disease
PREVALENCE OF WHITE COAT HYPERTENSION IN CHRONIC KIDNEY DISEASE PATIENTS IN UKMMC

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Objective
To determine the prevalence of white coat hypertension [WCHT] among CKD and correlate it with their target organ damage evidenced by left ventricular hypertrophy [LVH] and carotid intima media thickness (CIMT)

Method
A cross-sectional study involving 99 CKD patients with eGFR Epi of <60 mL/min/1.732 who attended the CKD clinic. Demographic data, routine blood investigations and number of antihypertensive medication were recorded. Mean Clinic blood pressure of last 2 visits were taken followed by 24-hr ambulatory blood pressure monitoring [24-h ABPM] , electrocardiography and carotid ultrasound measurement.

Discussion
Ninety-nine patients (42 males, 57 females) with median age of 62 (55-69) year-old were recruited. Ethnic background; Malay 66 (66.7%), Chinese 29 (29.3 %) and 4 (4%) Indian. The prevalence of WCHT was 34.3% (34 patients) and 65.7% (65 patients) were sustained hypertension (SHT). Median eGFR were comparable in both groups (p=0.479). Despite comparable mean clinic systolic and diastolic blood pressure (p=0.85),WCHT group had significant lower mean average systolic of 24 hour, daytime and night time blood pressure than SHT group (120.82 ± 8.24 vs. 153.20 ± 18.70), (124.50 ± 9.51 vs 155 ± 18.86) , (111.97 ± 20.07 vs 146.22 ± 21.17 ) and diastolic (66.36 ± 85.79 vs. 82.35 ± 12.17), (68.71 ± 10.94 vs 84.11.8) , (62.68 ± 7.78 vs. 79.28 ± 12.17) respectively (p <0.05) . There was a trend towards LVH in the WCHT compared to SHT group (52% vs.38% (p=0.066)). SHT group had significant median CIMT 0.80 (0.70-0.90) mm compared to mm in WCHT group 0.60 (0.60-0.70)(p <0.05). Two third of SHT were non dippers and one third of WCHT were non dippers. Number of anti-hypertensive agents were comparable in both groups (p=0.235).

Conclusion
White coat hypertension is prevalent in CKD. Patients with SHT had significant carotid intima thickening, LVH was detected more in WCHT group.

Keywords: Ambulatory Blood Pressure Monitoring; Carotid Intima; Chronic Kidney disease; White coat hypertension
Correlation between Health Related Quality Of Life (HRQOL) with grade of Chronic Kidney Disease (CKD) at Muhammadiyah Hospital Palembang

Objective
Chronic Kidney Disease (CKD) is a clinical condition characterized by an irreversible decline in kidney function, to a degree that requires the permanent renal replacement therapy, in the form of dialysis or kidney transplantation. This research aims to determine the relation between Health Related Quality Of Life (HRQOL) with grade of CKD.

Method
This research is an observational analytic with cross-sectional design. Sample in this research were all patients with CKD outpatient and inpatient at Muhammadiyah Hospital Palembang period from October to December 2016, with the number of 23 samples. Research instrument used KDQOL-SF 36 questionnaire. The analysis of the research data used the Pearson correlation test.

Conclusion
Result of this research are, there is strong positive correlation ($r = 0.630$) between HRQOL with grade of CKD with a value of $p = 0.001$

Keywords: Chronic Kidney Disease; Health Related Quality Of Life; Quality Of Life
Bioimpedance spectroscopy is associated with plasma NTproBNP and systolic blood pressure in chronic kidney disease patients

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Objective
Bioimpedance analysis is used to assess body composition including body water distribution in chronic kidney disease patients (CKD). There are many machines available and their comparative performance is unclear. The Fresenius Body Composition Monitor bioimpedance spectroscopy (FBCM BIS) is purportedly more suitable in CKD patients. We compared multifrequency analysis (BIA) to bioimpedance spectroscopy (BIS) in a multi-ethnic Asian population of CKD patients.

Method
We recruited 98 non-dialysis stable CKD patients, defined as serum creatinine not varying by >20% over 3 months. Serum creatinine, serum pre-albumin, and plasma B-type natriuretic peptide (plasma NT-proBNP) were assayed on the Architect platform (www.abbottdiagnostics.com). BIS was performed using the Fresenius Body Composition Monitor (FBCM) and multifrequency BIA performed using the Bodystat Quadscan 4000 (BQ4000). Measurements were taken in the supine position via two electrodes applied to the right hand and right leg. Total body water (TBW), extracellular water (ECW), and intracellular water (ICW) measurements were obtained and standard statistical tests applied to assess their relationship with Log plasma NT-proBNP, systolic (SBP) and diastolic (DBP) blood pressures.

Discussion
Log plasma NT-proBNP was associated with the ratio of ECW/ICW obtained by BIS (-153.88 + 248.60 × ECW/ICW, p = 0.0026). TBW and ECW measured by BIS and BIA, and ECW/ICW obtained by BIA were not associated with Log plasma NT-proBNP. SBP was associated with the ratio of ECW/ICW measured by BIS (SBP = 89.54 + 53.39 × ECW/ICW, p <0.001). DBP was associated with ECW/ICW evaluated by BIA (Average DBP = 102.52 - 35.28 × ECW/ICW, p = 0.0031). SBP and DBP were not associated with TBW and ECW measured by BIS or BIA.

Conclusion
FBCM BIS ECW/ICW ratios appear to be more valid in their association with elevated SBP and plasma NT-proBNP, both of which are indicative of an expanded intravascular volume. ECW/ICW ratios may be able to guide clinicians to safely reduce intravascular volume in CKD patients.

Keywords: Bioimpedance; systolic blood pressure; chronic kidney disease
ROLE HYPERTENSION WITH CHRONIC KIDNEY DISEASE INCIDENTS IN DR M DJAMIL HOSPITAL PADANG 2016

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Objective
Chronic kidney disease (CKD) is a non-transmitted diseases that need attention because it is a silent killer. The prevalence of CKD in Indonesia in 2013 is 0.2%, diabetes as the cause of CKD is 37%. The prevalence of hypertension in West Sumatera in 2013 was 7.9%, higher than that of 2007 at 7.6%. The study aim to identify risk factors that influence the most on the incidence of Chronic Kidney Disease with diabetes mellitus in Dr. M. Djamil Hospital Padang Year 2016. This study aims to look at the effect of covariates variables (age, education, and obesity) to hypertension with Chronic Kidney Disease based on the diabetes mellitus status in Dr. M. Djamil Hospital Padang Year 2016.

Method
The research conducted from November 2016 to July 2017. This study used a case-control design with 96 samples. Sample was taken by using simple random sampling method. The collection of data based on the status of medical records of patients Inpatient Medicine Hospital Dr. M. Djamil Padang Year 2013. Data were analyzed by chi-square test and logistic regression with 95% confidence degree.

Discussion
Bivariate analysis showed that age had OR=3.26 (95% CI 1.374-7.741), education had OR=0.33 (95% CI 0.142-0.754), hypertension had 3.22 (95% CI 1.309-7.898. Multivariate modeling showed that hypertension the same conditions with age and education to increase the incidence of diabetes mellitus in chronic kidney disease patient by 3.64 times.

Conclusion
Based on the results of the research showed that hypertension is a risk factor that most influence on the incidence diabetes mellitus in chronic kidney disease patient in Hospital Dr. M. Djamil Padang 2016. It is recommend to public health information division in Dr. M. Djamil hospital to increase strategy counseling to diabetes mellitus patients to control blood glucose levels and blood pressure so as not to lead to chronic kidney disease.

Keywords: Hypertension; chronic kidney disease; diabetes mellitus; education; age
ROLE HYPERTENSION WITH CHRONIC KIDNEY DISEASE INCIDENTS IN DR. M. DJAMIL HOSPITAL PADANG 2016

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¹Departement of Epidemiology and Biostatistic Faculty of Public Health / Andalas University/ Indonesia

Objective
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Keywords: Hypertension; chronic kidney disease; diabetes mellitus; education; age
Stress Oxidative in Chronic Kidney Disease Patients with High Systolic Blood Pressure

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Objective
This study aimed to compare oxidative stress markers in CKD patients with high systolic blood pressure (SBP) compared to patients with normal SBP.

Method
This study included 71 patients diagnosed as CKD using NKF-KDOQI criteria. The study participants were divided into High SBP (SBP ≥ 140 mmHg) and Normal SBP group (SBM <140). The SBP were measured at basal state. Serum level of Malondialdehyde (MDA) and Total Anti-oxidant Capacity (TAC) were used as stress oxidative marker. The TAC was measured by using chemical luminescence method, while serum level of MDA were measured by high performance liquid chromatographic (HPLC). The difference of serum MDA and TAC in high and normal SBP groups were tested using Mann-Whitney Test.

Discussion
The renal function parameters, including estimated Glomerular Filtration Rate (p-value < 0.0001), serum creatinine (p-value < 0.0001), and serum Cystatin-C (p-value < 0.0001) were significantly lower in CKD patients with high SBP compared to Normal SBP. Serum level of MDA were higher in high SBP group compare to Normal SBP group (p-value < 0.01). In the other hand, CKD patients with high SBP had lower TAC than normal SBP group(p-value < 0.0001).

Conclusion
Our result indicates that oxidative stress as one of cardiovascular disease risk factors in CKD is more prevalent among patients with high SBP, since marker of oxidative stress was increased while anti-oxidant capacity was decreased in high SBP group.

Keywords: Oxidative stress, hypertension, total anti-oxidant capacity, chronic kidney disease
**High Systolic Blood Pressure and Inflammation among Chronic Kidney Disease Patients**

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**Objective**
This study compared markers level of inflammation in Chronic Kidney Disease patients with high systolic blood pressure (SBP) compared to normal SBP.

**Method**
This cross-sectional study included 71 dialysis and non-dialysis patients enrolled in an out-patients clinic and a hemodialysis center in Surabaya. Patients with overt infection, exacerbated auto-immune disease, and clinical sign of fluid overload were excluded. High SBP group consisted of individual with SBP ≥ 140 mmHg measured at basal state, while Normal SBP defined as SBP <140 mmHg. Inflammatory markers measure in this study were serum hsCRP, differential leucocyte counts, platelet-to-lymphocyte ratio and monocyte-to-lymphocyte ratio.

**Discussion**
Serum hsCRP level were higher (p-value < 0.05) in high SBP group (3.2 ± 4.6 mg/L) compared to normal SBP group (5.5 ± 7.5 mg/L). Platelet-to-lymphocyte ratio were higher (p-value < 0.05) while monocyte-to-lymphocyte ratio (p-value < 0.05) were lower in high SBP compared to normal SBP group.

**Conclusion**
Our result showed that inflammation were greater in CKD patients with high systolic blood pressure. The causative role of high systolic blood pressure and inflammation in determining the outcome of CKD needs to be investigated.

*Keywords: inflammation, systolic blood pressure, chronic kidney disease*
Arterial hypertension treatment compliance in conditions of shift work in the Arctic polar region

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Objective
To study arterial hypertension treatment compliance in conditions of shift work in the Arctic polar region.

Method
Treatment compliance was examined in 294 patients aged 25 – 59 years with arterial hypertension (AH) of 1, 2 stage of blood pressure (BP) rise in conditions of shift work in Yamburg settlement (the Tyumen region, Yamal village, 61 degrees north latitude) based on the medical unit. Average age of the examined patients was 46.0±6.0 years. Shift work experience was 12.2± 4.7 years. Average office BP was 157.5±13.7 and 106.7±8.8 mmHg. Average disease duration was 6.4 ±5.7 years.

Discussion
Program of cardiovascular diseases (CVD) prevention designed by the cardiologists of the medical unit allowed to treat 98.6% of the examined patients. Despite the free medications provision only 49.3% patients out of 294 people regularly took the prescribed drugs. Besides, the target level of the office BP was defined only in 60.7% out of the patients treated regularly. The main reasons of treatment refusals were: young age, paucisymptomatic disease progress (87%), low medical knowledge (32%), poor acceptability of the prescribed drug (12%). Only 35% out of 294 patients controlled BP on their own. Patients took all range of the modern antihypertensive medications (AHM) (inhibitors of angiotensin converting enzyme, diuretics, calcium antagonists, b-blockers) in the monotherapy mode and combining the drugs, but monotherapy was in prevalence.

Conclusion
Young age, low medical knowledge, paucisymptomatic disease progress and several drugs taking were the main reasons of low acceptability of AHM by AH patients in conditions of shift work in the Arctic polar region.

Keywords: arterial hypertension; treatment compliance; Arctic polar region;
Antihypertensive efficacy of triple drugs fixed combination therapy of high-risk hypertensive patients

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Objective
Evaluate antihypertensive efficacy triple drugs fixed combination of indapamide, perindoprine and amlodipine in high-risk hypertensive patients during 12 weekly therapy.

Method
The study included 22 high-risk hypertensive patients (II-III stage of essential hypertension, ESH/ESC 2013) who were resistant to bi-combination antihypertensive therapy, in average age 56.9±9.2 years. All patients were administrated fixed combination of indapamide 1.7±0.61 mg, perindoprine 6.54±2.42 mg and amlodipine 6.81±2.46 mg daily (Triplixam, “Servier”) within 12 weeks. Blood pressure (BP) measured by Korotkov method and 24-h ambulatory BP monitoring (ABPM) was performed.

Discussion
By the end of the 12-weekly therapy was observed significantly reduce of systolic and diastolic BP (SBP and DBP) in both ambulatory and office measurements. During the therapy office SBP reduced on 23.4±5.77% (from 165.95±14.73 mmHg to 126.6±7.92 mmHg, p=0.0001), and DBP reduced on 21.37±7.12% (from 101.36±8.88 mmHg to 79.31±5.83 mmHg, p=0.0001). 86.4% of patients were achieved a target BP level <140/90 mmHg on office measurements. The results of 24-h ABPM shown normalization rates of 24-h BP, daytime BP and significantly reduce of nighttime BP. Thus, 24-h SBP reduced from 142.55±12.9 mmHg to 128.61±12.65 mmHg, p=0.0001 and 24-h DBP from 88.0±10.7 mmHg to 78.61±8.43 mm Hg, p=0.002. High antihypertensive efficacy of triple drugs fixed combination characterized with significantly reduce high daily (24-h) BP variability from 18.35±5.57 mmHg to 14.72±3.71, p=0.015 for SBP and from 13.86±3.08 to 12.17±2.4 mmHg, p=0.043 for DBP.

Conclusion
The results of our study have shown that 86.4% of high-risk hypertensive patients achieved BP goals with normalization of 24-h ABPM indexes such 24-h SBP, DBP and daily variability of SBP and DBP during 12-weekly therapy with Triplixam.

Keywords: indapamide, perindoprine, amlodipine, Blood pressure (BP)
HYPERTENSION AND CONCOMITANT DISEASES. RISK FACTORS, COMPLIANCE AND REALLY CLINICL PRACTICE TREATMENT AT WEST SIBERIAN INDUSTRIAL CITY

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\(^1\)Cardiology/ Novosibirsk Regional Cardiological Center / Russian Federation

Objective
Aim. To evaluate main risk factors, antihypertensive therapy (AHT) peculiarities and compliance of Hypertension (HT) and concomitant diseases patients (pts)– Novosibirsk citizens and to compare this data with ESH-2013 Recommendations.

Objectives. The treatment regimes of 320 hypertensives Grade 1-3 (143 men, 177 women aged 36-77 with concomitant coronary artery disease (CAD); n=104, atrium fibrillation (AF); n=82, heart failure (HF) NYHA II-III; n=51, diabetes mellitus (DM); n=50 and chronic obstructive lung disease (COPD); n=33 were evaluated. Average HT history duration was 18,2±1,7 years, average concomitant history duration was 5,7±0,8 years.

Method
Results. The prevalence risk factors were sedentary lifestyle (78,6%), overweight/obesity (74,8%), family HT history (71,3%), smoking (46,5%), alcohol consumption (11,2%). More often administered antihypertensive agents (AHA) at CAD and AF pts were beta-blockers (73,1% and 68,2%) and ACEI/ARB (61,5% and 52,7%); at HF and COLD pts – thiazide diuretics and beta-blockers (72,6% and 54,6%); at DM – beta-blockers and diuretics (74,0% and 70,0%). Combined AHT administered to 71-96% of different groups pts. Hypertensives with concomitant CAD, HF and DM more often administered 3-4 components AHT scheme (31,7% and 30,0%), hypertensives with concomitant COPD – 3-component scheme (33,3%) and hypertensives with concomitant AF more often administered 2-component AHT scheme (29,0%). Fixed AHA combinations received 12-15% different groups pts only. ACEI (ARB) with calcium antagonists (6,8%) or with diuretics (5,7%) administered at fixed regimes more often. Coincidence of different groups AHA admission at really practice (Novosibirsk Regional Cardiological Centre) with ESH-2013 Recommendations consisted 96% at treatment HT with HF; 92% - at treatment HT with DM; 91% - at treatment HT with CAD and AF. During 12-14 days treatment BP control reached 67,9% AF pts, 64,0% - DM pts, 62,8% HF and 60,6% - CAD and COPD pts. The most 6 month follow up compliance inherent to BB and ACEI/ARB. High compliance levels associated with marriage, education level, understanding of treatment benefice. Main causes of luck compliance were side effects fear, large number of agents and intakes, long duration of therapy, higher education absence, family, solitude and health satisfactory.

Conclusion
Conclusion. Beta-blockers, ACEI (ARB) and diuretics are the AHA groups, more often prescribed to high and very high risk HT pts with concomitant diseases. 3 or 4-component AHT scheme is prevalence. Different groups AHA administration at real clinical practice and European Guidelines 2013 coincidence more frequently applied ACEI and BB at hypertensives connected with CAD, HF, DM and AF. Such therapy promoted blood pressure control from 10-12\(^{th}\) treatment day at 60,6-67,9% pts.

Keywords: Hypertension, Risk factors, Compliance, Concomitant disease, Really clinical practice
The Impact of Angiotensin Converting Enzyme Inhibitor versus Angiotensin Receptor Blocker on Clinical Outcomes in Patients undergoing Endovascular Revascularization for Peripheral Arterial Disease

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Objective
Angiotensin-converting enzyme inhibitors (ACEI) have a well-established role in the treatment of patients (pts) with high risks of cardiovascular disease. The aim of this study is to evaluate the impact of ACEI versus angiotensin receptor blocker (ARB) on the clinical outcomes in pts with peripheral artery disease (PAD) who underwent percutaneous transluminal angioplasty (PTA).

Method
The outcomes of 519 consecutive pts with symptomatic PAD who underwent PTA from November 2004 to October 2012 at Korea University Guro Hospital were enrolled for analysis. Pts were divided into the three groups; PAD without ACEI or ARB (n=249), PAD with ACEI (n=61), and PAD with ARB (n=209). One-year clinical outcomes were compared among the 3 groups.

Discussion
Left ventricular ejection fraction (LVEF) was lowest in PAD pts with ACEI (P=0.004) and the prevalence of hypertension (p<0.001) and diabetes mellitus (p=0.005) was highest in PAD pts with ARB, and the use of beta blocker was highest in PAD patients with ACEI (p<0.001). The incidence of claudication and resting pain as the initial diagnosis for PAD were similar among the 3 groups. At 1-year follow up, the incidence of repeat revascularization of coronary artery disease (CAD) was lowest in PAD pts with ACEI (p=0.025) and adjusted multiple regression showed that ACEI was an independent predictor for preventing repeated revascularization of CAD (Hazard ratio 0.345, confidence interval 0.776-1.87, p=0.009).

Conclusion
In this study, although there were more cardiovascular risks in PTA pts with ACEI, they had similar peripheral outcomes. Further, the use of ACEI was useful to prevent repeated revascularization of CAD.

Keywords: Angiotensin-converting enzyme inhibitors, angiotensin receptor blocker, peripheral artery disease
Comparison of Efficacy and Tolerability of Lercanidipine and Amlodipine on Intima–Media Thickness in Newly Diagnosed Hypertensive patients

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Objective
We compared the efficacy and tolerability of the lercanidipine and amlodpine on intima–media thickness (IMT) in newly diagnosed hypertensive patients.

Method
An open label, controlled, randomized, parallel-group study was conducted on 100 newly diagnosed hypertensive patients (blood pressure [BP] >140/90 mmHg) from Oct 2010 to May 2012 in Eulji University Hospital. Patients were allocated randomly two groups to receive amlodipine 5-10 mg or Lercanidipine10-20 mg and followed up for 2 years. The endpoint was the change from baseline of the combined mean maximum far wall IMT of carotid artery, evaluated by repeated measurement analysis of the treatment effect and adverse events after first and second years of treatment.

Discussion
Both lercanidipine and amlodipine were similarly able to significantly reduce mean systolic BP (SBP)/diastolic BP (DBP), mean 24hr day-time and night-time BP monitor. In particular, mean SBP/DBP was reduced from 160 ± 21/94 ±13 mmHg to 142 ± 21/87 ±12 mmHg in the lercanidipine group (p < 0.001 for both SBP and DBP) and from 163 ± 18/96 ±12 mmHg to 141 ± 19/81 ±14 mmHg in the amlodipine-treated group (p < 0.001 for both SBP and DBP). After 2 years of treatment, amlodipine decreased IMT by 0.089 mm [95% confidence interval (CI) 0.144 - 0.037]. Lercanidipine decreased IMT by 0.065 mm (95% CI 0.124 - 0.10). No statistical difference was observed between the two treatments in the reduction of IMT. Both treatments achieved the greatest reduction of IMT after first and year, whereas the reduction in BP was maintained. Lercanidipine showed a better tolerability profile than amlodipine, with fewer adverse events and a lower percentage of patients suffering from peripheral edema.

Conclusion
Lercanidipine is as effective as amlodipine reduced IMT to a similar extent in newly diagnosed hypertensive patients and presents tolerability in the adverse events.

