## P072 VALIDATION OF A NOVEL METHOD FOR NONINVASIVE ESTIMATION OF CARDIAC OUTPUT USING BRACHIAL OSCILLOMETRIC BLOOD PRESSURE MEASUREMENTS IN PATIENTS WITH VARIOUS CLINICAL CONDITIONS

Camilo Madrid-Muñoz[1], Diego Álvarez-Montoya[1], Ricardo Fernández-Ruíz[1], Jaime Gallo-Villegas[1,2], Dagnovar Aristizábal-Ocampo[1]. *[1]SICOR, Medellín, Colombia,[2]University of Antioquia, Medellín, Colombia*

**Background and Objective:** Estimating cardiac output (CO) and other hemodynamic parameters from blood pressure (BP) measurements could aid in selecting appropriate antihypertensive treatments in clinical settings. Our research group has developed a non-invasive method to estimate CO based on total arterial compliance (Ct). However, its validity in populations with various cardio-metabolic chronic diseases remains uncertain. The objective of this study is to assess the validity of our CO estimation method across different patient with varied clinical conditions.

**Methods:** A cross-sectional study was conducted involving 217 adult patients who underwent ambulatory transthoracic Doppler echocardiograms, irrespective of valvular or cardiac pathology, or medication use, provided they had normal aortic valvular anatomy. Stroke volume was calculated as the product of the cross-sectional area of the aortic annulus and the average velocity of the left ventricular outflow tract. Simultaneously, oscillometric BP measurements were obtained. Subsequently, the CO values obtained via Doppler echocardiography and those estimated based on Ct were compared to determine validity. Ct was estimated as: Ct/BSA= 38/PPth + 4/5 × Td/T - 3/7, where BSA denotes body surface area, Td signifies diastolic time, T represents the cardiac period, and PPth refers to the theoretical pulse pressure.

**Results:** Of the participants, 49.7% were men, with an average age of 54.0±14.0 years. Among them, three had a history of acute myocardial infarction, one had a pacemaker, nineteen were diabetic, and one hundred thirty-six were hypertensive. CO by echocardiography averaged 4.9±1.0 L/min, ranging from 2.0 to 8.5 L/min. The agreement of CO between the new method and Doppler echocardiography was good. Bland-Altman plots showed that the differences between the methods were randomly distributed along the mean difference line (Figure).

**Conclusions:** The novel method for noninvasive estimation of CO based on Ct with brachial oscillometric BP measurements in patients with various clinical conditions is deemed valid. Its implementation in clinical practice has the potential to transform patient assessment.

**Keywords:** Blood pressure; cardiac output; compliance; validity; echocardiography

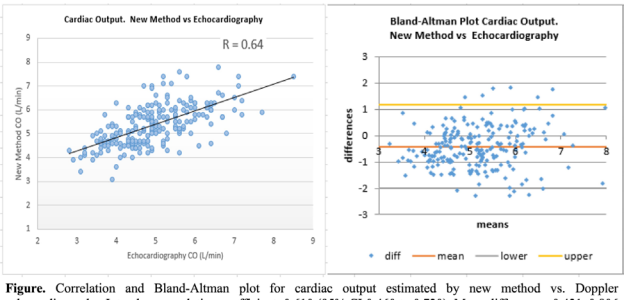


**Figure.** Correlation and Bland-Altman plot for cardiac output estimated by new method vs. Doppler echocardiography. Intraclass correlation coefficient: 0.610 (95% CI 0.460 to 0.720). Mean difference: -0.421±0.806 L/min (95% CI -0.529 to -0.314). CO: Cardiac output.

## P073 KNOWLEDGE OF HYPERTENSION AND HOME BLOOD PRESSURE MONITORING AMONG HYPERTENSIVE PATIENTS IN INDIA: RESULTS FROM THE GRAND STUDY

Anuj Maheshwari[1], Narsingh Verma[2]. *[1]Hind Institute of Medical Sciences, Lucknow, India,[2]King George's Medical University, Lucknow, India*

**Background and Objective:** Hypertension remains a significant risk factor for cardiovascular diseases in India, contributing substantially to cardiovascular mortality. Despite the rising prevalence of hypertension, blood pressure control among hypertensive patients remains low, emphasizing the need for improved hypertension management and treatment. Home blood pressure monitoring (HBPM) serves as a vital tool in hypertension management, yet its recognition and utilization in developing countries like India remain limited. This study aimed to assess the knowledge of hypertension and HBPM among hypertensive patients across 18 medical centers in 12 States in India.

