Vagally mediated Heart Rate Variability: Physiological reactivity to stressors and Hypertension

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Statement of the Problem: Despite the well documented link between the physiological substratum of stress and blood pressure regulation, stress management is not considered in relevant prevention and management approaches. The aforementioned omission is driven by studies examining psychosocial stressors and hypertension that are hindered by variability in the operational definitions and reactivity measures employed that prohibit the summarization of the evidence for the association between exposure to stressors, subsequent physiological reactivity and hypertension. This is of particular importance as physiological reactivity constitutes a prominent mechanism through which stressors impact blood pressure regulation. The neural substrates of vagally mediated Heart Rate Variability (VM-HRV) indicate that it is able to assimilate such an interfacing mechanism. Indeed, relevant research showed that VM-HRV integrates stressors with individuals' reactivity capturing a prominent biological mechanism through which stressors impact blood pressure regulation. The purpose of this meta-analytic study is to assess the strength of evidence presented regarding the association between VM-HRV and hypertension, examine heterogeneity in individual study results and obtain a single summary estimate of the effect.

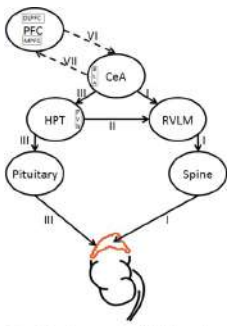

Figure 1: Schematic representation of PFC inhibitory influence on the CeA. The sympathetic output of the CeA is under tonic inhibitory control from the PFC (VI), including the mPFC and the OFC. The reduction of PFC's inhibitory input to the CeA as a result of the activation of the BLA (VII) leads to the activation

Methodology & Theoretical Orientation: We systematically searched and identified relevant cohort and case-controlled studies from six databases, including PubMed, Cochrane Library, Embase, LILACS, and Opengray until Dec 2021 that included participants above 40 years of age with SBP above 130mmHg or DBP above 85 mmHg and healthy controls.

Findings: Preliminary results show that low VM-HRV is associated with significant increases in blood pressure. Similarly, hypertensive patients had a lower VM-HRV compared to healthy normotensives.

Conclusion & Significance: Individuals' physiological reactivity to stressors, measured via VM-HRV, increases the risk for the development of hypertension. As such, its utilization can reinforce current screening initiatives. In addition, current primary prevention and management approaches targeting high blood pressure should consider the utilization of evidence-base interventions for stress management.

Biography

Spyros Christou-Champi has a strong background in the advancement of multidisciplinary research and more than eight years of hands-on experience in the development of research and innovation initiatives. Through the wide range of research programs he has been involved in, he has worked with both healthy and clinical populations among others Generalized Anxiety Disorder, Depression, and Hypertension on a variety of topics encompassing both basic and applied research aiming to examine and regulate the effects of stress on physical and mental health. His early work leveraged functional magnetic resonant imaging techniques while integrating behavioral research methods enabling the examination of the effectiveness of active avoidance behavior in regulating the stress response. Subsequent work utilized non-invasive brain stimulation paradigms to enhance the regulation of the stress response. This work investigated the effectiveness of non-invasive ambulatory brain stimulation in enhancing individuals' resilience to stressors. Current research focuses on individuals' ability to reduce the influence of stress implemented in populations at high risk for the development of stress deregulation and thus increase likelihood for adverse health outcomes, including elevated arterial hypertension.

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