Keywords: Lercanidipine, Amlodipine, Intima-Media Thickness
Angiotensin receptor blockers vs. angiotensin-converting enzyme inhibitors in hypertensive patients with acute myocardial infarction

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Objective
There has been a concern that angiotension receptor blockers (ARB) may increase myocardial infarction (MI) in hypertensive patients compared with other classes of anti-hypertensive drugs. Current guidelines recommend angiotensin-converting enzyme inhibitor (ACEi) as a first-line blocker of renin-angiotensin system in patients with acute MI, but ARB is also frequently used to control blood pressure in hypertensive patients with MI. This study aimed to investigate the long-term clinical effects of ARB vs. ACEi in hypertensive patients with acute MI who survived the initial attack.

Method
Among 13,105 patients who enrolled in nationwide acute MI database of South Korea, the KAMIR-NIH Registry, 5,121 hypertensive patients, who survived the initial attack and were taking ARB or ACEi at the time of discharge, were selected in this study.

Discussion
ARB were prescribed in 2,346 patients. They were older (67.6 ± 11.5 vs. 65.9 ± 12.1 years, p<0.001) and more female (37 vs. 31%, p<0.001). Compared with ACEi, ARB increased 1-year MI (5.0 ± 0.6 vs. 1.8 ± 0.3% p<0.001), cardiac death (4.5 ± 0.5 vs. 2.9 ± 0.4%, p=0.004), and major adverse cardiac events (MACE) of MI, cardiac death, revascularization, readmission due to heart failure or stent thrombosis (17.6 ± 1.1 vs. 13.8 ± 0.8%, p=0.001) on Kaplan-Meier analysis. On univariate Cox-proportional hazard analysis, ARB increased MI, cardiac death, total death, stent thrombosis, cerebral infarction, and MACE. On multivariate analysis, including age, gender, Killip class, diabetes mellitus, and previous history of angina, MI or heart failure, use of ARB was still a significant risk factor for recurrent MI (OR; 1.97, 95% confidence interval; 1.32-2.93, p=0.001).

Conclusion
ARB, compared with ACEi, may increase the recurrent MI in hypertensive patients with acute MI who survived the initial attack.
Down titration in SPRINT

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Objective
The SPRINT trial was stopped earlier (after 3.26 years of follow-up) due to significantly lower rate of the primary outcome in the intensive treatment group. Down titration was allowed in standard treatment group in SPRINT study to reach separation between standard and intensive treatment group. In SPRINT study 2.7% of 4678 patients in intensive group and 11.3% of 4683 patients in standard group were on 0(zero) anti-hypertensive drugs on last visit. In ACCORD study less patients than in SPRINT study were on 0(zero) anti-hypertensive drugs on last visit: 1% in intensive group and 7% in standard group in ACCORD vs 2.7% in intensive group and 11.3% in standard group in SPRINT. This difference may contribute to the differences in outcomes between two studies. I decided to analyze down titration on the last visit in mortality subgroup of SPRINT study

Method
I used unpublished DATA of SPRINT study represented by National Institute of Health and New England Journal of Medicine in the frame of SPRINT DATA Challenge contest. All patients with mortality events on 0(zero) anti-hypertensive drugs on last visit were calculated.

Discussion
32(9,863%) of total 365 patients of mortality subgroup were on 0(zero) anti-hypertensive medications on last visit: 26(9,88%) of 263 patients with non-cardiovascular death and undetermined death and 6(5,88%) of 102 patients with cardiovascular death. 31 patients of mortality subgroup on 0(zero) anti-hypertensive drugs were from standard treatment group, only 1 patient was from intensive treatment group

Conclusion
Possibly, in SPRINT study, down titration of anti-hypertension drugs in standard treatment group impacted outcomes, contributed to more mortality events in standard group vs intensive. This difference may contribute to the differences in outcomes between SPRINT and ACCORD studies.

Keywords: down titration: mortality
A Multi-Center, Randomized, Double-blind, Phase IV Clinical Trial to Compare the Efficacy and Safety of Amlodipine Orotate 5mg/Valsartan 160mg Versus Valsartan 160mg/Hydrochlorothiazide 12.5mg in Patients with Essential Hypertension Uncotteded with Valsartan 160mg Monotherapy

Yongcheol Kim*1; Youngkeun Ahn1
1Cardiology/ Chonnam National University Hospital/ Korea (대한민국)

Objective
The objective of this study was to determine whether the effectiveness and safety of fixed-dose combinations of amlodipine orotate 5mg/valsartan 160 mg (AML/VAL) and valsartan 160 mg/hydrochlorothiazide 12.5 mg (VAL/HCTZ) in hypertensive patients with inadequate response to valsartan 160 mg monotherapy.

Method
This 8-week, multicenter, double-blind randomized controlled trial was conducted at 17 cardiovascular centers in the Republic of Korea. Eligible patients had mean sitting diastolic blood pressure (MSDBP) ≥ 90 mmHg despite 4 weeks monotherapy with valsartan 160 mg. Patients were randomly assigned to receive AML/VAL or VAL/HCTZ for 8 weeks. The primary end point was the change from baseline to week 8 in MSDBP.

Discussion
A total of 238 patients were enrolled (AML/VAL, n=121; VAL/HCTZ, n=117) and 228 completed the study. Baseline characteristics did not differ between the 2 groups. (mean age, 56.92 [10.65] years; men, 77.8%). There was significant MSDBP reduction at 8 weeks after randomization in both groups (-9.31 [7.65] and -7.61 [7.70] mmHg in the AML/VAL and VAL/HCTZ groups, respectively; both p<0.0001 vs baseline). The mean difference between 2 groups was -1.70 mmHg, a non-significant difference, meaning that AML/VAL was not inferior to VAL/HCTZ for the primary end point because the difference was not significant. The control rates in blood pressure, which was defines as the percentage of patients achieving MSDBP < 90mmHg and mean sitting systolic blood pressure (MSSBP) < 140mmHg from baseline to week 8, were significantly higher in the AML/VAL group compared with the VAL/HCTZ group (62.8% [n=76] in AML/VAL group vs 39.1% [n=45] in VAL/HCTZ; p=0.0004).

Conclusion
Treatment with AML/VAL 5/160 mg was not inferior to VAL/HCTZ 160/12.5 mg in patients with hypertension inadequately controlled by Valsartan 160mg monotherapy regarding the effectiveness and safety.
A Multi-Center, Randomized, Double-blind, Phase IV Clinical Trial to Compare the Efficacy and Safety of Amlodipine Orotate 5mg/Valsartan 160mg Versus Valsartan 160mg/Hydrochlorothiazide 12.5mg in Patients with Essential Hypertension Uncotrolled with Valsartan 160mg Monotherapy

Yongcheol Kim*1; Youngkeun Ahn1; Tae Hun Ahn1; Sang-Wook Lim2; Kiyuk Chang3; Moo-Yong Rhee4; Chi Young Shim; Kwang Soo Cha

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Objective
The objective of this study was to determine whether the effectiveness and safety of fixed-dose combinations of amlodipine orotate 5mg/valsartan 160 mg (AML/VAL) and valsartan 160 mg/hydrochlorothiazide 12.5 mg (VAL/HCTZ) in hypertensive patients with inadequate response to valsartan 160 mg monotherapy.

Method
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Conclusion
Treatment with AML/VAL 5/160 mg was not inferior to VAL/HCTZ 160/12.5 mg in patients with hypertension inadequately controlled by Valsartan 160mg monotherapy regarding the effectiveness and safety.

Keywords: Valsartan, Amlodipine Orotate, Fixed-Dose Combination
Prevalence of Difficult to Treat Hypertension Among Patients Undergoing Periodic Executive Health Examination in a Tertiary Center

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Objective
The prevalence of hypertension among adults in the Philippines is 25%, but there is no data as to what proportion of this population has difficult to treat hypertension with a potential secondary cause. The purpose of this study is to determine the prevalence difficult to treat hypertension among patients undergoing periodic health examination at the Wellness Clinic of a tertiary hospital in the Philippines.

Method
The authors reviewed the records of the Wellness Clinic from November 2012 to December 2016 to identify adults who underwent one of its periodic health examination packages. Total of 220 patient records were randomly selected. Difficult hypertension was defined as having a BP greater than 140/90 mmHg with at least three maintenance medications of different classes or BP at goal but maintained on four or more antihypertensive medications.

Discussion
Hypertension was noted in 85 patients (39%), 20 of which were found to have difficult to treat hypertension (23.5%) with a mean age of 59.5 years and a mean BP of 144/90 mmHg. Of the 20 patients diagnosed, 70% (n=14) were diagnosed diabetics. Proteinuria was noted in 80% (n=16), hyperuricemia in 80%, metabolic syndrome in 75% of patients, and CKD in 90%, with an average eGFR of 42.3ml/min/1.73m². A family history of hypertension was seen in 80% and of diabetes was seen in 75% of patients. The most common used for patients with difficult to treat hypertension were ARBs (85%). Diuretics were used in only 40% of patients.

Conclusion
The prevalence of difficult to treat hypertension among the general population in the Philippines has yet to be established. The study showed that a fourth of hypertensive patients have difficult hypertension and warrant further investigation to rule out a secondary cause. This study also showed the preference of Filipino doctors to use ARBs, and to under-utilize diuretics as antihypertensive agents.

Keywords: secondary, hypertension, difficult to treat
A Prospective Study of the Antihypertensive Effects of Azilsartan Medoxomil in the Treatment of Patients with Essential Hypertension and Type 2 Diabetes in Asia

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Objective
Since the efficacy and safety of azilsartan medoxomil has not been studied in the Asian population (except Korea), this phase 4 Takeda-sponsored study evaluated azilsartan medoxomil in Asian adult patients with essential hypertension and T2DM.

Method
The prospective, multi-center, single-arm, open-label study included patients aged 18-75 years with established diagnosis of T2DM and essential hypertension, on stable treatment for T2DM. Patients with uncontrolled hypertension (SBP ≥140 to <180 mm Hg, or DBP ≥85 to <110 mm Hg) were treated with azilsartan medoxomil 40 mg daily, with the option to uptitrate to 80 mg at 6 weeks if hypertension remained uncontrolled.

Discussion
478 patients were screened from Hong Kong, Taiwan and Thailand, of whom 380 were enrolled (mean age: 61.6 years, male: 48.2%, mean BMI: 27.64 kg/m², mean HbA1c: 7.00 mmol/mol). At Week 6, 97 patients (25.5%) were titrated up to azilsartan 80 mg. At 12 weeks, approximately 55% of patients reached the BP goal of <140/85 mm Hg by clinic-measured sitting BP (primary objective), ~63% achieved a BP of <140/90 mm Hg, and 27% achieved a BP of <130/80 mm Hg (Table 1). The efficacy of azilsartan medoxomil over 12 weeks was also observed in all age groups and BMI groups. The treatment was well-tolerated with a low incidence of adverse events (AEs) related to study drug – 5.0% at 6 weeks and 3.9% at 12 weeks (Table 1). Most treatment-emergent AEs (TEAEs) were mild in intensity. The most frequently reported TEAE was dizziness, reported in 4.7% of patients. TEAEs leading to study drug discontinuation were seen in 4.5% of patients – of these, dizziness (1.6%, 6 patients) was the most common.

Conclusion
In patients with essential hypertension and T2DM in Asia, treatment with azilsartan medoxomil indicated a favorable efficacy and safety profile in achieving target BP.

Keywords: Essential Hypertension; T2DM; Asian Population; Azilsartan Medoxomil; Antihypertensive Effect
Objective
The aim of present study evaluated whether red ginseng treatment could effect on central BP and arterial stiffness in patients with hypertension.

Method
The participants with hypertension who were treated with antihypertensive agents and well controlled BP (<140/90 mmHg) were randomly assigned to an active Korean red ginseng 2g/day or a placebo 8 weeks treatment and cross over manner. Patients were not allowed to change their antihypertensive medications during study period. Brachial BP, central BP, brachial-ankle pulse wave velocity (baPWV) were measured at baseline, 8 weeks and 16 weeks.

Discussion
Thirty nine patients were completed each 8 weeks of active or placebo and 8 weeks placebo or active treatment. The mean age was 54.9±9.8 year-old and male sex was 58.2%. The body mass index was 26.7 ±3.1 Kg/ m². The brachial systolic BP (SBP) and diastolic BP (DBP) were not different between the baseline, after active treatment and placebo treatment (p>0.05). After 8 weeks of Korean red ginseng treatment central SBP and central DBP was not different from at baseline or placebo(p>0.05). The baPWV of baseline, after active treatment and placebo treatment were no significant difference (p>0.05). The augmentation index (AI) was not different from at baseline or placebo(p>0.05).

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Red ginseng</th>
<th>Placebo</th>
<th>p-value baseline vs red ginseng</th>
<th>p-value placebo vs red ginseng</th>
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</thead>
<tbody>
<tr>
<td>Brachial SBP (mmHg)</td>
<td>127.3±10.7</td>
<td>126.7±15.9</td>
<td>125.2±14.7</td>
<td>0.78</td>
<td>0.69</td>
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<tr>
<td>Brachial DBP (mmHg)</td>
<td>77.2±13.3</td>
<td>76.5±13.7</td>
<td>74.5±11.3</td>
<td>0.79</td>
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<tr>
<td>Central SBP (mmHg)</td>
<td>130.9±14.6</td>
<td>129.8±16.1</td>
<td>127.9±25.8</td>
<td>0.71</td>
<td>0.67</td>
</tr>
<tr>
<td>Central DBP (mmHg)</td>
<td>75.8±9.5</td>
<td>74.9±9.4</td>
<td>74.5±11.3</td>
<td>0.46</td>
<td>0.72</td>
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<tr>
<td>BaPWV (cm/sec)</td>
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<td>1415.7±240.2</td>
<td>1431±261.0</td>
<td>0.30</td>
<td>0.61</td>
</tr>
</tbody>
</table>

Conclusion
Additional red ginseng treatment did not influence peripheral and central blood pressure. The red ginseng treatment did not improve atrial stiffness in patients with antihypertensive medication.
A novel cardiovascular death prediction model for the general population in Asia: a prospective cohort study of 396369 study participants

Objective
To develop a novel risk prediction model for death from cardiovascular disease (CVD) for the general population in Asia based upon a large Asian cohort.

Method
In this prospective cohort study, a total number of 396,369 healthy subjects free of heart disease from a private health screening program in Taiwan were included.

Discussion
The median follow-up period was 8.8 years. 1317 deaths attributed to CVD were identified by linking the study participants with the National Death File. A novel CVD death risk prediction model for the general population in Asia was established from this cohort. An increase in the resting heart rate was the statistically independent predictor in this model. The discriminatory accuracy was measured by generating receiver operating characteristic (ROC) curve and the area under the ROC curve was 0.904 (95% CI = 0.898 to 0.910).

Conclusion
A novel cardiovascular death prediction model with high predictability for the general population in Asia was demonstrated in the present study.

Keywords: cardiovascular disease, cohort, prospective, risk prediction model
Four-limb blood pressure abnormalities and cardiovascular risk in Chinese individuals with hypertension: A cross-sectional study

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Objective
Although current technology allows simultaneous BP measurement in all four limbs, few studies have examined whether individuals with hypertension and abnormal four-limb blood pressure (BP) ratios and differences have higher cardiovascular risk compared to hypertensive and normotensive individuals with appropriate ratios and BP differences. This cross-sectional study performed from November to December 2014, aimed to observe the prevalence of abnormal four-limb BP in individuals with hypertension and explored their cardiovascular risk.

Method
A total of 1591 participants were enrolled (participation rate, 80%). We excluded 106 participants because 4-limb BP measurement was not performed (n = 34), no blood test was performed (n = 17), or other information was missing (n = 55). Thus, the number of participants included in the present analysis was 1485. Four-limb BP measurements using oscillometric devices, calculated ankle-brachial index (ABI), and interarm/interankle BP differences were obtained from 1485 participants aged ≥35 years. Left ventricular mass was examined by echocardiography. Sympathetic activity index (SAI) and estimated ischemic cardiovascular disease (ICVD) risk were calculated by scores.

Discussion
Hypertensive participants had a higher prevalence of abnormal ABI and interarm/interankle BP differences than normotensive participants (p < 0.0001, p = 0.0269, p < 0.0001, respectively). Female hypertensive individuals with abnormal four-limb BP had a higher SAI than did those with normal four-limb BP (p=0.010), male hypertensive individuals with an interankle BP ≥15 mmHg had higher left ventricular mass index than did those with an interankle BP <15 mmHg (p=0.033). Male hypertensive individuals with abnormal four-limb BP had the highest estimated ICVD risk, at about 7% (p=0.008).

Conclusion
In conclusion, this study delineated that hypertensive patients have a higher prevalence of abnormal four-limb BP than normotensive patients do. Associated higher cardiovascular risk was different between male and female subjects, which could facilitate both targeted monitoring and prevention of hypertensive progression.

Keywords: Ankle–brachial index; cardiovascular risk; interankle blood pressure difference; interarm blood pressure difference; hypertension
High interankle blood pressure difference is a marker of initial severity of acute ischaemic stroke

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Objective
An interankle systolic blood pressure (SBP) difference ≥7 mmHg could be the independent marker of a stroke history in Chinese adults. It could offer an extra benefit in identifying individuals with risk of stroke beyond conventional clinical features. Initial stroke severity is a strong predictor of long-term outcome. Thus, we investigated whether a high interankle SBP difference was associated with severe stroke presentation.

Method
We enrolled 652 first-ever ischaemic stroke (IS) patients who underwent interankle SBP difference measurements during hospitalization. Patients were categorized into the normal(<7 mmHg) and the abnormal (≥7 mmHg) interankle SBP difference group. Baseline characteristics and initial National Institutes of Health Stroke Scale (NIHSS) scores were compared between the groups. We further estimated the association between the interankle SBP difference and NIHSS by multivariate logistic regression.

Discussion
Interankle SBP difference was abnormal in 470 (72.09%) patients. Compared with normal group, the abnormal group had lower high density lipoprotein (1.12 ± 0.25 vs. 1.23±0.33, p =0.034), apolipoprotein A (1.14 + 0.22 vs. 1.24±0.27, p =0.019), and folic acid (4.69 + 2.59 vs. 6.41±4.34 , p=0.021). In addition, abnormal group had higher homocysteine (19.01 + 16.08 vs.14.33±7.56, p =0.013). Mean initial NIHSS score was higher in the abnormal interankle SBP difference group than in the normal group (6.84±4.78 vs. 2.40±2.61, p<0.001). A high interankle SBP difference was independently associated with higher NIHSS score in a multivariate analysis after adjusting for traditional stroke risk factors (OR=6.45, 95%CI: 2.56-16.13, p<0.001).

Conclusion
Patients with high interankle SBP difference presented with more severe ischaemic stroke. Our finding suggests that poor clinical outcomes in patients with interankle SBP difference ≥7 mmHg may be partially explained by their increased likelihood for severe stroke.

Keywords: Blood pressure; interankle blood pressure difference; stroke; China
Effects of white coat hypertension on heart rate recovery and blood pressure response during exercise testing.

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Objective
Increased sympathetic activity is one of the proposed mechanisms underlying exaggerated blood pressure (BP) response to exercise (EBPR). Heart rate recovery (HRR) is a simple non-invasive measurement analyzing autonomic nervous dysfunction. We aimed to the association between HRR and EBPR in patients with hypertension according to the circadian pattern and white coat hypertension (WCH).

Method
A total of 409 patients who simultaneously underwent treadmill test and 24-hours ambulatory BP monitoring (ABPM) were included to this cross-sectional case-control study. Patients were classified according to the ABPM; dipper (n=147), non-dipper (n=140) and normotensive (n=71). EBPR was defined as a peak exercise systolic BP ≥210 mmHg in men and ≥190 mmHg in women. HRR was defined as peak heart rate minus heart rate after a 1-minute recovery; abnormal HRR was defined as ≤12 beats/min.

Discussion
Compared to the normotensive subjects, mean values of the first minute of HRR were significantly higher in WCH, dipper and non-dipper groups. HRR values were significantly lower (p< 0.001) in subjects with WCH and both hypertensive groups when compared with normotensive subjects, especially in non-dipper. There was a significant positive correlation between the decrease in systolic BP during the recovery and degree of HRR in individuals without EBPR (r = 0.124, p = 0.032), however, such a correlation was not observed in subjects with EBPR (r = -0.08, p = 0.471). Furthermore, in patients with WCH, there was a significant negative correlation between the decrease in systolic BP during the recovery and degree of HRR(r = -0.292, p = 0.044). The percentages of blunted HRR and EBPR were significantly highest in patients with WCH (35.3% and 33.3%, respectively).

Conclusion
Blunted HRR indicating impaired parasympathetic reactivation and higher prevalence of EBPR indicating increased sympathetic activation suggest that these autonomic dysfunctions could be the important future cardiovascular risk factors in subjects with white coat hypertension.

Keywords: blood pressure; cardiac autonomic function; heart rate recovery; hypertension; prehypertension
Risk of Developing Cardiovascular Disease in Hypertension with and without Diabetes Mellitus

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Objective
(1) to assess a prevalence of diabetes in hypertension, and (2) to compare risk score and risk level for developing CVD among hypertension with and without diabetes.

Method
Sample were 782 hypertension treated at one district hospital (n=342), one rural (n=324), and one sub-urban (n=116) primary health care units. Risk of developing CVD was estimated based on the Framingham Heart Study Risk Profile. Risk level could be stratify into low (score ≤2 to 9), moderate (score 10-17) and high (score ≥18) risk groups. We defined diabetes as known, treated, or fasting plasma glucose ≥126 mg/dl. Independent t-test, Chi-square, and crude odd ratios (OR) with 95% confidential interval (CI) was employed.