**Methods:** A survey was conducted among 1,920 hypertensive patients, analyzing the patients' background, the reasons for home blood pressure (HBP) measurement and non-HBP measurement, and associated factors to knowledge levels of hypertension and HBPM.

**Results:** Findings revealed that 47.5% were measuring HBP, with reasons mainly attributed to physicians' recommendations, while cost and lack of physician guidance were common reasons for non-HBP measurement. High knowledge levels of hypertension and HBPM significantly associated with measuring HBP (OR 16.23; 11.28-23.35, P-value <0.001), however, a significant gap existed in adherence to the optimal guidelines-based procedures of HBPM with only 40.7% following any 2 out of 8 steps to measure HBP.

**Conclusions:** These results highlight the necessity for increased physicians' recommendations of HBP measurement and providing clear instructions for measuring HBP aligned with guideline-based procedures.

**Keywords:** Home blood pressure monitoring, hypertension, India, patient knowledge, survey

## P074 STRIDE BP SYSTEMATIC REVIEW OF PUBLISHED VALIDATION STUDIES OF BLOOD PRESSURE MEASURING DEVICES

Ariadni Menti[1], Dimitrios Mariglis[1], Konstantinos Kyriakoulis[1], Anastasios Kollias[1], Paolo Palatini[2], Gianfranco Parati[3,4], Jiguang Wang[5], Aletta Schutte[6,7], George Stergiou[1]. *[1]Hypertension Center Stride-7, National and Kapodistrian University of Athens, School of Medicine, Athens, Greece,[2]Studium Patavinum, University of Padova, Padova, Italy,[3]Department of Medicine and Surgery, University of Milano-Bicocca, Milan, Italy,[4]Department of Cardiovascular Neural and Metabolic Sciences, San Luca Hospital, Istituto Auxologico Italiano, IRCCS, Milan, Italy,[5]Shanghai Institute of Hypertension, Shanghai Jiaotong University School of Medicine, Shanghai, China,[6]School of Population Health, Faculty of Medicine and Health, University of New South Wales, Sydney, Australia,[7]Cardiovascular Program, The George Institute for Global Health, Sydney, Australia*

**Background and Objective:** The accuracy of blood pressure (BP) monitors is essential for an accurate diagnosis, yet few devices have been validated using an established protocol. This study assessed the published evidence on validation studies of BP monitors.

**Methods:** STRIDE BP (www.stridebp.org) performs periodic systematic PubMed searches to identify published validation studies of automated cuff BP monitors. Validation studies conducted using an established protocol, including the AAMI/ESH/ISO Universal Standard (ISO 81060-2:2018), ANSI/AAMI/ISO 2013/2009, ESH-IP 2010/2002, AAMI 2002/1992/1987, and the BHS 1993/1990, were identified from the STRIDE BP database.

**Results:** Of 569 validation studies included in the STRIDE BP database, 238 (42%) used the ESH-IP, 153 (27%) the AAMI/ISO, 132 (23%) the BHS, and 46 (8%) the AAMI/ESH/ISO Universal Standard. These studies evaluated 346 devices (upper-arm 290; wrist 56) intended for office (55), ambulatory (44), home (233), public space/kiosk (8), and hospital (6) BP measurements. Among the 569 reviewed studies the STRIDE BP review process rejected 202 (35.5%) due to major violation of the validation protocol and/or device failure to pass the protocol's requirements. Six of 46 validation studies that used the most recent AAMI/ESH/ISO Universal Standard were rejected (13%), versus 190 (36.3%) using older validation protocols. STRIDE BP concluded that 280 of total 346 BP devices (81%; upper-arm 236; wrist 44) fulfilled the protocol's requirements and can be recommended for clinical use. Among these 280 devices, 106 (37.6%) were selected by STRIDE BP as preferred devices (fulfilling additional requirements), and 182 (65%) are available on the market (Table).

**Conclusions:** This analysis highlights a shortage of validated BP monitors available on the market, particularly for office and 24-hour ambulatory use. It is encouraging that fewer validation studies using the most recent AAMI/ESH/ISO Universal Standard were rejected by STRIDE BP than older studies using previous protocols, suggesting an improvement in the quality of published validation studies.

**Keywords:** blood pressure devices; validation

**Table.** STRIDE BP systematic review of published validation studies.

| | Office | Home | Ambulatory | All |
|---|---|---|---|---|
| **Reviewed** | **55** | **233** | **44** | **346** |
| **Rejected** | 17 | 35 | 8 | 66 |
| **Recommended** | 38 | 198 | 36 | 280 |
| **Preferred** | 23 | 61 | 19 | 106 |
| **On the market** | **27** | **120** | **30** | **182** |