DOI: 10.7860/JCDR/2025/80478.21842

Predicting and Modulating Cardiac Autonomic Dysfunction: A Review of Interventions in Hypertensive Patient

Rohit Gupta, Student Researcher, School of Physiotherapy, Delhi Pharmaceutical Sciences and Research University, New Delhi, India.
Shilpa Jain, Professor, Maharishi Markandeshwar College of Physiotherapy and Rehabilitation, Maharishi Markandeshwar University, Ambala, Haryana, India.
Urvashi Sinha, Student Researcher, School of Physiotherapy, Delhi Pharmaceutical Sciences and Research University, New Delhi, India.
Charu Chhabra, Assistant Professor, Department of Physiotherapy, Jamia Hamdard University, New Delhi, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Shilpa Jain,
Student Researcher, School of Physiotherapy, Delhi Pharmaceutical Sciences and Research University, New Delhi, India.
E-mail: drshilpa.jain55@gmail.com

ABSTRACT

Significant health risks are posed by hypertension which is an elevated blood pressure against arterial walls and further influenced by autonomic nervous system. This review aims to address a lacuna in the literature concerning the predictors and modulators of CAF (cardiac autonomic dysfunction) in patients with hypertension, particularly focusing on physiotherapeutic interventions. Taking into account of high prevalence of hypertension and its associated complications, autonomic dysfunction would be manageable by understanding the crucial role of exercises. Databases such as Google Scholar, PubMed, and PEDro were utilised to gather the Randomised Controlled Trials (RCTs) related to prediction and modulation of CAF and related anomalies using the boolean operators to refine the search results, and pertinent studies were selected using a rigorous criteria. After exhaustive search four RCTs involving 364 participants, revealed that various exercise approaches specifically Circuit Weight Training (CT), Aerobic Exercise Training (AExT) and Resistance Training are helpful in modulating cardiac autonomic function in hypertensive individuals and also indicated in the studies that Heart Rate Variability (HRV), sedentary behavior and obesity provide as independent predictors of CAF related anomalies. Particularly, combination of HRV and sedentary lifestyle factors further emphasise their role in autonomic dysfunction. While Breathe-Humming Breathing (BHB) exercises were not observed to have a direct significant effect on CAF, but they may put forth an indirect sway over modulation of HRV. In conclusion, exercise therapy emerges as a promising approach for positively influencing cardiac autonomic function in hypertensive patients. This review warrants inevitability for further such research studies to describe the mechanisms underlying these effects and to optimise the strategies for managing better health outcomes in this population.

Keywords: Aerobic exercise training, Bee-humming breathing, Cardiac autonomic function, Circuit weight training, Hypertention