Discussion
One-third (35%) had diabetes. Diabetic group was younger than non-diabetic (p=0.019). Compare to non-diabetic group, diabetic group was more likely had higher CVD risk score (p<0.001), and had higher CVD risk estimated % (p<0.001). Diabetic group had less score on age (p=0.031), smoking (p=0.038), and HDL index (p<0.001). Mean score on systolic blood pressure, and cholesterol were not significantly differences. Hypertension with and without diabetes had significantly differences in prevalence of 3-risk levels ($\chi^2$=104.48, p<0.001). Diabetic group had higher rate of high risk (71.9 vs 34.3%), but had lower rate of moderate risk (27.7 vs 57.9%) levels. Diabetic group was more likely had higher rate of high risk (OR 4.91, 95%CI 3.56-6.77), compared to non-diabetic group.

Conclusion
As expected, hypertension with diabetes had higher risk for developing CVD. Our results pointed out that those with diabetes were younger age, had less number of smokers, and had lower HDL on the CVD risk index. The result, in other word reflected the congruence and complex risk of CVD in younger age hypertension with diabetes.
Vascular and metabolic effects of omega-3 fatty acids combined with fenofibrate in patients with hypertriglyceridemia

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Objective
We have reported significantly differential effects of omega-3 fatty acids (n-3 FA) and fenofibrate and even high dose of n-3 FA. However, effects of n-3 FA combined with fenofibrate are not yet investigated, compared with fenofibrate.

Method
This was a randomized, single-blind, placebo-controlled, parallel study. Age, sex, and body mass index were matched among groups. All patients were recommended to maintain a low fat diet. Fifty patients with hypertriglyceridemia in each group were given placebo, n-3 FA 2 g+fenofibrate 160 mg (combination), or fenofibrate 160 mg, respectively daily for 2 months.

Discussion
Placebo, combination, and fenofibrate significantly decreased triglycerides by 7%, 41% and 30%, respectively and triglycerides/HDL cholesterol by 11%, 45% and 32%, respectively relative to baseline measurements (all $P<0.05$ by paired t-test). When compared with placebo and fenofibrate, these with combination were significant ($P<0.001$ by ANOVA). When compared with placebo, both combination and fenofibrate significantly decreased apolipoprotein B and non-HDL cholesterol and improved flow-mediated dilation and reduced CRP and fibrinogen (all $P<0.05$ by ANOVA), however, there were no significant differences between combination and fenofibrate. When compared with placebo, both combination and fenofibrate significantly reduced insulin and glucose (both $P<0.05$ by ANOVA), and improved insulin sensitivity ($P=0.005$ by ANOVA). However, there were no significant differences between combination and fenofibrate.

Conclusion
When compared with fenofibrate, combination significantly decreased triglycerides and triglycerides/HDL cholesterol. Otherwise, combination and fenofibrate significantly reduced apolipoprotein B and non-HDL cholesterol and improved flow-mediated dilation and reduced CRP and fibrinogen to a similar extent. Also, combination and fenofibrate significantly improved insulin sensitivity by reducing insulin and glucose to a similar extent in patients with hypertriglyceridemia.

Keywords: omega-3 fatty acids; fenofibrate; insulin resistance; hypertriglyceridemia

Rosuvastatin dose-dependently improves flow-mediated dilation, but reduces adiponectin levels and insulin sensitivity in hypercholesterolemic patients

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Objective
Genetic analysis from patients participated in the randomized trials reported that the increased risk of type 2 diabetes noted with statins is at least partially explained by HMG-coenzyme A reductase inhibition. We investigated vascular and metabolic phenotypes of different dosages of rosuvastatin in hypercholesterolemic patients.

Method
This was a randomized, single-blind, placebo-controlled, parallel study. Age, sex, and body mass index were matched among groups. Forty-eight patients were given placebo, and 47, 48, and 47 patients given rosuvastatin 5, 10, and 20 mg, respectively daily during a 2 month treatment period.
Discussion
Placebo therapy did not significantly change insulin, adiponectin, glycate{ed} hemoglobin, and insulin sensitivity relative to baseline measurements. Rosuvastatin 5, 10, and 20 mg dose-dependently and significantly improved flow-mediated dilation (34, 40, and 46%) after 2 months therapy when compared with baseline ($P<0.001$ by paired $t$-test) or when compared with placebo ($P<0.001$ by ANOVA). Rosuvastatin 5, 10, and 20 mg dose-dependently and significantly increased insulin (median % changes; 16, 20, and 20%, respectively) and glycate{ed} hemoglobin levels (mean % changes; 2, 2, and 3%, respectively), and decreased adiponectin levels (mean % changes; 3, 9, and 14%, respectively) and insulin sensitivity (mean % changes; 2, 3, and 4%, respectively) after 2 months therapy when compared with either baseline (all $P<0.05$ by paired $t$-test). These effects with rosuvastatin 5, 10, and 20 mg were significant when compared with placebo ($P=0.006$ for insulin, $P=0.012$ for glycate{ed} hemoglobin, $P=0.007$ for adiponectin, and $P=0.002$ for insulin sensitivity by ANOVA).

Conclusion
Despite beneficial reductions in LDL cholesterol and improvement of flow-mediated dilation, rosuvastatin treatment dose-dependently and significantly resulted in decreasing insulin sensitivity and increasing ambient glycemia by reducing adiponectin levels and increasing insulin levels in hypercholesterolemic patients.
Lower BMI but having abdominal obesity is a risk of high arterial stiffness and severity of orthostatic hypotension for middle-aged and elderly patients with life-style related disease: A cross-sectional study

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Objective
Recently, patients with sarcopenia and abdominal obesity are known to exhibit subclinical atherosclerosis, frailty and high mortality risk. Sarcopenic obesity is considered to be latent in those without increase in body mass index (BMI) despite having abdominal obesity. We aimed to investigate whether arterial stiffness and orthostatic hypotension, which is important as risk of cardiovascular disease, is associated with BMI in life-style related disease patients with abdominal obesity.

Method
We studied 762 middle-aged and elderly patients with normal to high BMI (BMI ≥ 18.5) and being treated with life-style related diseases. The patients were divided into 2 groups (with or without abdominal obesity) according to waist circumference (WC) (abdominal obesity: men; WC ≥ 85 cm, women; WC ≥ 90 cm). We measured cardio-vascular ankle index (CAVI) for an index of arterial stiffness. We assessed sit-to-stand test for measuring orthostatic blood pressure change.

Discussion
Mean age of the patients was 67.8 ± 10.3 years (43.3% were men), hypertension dyslipidemia and diabetes mellitus was observed in 84.9%, 74.4% and 22.6% of the patients respectively. There was a significant negative correlation with BMI and CAVI in patients with abdominal obesity (r=-0.348, p<0.001, n=322), whereas no significant association was observed in patients without abdominal obesity (r=0.022, p=0.639, n=440). There was a significant positive correlation with BMI and orthostatic blood pressure change only in patients with abdominal obesity (r=0.258, p=0.001). Multivariate regression analysis using stepwise method revealed that BMI was an independent determinant of CAVI and orthostatic blood pressure change only in patients with abdominal obesity (p<0.001, p=0.001, respectively).

Conclusion
In patients with abdominal obesity, lower BMI was an independent determinant of high arterial stiffness and severity of orthostatic hypotension. Further investigation by evaluating muscle and fat mass is necessary to assess the risk of low BMI in middle-aged and elderly life-style related disease patients with abdominal obesity.

Keywords: sarcopenia, obesity, arterial stiffness, orthostatic hypotension
Association of Obesity Types with the 10-year Coronary Heart Disease Risk in Tibet and Xinjiang area of China

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Objective
To investigate the association between types of obesity and 10-year coronary heart disease risk in a Tibetan and Xinjiang population of China. To investigate the association between types of obesity and 10-year coronary heart disease risk in a Tibetan and Xinjiang population of China.

Method
Using stratified multi-stage random sampling, 7,631 populations aged 35 or older were examined with international standardized examination in 2015-2016. There were 5,802 participants were eligible for analysis.

Discussion
The prevalence of general obesity, central obesity, visceral obesity and compound obesity were 0.53%, 12.62%, 10.08% and 42.35%, respectively. Out of all compound obesity, 58.65% (1,441/2,457) included all types of the obesity in our study. The 10-year coronary heart disease risk of man was higher than woman [(3.05±4.14)% for man and (1.42±2.37)% for woman, respectively], P <0.0001. Compound obesity (30.16%) had the greatest percent of the highest 10-year coronary heart disease risk than central obesity (28.01%), visceral obesity (18.46%) and general obesity (19.35%). After adjustment for confounding factors, multivariate analysis found compound obesity was associated with the greatest risk to the 10-year coronary heart disease risk (OR, 95%CI: 2.889, 2.525-3.305), moreover people with anomalous BMI and WC had greater risk (OR, 95%CI: 3.168, 2.730-3.677).

Conclusion
Obesity was popular in Tibet and Xinjiang area of China, male and compound obesity (especially both BMI and WC were abnormal) population has a greater risk to 10-year coronary heart disease.

Keywords: obesity type; compound obesity; 10-year coronary heart disease risk; Tibet; Xinjiang
The correlation between ownership of household devices and obesity and diabetes in urban and rural areas in China

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Objective
Ownership of common household devices (such as television, car or computer) has been associated to obesity and diabetes. We hypothesized that possession of common household devices was part of the factors of obesity and diabetes, and these influences would be interpreted by less physical activity, increased sitting time and increased energy intake. The objective of this study is to have a comprehensive understanding of the ownership of common household devices in different income level regions in China and find the correlation between ownership of devices and obesity and diabetes.

Method
We used the baseline data from a prospective urban rural epidemiology called PURE-China, which including 46285 individuals from 115 communities (70 urban and 45 rural) in 12 provinces of high, middle and low-income regions in China. To address our hypothesis, we used multilevel regression models and took community- and family-level clustering as random effects.

Discussion
With the increase of regional economic level, the amount of household devices increased. Physical activity decreased by grade and time spent sitting, daily energy intake, BMI and waist circumference gradually increased with decreased regional income status (P<0.001 for trend). There was an increased trend from possess no device to 1 device (urban: adjusted OR: 0.79, 95% CI 0.70–0.90; rural: adjusted OR: 0.88, 95% CI 0.79–0.98), 2 devices (urban: adjusted OR: 0.75, 95% CI 0.66–0.86; rural: adjusted OR: 0.99, 95% CI 0.81–1.19) and 3 devices (urban: adjusted OR: 0.91, 95% CI 0.72–1.16; rural: adjusted OR: 1.11, 95% CI 0.77–1.59).

Conclusion
The ownership of household devices likely increased the odds of obesity and diabetes. Simple, effective and low-cost health promotion strategies such as encouraging physical activity should be applicable around China.

Keywords: Household devices; Obesity; Diabetes; Correlation analyses.
Waist-to-Height Ratio Remains an Optimal and Easier Index for Indicating Obesity-related Cardiovascular Risk in Children and Adolescent Population

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Objective
Objectives:
Recently tri-ponderal mass index (TMI) is reported better correlated with body adiposity than body mass index (BMI). The current study aims to evaluate the accuracy of different body adiposity indexes based on BMI, TMI, waist circumference (WC) and percentage of body fat (PBF) in relation to cardiovascular (CVD) risk in children and adolescents.

Method
Materials and Methods:
Subjects were recruited from 4 schools in Shanghai by random cluster sampling. Anthropometrics, blood pressure, fasting blood glucose (FBG) and lipid profiles were examined by standard protocols and standardized based on national references. PBF were measured by dual energy X-ray absorptiometry and standardized into Z scores using American recommendation. Subjects with any 3 or more the following abnormalities, elevated FBG, profiles, blood pressure, or central obesity, were defined as CVD3 (outcome 1). Subjects with at least 2 above abnormalities were defined as CVD2 (outcome 2). Metabolic syndrome (MS) was defined by centroobese in combination with any two of the rest of abnormalities. Receiver operation curves (ROC) were performed to assess and compare the performance of adiposity indexes in predicting two CVD outcomes.

Discussion
Results:
A total of 1094 subjects were analyzed. WhtR and TMI were very weakly correlated with age (r=−0.08 and 0.08, P<0.05). To predict CVD3, AUC of WhtR, TMI, BMI, standardized BMI, WC, standardized WC, standardized PBF, were 0.88 (95% CI:0.83-0.94), 0.85 (95% CI:0.79-0.91), 0.84 (95% CI: 0.78-0.90), 0.85(95% CI:0.79-0.92), 0.87 (95% CI:0.81-0.93), 0.87 (95% CI:0.82-0.93),0.84 (95% CI:0.80-0.89), respectively. In predicting CVD2, AUC were 0.83(95%CI:0.79-0.87), 0.81(95%CI:0.78-0.85), 0.79(95%CI: 0.75-0.83),0.82(95% CI:0.78-0.86), 0.80 (95% CI:0.76-0.85), 0.83 (95% CI:0.79-0.87), 0.78 (95% CI:0.74-0.82), respectively. AUC of WhtR reached 0.93 (95%CI: 0.92-0.95) for MS.

Conclusion
Conclusion:
Considering performances in indicating CVD risk and simplicity in application, WhtR remains an optimal index to evaluate obesity related CVD risk in children and adolescent population.
**RELATIONSHIP BETWEEN ACTIVITY OF RENIN-ANGIOTENSIN-ALDOSTERONE SYSTEM AND INSULIN RESISTANCE IN UNTREATED ESSENTIAL HYPERTENSION**

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**Objective**
Numerous clinical evidences demonstrate that ACE inhibitors or ARBs improve glucose homeostasis and reduce the incidence of T2DM in subjects at high risk of cardiovascular events, despite the mechanism is unknown. The present study aimed to investigate the relationship between activity of RAAS and Insulin resistance in untreated essential hypertensive subjects.

**Method**
172 eligible subjects underwent oral glucose tolerance testing (OGTT) and measured seated plasma renin activity (PRA), angiotensin II and plasma aldosterone concentration (PAC) in the midmorning, and insulin resistance was evaluated by Homeostasis model assessment [HOMA-IR, FPG(mmol/L)×FINS(mIU/L)/22.5]. The relationship between PRA, PAC and the level of insulin as well as HOMA-IR were analyzed by spearman correlation analysis and Partial correlation analysis.

**Discussion**
PRA was positively related to Insulin 0, 30, 60,120 min at OGTT as well as HOMA-IR(r = 0.19, 0.17, 0.20, 0.15, 0.20 respectively, P<0.05), and angiotensin II was positively related to HbA1C level(r = 0.61, P=0.036). In addition, ARR was inversely related to insulin 0 min at OGTT as well as HOMA-IR (r = -0.17, -0.21, respectively, P<0.05). PAC was related neither to Insulin of anytime phase at OGTT nor to HOMA-IR. Age was inversely related to PRA and PAC (r = -0.33, -0.16, P<0.05). BMI was inversely related to PRA (r = -0.09, P<0.05) and positively related to PAC (r = 0.09, P<0.05). After controlled age and BMI, only the level of angiotensin II showed positive relationship with HbA1C level (r² = 0.764, P=0.027).

**Conclusion**
This study showed that insulin resistance is associated with elevated PRA in patients with untreated essential hypertension but not PAC and the association affected by age and BMI, whereas angiotensin II seemed to strongly relate to HbA1C level.

**Keywords:** hypertension; insulin; insulin resistance; angiotensin II; renin; aldosterone
Objective
To evaluate BMI, WHR and hypertension as predictor to T2DM by separate analysis for urban and rural population of Bangladesh.

Method
This cross-sectional study was conducted among 17953 adults (aged ≥18 years, 37% nonDM and 63% T2DM) from the OPD of 19 healthcare centres of Bangladesh. WHO guidelines for Asian population were used to identify general obesity by BMI, central obesity by WHR and hypertensive by blood pressure. History of FBG and lipid profile were collected from patient’s guide book. Statistical comparisons were made by appropriate test. Binary logistic regression was performed the individual effect of predictor variables considered significant at 5% level.

Discussion
In nonDM-general-rural population underweight were (10.7%), normal (49%) and overweight (40%), central obesity (63.4%) and hypertension (8%) respectively. In general-urban population 5%, 41% and 54% were underweight, normal and overweight respectively, 68%, and 19% had central obesity and hypertension respectively. In rural-diabetic population 8%, 44% and 48% were underweight, normal and overweight respectively with 81%, 19.4% and 2.1% had central obesity, hypertension and dyslipidemia respectively. In urban-diabetic population 2.5%, 33% and 64.5% were underweight, normal and overweight respectively with this, 84%, 27% and 3.5% had central obesity, hypertension and dyslipidemia respectively. Urban-general people were 2.6 times higher risk to hypertension compare to rural. Underweight (urban/rural p=0.005) and overweight among urban population (urban/rural p=0.005) was significantly higher but no significant difference were found considering WHR. Urban-DM population were 3.5 times higher risk to hypertension and 1.6 times higher risk to dyslipidemia compare to rural. Binary logistic regression showed that age, living area, BMI, WHR and HTN were significant explanatory variables of diabetes after adjusting for other demographic variables (R²=0.16; p<0.001).

Conclusion
The strategies of public health programs initiated in both for the prevention and control of excess weight and hypertension as well as of other risk factors associated with diabetes.

Keywords: BMI, WHR, HTN, T2DM, Bangladesh
Objective
To evaluate BMI, WHR and hypertension as predictor to T2DM by separate analysis for urban and rural population of Bangladesh.

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In nonDM-general-rural population underweight were (10.7%), normal (49%) and overweight (40%), central obesity (63.4%) and hypertension (8%) respectively. In general-urban population 5%, 41% and 54% were underweight, normal and overweight respectively, 68%, and 19% had central obesity and hypertension respectively. In rural-diabetic population 8%, 44% and 48% were underweight, normal and overweight respectively with 81%, 27% and 3.5% had central obesity, hypertension and dyslipidemia respectively. In urban-diabetic population 2.5%, 33% and 64.5% were underweight, normal and overweight respectively with this, 84%, 27% and 3.5% had central obesity, hypertension and dyslipidemia respectively. Urban-general people were 2.6 times higher risk to hypertension compare to rural. Underweight (urban/rural p=0.005) and overweight among urban population (urban/rural p=0.005) was significantly higher but no significant difference were found considering WHR. Urban-DM population were 3.5 times higher risk to hypertension and 1.6 times higher risk to dyslipidemia compare to rural. Binary logistic regression showed that age, living area, BMI, WHR and HTN were significant explanatory variables of diabetes after adjusting for other demographic variables (R²=0.16; p<0.001).

Conclusion
The strategies of public health programs initiated in both for the prevention and control of excess weight and hypertension as well as of other risk factors associated with diabetes.

Keywords: BMI, WHR, HTN, T2DM, Bangladesh
**Body fat distribution is more predictive of all-cause mortality than overall adiposity**

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**Objective**
The relationship between directly measured body fat and all-cause mortality has been rarely studied. The aim of this study was to evaluate the predictive significance of computed tomography (CT)-measured body fat, including both visceral fat area (VFA) and subcutaneous fat area (SFA), for mortality.

**Method**
The study included 36,656 participants who underwent abdominal CT as part of a health check-up at a single university-affiliated healthcare centre in 2007–2015. Of those, 32,593 participants with data regarding vital status as of May 2016 were included in the final analysis. The main factors evaluated were VFA, SFA and visceral-to-subcutaneous fat area ratio (VSR), and the primary outcome was all-cause mortality.

**Discussion**
There were 253 deaths during a mean follow-up of 5.7 years. Increased SFA was associated with decreased all-cause mortality, whereas an increased VFA and VSR were related to increased all-cause mortality. Compared with the predictive power of body mass index (BMI), SFA and VSR showed a larger area under the curve than did BMI. In Kaplan-Meier survival curve analysis, increased SFA and VSR were associated with decreased and increased hazard of all-cause death, respectively. However, in multivariate Cox proportional hazard regression analysis, only VSR was independently associated with all-cause mortality. Moreover, this relationship was paralleled by the harmful impact of increased VSR on metabolic profiles.

**Conclusion**
Increased VSR was an independent predictor of all-cause mortality. This suggests that the location of fat deposits may be more important than the actual amount of body fat.
Objective
This study investigated the relationship between drinking behavior (alcohol consumption frequency, average alcohol intake per drinking session) and the prevalence of the metabolic syndrome (MetS) and its components (central obesity, raised triglycerides, decreased HDL cholesterol, raised blood pressure, raised fasting plasma glucose) in Korean men aged between 20 and 79.

Method
Our study employed data from the Korea National Health and Nutritional Examination Survey (KNHANES) for the years 2007 to 2013. The study population consisted of a total of 16,164 Korean males, of which 30.1% (n 4,815) were diagnosed with metabolic syndrome.

Discussion
Relative to non-drinkers, those who consumed alcohol more than 4 times per week (OR: 1.30, 95% CI 1.14-1.49) and those who consumed more than 10 glasses per drinking session (OR: 2.04, 95% CI 1.82-2.28) were most likely to have an association with MetS. Alcohol consumption frequency was also associated with raised triglyceride levels, decreased HDL cholesterol, raised blood pressure, and fasting plasma glucose, whilst average alcohol intake per drinking session had an impact on central obesity, raised triglyceride levels, decreased HDL cholesterol, raised blood pressure, and fasting plasma glucose. Most significantly, alcohol intake per drinking session was found to be more significantly associated with MetS than alcohol consumption frequency.

Conclusion
Frequent alcohol consumption and high alcohol intake per drinking session were associated with higher prevalence of MetS and most of its components (central obesity, raised triglycerides, decreased HDL cholesterol, raised blood pressure, raised fasting plasma glucose) in Korean men aged between 20 and 79.

Keywords: alcohol, metabolic syndrome, hypertension, high alcohol intake, obesity, blood pressure
Systemic vascular resistance of vasospastic angina is higher compared with microvascular angina after sheath insertion.

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Objective
To compare the vascular resistance of microvascular angina and vasospastic angina after sheath insertion.

Method
Continuous 22 cases who were suspected of angina pectoris by exercise ECG and/or, portable monitor of ECG and underwent coronary angiography and who had no obvious coronary organic stenosis. All patients underwent acetylcholine provocation test to estimate presence or absence of coronary spasm. Swan-ganz catheter was used for measuring circulation parameters including systemic resistance(SVR) after sheath insertion. Atrial stiffness parameter was measured using cardio-ankle vascular index (CAVI) at same time.

Discussion
The subjects were divided into coronary spasm positive group (Group A, n=13) and coronary spasm negative group (group B, n=9). There were no difference in age, gender, body mass index and central blood pressure between the two groups. And in circulation parameters, there were no difference in cardiac output, pulmonary resistance and pulmonary artery wedge pressure between two groups. But, SVR was higher in Group A than that of group B(2226.8±693.9 vs 1561.9±706.5 dyne*sec*cm⁻⁵, p<0.05). On the other hand, CAVI correlate positive to systemic vascular resistance.

Conclusion
Systemic vascular resistance of vasospastic angina pectoris was higher compared with microvascular angina pectoris. CAVI could be partly relating to systemic vascular resistance.

Keywords: Vasospastic angina pectoris; Microvascular angina pectoris; Cardia-ankle vascular index; Systemic vascular resistance; Swan-ganz catheter
Changes in Arterial Stiffness when compared to brachial pressures with posture in normotensive, hypertensive with or without anti-hypertensive treatment – A cohort study

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Objective
To see if there is postural variation of arterial stiffness in normotensives and hypertensives with or without treatment and if there is difference in arterial stiffness when compared to brachial pressures in three groups.

Method
Postural variations of arterial stiffness were measured in 3 groups (Hypertensives on medication; Hypertensives off medication; Normotensives). Central aortic systolic pressure (ASP), central aortic pulse pressure (APP), Augmentation Index (AI) and brachial systolic pressure (SP), brachial diastolic pressure (DP) and operator index were measured in supine and sitting positions using SphygmoCor. Ethics approval was taken before the start of the study for normotensive subjects. Data obtained was compared between supine and sitting position within and across the groups. Demographics i.e age, race, gender, height, weight and BMI were noted. Differences between BP characteristics in supine and sitting were compared using non-parametric paired test of Wilcoxon Signed-rank test. The differences in BP characteristics were analysed using Man Whitney U-test. A p-value of p<0.05 was accepted as statistically significant in both the tests.

Discussion
There were 111 subjects in the study (41 hypertensives on medication;16 hypertensives not on treatment; 54 normotensives). In hypertensives on treatment and normotensive subjects, a statistically significant increase in APP and decrease in DP was seen in the supine position compared to sitting position. When brachial BP was compared with AI between hypertensives on treatment and normotensive group, there was significant difference in brachial BPs when compared in both groups but the antihypertensive treatment brought down the AI significantly and there was no statistical difference in AI in both groups

Conclusion
As a conclusion, postural variation had an effect on arterial stiffness as it affected central APP and DP but its effect on central ASP and AI is inconclusive. Anti-hypertensive treatment reduces AI more than brachial BP in hypertensive patients when compared to normotensive subjects.

Keywords: Postural variations of arterial stiffness; Central aortic systolic pressure; central aortic pulse pressure; Augmentation Index; brachial systolic pressure; brachial diastolic pressure
Echocardiographic Assessment of Left Ventricular Geometry in Prehypertensive Subjects

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**Objective**

**Introduction:** High blood pressure is a strong risk factor for cardiovascular disease. JNC identified a new category of blood pressure in adults termed pre-hypertension. It remains an important public health challenge all over the world. Awareness of prevalence, determinants and prognosis of asymptomatic untreated prehypertension is still lacking in India. Keeping BP below 120/80 mm Hg may provide important health benefits later in life. But in practice, sub-optimal BP levels that remain below 140/90 mm of Hg are often ignored. Even the prehypertensives show abnormal LV function and structure which is reversible if appropriate measures should be instituted timely.

**Method**

**Methods:** Total 201 subjects were selected from general population with the age between 18-70 years. Blood pressure was measured and prehypertension was classified according to JNC 7. 101 subjects were found to be prehypertensives and 100 were normotensives. 2D echocardiography was performed by standard methods.

**Discussion**

**Results:** BMI and BSA were elevated in prehypertensives. 68.51% of the male prehypertensives were found to be having Normal geometry (37/54), while altered geometrical patterns were noted in; CH (12.96%), CR (12.96%), EH (5.55%). In female prehypertensives Normal geometry was noted in 36.17% (17/47), and in others CH (2.12%), CR (59.57%) and EH (2.12%). In normotensive male, 67.34% (33/49) of the subjects had a normal geometry and 32.65% (16/49) of the subjects shows CR. In normotensives females, 68.62% (35/51) having the normal geometry while rest 31.37% (16/51) has CR.

**Conclusion**

**Conclusion:** Such findings carry prognostic implication. Early diagnosis of prehypertension will help to take preventive measures to reduce cardiac morbidity and mortality in later period.

**Keywords:** Cardiovascular Risk, Prehypertension, Echocardiography, LVH
Clues of transthoracic echocardiography into rapid diagnosis of type A aortic dissection in hypertensive patients

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Objective
Aortic dissection is one of serious acute complication of hypertension. Especially, quick diagnosis of type A aortic dissection (AD) is important for early surgical intervention. Transthoracic echocardiography (TTE) is an easy and available tool before definite diagnosis with chest CT angiogram in the emergency setting. We investigated simple clues of TTE to suspect type A AD, thus, shortening time of confirming type A AD

Method
Twenty one patients were enrolled in this retrospective study. Fifty patients were diagnosed as acute AD from January 2004 to April 2013 in Kangdong Sacred Heart hospital. Among them, 21 patients were confirmed with type A. AD by chest CT angiogram and TTE. We evaluated baseline characteristics, general parameters and aortic distensibility (D) of ascending aorta(AscA) using TTE: D = (AscA diameter in systole - AscA diameter in diastole) / (AscA diameter in diastole × pulse pressure).

Discussion
In our study, patients with type A AD showed various TTE features such as pericardial effusion (76%), tamponade sign (38%), aortic regurgitation (67%), intimal flap (23.8%). Ascending aortic diameter was increased (50.1±7.7 mm in systole; 48.5±7.4 in diastole). Aortic distensibility of type A AD was 1.46±1.1×10^{-3} mmHg^{-1} that is smaller than aortic distensibility of dilated AscA in patients with Marfan syndrome (3.0±2.6×10^{-3} mmHg^{-1}) and that of normal AscA (4.4±2.2×10^{-3} mmHg^{-1}) in previous studies. There was no significant difference between aortic distensibility with and without intimal flap in type A AD patients (1.91±0.99× 10^{-3} mmHg^{-1} and 1.21±1.06 ×10^{-3} mmHg^{-1})

Conclusion
In emergency setting, ascending aortic distensibility by transthoracic echocardiography might be a putative indicator for rapid diagnosis of type A. aortic dissection.

Keywords: type A Aortic dissection, transthoracic echocardiography
**Relationship between Two Arterial Stiffness Index of Ambulatory Blood Pressure Monitoring and Early Renal Impairment in Essential Hypertensive Patients**

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**Objective**
To investigate the relationship between the arterial stiffness parameters that derived from Ambulatory blood pressure monitoring (ABPM) and the markers of renal impairment in order to provide a scientific method for detecting the renal impairment of hypertension.

**Method**
The 300 essential hypertensive patients without overt proteinuria were enrolled. The ABPM was performed and the blood pressure parameters were analyzed in order to estimated symmetrical ambulatory arterial stiffness index (S-AASI) and ambulatory arterial stiffness index (AASI). Microproteinuria was measured by urine microalbumin to creatinine (mAlb/Cr) as well as n-acetyl-β-d-glucosaminidase to creatinine rate (NAG/Cr). Creatinine clearance (Ccr) and Glomerular filtration rate (eGFR) were estimated from serum creatinine (sCr). The subjects were divided into four groups according to the S-AASI quartiles. Baseline demographic, clinical and laboratory findings of each group was compared respectively. Linear correlations and afterwards multivariate regression analysis were performed to confirm the independent predictive power of S-AASI and AASI for renal lesion.

**Discussion**
(1) The patients in the highest quartile of S-AASI distribution showed worse parameters of renal injury (P<0.05). (2) Correlation test showed a significant positively relationship of S-AASI with mAlb/Cr (0.708, P<0.05), NAG/Cr (0.700, P<0.05), sCr (0.229, P<0.05), Ccr (−0.601, P<0.001) and eGFR (−0.309, P<0.05) were negatively correlated with S-AASI. In one aspect AASI was also correlated with mAlb/Cr (0.489, P<0.001), NAG/Cr(0.470, P<0.001) and Ccr (−0.311, P<0.05), but not with the sCr (0.064, P>0.05) and eGFR(−0.135, P>0.05). S-AASI seems to get an independent relationship with these parameters of renal impairment which could not be detected with AASI. (3) Multivariate regression analysis showed that age (β=0.325, P<0.01), mAlb/Cr (β=0.410, P<0.01) and NAG/Cr (β= 0.264, P<0.05 were independently related to S-AASI. And it can established regression formulation as S-AASI=0.04+0.004×age+0.003×mAlb/Cr+0.03×NAG/Cr.

**Conclusion**
This study can support the idea that S-AASI may be a better approach than AASI to estimate arterial stiffness and hypertensive renal impairment.

**Keywords:** Essential hypertension; Ambulatory blood pressure monitoring; Arterial stiffness; Renal impairment
Albuminuria and Kidney Function as Prognostic Marker of Left Ventricular Mass among Hypertensive Adults in South Asia

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Objective
The temporal association between markers of kidney damage and abnormalities in cardiac structure have not been evaluated in populations in South Asia. This study aimed to evaluate the association of albuminuria and estimated glomerular filtration rate (eGFR) at baseline and changes in these parameters with left ventricular mass index (LVMI) at 7 years in adults with hypertension in Pakistan.

Method
A nested cohort of 539 hypertensives aged 40 years and older from a community-living population in Karachi, Pakistan followed up for 7 years in the Control of Blood Pressure and Risk Attenuation (COBRA) trial. Urine spot albumin to creatinine ratio (UACR) and IDMS standardized serum creatinine-based CKD-EPI eGFR (validated for Pakistan population) were assessed at baseline and 7 years, and echocardiography at only 7 years.

Discussion
Mean age of participants was 50.9±9.1 (SD) years; 63% were female. Mean baseline eGFR was 91.0±15.9 (SD) ml/min/1.73 m², median (IQR) baseline UACR was 6.2 (3.9, 11.3) mg/g, and mean LVMI at 7-year follow-up was 69.9±17.5 g/m². In multivariate analysis, although baseline eGFR was marginally associated with LVMI (β = -0.11, 95% CI (-0.23, 0.00), P=0.061), a strong association was found between higher rate of increase in eGFR and lower LVMI (β = -1.07, 95% CI (-1.95, -0.19), P=0.018). Higher baseline UACR was significantly associated with higher follow-up LVMI, per unit increase in log transformed baseline UACR (about 2.7 times greater in UACR) was predictive of 2.30 g/m² higher LVMI. In addition, rate of UACR increase of ≥1.07 mg/g/year vs. of <0.14 mg/g/year significantly predicted higher LVMI (β = 4.34, 95% CI (0.89, 7.78), P=0.014).

Conclusion
Lower eGFR and higher albuminuria at baseline, and their longitudinal worsening were associated with increased LVMI among individuals with hypertension in Pakistan. The potential clinical utility of our findings need evaluation in South Asia across a variety of clinical settings.

Keywords: Creatinine; Glomerular Filtration Rate; Albuminuria; Hypertension; Left ventricular hypertrophy
**Prevalence and Correlates of Chronic Kidney Disease (CKD): a Cross-Sectional Study of Hypertensive Individuals in Rural Communities in Pakistan, Bangladesh, and Sri Lanka**

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**Objective**
The objectives of the study were to determine the regional differences in prevalence and determinants of CKD in rural Bangladesh, Pakistan, and Sri Lanka.

**Method**
We conducted a cross-sectional study on 2349 participants aged ≥ 40 years with hypertension in 30 randomly selected rural communities, 10 each in Bangladesh, Pakistan, and Sri Lanka. The primary outcome was CKD defined as estimated glomerular filtration rate (eGFR) <60 mL/min/1.73 m2 estimated by CKD Epidemiology Collaboration (CKD-EPI) or urinary albumin to creatinine ratio ≥ 30 mg/g

**Discussion**
The mean (SD) age of participants was 58.8 (11.3) years, and 36% were men, 27% had diabetes, and 10% were current smokers. The age-standardized prevalence (95% CI) of primary outcome of CKD was 38.4% (34.1 to 42.8%) in Bangladesh, 19.1% (15.7 to 22.5%) in Pakistan, and 49.8% (45.1 to 54.6%) in Sri Lanka. The factors independently associated with CKD were older age (OR=1.06, 95% CI(1.05,1.07) for every 1 year increase), diabetes (OR=2.03, 95% CI(1.63,2.52)), elevated systolic blood pressure (OR=1.06, 95% CI(1.04,1.09), per 5 mm Hg increase), current vs non-smoker (OR=1.42, 95% CI(1.01,2.00)), and country (OR=0.57, 95% CI(0.40,0.80) for Bangladesh vs Sri Lanka, and OR=0.18, 95% CI(0.12,0.26) for Pakistan vs Sri Lanka). A significant interaction with p<0.001 was detected between age and country indicating that the association between older age and higher prevalence of CKD was stronger in Sri Lanka compared to the other two countries.

**Conclusion**
CKD is common among individuals with hypertension in rural South Asia with alarmingly high rates of reduced kidney function in Sri Lanka. Our findings underscore the urgency of addressing the key determinants of CKD, and establishing CKD detection and management programs as a public health priority in the South Asian region.
Objective
Aldosterone to Renin Ratio (ARR) decreased in some patients with essential hypertension, like in primary aldosteronism patients with low levels of renin, high levels of aldosterone. The relationship between ARR and target organ damage (TOD) is not clear. To determine the relationship between ARR and TOD in essential hypertension patients.

Method
Patients with primary hypertension were followed up to examine for target organ including left ventricular mass index (LVMI), BNP, intima-media thickening (IMT), Urinary albumin creatinine ratio (UACR), and estimated glomerular filtration rate (eGFR), pulse wave velocity (PWV), flow mediated dilation (FMD). The radioactivity was used to measure renin activity and aldosterone to calculate ARR. Blood pressure levels were assessed for all patients with 24-hour ambulatory blood pressure monitoring. Patients were divided into two groups by mean values of ARR(55.56 (pg/ml)/(ng/ml/h)). Background information is collected in all patients.

Discussion
370 patients with essential hypertension (EH) were included in this study, with 182 males and 188 females. In the two groups with different ARR level, there is no difference in in age, sex, body mass index, smoking, fasting plasma glucose, blood lipid, homocysteine, urinary MA/CRE, serum potassium concentration, blood serum sodium concentration, uric acid, serum creatinine, blood urea nitrogen, urine potassium, urine sodium, 24hSBP, 24hDBP, 24hHR. eGFR in the higher ARR patients is significantly lower than in the lower ARR patients. And IMT, PWV, BNP is significantly higher in the lower ARR patients. There was negatively correlation between ARR and eGFR, positively correlation between ARR and BNP, PWV, carotid intima-media thickness. There was no relationship between ARR and LVMI, UACR and FMD.

Conclusion
In patients with essential hypertension, ARR could be used as a monitoring indicators or risk factors for atherosclerosis and the decrease of glomerular filtration rate.

Keywords: Essential hypertension Hypertension; Target organ damage; ARR; Renin-angiotensin-aldosterone system
Higher normal value of urinary albumin to creatinine ratio is associated with concentric remodeling in hypertensive patients

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Objective
Microalbuminuria is known as a marker of cardiac geometric adaptations in hypertensive subjects. However, the association between geometric change following hypertension and urinary albumin to creatinine ratio (ACR) below 30mg/g have not been investigated. In this study, we examine the relationship between concentric remodeling of left ventricle (LV) and urinary ACR in hypertensive patients whose urinary ACR was within normal range (0-30mg/g).

Method
The Korean Registry of Target Organ Damages in Hypertension (KorHR) is a multi-center prospective study which enrolled 1318 essential hypertension patients without any cardiovascular diseases. Among 1318 subjects, we analyzed 133 patients without LV hypertrophy (LVH) whose urinary ACR was below 30mg/g, and echocardiographic data were available. Concentric remodeling was defined as relative wall thickness (RWT) greater than 0.42 in the absence of LVH.

Discussion
Hypertensive patients with concentric remodeling had significantly higher level of urinary ACR compared to those with normal LV geometry (7.9 vs. 10.5; p=0.049). Urinary ACR was significantly correlated with RWT(r=0.2; p=0.02). In the multivariate logistic regression analysis with stepwise backward elimination for predicting concentric regressing, only urinary ACR remained as a significant predictor of concentric remodeling(OR 1.12, 95% CI 1.04-1.22; p=0.004).

Conclusion
Urinary ACR was an independent predictor of concentric remodeling in hypertensive patient whose ACR level was below 30mg/g. This result suggests that urine ACR might be a risk factor of hypertension event at the level below 30mg/g.

Keywords: Microalbuminuria, concentric remodeling, Hypertension,
Association between serum cystatin C and intima-media thickness of common carotid artery in people with normal renal function

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Objective
To investigate the association between serum cystatin C and the intima-media thickness of common carotid artery (C-IMT) in people with normal renal function.

Method
A total of 172 subjects averagely aged 49.6±7.5, with normal renal function were recruited from the rural population in Shangxi province, including 89 males and 83 females. According to C-IMT, they were divided into C-IMT<0.9mm group (n=154) and C-IMT≥0.9mm group(n=18). Their serum cystatin C, fasting glucose, creatinine, total cholesterol, triglyceride, high density lipoprotein cholesterol levels were measured. Intima media thickness (IMT) in the common and carotid arteries was evaluated by ultrasound image. The relationship between serum Cys C and C-IMT were analyzed with multiple linear regression.

Discussion
① Serum cystatin C level was higher in C-IMT≥0.9mm group than in C-IMT<0.9mm group[(0.84±0.19) vs. (0.70±0.14), P<0.05]. IMT increased as serum Cys C concentration increased (P=0.009). ② C-IMT was positively correlated with serum cystatin C level, age, waist circumference, body mass index(BMI), systolic blood pressure(SBP), diastolic blood pressure(DBP) (respectively, r=0.446, 0.215, 0.240, 0.326, 0.188, and 0.19; all P<0.05). ③ Stepwise multivariate regression analysis showed that, after adjusting for age and sex, the cystatin C level, BMI, SBP were independent predicting factors of C-IMT. Furthermore, after adjusting various confounders, cystatin C level were still independent predictors of C-IMT (b=0.182, P=0.005). After excluding hypertensive and diabetic subjects, the serum Cys C remained correlative to C-IMT.

Conclusion
Cystatin C could be a more effective predictor of C-IMT in subjects with normal renal function.

Keywords: Cystatin C; intima-media thickness; atherosclerosis; renal function
«Two-faced» hypertension: the relationship between cerebral circulation and cognitive functions

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Objective
To investigate the features of cerebral circulation in functional respiratory tests and the relationship of intracranial blood flow reactivity with the presence of cognitive disorders (CD) in patients with arterial hypertension (AH) stage II.

Method
The main group consisted of 27 patients with AH stage II and pre-dementia CD, the comparison group included 33 patients with AH stage II without CD. The average age of the patients was 57.8±2.1 years. The duration of the AH was 11.8±5.3 years. A comprehensive examination was conducted in accordance with the standard protocols, as well as a neuropsychological examination with an assessment of cognitive functions using the MoCA test. Blood flow in the middle cerebral artery (MCA) was studied using transcranial Doppler (TCD) on the HDI 7, Philips, USA with functional respiratory hyper- and hypocapnic ventilation tests to assess the index of vasomotor reactivity (IVMR=[(Vapnea–Vhyper)/V0]*100%, Vapnea — the average maximum velocity of blood flow after 20s of apnea (cm/s), Vhyper — the average maximum velocity of blood flow after 20s of hyperventilation (cm/s), V0 — the average maximum velocity at rest (cm/s)). The exclude criteria: congenital anomalies of brachiocephalic vessels, occlusive lesions of extra- and intracranial arteries, uncontrolled and symptomatic hypertension, depression, dementia.

Discussion
During TCD MCA, there were no statistically significant differences in the mean flow velocity (75.5±7.2 m/s and 71.2±6.4 m/s, p>0.05), unlike the IVMR data (the main group — 45.16±4.6%, the control group — 58.98±5.1%, p<0.05. A strong correlation was found (r=0.931) between IVMR and the level of CD in patients with AH stage II.

Conclusion
The functional state of the cerebral circulation can be estimated in the dynamics of functional respiratory tests during transcranial Doppler of the middle cerebral artery by the index of vasomotor reactivity, which makes it possible to control the early brain damage as the target organ for arterial hypertension.

Keywords: hypertension; cerebral circulation; cognitive disorders
Hypertension and Albuminuria in Chronic Kidney Disease Patients

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Objective
This study investigate the degree of renal function and albuminuria as marker of renal damage in Chronic Kidney Disease patients with high blood pressure.

Method
This multicenter study included 71 CKD patients enrolled at two hospitals in Surabaya, Indonesia. Patients with overt infection, exacerbated auto-immune disease, and clinical sign of fluid overload were excluded. Renal function parameters measured in this study included Serum Creatinine, serum Cystatin-C, urinary Albumin-to-Creatinine Ratio (ACR). Blood pressure were measured at basal stages. High systolic blood pressure SBP was defined as SBP ≥ 140 mmHg, while high diastolic blood pressure (DBP) was identified as DBP ≥ 90 mmHg. The comparison of renal function and albuminuria were tested using Mann-Whitney Test.

Discussion
Serum Creatinine (p-value <0.0001) and Cystatin-C (p-value <0.0001) were higher among CKD patients with High SBP compared to Normal SBP. In CKD patients with high DBP, Serum Creatinine (p-value <0.05) and Cystatin-C (p-value <0.05) were also higher compared to patients with Normal DBP. Estimated GFR were lower in high SBP (p-value <0.0001) and high DBP groups (p-value <0.05) compared to patients with normal blood pressure. Means of ACR in high SBP (p-value <0.0001) and high DBP (p-value <0.05) were higher compared to patients with normal blood pressure.

Conclusion
Our study showed that increased urinary albumin secretion as a renal damage marker were observed in CKD patient with increased blood pressure, irrespectively of systolic or diastolic blood pressure. This implicate in the need of blood pressure control as a strategy of halting the progressivity of renal damage.

Keywords: Albuminuria, Chronic Kidney Disease, Hypertension
The influence of hypertension on daytime sleepiness in obstructive sleep apnea

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Objective
Daytime sleepiness is a common symptom among hypertensive patients. The aim of this study was to determine subjective sleepiness assessed by Epworth Sleepiness Scale (ESS) and to assess sleep architecture in 304 patients with arterial hypertension.

Method
All patients underwent a standardized diagnostic overnight, polysomnography. The control group consisted of 67 normotensives. ESS was used to measure subjects' level of daytime sleepiness.

Discussion
The hypertensive patients had a decreased sleep efficiency, mean and minimum oxygen saturation levels, and increased apnea/hypopnea index and oxygen desaturation index compared with normotensive patients. The lower ratio of N3 sleep, higher of N2 sleep, and decreased sleep efficiency was observed in hypertensives without obstructive sleep apnea (OSA). In the moderate to severe OSA groups, the total ESS score was significantly lower in hypertensives compared with normotensives (table 1). The ESS scores decreased with age in hypertensives, but not in normotensives.

Table 1
The Epworth scale total score in studied normotensive and hypertensive group with an AHI> 5/h, AHI >15/h, AHI> 30/h compared to controls

<table>
<thead>
<tr>
<th>AHI category</th>
<th>Total ESS score in hypertensives</th>
<th>p</th>
<th>Total ESS score in normotensives</th>
<th>p</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>I- AHI &lt;5 /h</td>
<td>9.20 ± 5.64</td>
<td></td>
<td>7.89 ± 4.58</td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>II- AHI &gt;5/h</td>
<td>9.42 ± 5.42</td>
<td>ns</td>
<td>10.13 ± 6.10</td>
<td>ns</td>
<td></td>
</tr>
<tr>
<td>III- AHI &lt;15/h</td>
<td>8.90 ± 5.34</td>
<td></td>
<td>8.10 ± 4.85</td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>IV- AHI &gt;15/h</td>
<td>9.84 ± 5.56</td>
<td>ns</td>
<td>13.80 ± 6.66</td>
<td></td>
<td>&lt;0.05*</td>
</tr>
<tr>
<td>V- AHI &lt;30/h</td>
<td>9.00 ± 5.19</td>
<td></td>
<td>8.69 ± 5.44</td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>VI- AHI &gt;30/h</td>
<td>10.34 ± 6.03</td>
<td></td>
<td>13.33 ± 5.60</td>
<td></td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

AHI - apnea/hypopnea index, * - p statistically significant

Conclusion
1. The hypertensive patients have a decreased sleep efficiency, increased AHI, ODI, and minimal saturation compared with normotensives.
2. The sleepiness measured by ESS in hypertensives decreases with age, but not in normotensives.
3. The sleepiness measured by ESS is decreased in hypertensives compared with normotensives in the subjects with moderate or severe OSA.

Keywords: sleepiness; obstructive sleep apnea; hypertension
The impact of self-reported symptoms of tempomandibular dysfunction and bruxism on blood pressure in hypertensives

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Objective
Hypertension and temporomandibular disorders (TMD) are very common problems in the modern society. Some of risk factors including stress, anxiety and depression are common for both hypertension and TMD. Symptoms of TMD, especially chronic pain, may be causative or intensifying factor in the development of hypertension.

Method
The aim of the study was to estimate the prevalence of symptoms of TMD in hypertensives and to estimate association between ABPM parameters and TMD symptoms. The study group included 196 patients of Department and Clinic of Internal Medicine, Occupational Diseases, Hypertension and Clinical Oncology of Wroclaw Medical University. The questionnaire on TMD symptoms and ambulatory blood pressure monitoring were conducted.

Discussion
The most interesting result of the study is an increased variability of both systolic (20.56 ± 2.8 vs. 13.26 ± 2.73, p=0.001) and diastolic (11.99 ± 3.03 vs. 10.78 ± 2.12, p<0.05) blood pressure in hypertensives with symptoms of tempomandibular dysfunction. However, we have not observed the effect of bruxism on mean blood pressure, but we observed increased systolic blood pressure variability (18.22 ± 23.87 vs. 13.21 ± 3.05, p<0.05) in patients with the possible bruxism complication such as grooves or notches on your teeth near the gum line. The second important result of our study is increased mean systolic (131.92 ± 18.18 vs. 126.29 ± 14.86, p<0.05) and diastolic (79.26 ± 12.37 vs. 74.54 ± 10.60, p<0.05) blood pressure at hypertensives reporting cavities within the past 3 years or changed bite or teeth (shorter, thinner, or worn).

Conclusion
1. The hypertensives with TMD symptoms have increased blood pressure variability, therefore accurate assessment of cardiovascular risk is needed in these patients.
2. The reported dental caries in hypertensives is associated with increased mean systolic and diastolic blood pressure thus hypertensives with caries need special blood pressure control.

Keywords: bruxism, tempomandibular disorder, hypertension
Reduced coronary flow reserve is associated with impaired ventriculoarterial interaction in patients with obstructive sleep apnea

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Objective
Obstructive sleep apnea (OSA) is associated with cardiac and arterial damage, and adverse cardiovascular outcome. Microvascular dysfunction is subclinical pathologic condition, then we aimed to whether coronary flow reserve (CFR), which represents microvascular dysfunction, might be associated with ventricular-vascular coupling index (VVI), which represents the afterload-adjusted contractility.

Method
315 patient (282 males, mean 43 ± 11 years) with newly diagnosed OSA were enrolled. Transthoracic echocardiography was performed, and adenosine-associated coronary flow reserve (CFR) was measured in left anterior descending (LAD) coronary artery. We evaluated the differences between the patients with normal CFR (≥2.5) and reduced CFR (<2.5). VVI was calculated using effective arterial elastance (Ea) and left ventricular end-systolic elastance (Ees). Ea was estimated as the end-systolic pressure/stroke volume, and Ees index (m/s²) was calculated using a trans-LV outflow tract pulsed wave Doppler as peak velocity (cm/s)/accelerating time (ms). Then we calculated VVI (10XEa/Ees).

Discussion
Normal CFR group (n=243) showed increased Ees compared with reduced CFR group (n=72) (8.17 ± 2.30 vs 7.26 ± 2.29 m/s², p=0.007) and preserved VVI (2.76 ± 1.16 vs 3.18 ± 1.58, p=0.023). Normal CFR group showed higher systolic tricuspid annulus peak velocity (13.93 ± 2.33 vs 12.67 ± 2.08 cm/s, p=0.029) compared to reduced CFR group. There were no differences in LV dimension, LV ejection fraction, left atrial (LA) volume index, E/e’, LA strain and LV global longitudinal strain between two groups (all p>0.05).

Conclusion
Reduced CFR is associated with decreased Ees and impaired VVI in OSA patients. Microvascular dysfunction might affect myocardial contractility, which supports the necessity of more intensive observation in OSA patients with reduced CFR to improve cardiovascular outcome.

Keywords: coronary flow reserve, obstructive sleep apnea, ventriculoarterial interaction
Association between uric acid levels and obstructive sleep apnea syndrome in patients with hypertension from Xinjiang of China

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Objective
Recurrent apnea and hypoxia, which is associated with obstructive sleep apnea syndrome (OSAS), leads to an increase in the degradation of adenosine triphosphatase (ATP) into xanthine, which in turn increases uric acid (UA) concentrations. The study aimed to determine whether an association exists between OSAS and UA levels in hospitalized patients with hypertension from Xinjiang, China.

Method
A total of 1893 hospitalized patients with hypertension who firstly attended Hypertension Center of Xinjiang from 2006 to 2012 were consecutively recruited, all subjects underwent polysomnography recordings for OSAS diagnosis, blood pressure assessment, and biochemical blood analysis.

Discussion
The mean age of patients with hyperuricemia was lower than that in controls [(45.5±10.2)yr vs. (47.8±10.1)yr, P<0.001 in whole population; (44.9±9.9)yr vs. (46.1±9.7)yr, P=0.035 in males] respectively. Adjusted for age, body mass index, blood pressure, the patients with hyperuricemia presented shorter deep sleep time but greater AHI, mean oxyhemoglobin saturation (SpO2), frequency of SpO2 decreased ≥4% and ≥5%, and light sleep time. The UA levels significantly increased with the severity of OSAS in whole population and in males, but in females, the lowest level of UA was in patients with mild OSAS. Further correlation analysis indicated that waist circumference (WC) displayed lower level in mild OSAS group than that in female individuals without OSAS. Importantly, AHI and age were significant contributing factors of UA levels in males by stepwise linear regression. In females, the WC, besides of AHI and age, played as significantly predictor of UA level [β=1.32(0.76-1.88), P<0.001] regardless of OSAS status.

Conclusion
A strong association was found between uric acid levels and OSAS in a large number of hospitalized patients of Xinjiang. Although it does not qualify for a biomarker alone, besides of obesity, uric acid levels may be involved in OSAS severity and should be considered in sleep apnea management in the future.

Keywords: uric acid; obstructive sleep apnea syndrome; hypertension
Increased epicardial adipose tissue and arterial stiffness, using cardio-ankle vascular index in sleep apnea

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Objective
To clarify the relationships between severity of obstructive sleep apnea (OSA) and epicardial adipose tissue (EAT), in addition to discusses for arterial stiffness shown by cardio-ankle vascular index (CAVI).

Method
A total of 110 Japanese patients with obstructive sleep apnea who had CAVI test and computed tomography (CT) were included in this study. EAT, visceral adipose tissue (VAT) and subcutaneous adipose tissue (SAT) were measured and assessed for severity of OSA.

Discussion
Neither the body mass index nor SAT showed any co-relation with severity of OSA. But there were significant positive co-relation between severity of OSA and VAT or EAT (r=0.17 p<0.05, r=0.18 p<0.05 respectively). In addition, severity of OSA and EAT were selected as contributing factor for CAVI.

Conclusion
These data suggested that OSA could be a progressive factor for arterial stiffness and EAT accumulation. EAT may have increased through the increase of afterload such as arterial stiffness shown by CAVI induced by intermittently hypoxia and reoxygenation.

Keywords: Arterial stiffness; Cardio-ankle vascular index; epicardial adipose tissue; visceral adipose tissue; sleep apnea
5 year follow up mortality and rehospitalization due to heart failure in Dilated Cardiomyopathy Registry

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Objective
Dilated cardiomyopathy (DCM) is associated with various prognosis and it requires repeated hospitalizations. However, long term outcome of DCM in the community remains largely unsolved. The aims of this study were to describe the clinical characteristics and outcomes of DCM in Korea.

Method
A total of 272 patients enrolled retrospectively in multi-center. Ischemic cardiomyopathy was excluded by coronary angiography and coronary computed tomography in all patients. 5 year follow up clinical and echocardiographic data were analysed.

Discussion
Male was 61.7%. Mean age was 61.4±14.3 years old. All-cause mortality were 7.0% and rehospitalization due to heart failure were 37.1% in 5 year follow up. Left bundle branch block (LBBB) were 12.1%. LBBB group showed significantly high mortality (p=0.005) and rehospitalization due to heart failure (p=0.005) than non-LBBB group.

Conclusion
DCM patients appear to experience frequent rehospitalization due to heart failure, however a relatively low risk for all-cause mortality. LBBB seems to be related to poor prognosis.
Out-of-office BP monitoring: gaps between clinical guidelines and clinical practice in Singapore

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Objective
Home blood pressure monitoring (HBPM) and ambulatory blood pressure monitoring (ABPM) provide important information for effective hypertension management. This study evaluated awareness related to blood pressure variability (BPV) and the practice of HBPM and ABPM among physicians from Singapore.

Method
A sample of physicians from Singapore was surveyed between 8 September and 5 October 2016. Those included were practicing for ≥3 years, directly cared for patients’ ≥70% of the time, and treated ≥30 hypertension patients/month. The questionnaire covered 6 main categories: general BP management, BP variability (BPV) awareness/diagnosis, HBPM, ABPM, BPV management, and training needs.

Discussion
Responses from sixty physicians (30 general practitioners [GPs], 20 cardiologists, 10 nephrologists) were included for analyses (77% male, 85% aged 31-60 years). Physicians recommended HBPM and ABPM to 81% and 27% of hypertensive patients, respectively. Almost half of all physicians surveyed (48%) did not adhere to the BP cut-off recommended by most guidelines for diagnosing hypertension using HBPM (>135/85 mmHg). HBPM instructions often differed from current guidelines in terms of frequency, number of measurements and timing. The proportion of consultation time devoted to discussing HBPM was one-quarter or less for 73% of physicians, and only 55% said that they had the ability to provide education on BPV. Patient inertia, poor patient compliance, lack of medical consultation time and lack of access to a BP machine were the most common challenges for implementing out-of-office BP monitoring. The majority of physicians (82%) had no training on BPV, and stated that this would be useful.

Conclusion
Although physicians from Singapore do recommend out-of-office BP measurement to patients with hypertension, this survey identified important gaps in knowledge and clinical practice.

Keywords: hypertension, blood pressure monitoring, blood pressure variability, guidelines
**Abstract**

**Association of Average 24 hours Ambulatory Blood Pressure and Ambulatory Arterial Stiffness Index with Dipper state in Normotensive young adult males**

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**Objective**

1. To compare average 24 hours systolic and diastolic BP in dippers & non-dippers
2. To compare the Ambulatory Arterial Stiffness Index (AASI) in dippers and non-dippers.

**Method**

30 healthy young adults of age between 20 to 35 years were enrolled in the study after taking ethical clearance from Institutional Ethical Committee and written informed consent from them. Subjects with any H/o hypertension, cardiovascular, renal disorders were excluded. Subjects were allowed to sit quietly for 15 min prior to assessment of BP; three consecutive measurements were made 5 min apart, and baseline BP was determined as the mean of the three readings. 24 hours Ambulatory Blood Pressure was measured using Contec Ambulatory Blood Pressure Monitor (AMBP 50). The cuff of the BP apparatus was tied on the non-dominant arm. Subjects were enquired about daily morning wake up time and night bed time. The ambulatory BP monitor was set to measure BP every 15 min during daytime and every 30 min night time while sleeping using manufacturer-provided software. Subjects were divided into two groups according to their dipper profile, as defined: dippers (nocturnal decrease in systolic BP/diastolic BP was >10% of daytime BP) and non-dippers (nocturnal decrease in systolic BP/diastolic BP was <10% of daytime BP). AASI was calculated by the formula one minus the regression slope of diastolic BP over systolic BP.

**Discussion**

The average 24 hours SBP & DBP (in mm Hg) in non-dippers (n=9) were significantly more as compared to dippers (n=21) [SBP: 128.74 ±4.42 vs 116.52 ±9.13; p<0.01 , DBP: 82.56 ±5.52 vs 71.74 ±8.17; p<0.01]. AASI was also significantly more in non-dippers (0.38 ±0.08) than dippers (0.26 ±0.12); p<0.05.

**Conclusion**

As normotensive young males had higher 24 hours average BP and AASI than dippers, they are at higher risk of developing hypertension and arterial stiffness associated cardiovascular morbidities.

**Keywords:** Ambulatory BP; Dipper; Non Dipper; AASI
Effect of Emotional Intelligence on Ambulatory Blood Pressure in Normotensive Young Adult Males

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Objective
- To compare Emotional Intelligence (EI) with average Day systolic and diastolic BP.
- To compare EI with average Day systolic and diastolic BP load.
- To compare EI in dippers and non-dippers.

Method
30 healthy young adults of age between 20 to 35 years were enrolled in the study after taking informed consent from them. EI was assessed using Schutte’s EI Scale and subjects were divided into two groups: normal EI (Score >111) & low EI (Score <111). Baseline BP was determined as mean of three consecutive readings taken 5 minutes apart after 15 minutes of rest. 24 hours Ambulatory Blood Pressure was measured using Contec Ambulatory Blood Pressure Monitor (AMBP 50). Subjects were enquired about daily morning wake up time and night bed time. The ambulatory BP monitor was set to measure BP every 15 min during daytime and every 30 min night-time (sleeping). Dipper state was assessed as dippers (nocturnal decrease in SBP/DBP >10% of daytime BP) and non-dippers (nocturnal decrease in SBP/DBP <10% of daytime BP). All the subjects were instructed to perform their daily chores but refrain from doing any exercise.

Discussion
Average daytime SBP (mm Hg) in low EI (n=11) was significantly more than normal EI (n=19) group [129.16±10.11 vs 117.44±6.99; p<0.01] while Day DBP showed no difference statistically. Day SBP and DBP load (%) were significantly more in low EI than normal EI [SBP load: 16.21±11.68 vs 5.84±0.01; DBP load: 18.27±14.59 vs 6.14±6.94; p<0.01]. There was a significant increase in risk of becoming non-dippers in subjects with low EI odds ratio of 6.4 (p=0.026).

Conclusion
Low EI subjects had more average daytime SBP, SBP & DBP load and are at more risk of becoming non dipper making them prone to develop hypertension & other cardiovascular morbidities in future.

Keywords: Emotional Intelligence; Ambulatory BP; Dipper; Non-dipper
Which is more correlated with hypertensive organ damage, sleep blood pressure assessed by self-measured at home or ambulatory blood pressure monitoring?: Japan Morning Surge Home Blood Pressure (J-HOP) Study

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Objective
To assess the associations with hypertensive organ damage of sleep SBP assessed by self-measured home blood pressure monitoring (HBPM) and ambulatory blood pressure monitoring (ABPM)

Method
Data of 1008 participants in the J-HOP study who measured sleep BP using both HBPM, three times during sleep (2AM, 3AM and 4AM) and ABPM during sleep were analyzed. Study participants were classified into 4 groups according to sleep SBP measurements: group 1, HBPM <120 mmHg, ABPM<120 mmHg; group 2, HBPM <120 mmHg, ABPM >120 mmHg; group 3, HBPM >120 mmHg, ABPM<120 mmHg and group 4, HBPM >120 mmHg, ABPM>120 mmHg. Hypertensive organ damage as indicated by B-type natriuretic peptide (BNP) levels, left ventricular mass index (LVMI) and carotid intima media thickness (IMT), assessed in 1008, 876 and 317 participants respectively, were compared among the four groups.

Discussion
Mean age was 63±11 years. The percentage of male participants was 49.9. Thirty-four, 10, 20 and 36 percent of the study population were classified into groups 1, 2, 3 and 4. For groups 1, 2, 3 and 4, respectively, BNP (median (25th Percentile, 75th Percentile)) levels were 14.6 (7.5, 30.9), 15.9 (6.5, 29.5), 17.9 (9.0, 44.9) and 22.1 (10.0, 41.7) pg/ml, LVMI were 91±23, 94±22, 101±26 and 101±28 g/m², and mean right and left IMT were 0.73±0.14, 0.72±0.18, 0.79±0.15 and 0.80±0.19 mm. After age, sex and clinic SBP were adjusted, the LVMI and IMT of groups 3 and 4 were significant higher than of group 1, and the BNP of group 4 was significantly higher than of group 1. In multivariate analyses, sleep SBP assessed by HBPM was an independent predictor of BNP, LVMI and IMT, but that assessed by ABPM was not.

Conclusion
Sleep SBP measured by HBPM was more closely associated with BNP, LVMI and IMT than sleep SBP measured by ABPM.

Keywords: sleep SBP, home blood pressure monitoring, ambulatory blood pressure monitoring, hypertensive target organ damage
Finding supplements to traditional BP monitoring: A correlation research analysis from model NCD lifestyle clinic, Jodhpur, India.

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Objective
To monitor relationship between hypertension and indicators/risk factors in patients at model NCD lifestyle clinic (MNLC) and suggest supplementary indicators based on findings.

Method
Present study was carried out at MNLC situated Urban Health Center (UHC) Pratap Nagar, Jodhpur. Secondary data i.e digital medical records of the patients (n = 1036) collected between Nov, 2015 to Nov, 2016 were analyzed using appropriate statistical tests (descriptive and correlation analysis). Data included patient’s personal and clinical examination details, diagnosis, laboratory values, anthropometric measures etc. Confidentiality of the data was maintained and ethical approval obtained from Institutional ethical committee: AIIMS, Jodhpur.

Discussion
The mean age of patients was 58±4.6 years and majorly females (57.6%). Prevalent morbidities were: Hypertension (72.9%), Diabetes (23.7%) and Obesity (67.2%). The mean systolic (SBP) 152±9.8 mmHg, diastolic blood pressure (DBP) 91±5.7 mmHg, Fasting blood sugar 112±7.4 gm/dl and total cholesterol (TC) 178±12 gm/dl. Mean weight (BW) 76+5.4 kg, body mass index (BMI) was 26.4±4.7, mean waist circumference (WC) 97.5±7.2cm and waist-hip ratio (WHR) 0.97±.17 reflecting the high burden of central obesity. Correlation analysis demonstrated positive relationship between BP-Weight (r = 0.88) BP-FBS (r = 0.76), BP-WHR (r= 0.70). However, the BP-BMI (r = 0.16) and BP-TC (r = 0.28) showed a weak positive relationship.

Conclusion
Present research suggests BW, FBS and WHR demonstrate incremental risk trend towards rising BP, major pathology in hypertension. It is suggested that further research be conducted to devise research backed proxy indicators/risk factors as supplements to error prone tradition BP monitoring for improved clinical outcomes.

Keywords: Blood Pressure; Measurement; Lifestyle; Monitoring; NCD
Diurnal Blood Pressure Rhythmicity in Relation to Environmental and Genetic Cues in Untreated Referred Patients

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Objective
No previous study addressed the relative contributions of environmental and genetic cues to the diurnal blood pressure rhythmicity. We firstly investigated the explained variance of environmental and clock genes in relation to the night-to-day ratio and morning surge, respectively.

Method
From 24 h ambulatory recordings of systolic blood pressure obtained in untreated patients (51% women; mean age, 51 years), we computed the night-to-day ratio in 897 and morning surge in 637. Environmental cues included season, mean daily outdoor temperature, atmospheric pressure, humidity and weekday and the genetic cues 14 single-nucleotide polymorphisms in 10 clock genes.

Discussion
Systolic blood pressure averaged (±Standard Deviation) 126.7±11.9 mm Hg, night-to-day ratio 0.86±0.07 and morning surge 24.8±10.7 mm Hg. In adjusted analyses, night-to-day ratio was 2.4% higher in summer and 1.8% lower in winter (P<0.001) compared with the annual average with a small effect of temperature (P=0.079); morning surge was 1.7 mm Hg lower in summer and 1.1 mm Hg higher in winter (P<0.001). The other environmental cues did not add to the night-to-day ratio or morning surge variance (P≥0.37). Among the 14 genetic variations, only CLOCK rs180260 was significantly associated with morning surge after adjustment for season, temperature and other host factors and after Bonferroni correction (P=0.044). In CLOCK rs1801260 C allele carriers (n=83), morning surge was 3.7 mm Hg higher than in TT homozygotes (n=554). Of the night-to-day ratio and morning surge variance, season and temperature explained ~8% and ~3%, while for genetic cues these proportions were ~1% or less.

Conclusion
In conclusion, environmental compared with genetic cues are substantially stronger drivers of the diurnal blood pressure rhythmicity.

Keywords: blood pressure measurement; blood pressure variability; clock genes; season; ambient temperature
ONE READING DOES NOT DIAGNOSE HYPERTENSION. AN ALTERNATIVE TO DIAGNOSE HYPERTENSION IN SINGLE PATIENT VISIT.

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Objective
Isolated BP measurement does not diagnose Hypertension. To find alternative method to diagnose Hypertension during single visit.

Method
We measured patient's Blood pressure during echocardiography procedure thrice. Before, at 3 minutes interval twice during the examination. Routinely used oscilloscopic instrument was used. Standard 2D echocardiographic measurements (Left ventricular mass, wall thickness and indexed LA volume) were considered. Patients who enquired about their BP readings during procedure, or with echocardiographic findings of other causes of LV hypertrophy, Coronary artery disease were excluded. Based on Blood pressure readings, patients were sub-grouped to 2 types. Dippers - Sequential drop in readings over sampling period. Non-Dippers - Either of subsequent reading was higher than previous reading. These were further subdivided into Normotensives, Pre-hypertensive and Hypertensives. Standard statistical methods were applied to interpret significance of results.

Discussion
1241 patients qualified for study. Male female ratio was 1.3. Only 21% of study population had sequentially declining BP readings. In each Hypertensive range, a definite subset of Non-Dipper exists. Mean age and BMI were similar in both Dippers & Non-Dippers. In Normotensives, Non-Dippers had higher Left atrial volumes (p<0.01). In pre-hypertensive, Non-Dippers had in addition, higher LV mass (p<0.01). In hypertensive group, difference in LA Volume & LV mass was not statistically different in Dippers & Non-Dippers. Product of difference in 3 BP readings was highly statistically different in Dippers and Non-Dippers (p<0.0001)

Conclusion
Three BP readings obtained 3 minute apart during single visit identifies Non-Dippers, a definite subset. Non-dippers are likely to have masked hypertension, or are prone to develop hypertension, even with normal BP readings during examination. Non-Dippers are more likely to have cardiac end organ damage, even in Normotensives and pre-hypertensive individuals. This is suitable & cheaper alternative for mass screening of hypertension. Conversion from Non-Dipper to Dipper status may be useful to assess effectiveness of anti-Hypertensive therapy.

Keywords: Hypertension, Dippers, Echocardiography LV hypertrophy
Prevalence and clinical co-relates of white coat effect in patients with chronic kidney disease

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Objective
Hypertension in CKD is an important modifiable cardiovascular risk factor. CKD patients can have clinically significant white coat effect (WCE), making routine clinic blood pressure (BP) measurements an unreliable indicator of actual BP control. Suboptimal blood pressure (BP) measurement by clinic BP alone has been recognized as an important factor in high incidence of poorly controlled hypertension in the CKD population. The goal of this study was to estimate the prevalence and determinants of white-coat effect in the adult CKD population using an automated blood pressure device (BpTRU)

Method
Stable CKD patients attending the nephrology clinic over a period of 6 months (January 2016 to July 2016) who were suspected to have white coat effect by treating physician were assigned to measurement of BP by both the standardized manual BP recording by a single nephrologist and also with the BpTRU machine as per a defined protocol. Clinical, demographic characters that would influence outcomes were also studied.

Discussion
A total of 118 patients were included in the study. 69 males (58.5%) and 49 females (41.5%). Mean age of the study population was 43.94 (+/- 14.93 SD) years. 68 patients showed white coat effect (57.6%) accounting for higher incidence in our population. 53 out of 68 patients (77.9%) who showed white coat effect had BP <140/90 mm Hg and thus didn’t require any dose adjustment for anti-hypertensives. There was no statistically significant difference in the incidence of white coat effect based on gender, presence of diabetes mellitus or smoking in our population

Conclusion
White coat effect is a highly prevalent and underdiagnosed entity in the CKD population. BpTRU is a useful and time saving tool in detection of white coat effect in patients with CKD attending the outpatient clinic and guide management.

Keywords: white coat effect; BpTRU; CKD
Changes of plasma Angiotensin-(1-7) in patients with pulmonary arterial hypertension due to congenital heart disease before and after intervention closure

Objective
The angiotensin(Ang) converting enzyme 2 (ACE2)-Ang-(1-7)-Mas receptor axis might be a promising therapeutic target for pulmonary arterial hypertension. We previously showed that serum Ang-(1-7) levels was decreased in the patients with pulmonary arterial hypertension(PAH) due to congenital heart disease(CHD). In this study, To observe the changes of plasma Angiotensin-(1-7) in patients with CHD-PAH before and after intervention closure.

Method
59 patients with CHD and 20 normal control patients (group A) were involved in the research. The patients with CHD were divided into 21 cases of nonpulmonary hypertension (group B), 20 cases of mild pulmonary hypertension (group C) and 18 cases of moderate to severe pulmonary hypertension (group D). The serum levels of Ang-(1-7) were detected by enzyme-linked immunosorbent assay(ELISA) at 1 day before operation and 2 days after operation.

Discussion
Before operation, in group D, their serum Ang-(1-7) level was significantly lower than that in the group A, group B and group C (17.54±2.10 vs 19.31±1.34, 23.16±2.74, 20.07±2.11 pg/ml, P < 0.05). After operation, compared to 1 day before operation, echocardiographic assessment showed that pulmonary artery systolic pressure was decreased in group C and group D(all P < 0.05). In group C, their serum Ang-(1-7) level was increased (20.07±2.11 vs 20.45±2.20 pg/ml, P < 0.05); in group D, their serum Ang-(1-7) level was increased (17.54±2.10 vs 18.92±2.44 pg/ml, P < 0.001).

Conclusion
Serum Ang-(1-7) levels declined in patients with CHD-PAH. The decline of pulmonary artery pressure was decreased accompanied by an increase in Ang-(1-7) after interventional closure. Detection of plasma Ang-(1-7) level may be benificial to evaluate the postoperative prognosis in patients with CHD-PAH.

Keywords: congenital heart disease; pulmonary arterial hypertension; Ang-(1-7)
Total Cholesterol to HDL Cholesterol Ratio: Equally Sensitive as high sensitivity C-reactive protein to predict Atherosclerosis in Diabetic patients.

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Objective
Determination and comparison of calculated cardiac risk ratio with high sensitivity C-reactive protein to predict atherosclerosis in diabetic patients.

Method
A prospective cross-sectional study was conducted from 10 January to 15 December 2016 at the Department of Clinical Biochemistry and General Medicine of Dhulikhel Hospital-Kathmandu University Hospital. All the known cases of Type 2 diabetes mellitus not taking lipid lowering drugs and meeting inclusion criteria were included in this study. Patients willing to participate in this study were asked to answer structured questionnaire after written consent and overnight fasting blood sample was collected. Blood sample was analyzed for Total Cholesterol, High Density Lipoprotein (HDL), low density lipoprotein (LDL), Triglycerides and blood glucose in fully automated biochemistry analyzer. High sensitivity C-reactive protein (hs-CRP) was measured in Nephelometry and HbA1c was measured by High Performance Liquid Chromatography (HPLC). Cardiac risk was calculated by dividing total cholesterol with high density lipoprotein cholesterol (HDL).

Discussion
We recruited 1364 inclusion criteria matched diabetic patients out of which 709 were male and 655 were female with a mean age of 57.81 years. Out of all these diabetic patients 91.2% have some sorts of dyslipidemia. Cardiac risk ratio was found six to eight among 17.1% and more than eight in 1.68%. 86.9 % of participants having cardiac risk ratio more than eight have average hs-CRP level 6.92 mg/L and 13.1% have more than 10.0 mg/L of hs-CRP found.

Conclusion
High sensitive CRP being established marker of atherosclerosis is still not in routine use because of its high cost. So calculated cardiac risk ratio can be used as an alternative marker to predict atherosclerosis instead of hs-CRP.

Keywords: hs-CRP; Cardiac Risk ratio; HbA1c; Atherosclerosis; Lipid Profile Test
Objective
To study the correlation between P-selectin as a marker of endothelial dysfunction and CD40 Ligand (CD40L) as a marker of platelet activation in hypertensive subjects.

Method
The study was a cross-sectional consist of 72 subjects, aged between 40-60 years. P-Selectin and CD40L was measured using quantitative sandwich immunoassay technique. Spearman correlation test is used for data analysis with P value <0.05 was considered as significant. Criteria of hypertension based on JNC-7.

Discussion
This study showed that there is a significant correlation between P-selectin and CD40L (r=0.364, p=0.002).

Conclusion
Our present study showed that endothelial dysfunction have a significant correlation with platelet activation.

Keywords: Hypertension, P-Selectin, CD40L.
Association of Aldosterone and Serum Surfactant Proteins in Middle-aged Males with Obstructive Sleep Apnea

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Objective

The present study was to investigate the association of aldosterone excess and serum surfactant protein levels in middle-aged males with obstructive sleep apnea (OSA).

Method

This is a cross-sectional study. Patients with OSA confirmed by polysomnography (PSG) were enrolled, circulating levels of aldosterone (ALD) and surfactant proteins (SPs, including SP-A, B, C and D) were measured and SPs were compared between higher and normal plasma aldosterone concentration (PAC). Association of key variables and PAC was then evaluated by univariate and multiple linear regression analysis.

Discussion

A total of 86 middle-aged males with OSA were enrolled. Compared with N-ALD group (PAC<15ng/dl)(n=32), H-ALD group (PAC≥15ng/dl)(n=54) had lower serum SP-B level (40.10±5.76ng/L vs 43.16±6.89ng/L, \(p=0.038\)). Correlation analysis showed that PAC was negatively correlated with SP-B (\(r=-0.361, P=0.043\)) by controlling apnea-hypopnea index (AHI). Multiple linear regression analysis showed that SP-B levels were positively associated with PAC, independent of AHI, plasma renin activity (PRA), mean oxyhemoglobin saturation (MSaO2), and plasma potassium.

Conclusion

In patients with OSA, PAC might repress synthesis of SP-B, presented as decreased serum SP-B, which needs further confirmation.

Keywords: aldosterone; serum surfactant proteins; obstructive sleep apnea
The relationship between soluble lectin-like oxidized low-density lipoprotein-1 and carotid intima-media thickness in patients with diabetes mellitus without cardiovascular diseases

Objective
Lectin-like oxidized low-density lipoprotein receptor-1 (LOX-1) is regarded as a central element in the initiation of endothelial dysfunction (ED). LOX-1 has been implicated as a key causative of a number of cardiovascular diseases. LOX-1 is viewed as a biomarker of ED. Measurement of soluble LOX-1 (sLOX-1) may provide a novel diagnostic tool for the prediction of ED. Since endothelial dysfunction is a very early step in atherogenesis, we investigated whether sLOX-1 could be a novel diagnostic tool for the prediction of ED in patients with type 2 diabetes mellitus (DM) without cardiovascular disease. We evaluated relationship of serum sLOX-1 with carotid intima-media thickness (CIMT).

Method
The three groups; DM with cardiovascular diseases (Group I), DM without cardiovascular diseases (Group II) and control were comprised. CIMT were measured on ultrasonography images. Serum oxidized low density lipoprotein (oxLDL), sLOX-1 levels and paraoxonase-1 (PON-1) activity were measured from collected blood samples. All statistical comparisons were performed using the analysis of variance was used to compare multiple-group means.

Discussion
OxLDL, sLOX-1 levels were significantly higher in the Group I and Group II than in the control (p<0.001). sLOX-1 levels were significantly higher in the Group I compared with the Group II (p<0.01). PON-1 activity were significantly lower in the Group I and Group II groups than in the control (p<0.001). There were no significant differences between the Group I and Group II. CIMT were significantly higher in the Group I and Group II than in the control (p<0.001) but were significantly higher in the Group I compared with the Group II (p<0.01). There was a significant positive correlation between sLOX-1 and CIMT in Group I and Group II.

Conclusion
sLOX-1 levels could be strong biomarker for determining early endothelial damage in DM patients without cardiovascular diseases.

Keywords: sLOX-1 DM
Relation of Stature to Outcomes in Korean Patients Undergoing Primary Percutaneous Coronary Intervention for Acute ST-Elevation Myocardial Infarction (from the INTERSTELLAR Registry)

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Objective
Although epidemiologic studies have shown the impact of height on occurrence and/or prognosis of cardiovascular diseases, the underlying mechanism is unclear. In addition, the relation in patients with ST-segment elevation myocardial infarction (STEMI) who underwent primary percutaneous coronary intervention (PCI) remains unknown. We sought to assess the influence of height on outcomes of patients with acute STEMI undergoing primary PCI and to provide a pathophysiological explanation.

Method
All 1,490 patients with STEMI undergoing primary PCI were analyzed. Major adverse cardiac and cerebrovascular events (MACCE) were defined as all-cause mortality, nonfatal myocardial infarction, nonfatal stroke, and unplanned hospitalization for heart failure (HF). Patients were divided into (1) MACCE (D) versus MACCE (L) and (2) first- to third-tertile groups according to height.

Discussion
MACCE (D) group was shorter than MACCE (L) group (164 – 8 vs 166 – 8 cm, p [ 0.012). Prognostic impact of short stature was significant in older (‡70 years) male patients even after adjusting for co-morbidities (hazard ratio 0.951, 95% confidence interval 0.912 to 0.991, p [ 0.017). The first-tertile group showed the worst MACCE-free survival (p [ 0.035), and most cases of MACCE were HF (n, 17 [3%] vs 6 [1%] vs 2 [0%], p [ 0.004). On post-PCI echocardiography, left atrial volume and early diastolic mitral velocity to early diastolic mitral annulus velocity ratio showed an inverse relation with height (p <0.001 for all) despite similar left ventricular ejection fraction.

Conclusion
Short stature is associated with occurrence of HF after primary PCI for STEMI, and its influence is prominent in aged male patients presumably for its correlation with diastolic dysfunction.

Keywords: Stature, Myocardial infarction, Intervention, Echocardiography, Diastolic dysfunction
The expression of miR-125a-3p in peripheral blood mononuclear cells of patients with Coronary heart disease

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Objective
Macrophages play a key role in the occurrence and development of coronary atherosclerosis, tissue macrophages can be divided into two types, the classical activation type (type M1) and alternative activation type (M2 type), M1 type macrophages mainly for promoting inflammation, and M2 type macrophages mainly for anti-inflammatory effect. Recent studies show that the balance of M1/M2 plays an important role in atherosclerotic plaque stability. And a study show that miR-125a-3p plays an important role in the regulation of the differentiation of monocytes to M1 type macrophages.

Method
20 cases of normal control group(group A), and the patients with coronary heart disease were divided into 23 cases of stable angina pectoris group, and 40 cases of acute coronary syndrome group. All people were confirmed by coronary angiography. Extracting object venous blood and separating the mononuclear cells, total RNA was extracted from the resulting mononuclear cells, and then the total RNA was reverse transcribed using the reverse transcription object microRNA reverse primer synthesis, the level of miRNAs in blood was detected by using real-time fluorescent quantitative PCR. To detect the expression level of peripheral blood mononuclear cells differentiation miR-125a-3p in patients of Coronary atherosclerotic heart disease.

Discussion
Compared with group A, the levels of miR-125a-3p in group B, group C were significant high expression (P<0.01). Compared with group B, the levels of miR-125a-3p in group C was significant high expression (P<0.01). group C > group B > group A.

Conclusion
miR-125a-3p may be a new targets for the treatment of unstable plaque.
Association between Hemorrhoid and Risk of Coronary Heart Disease: A Nationwide Population-Based Cohort Study

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Objective
The purpose of the study was to address the association between hemorrhoid and the subsequent risk of coronary heart disease (CHD) development.

Method
This retrospective cohort study used reimbursement claims data from the Longitudinal Health Insurance Database 2000 in Taiwan. 33034 patients with hemorrhoids and 132136 age-, gender-, and index year matched controls between 2000 and 2010 were identified. Cox model was performed to estimate the hazard ratios (HRs) and 95% confidence intervals (CIs) of CHD development for the hemorrhoid cohort compared with the non-hemorrhoid cohort.

Discussion
During a follow-up period of 12 years, the overall incidence rate of CHD was 9.91 per 1000 person-years in the hemorrhoid patients and was 1.36-fold higher than in the non- hemorrhoid cohort (7.28 per 1000 person-years) with an adjusted hazard ratio (aHR) of 1.27 (95% CI = 1.21–1.34). Moreover, compared with the non-hemorrhoid patients without these comorbidities, among patients with hemorrhoids, those with any two comorbidities were at a significantly increased risk of CHD (aHR = 3.23, 95% CI = 2.97–3.50; p< 0.001), followed by those with any one comorbidity (aHR = 2.24, 95% CI = 2.04–2.45; p< 0.001).

Conclusion
We found that hemorrhoid patients had a 1.27-fold higher risk of CHD compared with those without hemorrhoids after adjusting for age, sex and comorbidities.

Keywords: Cohort Study, Coronary Heart Disease, Hemorrhoid
RELATIONSHIP BETWEEN LEFT VENTRICULAR MASS INDEX AND COMPLEXITY OF CHRONIC TOTAL OCCLUSION LESION IN HYPERTENSIVE PATIENTS

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Objective
Hypertension causes left ventricular (LV) hypertrophy and contribute to severity of coronary artery disease (CAD) through several mechanisms such as shearing forces, reduced endothelial functions and vascular remodeling. Chronic total occlusion (CTO) represents the most severe and technically challenging CAD lesion subset. Previous studies stated that LV remodeling is parallel to the increase in extent and complexity of CAD. According to our knowledge, relationship between LVMI and complexity of CTO lesion has not been investigated. The aim of this study was to analyze the relationship between LVMI and complexity of CTO lesions in hypertensive patients.

Method
It was an observational analytic study conducted on 58 hypertensive patients who had CTO based on angiographic data in Dr. Hasan Sadikin General Hospital within January 2015-December 2016 and met the inclusion and exclusion criteria. Correlation of LVMI and J-CTO score was analyzed with Spearman’s rank test. Independent Sample T-Test was used to analyze mean J-CTO Score difference between hypertrophic and non-hypertrophic group and linear regression multivariate analysis was performed to adjust the effect toward other factors.

Discussion
Mean LVMI was 150.62 ± 39.7g/m² and mean J-CTO Score was 2.1±1.12. There were no significant differences in term of age, gender, DM, dyslipidemia, smoking, and family history between hypertrophic and non-hypertrophic groups. There was moderate positive correlation between LVMI and J-CTO score (r=0.44, p=0.001). Mean J-CTO score in hypertrophic group was very significantly higher than non-hypertrophic group (2.31±1.014 vs. 1.10±1.101, p=0.001). From multivariate analysis, mean J-CTO score of hypertrophic group remained very significantly higher than non-hypertrophic even after adjustment toward age and dyslipidemia.

Conclusion
There is moderate positive correlation between LVMI and complexity of chronic total occlusion in hypertensive patients. Hypertensive patients with LV hypertrophy tend to have more complex CTO lesion. LV hypertrophy has an independent contribution toward complexity of CTO lesion.

Keywords: Left Ventricular Mass Index; Chronic Total Occlusion; J-CTO Score; Hypertension
Comparison of Hypertensive and Normotensive Patients undergoing Endovascular Revascularization for Peripheral Arterial Disease

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Objective
Peripheral arterial disease (PAD) is known to be associated with poor outcomes due to higher incidence of combined cardiovascular morbidity and mortality. We evaluated the clinical outcomes of hypertensive versus normotensive patients (pts) with PAD who underwent peripheral transluminal angioplasty (PTA).

Method
The outcomes of 559 consecutive pts with symptomatic PAD who underwent PTA were enrolled for analysis. Pts were divided into two groups; PAD with hypertension (N=390) and PAD without hypertension (N=169). The incidence of restenosis, amputation rates and clinical outcomes were assessed at a follow-up of 1 year.

Discussion
Hypertensive PAD pts had suffered from more diabetes mellitus (DM, 78.2% vs 64.5%; P=0.001), chronic kidney disease (CKD, 34.9% vs 13.0%; P<0.001), and need for dialysis (23.8% vs 8.9%; P<0.001). However, the incidence of wounds and claudication as the initial diagnosis for PAD were similar between the two groups. At 8 months follow-up, the incidence of binary restenosis, total occlusion of the limb were similar between the two groups. At 1-year follow up, the incidence of repeat PTA, amputation rate, and major adverse cardiovascular events (MACE) were similar between the two groups.

Conclusion
Although hypertensive PAD pts had higher comorbidity including DM and CKD, the incidence of restenosis and amputation rate, and MACE at 1 years following successful PTA were similar with those of PAD pts without hypertension.

Keywords: Hypertension, peripheral artery disease
The impact of endothelial function measured by pulse amplitude tonometry (PAT) on late loss in the patients undergoing coronary intervention

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**Objective**
Endothelial dysfunction plays an important role in vascular biology. Pulse amplitude tonometry (PAT) is a useful tool for the assessment of endothelial function expressed as reactive hyperemia index (RHI). The effect of endothelial function on the late result of percutaneous coronary intervention (PCI) is not well known. The aim of this study was to evaluate the impact of endothelial dysfunction on late loss in normotensive group and hypertensive group undergoing PCI.

**Method**
Data from 132 patients who underwent PCI using drug eluting stents and PAT study were analyzed.

**Discussion**
The values of RHI were 1.64 ± 0.42 and 1.63 ± 0.49 in normotensive group (n=50) and hypertensive group (n=82), respectively (p=0.891). However, the number of diseased coronary arteries were 1.83±0.79 and 2.26±0.73, respectively (p=0.003) There was negative correlation between RHI and late loss in normotensive group (correlation coefficient = -0.378; p=0.028). However, there was no correlation between RHI and late loss in hypertensive group (correlation coefficient = -0.061 ; p=0.650)

**Conclusion**
Endothelial dysfunction is unfavorable for late loss of the patients undergoing PCI in normotensive patients. However, this is not with hypertensive patients.

*Keywords: Endothelia dysfunction, Pulse amplitude tonometry*
**Ganoderma lucidum** Polysaccharide Peptides: A Potent Protective Endothelial Vascular and Anti-lipid in Atherosclerosis

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**Objective**
Atherosclerosis has been known as the hallmark of cardiovascular diseases. It involves inflammation, oxidative stress and endothelial dysfunction, which stimulate cytokines and other biomarkers. *Ganoderma lucidum* is a mushroom that is known for its numerous pharmacological effects such as anti-tumour, immunomodulator, antioxidant, anti diabetic and anti-lipid. This study was aimed to evaluate the effects of polysaccharide peptides (PSP) of *Ganoderma lucidum* on circulating endothelial cells (CECs), endothelial progenitor cells (EPCs) and nitric oxide (NO) as the hallmark of endothelial vascular injury; and TNF alpha and IL-6 as inflammatory markers.

**Method**
This is a prospective study with pre- and post-test design that involves 34 patients with stable angina and 37 high-risk patients according to Framingham Risk Score and they were given PSP 750 mg/day in divided dose for 3 months as adjuvant therapy to their previous medications. The primary endpoint is the level of CEC and EPC after treatment. We also evaluate lipid profile, TNF alpha, IL-6, and NO concentrations.

**Discussion**
The levels of CEC and EPC significantly reduced in stable angina patients (p=0.000) and high-risk patients (p=0.000). The levels of TNF alpha and IL-6 also decreased significantly after PSP administration, interestingly followed by the level of NO. Total cholesterol level reduced from 205.49±48.49 mg/dl to 182.11±73.81 mg/dl (p=0.081) and LDL reduced from 126.17±38.87 mg/dl to 116.17±54.16 mg/dl (p=0.268) in patients with stable angina. The same reduction also occurs in high-risk patients, where the level of total cholesterol (p=0.193) and LDL cholesterol (p=0.580) decreased after 3-month treatment.

**Conclusion**
*Ganoderma lucidum* polysaccharide peptides have a potent protective vascular effect and anti lipid in stable angina pectoris and promising as adjuvant therapy on the treatment of atherosclerotic cardiovascular diseases.

*Keywords: Ganoderma lucidum; atherosclerosis; endothelial dysfunction; CEC; EPC*
Anti-Anginal and Metabolic Effects of Carvedilol and Atenolol in Patients with Stable Angina Pectoris: A Prospective, Randomized, Parallel, Open-Label Study

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Objective
While recent guidelines have suggested the potential for beta-blockers as first-line agents in chronic stable angina, few data regarding comparative anti-anginal and metabolic effects between beta-blockers have been reported, particularly in patients with angina pectoris. Our objective was to compare the anti-anginal and metabolic effects of carvedilol and atenolol in patients with stable angina pectoris.

Method
A total of 89 patients (mean age 54.9 ± 9.3 years; male 53.9 %) with stable angina pectoris were randomly assigned to carvedilol (n = 43) or atenolol (n = 46). The subjects undertook an exercise treadmill test and completed the Seattle Angina Questionnaire (SAQ); metabolic parameters were measured at baseline and 6 months after treatment.

Discussion
The baseline characteristics of both groups were well balanced. Both carvedilol and atenolol significantly reduced heart rate from baseline (76±11 to 66±9 beat/min, p < 0.001; 74 ± 9 to 64 ± 9 beat/min, p < 0.001, respectively) with no significant changes in systolic and diastolic blood pressure. Improvement of time to ST-segment depression during the treadmill exercise and the SAQ scores for angina stability and frequency after 6 months of treatment were similar. There was no significant change from baseline in the level of fasting glucose, insulin, or glycated hemoglobin in either group. However, total cholesterol and low-density lipoprotein cholesterol levels significantly reduced to a greater extent with carvedilol than with atenolol (−23 vs. −10 and −38 vs. −24 %, respectively, p < 0.05 for both), although the rate of statin use was comparable. No changes were seen in high-density lipoprotein cholesterol and triglyceride levels after 6 months of treatment in both groups compared with baseline.

Conclusion
Both carvedilol and atenolol had a similar anti-anginal effect. Compared with atenolol, carvedilol might have more beneficial effects on lipid metabolism in patients with stable angina pectoris.

Keywords: angina pectoris, carvedilol, atenolol
Anti-Anginal and Metabolic Effects of Carvedilol and Atenolol in Patients with Stable Angina Pectoris: A Prospective, Randomized, Parallel, Open-Label Study

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Objective
While guidelines have suggested the potential for beta-blockers as first-line agents in stable angina, few data regarding comparative anti-anginal and metabolic effects between beta-blockers with and without vasodilating properties have been reported. Our objective was to compare the anti-anginal and metabolic effects of carvedilol and atenolol in patients with stable angina pectoris.

Method
A total of 89 patients (mean age 54.9 ± 9.3 years; male 53.9 %) with angina pectoris were randomly assigned to carvedilol (n = 43) or atenolol (n = 46). The subjects undertook an exercise treadmill test and completed the Seattle Angina Questionnaire (SAQ); metabolic parameters were measured at baseline and 6 months after treatment.

Discussion
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Conclusion
Both carvedilol and atenolol had a similar anti-anginal effect. Compared with atenolol, carvedilol might have more beneficial effects on lipid metabolism in patients with stable angina pectoris.

Keywords: angina pectorie, carvedilol, atenol
Clinical implications of combined glucose intolerance in treatment-naïve hypertensive patients

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Objective
This study is the first to evaluate clinical significances of combined glucose intolerance (CGI) in treatment-naïve hypertensive patients. We compared the results of demographic, anthropometric, clinical, laboratory examinations, echocardiography, arterial stiffness, central blood pressure (BP) and ambulatory BP monitoring (ABPM) in treatment-naïve hypertensive patients.

Method
A total of 376 consecutively-eligible patients were categorized as follows: (1) normal glucose tolerance (NGT); FBS<100 mg/dL and PP2<140 (2) isolated glucose intolerance (IGI); 100≤FBS<126 or 140≤PP2<200, but not both 100≤FBS<126 and 140≤PP2<200 (3) CGI; both 100≤FBS<126 and 140≤PP2<200.

Discussion
Multivariate analyses revealed that mitral average E/Ea (IGI vs CGI, p=0.022), brachial-ankle pulse wave velocity baPWV(Rt.) (IGI vs CGI, p=0.026), baPWV(Lt.) (IGI vs CGI, p=0.018), office systolic BP (SBP) (NGT vs. CGI , p=0.005; IGI vs. CGI, p=0.001), office diastolic BP (DBP) (NGT vs. CGI , p=0.034; IGI vs. CGI, p=0.019), night-time SBP (NGT vs. CGI , p=0.049; IGI vs. CGI, p=0.018) were significantly higher in the CGI group than in the NGT or IGI group . However, there were no significant differences between the female groups.

Conclusion
Treatment-naïve hypertensive males with CGI showed increased subclinical diastolic dysfunction, arterial stiffness and BPs, compared to those of the male NGT or IGI group but not females.

Keywords: combined glucose intolerance;hypertension;oral glucose tolerance test
Using network meta-analysis to determine the level of systolic blood pressure with the best outcome

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Objective
A recent clinical trial showed that lowering the systolic blood pressure (SBP) to <120 mmHg reduced cardiovascular events and mortality. Whether this should be the target SBP is controversial. We therefore related outcomes in large clinical trials to the level of SBP attained using network meta-analysis.

Method
We searched for randomised controlled trials comparing different BP targets that reported major adverse cardiovascular events (MACE) and mortality. The mean SBP attained was classified into five groups (110-119, 120-129, 130-139, 140-149 and 150-159 mm Hg). Data were analysed using R.

Discussion
We included 13 trials involving 48152 patients over 50 years old. MACE and strokes were significantly reduced when controlling SBP to 120-129 mmHg compared to 130-139 mmHg (OR 0.84, 95% CI 0.73-0.96 and 0.83, 0.69-0.99), 140-149 mmHg (0.75, 0.63-0.90 and 0.70, 0.55-0.90), and 150-159 mmHg (0.42, 0.31-0.58 and 0.39, 0.23-0.67), respectively. Stroke was further reduced with more intensive control to <120 mmHg (0.58, 0.38-0.87, 0.49, 0.31-0.77, and 0.27, 0.14-0.52, respectively). In contrast, cardiovascular mortality and myocardial infarction increased with SBP ≥150 mm Hg compared to 120-129 mmHg (2.05, 1.27-3.30 and 1.73, 1.08-2.78) and 130-139 mmHg (1.60, 1.09-2.39 and 1.53, 1.03-2.29). The relationship between SBP and all-cause mortality was not significant.

Conclusion
Lowering SBP to <130 mmHg reduces MACE and stroke. Further reduction to <120 mmHg reduces stroke risk and is therefore an option if the treatment is tolerated. The long-term SBP should not exceed 150 mmHg because of increased risk of myocardial infarction and cardiovascular mortality.

Keywords: meta-analysis; systolic blood pressure; target; major adverse cardiovascular event;
Development, Validation, Reliability and Testing of Medication Adherence Questionnaire in the Hypertensive Patients

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Objective
Medication non-adherence in hypertensive patients rests a universal problem and promoting adherence to antihypertensive therapy is the major obstacle, which is required to reduce the morbidity and mortality. Appropriate tool for assessing the adherence to antihypertensive therapy in the Asian patients is lacking. Therefore, the objective was to develop, validate, reliability and testing of medication adherence questionnaire (MAQ) in hypertensive patients.

Method
A cross-sectional study was conducted in both inpatients and outpatients for a period of 8 months. The MAQ was prepared by referring to the previously validated questionnaires and other related medication adherence studies. The validation of MAQ was done by experts committee and tested for test-retest reliability. The validated medication adherence questionnaire was translated into the local language Kannada and Malayalam by using a 3-steps process of forwarded translation, backward translation and patient testing. The MAQ consist of eight self-reported questions that can be answered with a simple “YES” or “NO”, to assess medication adherence. The data was collected from patients who have been receiving at least one antihypertensive medication in the past 3 months by using developed MAQ.

Discussion
The mean medication adherence score for the test, re-test was 66.25 +19.49 and 67.50 + 19.19 respectively, and the test-retest reliability of MAQ was 0.979. Out of 299 hypertensive patients, 180(60.20%) were males and 118(39.46%) were females. In our study population, most the patients were found to have medium medication adherence 161(53.84%) followed by low medication adherence 117(39.13%) and high medication adherence 21(7.02%).

Conclusion
The self-reported 8 items MAQ was developed and tested for reliability in Indian hypertensive patients. This MAQ will also able to categorise the patients in to three different types of adherence groups. The mean medication adherence of the study population was 71.77 ± 13.94, which indicates low adherence to antihypertensive treatment.

Keywords: Hypertension; medications adherence, blood pressure; treatment
Aplastic Anemia and Risk of Incident Atrial Fibrillation: A propensity score matching and competing risk analysis of a nationwide cohort

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Objective
The present study sought to identify whether there exists such an association between aplastic anemia (AA) and risk of incident atrial fibrillation (AF).

Method
This retrospective cohort study was conducted using the National Health Insurance Research Database (NHIRD) of the Taiwan National Health Insurance (NHI) program. An AA cohort and a non-AA cohort were established to identify the incidence of new-onset AF. Both the 2 cohorts were matched by a propensity score (AA cohort: non-AA cohort=1:4). Cox proportion hazard regression models were applied to assess the hazard ratios (HRs) and 95% confidence intervals (CIs) for AF between the 2 cohorts. Death was considered as a competing factor to estimate subhazard ratios (SHRs) and 95% CIs by using the Fine and Gray method as sensitivity analysis.

Discussion
During 11637 and 85306 person-years of follow-up, the overall incidence density of AF was significantly higher in the AA cohort than in the non-AA cohort (8.94 vs 6.47 per 1000 person-years). After adjustment for age, gender, and comorbidities, the adjusted HR (aHR) of AF for the AA cohort to the non-AA cohort was 1.59 (95% CI = 1.29–1.97). Furthermore, after adjusted for the confounding factors and the competing risk for death, the AA cohort still conferred a significantly higher risk of developing AF than the non-AA cohort [adjusted subhazard ratio (aSHR) = 1.39, 95% CI = 1.13-1.72].

Conclusion
In conclusion, the current study is the first to show the association between AA and risk of incident AF.

Keywords: Aplastic Anemia, Atrial Fibrillation, Cohort Study
Comparison of CHA2DS2-VASc, CHADS2 and HATCH Scores for the Prediction of New-Onset Atrial Fibrillation in Cancer Patients- A Nationwide Cohort Study of 760339 Study Participants with Competing Risk Analysis

WS HU

1 CARDIOLOGY/ CMUH/ Taiwan (台灣)

Objective
The current study was conducted to assess the ability of CHA2DS2-VASc, CHADS2 and HATCH scores in predicting new-onset atrial fibrillation (AF) among patients with cancer.

Method
Patients with newly diagnosed cancer between 1 January, 2000 and 31 December, 2011 from the Registry for Catastrophic Illness Patient Database were defined as the study cohort. CHA2DS2-VASc, CHADS2 and HATCH scores were used for new-onset AF prediction in these study patients and the predictive accuracy of the scores were assessed by the receiver operating characteristics (ROC) curve.

Discussion
A total of 760339 cancer patients were identified as the study participants. The ROC curves were 0.68 (95% CI=0.68-0.69) for the CHA2DS2-VASc score, 0.67 (95% CI=0.67-0.68) for the CHADS2 score and 0.69 (95% CI=0.69-0.70) for the HATCH score. There are significant differences of c-statistics among CHA2DS2-VASc score, CHADS2 score and HATCH score (CHA2DS2-VASc score vs. CHADS2 score, p-value = 0.01; CHA2DS2-VASc score vs. HATCH score, p-value = 0.002; CHADS2 score vs. HATCH score, p-value < 0.001).

Conclusion
In summary, the current study is the first to address the predictive ability of CHA2DS2-VASc, CHADS2 and HATCH scores in risk stratification for new-onset AF in cancer patients. Moreover, HATCH score was found to have a better predictive performance than and CHA2DS2-VASc and CHADS2 scores.

Keywords: Atrial fibrillation, Cancer, CHA2DS2-VASc score, CHADS2 score, HATCH score
ATRIAL FIBRILLATION IN HYPERTENSION AND COMORBIDITIES PATIENTS

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Objective
246 patients (129 men and 117 women aged 38-76 years) with the aim of studying of particularities of the course of atrial fibrillation (AF) in patients with hypertension (Ht) and various non-coronary diseases were examined. Comorbid conditions were presented with diabetes mellitus (DM; n=27), COPD (n=27), Graves’ disease (GD, n=25); hypothyroidism (HT, n=50) and central obesity (CO; n=48). All surveys were diagnosed with essential hypertension grade 1-3). The comparison group with AF and Ht and without comorbidity was about 69 patients. There was no significant association with frequency of alcohol consumption and smoking.

Discussion
There was no difference in the incidence of permanent form of atrial fibrillation but paroxysmal form have been frequently recorded in cases of thyroid diseases and CO. The youngest patients were hypothyroid; there were significantly more female in GD and HT groups; HT and CO groups showed the longest duration of AF. Biochemical blood indicators did not differ much between the groups, with exceptions such as: patients with GD had the lowest total cholesterol level, lowest HDL level appeared in patients with DM and lowest triglycerides – in COPD patients. The uric acid levels in GD and CO significantly exceeded the indexes in group of comparisons, thyroid patients had the lowest serum potassium level, eGFR in GD group was authentically lower, than in the comparison group. Patients with GD and COPD had significantly lower LVMI also it was significantly higher in HT and CO and HTH comparing AF without comorbidity. High CHF class (NYHA III) was related to DM and COPD. Patients in all groups were assigned to receive beta-blockers, cardiac glycosides, RAAS blockers and antiarrythimics and were approximately the same in dose frequency. Cardioversion for sinus rhythm restorey was provided at various stages in 71.6% comparison group and significantly less frequently (23.0-32.0%) than in comorbid group. GD patients were successfully cardioverted to sinus rhythm more often (56.5%), and COPD patients – more rare (29.0%).

Conclusion
Thus, while hypertension is the most relevant predictor of AF owing to morphofunctional changes in the myocardium and neurohormonal activation, non-coronary comorbidity association does leave its mark on the disease course, the intensity of biochemical, hemodynamic and functional changes in disease activity and the feasibility of rhythm restoration treatment.

Keywords: Hypertension, Atrium fibrilation, Concomitant diseases
Atrial Fibrillation in India: Is it a Tide Rising or a Tsunami?

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Objective
This review analyses the current epidemiological data of AF in the Indian population.

Conclusion
The incidence, prevalence, risk factors and economic burden of AF in Indians are different from those in Western population. Indian patients of AF are about a decade younger and have female preponderance, which could be attributed to Rheumatic valvular disease. More proportion of Indian patients has persistent/permanent AF thus representing a higher stroke risk. More registries like the IHRS-AF registry are required to document the epidemiologic data of AF in India, thus helping us in better understanding of the changing trends in patients of AF and improve care, with better prevention and management strategies.

Keywords: ATRIAL FIBRILLATION ; INDIAN SUBCONTINENT; PREVALENCE; INCIDENCE; EPIDEMIOLOGICAL DATA
Predictive value of echocardiographic measurement for evaluating left ventricular filling pressure in chronic atrial fibrillation patients with preserved LV ejection fraction.

JIHUN AHN

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Objective
Left ventricular (LV) filling pressure can be estimated by echocardiographic measurement, including the Doppler E velocity to tissue Doppler E’ velocity ratio (E/e’) during sinus rhythm. However, non-invasive echocardiographic estimation of LV filling pressure is not simple in patients with atrial fibrillation (AF). AF is associated with reduced survival in patients with HF with preserved LV ejection fraction (LVEF). The aim of this study was to investigate echocardiographic parameters for predicting LV filling pressure and diastolic function in chronic atrial fibrillation patients with preserved LVEF.

Method
Clinical data, echocardiographic findings, and laboratory data including measurement of brain natriuretic peptide (BNP) levels were assessed retrospectively in 90 chronic AF patients with preserved LVEF who underwent diagnostic left-heart catheterization from January 2011 to September 2015. LV end-diastolic pressure (LVEDP) and standard echocardiographic measurements were performed.

Discussion
The E/e’ ratio (r= 0.449, P<0.001), E (r= 0.463, P<0.001) and E/Vp (r= 0.471, P<0.001) was significantly correlated with LVEDP (Figure 1). Also, Pulmonary artery systolic pressure (PASP) was well correlated with LVEDP (r= 0.422, P<0.001). Using receiver operating characteristic analysis, the optimal cut-off for E/e’ was 13 (sensitivity, 88%; specificity, 67%) to predict >15mmHg LVEDP. E (r= 0.463, P<0.001) and E/Vp ratio (r= 0.471, P<0.001) were also well correlated with LVEDP (Figure 2). E>90 m/sec predicted elevated LVEDP (>15 mmHg) with a sensitivity of 84% and a specificity of 70%. Also, E/Vp>1.6 predicted elevated LVEDP (>15 mmHg) with a sensitivity of 80% and a specificity of 72%.

Conclusion
Not only classic echocardiographic parameters such as E, E/e’ and E/Vp but also PASP was well correlated with LVEDP in the patients with chronic AF. And E, E/e’ and E/Vp provide significant predictive value for LVEDP and diastolic dysfunction in chronic atrial fibrillation patients with preserved LV ejection fraction.

Keywords: ATRIAL FIBRILLATION, LVEDP, ECHOCARDIOGRAPHY
Effects of High Intensity Interval Training vs. Moderate Intensity Continuous Exercise on Epicardial Fat Thickness and Endothelial Function in Hypertensive Patients.

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Objective
Several recent studies have suggested that compared with moderate-intensity continuous exercise (MICE), high-intensity interval training (HIIT) may result in a superior or equal improvement in fitness and cardiovascular health. But its effects on the epicardial fat thickness (EFT) and endothelial dysfunction observed in hypertension have not been studied. We compare the effects of high intensity interval training (HIIT) versus moderate intensity continuous exercise (MICE) on EFT and endothelial function in hypertensive patients.

Method
Twenty-seven hypertensive patients (mean age 49.4 ± 9.6) participated in this study and randomized to equal volumes of either HIIT (n=14) or MICE (n=13) group. HIIT alternated consecutively 3 min at 40% heart rate reserve (HRR) with 3 min at 80% and MICE was performed at 60% of HRR for 8 weeks, 5 times a week. The EFT measured with echocardiography, endothelial function was determined by assessing endothelial progenitor cells (EPCs) using flow cytometry and flow mediated dilation (FMD) using ultrasonography.

Discussion
Following exercise training, the epicardial fat thickness was significantly decreased both HIIT and MICE groups (P < 0.001). EPCs (P<0.01) and FMD (P<0.01) were significantly increased in only HIIT, and EPCs showed a significant interaction between two groups (P<0.05). Systolic BP was reduced by 13mmHg (p<0.001) in HIIT and 9.7mmHg (P<0.01) in MICT. Diastolic BP was reduced by 10 mmHg (p<0.001) in HIIT and 5.2 mmHg (P<0.05) in MICT. But these changes were not different among groups.

Conclusion
These data suggest that HIIT and MICE equally have beneficial effects on EFT and BP reduction in hypertensive patients. However, HIIT may improve endothelial function better than MICE. These findings demonstrate that exercise intensity was an important factor in improving endothelial function in hypertensive patients.

Keywords: hypertension, endothelial function, epicardial fat, interval training, continuous exercise
Autopsy imaging (post-mortem cross-sectional imaging) for aortic dissection

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Objective
We investigated death cases due to aortic dissection or aneurysm except brain in Osaka examiner office in 2016.

Method
The number of death was 128 (male 70, female 58; average 72.8 year old). The location of aortic dissection/aneurysm was thoracic (108 cases), only abdominal (15 cases), vertebral artery (three cases), iliac artery (one case) and renal artery (one case). The case of diagnosis by autopsy imaging (post-mortem cross-sectional imaging) was 12 in thoracic, seven in abdominal and all in others. The dissection was pointed while alive in thoracic (six case) and aortic (five case), but not pointed in vertebral, iliac and renal artery.

Discussion
They have medical history of hypertension (42 cases), diabetes mellitus (11 cases) and hyperlipidemia (six cases).

Conclusion
We showed autopsy imaging attributed to diagnosis of thoracic and aortic dissection/aneurysm.

Keywords: Autopsy imaging, Aortic dissection, Hypertension
Association among epicardial fat, heart rate recovery and circadian blood pressure variability in patients with hypertension.

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Objective
Epicardial fat tissue has unique endocrine and paracrine functions that affect the cardiac autonomic system. Heart rate recovery (HRR) is a simple non-invasive measurement that assesses autonomic nervous system dysfunction. We aimed to investigate the association among epicardial fat thickness (EFT), HRR and circadian blood pressure (BP) variation in patients with hypertension.

Method
Epicardial fat tissue has unique endocrine and paracrine functions that affect the cardiac autonomic system. Heart rate recovery (HRR) is a simple non-invasive measurement that assesses autonomic nervous system dysfunction. We aimed to investigate the association among epicardial fat thickness (EFT), HRR and circadian blood pressure (BP) variation in patients with hypertension.

Discussion
EFT was significantly higher in hypertensive patients, especially in the non-dipper group, compared to the controls (p < 0.001). HRR was significantly lower in both hypertensive groups as compared to the control group and was the lowest in the non-dipper group (non-dipper, 26.6 ± 18.6; dipper, 29.5 ± 21.5; control, 71.4 ± 19.8; p < 0.001). EFT was significantly correlated with 24-hour mean systolic BP and 24 hours mean BP variability, whereas HRR were inversely correlated with EFT. Furthermore, EFT > 6.7 mm was associated with a blunted HRR with 76% sensitivity and 61% specificity (ROC area under curve: 0.71, 95% confidence interval, CI = 0.65–0.76, p < 0.001). In a multivariate analysis, EFT (odds ratio, OR = 3.53, 95% CI = 1.20–10.37, p = 0.022) and 24-hour mean BP variability (OR = 1.09, 95% CI = 1.03–1.16, p = 0.005) were independent predictors of a blunted HRR defined as HRR ≤ 12 beats in patients with hypertension.

Conclusion
EFT and HRR were significantly correlated with circadian BP variability in patients with hypertension. EFT and circadian BP variability were independent predictors of blunted HRR, which suggests a link between epicardial fat and autonomic dysregulation in hypertension.

Keywords: epicardial fat; cardiac autonomic function; heart rate recovery; hypertension
Left ventricular dysfunction in primary aldosteronism - an echocardiography based study

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Objective
Aldosterone has an adverse effect on cardiac structure and function. Higher incidence of left ventricular hypertrophy and diastolic dysfunction was found in primary aldosteronism (PA) compared with essential hypertension (EH). However, systolic function via endocardial measurements is similar between patients with PA and EH. We applied two different techniques (tissue Doppler imaging and speckle-tracking echocardiography) to evaluate the cardiac function of patients with PA.

Method
We prospectively enrolled patients with PA and EH and analyzed their clinical data, biochemical data, and echocardiographic parameters including tissue Doppler imaging and myocardial strain (global longitudinal strain, GLS).

Discussion
Fifty-eight PA and 44 EH patients were enrolled for analysis. The PA patients had significantly lower serum potassium levels, lower plasma renin activity, higher aldosterone to renin ratio, and higher 24-hour urinary aldosterone levels than those with EH. With regards to echocardiographic parameters, the PA patients had a thicker ventricular wall and higher left ventricular mass index than those with EH. In tissue Doppler analysis, the diastolic dysfunction of PA patients could be detected by decreased mitral annular early diastolic velocity. Otherwise, aldosterone-induced subclinical systolic function impairments in PA patients could be demonstrated by decreased lateral mitral annular systolic velocity (8.1 ± 1.7 vs. 9.9 ± 2.3, p<0.001) and significant degradation of GLS (-18.3 ± 2.2 vs. -20.5 ± 2.1, p<0.001) compared to those with EH. In correlation analysis, GLS was significantly correlated with serum potassium level, LVMI, log-transformed PRA, log-transformed ARR, log-transformed 24-hour urinary aldosterone levels, E'(septal/lateral), mean E' and S' (lateral) (all p<0.05). Multivariate linear regression analysis further identified LVMI (b=0.282), and log-transformed 24-hour urinary aldosterone level (b=0.217) as independent factors correlated with GLS.

Conclusion
PA patients have subclinical decline in left ventricular systolic function, which could be demonstrated by lower lateral mitral annular systolic velocity and lower magnitude of GLS than EH patients.

Keywords: primary aldosteronism; tissue doppler image; global longitudinal strain; speckle-tracking echocardiography; TAIPAI
STUDY THE CHARACTERISTICS OF BRUGADA PATIENT IN THE NORTH OF BINH DINH PROVINCE, VIET NAM

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Objective
Analysis of characteristics of age, sex, blood pressure, BMI, clinical symptoms, family history of Brugada syndrome patients and learn some relationships between the characteristics of the Brugada syndrome patient.

Method
A cross-sectional descriptive study of 64 patients with Brugada syndrome, in 02 years since 2015 to 2016 at Bình Đình province, Việt Nam

Discussion
1. Result of characteristics of Brugada syndrome: Brugada syndrome patients in the North of Bình Đình province is characterized by:

2. Results of the relationship: There was relationship between age, sex and Brugada typ. There was not relationship between blood pressure, BMI, clinical symptoms and Brugada typ. Conclusion: The characteristics of Brugada patients in North of Bình Đình province mainly were: Brugada type 1, male, normal BMI, positive clinical symptoms, there was a family history of sudden death before 45 years old and had the relationship between age, sex and Brugada typ.

Conclusion
The characteristics of Brugada patients in North of Bình Đình province mainly were: Brugada type 1, male, normal BMI, positive clinical symptoms, there was a family history of sudden death before 45 years old and had the relationship between age, sex and Brugada typ.

Keywords: Brugada Syndrome.
Activity of antioxidant protection system and adipokines levels in patients with essential hypertension and concomitant type 2 diabetes depending on IRS-1 gene polymorphism

Anna Shalimova

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Objective
to investigate the influence of insulin receptor substrate type 1 (IRS-1) gene polymorphism on antioxidant protection system activity and adipokines levels in Ukrainian population of patients with essential hypertension (EH) and type 2 diabetes (DM2).

Method
We examined 320 patients with EH and concomitant DM2 (main group), 90 patients with EH without DM2 (comparison group). Insulin resistance (IR) was assessed by HOMA index (HOMA-IR). Levels of antioxidant protection system indicators (superoxide dismutase and catalase) were studied with spectrophotometric methods. Adipokine (leptin) content was determined by immunoassay method. Gly972Arg polymorphism of IRS-1 gene was assessed by molecular genetic method.

Discussion
Main group patients with Arg/Arg and Gly/Arg genotypes significantly (p<0.01) differed from Gly/Gly genotype by higher levels of HOMA-IR. Main group patients with Arg/Arg genotype differed from patients with Gly/Gly and Gly/Arg genotypes by significantly (p<0.01) lower levels of superoxide dismutase and catalase. It can be explained by the effect of IRS-1 polymorphism to the receptor level of IR development that leads to the endothelial dysfunction progression, a component of which is the inhibition of antioxidant protection system.

Comparison group patients with Gly/Arg and Arg/Arg genotypes had significantly higher levels of HOMA-IR. However unlike patients with concomitant DM2, patients without DM2 had no significant differences of antioxidant protection system indicators and leptin levels depending on the IRS-1 gene polymorphism.

Conclusion
In Ukrainian population of patients with EH and DM2 genotype Arg/Arg of IRS-1 gene is associated with higher levels of leptin and more pronounced inhibition of antioxidant protection system. IRS-1 gene polymorphism affects the development of IR even in the absence DM2.

Keywords: essential hypertension, type 2 diabetes, IRS-1 gene polymorphism, antioxidant protection system, adipokines
The association of Hypertension, Tobacco and Oral Health: A Hospital-Based Survey

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Objective
Hypertension is a growing public health problem, especially in India. Such patients need continuous medical care and meticulous self-management. Hypertension is a well-documented risk factor for oral diseases, including periodontitis, gingivitis, and xerostomia. Tobacco use too, is an established risk factor for non-communicable diseases (NCD). The risk for such morbidities increases with increase in tobacco usage. Existing literature supports the relationship of these entities, but the magnitude of hypertension and its oral manifestations with tobacco usage is unknown. Hence, the study assesses the inter-relationship of tobacco usage and oral health among hypertensive patients.

Method
A cross-sectional hospital based survey is systematized to include 4 study groups, viz Tobacco users with & without hypertension and Non-users with & without hypertension with each group serving as control for other corresponding group. The sample is derived from an Urban Health Centre in Central Delhi, India over a period of 6 months. Voluntary participants reporting with history of raised BP (>140 Systolic BP and >90 Diastolic BP) aged >18 years with no other reported physical or mental illness are included. Apart from socio-demographic details and tobacco usage, subjects will undergo a Type III clinical oral examination using modified WHO Oral Health Assessment Form 2013. The examination assess periodontal status, hard tissue examination, and other common oral diseases.

Discussion
Results from previous studies suggest a minimum sample of 66 per study group, amounting to a total of nearly 300 subjects. Level of significance is taken as 5% (*p < 0.05). Final results will be presented at the conference venue. The outcome variables will include prevalence and severity of common oral diseases with the presence of either or both the conditions.

Conclusion
The study focuses upon the evaluation of tobacco usage, severity of hypertension and oral health problems, assessing a causal relationship among them.

Keywords: Hypertension; Periodontitis; Oral Health
Rethinking the Active Control of Hypertension (REACH): An Educational Initiative

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Objective
Reports by the WHO indicate that there is a lack of adequate hypertension management worldwide.¹ in the Asia Pacific region over 70% of hypertensive patients remain uncontrolled. The REACH programme’s aim was to build a partnership of physicians and patients, to achieve better hypertension control, effectively reducing the prevalence of uncontrolled hypertension and related cardiovascular events in Asia Pacific.


Method
The authors have developed four educational modules on the various aspects of hypertension treatment. These educational modules will be presented by cardiologists across the APAC region. Additional educational materials that were developed in conjunction with the modules include patient profiles, research article summaries, and short educational videos. Physicians attending the educational programmes will be asked to fill a pre- and post-seminar questionnaire to capture their current knowledge and to see if the educational models could modify their perceptions of hypertension management.

Discussion
The REACH Programme will be rolled out in eight countries across Asia: Hong Kong, Indonesia, Malaysia, Philippines, Singapore, South Korea, Thailand, and Vietnam. The REACH educational modules will be presented by cardiologists to local GPs. Results of the questionnaires will help demonstrate that the REACH educational programme can help physicians define who the uncontrolled hypertensive patient is and identify trigger points for treatment—be it as monotherapy or combination therapy—to improve hypertension control.

Conclusion
Educational initiatives that are localised across the Asia Pacific region may have an impact on regional physicians and their best practices to improve hypertension control.

Keywords: hypertension; blood pressure; Asia Pacific; education; behaviour change
Heart Rate and Heart Rate Variability Change While Falling Asleep During Driving a Car

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Objective
Heart rate (HR) decreases and heart rate variability (HRV) increases during sleeping. However it is not investigated how they change during falling asleep while driving a car. This is basic study for developing heart rate monitoring system inside a car for preventing falling asleep while driving a car.

Method
Healthy volunteers are monitored with 24hour holter monitoring systems for HR and HRV starting 8AM to 11AM for 24hours. They are instructed to push the button if they feel sleepy or arrhythmia while driving a car. If the volunteers cannot help sleeping while driving a car, they are ought to change seat with person at passenger seat and feel free to sleeping at the passenger’s seat while sleeping.

Discussion
Four healthy volunteers who are planning to drive a long journey were enrolled. They are all male and 40.2 years old of mean age. Their mean driving time is 5 hours majorly at express way. They felt sleepy 2±1 hours after starting driving and the mean duration of falling asleep time is 17±4minutes. While driving their mean heart rate was 86±5 beats/min and this decreases by 15±5% while they feel sleepy. HRV increased by 10% 0.16Hz to 0.18Hz while they are falling asleep. One volunteer change the seat from driver’s to passengers when he cannot help sleeping, the HR and HRV changed much more from 89 beats/min to 65 beats/min and from 0.09 Hz to 0.23Hz. When they slept at night the HR decreased from 86 beats/min to 75 beats/min by 12.8% and HRV increased from 0.1Hz to 0.25Hz.

Conclusion
This pilot study the first time demonstrated the HR decreased and HRV increased while feeling sleepy while driving a car. HR decreased significantly when the driver slept at the passenger’s seat at the car as well as sleeping at night.

Keywords: Heart rate, remote monitoring, sleep, car
Heart Rate and Heart Rate Variability Change While Falling Asleep During Driving a Car

Sang-Ho Jo¹; Sang-Jin Han¹; Hyun-Sook Kim¹; Sung-Ai Kim¹; Jin-Myung Kim²; Yong-Koo Park¹
¹Internal Medicine/ Hallym University Sacred Heart Hospital/ Korea (대한민국) ²Radar development/ ACE technology/ Korea (대한민국)

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Conclusion
This pilot study the first time demonstrated the HR decreased and HRV increased while feeling sleepy while driving a car. HR decreased significantly when the driver slept at the passenger's seat at the car as well as sleeping at night.

Keywords: Heart rate, remote monitoring, sleep, car
Unraveling the Prevalence of Hypertension in Women with Fibromyalgia Syndrome

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Objective
The aim of this study was to appraise the association and prevalence of hypertension in women with Fibromyalgia Syndrome (FMS).

Method
100 consecutive patients with FMS were screened for hypertension and it was found in 41 patients. FMS was diagnosed according to the 2010 American College of Rheumatology criteria. The blood pressure was measured by using mercury sphygmomanometer and according to WHO protocol. Symptoms of FMS were measured by FIQR (Fibromyalgia Impact Questionnaire Revised). Counts of 18 tender points were performed by thumb palpation and levels of hormonal profiles (cortisol and serotonin) were recorded in each patient.

Discussion
The main outcome measure was the association of FMS with hypertension. Hypertension was diagnosed in 51 patients with FMS. Furthermore, a very significantly higher levels of cortisol was found among patients with FMS along with hypertension (P<0.01) whereas a significantly higher levels of cortisol were found in FMS patients without hypertension (P<0.05). Moreover, the number of tender points, and FIQR scores, were much higher in FMS with hypertensive group of patients than the other group.

Conclusion
Hypertension is a common finding in patients with FMS, and its prevalence could be related to disease severity.

Keywords: Fibromyalgia syndrome, hypertension, cortisol.
Correlation Between Left Atrial Volume Index and Spatial QRS-T Angle in Hypertensive Heart Disease Patients

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Objective
To assess correlation between left atrial volume index (LAVI) and spatial QRS-T angle in hypertensive heart disease patients.

Method
This cross-sectional study was conducted in dr. Hasan Sadikin hospital Bandung from June to September 2016 with hypertensive heart disease patients as the subject. Hypertensive heart disease was defined by left ventricular mass index more than 115 g/m² (male) or 95 g/m² (female). LAVI was calculated by echocardiography using biplane area length method and indexed to body surface area. Spatial QRS-T angle was measured from standard surface ECG using Kors regression matrix method. Pearson's correlation was used to analyze the correlation between LAVI and spatial QRS-T angle.

Discussion
Thirty seven hypertensive heart disease patients were included in this study (70.3% female, mean age 58 ± 9 years old). Mean systolic blood pressure was 151 ± 27 mmHg and mean left ventricular mass index was 151.48 ± 28.22 g/m² for male and 140.44 ± 32.63 g/m² for female. Mean LAVI was 26.96 ± 7.95 ml/m² and median spatial QRS-T angle was 28.52° (2.21-118.25°). There was correlation between LAVI and spatial QRS-T angle (r = 0.479; p=0.001). Electrocardiogram data showed 21.6% patients fulfilled criteria for left ventricular hypertrophy. Left ventricular hypertrophy with typical strain showed in ECG had higher LAVI and wider spatial QRS-T angle. This finding supported previous study that showed greater LAVI in patients with wider frontal QRS-T angle. This was the first study that analyzed the correlation between LAVI and spatial QRS-T angle in hypertensive heart disease patients.

Conclusion
Left atrial volume index was significantly correlated with spatial QRS-T angle in hypertensive heart disease patients.

Keywords: left atrial volume index; spatial QRS-T angle; hypertensive heart disease
Early inhibition of renin-angiotensin-aldosterone system is associated with improved left ventricular function in STEMI survivors without previous hypertension: a two dimensional speckle-tracking study

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Objective
Impairment of left ventricular systolic function after ST elevation myocardial infarction (STEMI) is major complication and associated with long term poor outcome. Early treatment with inhibition of renin-angiotensin-aldosterone system (RAAS) is possible solution to preserve left ventricular function. In this study, we proposed to check early RAAS inhibition is whether associated with improved LV function in patients with STEMI.

Method
In this study, we prospectively included patients with STEMI who were treated by primary percutaneous coronary intervention (PCI). We choose left ventricular (LV) global longitudinal strain (GLS) as a marker of LV systolic function. GLS was estimated by using a two dimensional (2D) speckle-tracking echocardiography (STE).

Discussion
A total of 473 patients (59±13, 86% male) were selected for this study. In patients without previous hypertension, LV GLS was significantly different between patients who received treatment with RAAS inhibition and who didn’t receive during their admission (-16.2% vs. -14.9%, p<0.05). In patients with previous hypertension, however, LV GLS was similar between patients who received treatment with RAAS inhibition during their admission and patients who didn’t (-14.9% vs. -14.8%, p=0.881). Multiple linear regression analysis which including age, gender, DM, CKD, previous CAD, previous MI, previous CHF, showed that treatment with RAAS inhibition was independent predictor of improved GLS in patients without previous hypertension (β=1.23, 95% CI 0.21-2.20, r=0.158, r²=0.025, p<0.05). Furthermore, simple linear regression analysis revealed that treatment with RAAS inhibition resulted 1.20% increase of GLS in patients without previous hypertension (β=1.20, 95% CI 0.21-2.20, r=0.158, r²=0.025, p<0.05).

Conclusion
In STEMI survivors without previous hypertension, early treatment with RAAS inhibition during their admission is independently associated with improved LV GLS.

Keywords: STEMI, RAAS, LV function, GLS
Validation of a piezoelectric sensor array based device for measurement of carotid-femoral pulse wave velocity: the Philips Prototype

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Objective
Piezoelectric pressure measurements with multiple sensors might improve efficiency and accuracy in collecting arterial pressure waveforms for measurement of pulse wave velocity. In the present study, we validated a prototype based on piezoelectric sensor-array (Philips) against the clinically validated and widely used Complior device (Artech).

Method
We recruited 33 patients with a wide distribution of blood pressure measured with validated sphygmomanometer. PWV was measured sequentially with the Complior device (4 times) and the Philips prototype (3 times). With the 99 paired PWV value, we investigated agreement between the Philips prototype and Complior device by Pearson’s correlation analysis and Bland-Altman plot. We also performed analysis on determinants of PWV measured with both devices, and on reproducibility of both devices.

Discussion
The correlation coefficient for PWV measured with the Philips prototype and the Complior device was 0.918(P<0.0001). Compared with the Complior device, the Philips prototype slightly overestimated PWV by 0.238(±2 standard deviations, ±1.907) m/s, especially when PWV was high. The correlation coefficient between the difference and the average of the Philips and Complior measurements was 0.212 (P=0.035). Nonetheless, they had similar determinants. Age, mean arterial pressure and gender altogether explained 84.3% and 93.6% of the variance of PWV values measured with the Philips prototype and Complior device, respectively. When the two extreme of the 3 PWV values measured with the Philips and Complior device were investigated, the reproducibility coefficients were 8.26% and 3.26%, respectively.

Conclusion
Compared with Complior device, Philips prototype had similar accuracy, determinants and reproducibility in measuring PWV.

Keywords: arterial stiffness; carotid-femoral pulse wave velocity; piezoelectric