
# CARDIAC FUNCTION AND POSTTRAUMATIC STRESS DISORDER

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## Why study cardiac function and PTSD?

Research into cardiac function among individuals with Posttraumatic stress disorder (PTSD) or in occupational and stressful environments is very limited. Yet insights derived from cardiac monitoring could potentially have important implications for individuals such as first responders and other public safety personnel (PSP), who are frequently exposed to potentially psychologically traumatic events (PPTE) and other stressors.

## Background

Royal Canadian Mounted Police (RCMP) members, like other first responders and PSP, are frequently exposed to PPTE during the course of service. Frequent PPTE exposures and other occupational stressors can contribute to posttraumatic stress injuries (PTSI) and other mental health challenges. A high number (approximately 50%) of RCMP screen positive for one or more mental health disorders. The current research is part of larger, 10-year RCMP Study designed to assess the impact of skills taught to help protect members from PTSI.

## The current study

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| **Literature review** | 14 existing studies | Synthesized research on echocardiography, PTSD, and related symptoms |
| **Case study** | 1 participant | Daily data collected for 1 month using seismocardiography |

Researchers conducted a literature review of articles examining echocardiography and PTSD or related symptoms from relevant research databases. Assessing cardiac function in clinical settings is usually done using echocardiography, a diagnostic technique that uses ultrasound imaging of the heart. After screening for duplication and for relevance to the current study, 14 articles were included. Case study data from one participant (male, age 33, and working in a high pressure hospital setting) were also included in the current study, in order to illustrate the effects of PPTE on cardiac function. Daily cardiac data were collected for one month from the case study participant using a seismocardiographic sensor and included three incidents of acute occupational stress. Seismocardiography (SCG) is a reliable and noninvasive cardiac diagnostic that requires comparatively less costly equipment and time/technical expertise to operate than echocardiography.

## Results

Few of the existing studies featured echocardiography and the cardiac changes induced by PTSD or occupational or stressful environments as a primary research objective, and much variation exists in the literature addressing cardiac function in PTSD, seemingly due to study design.

Findings within the existing echocardiography research with PTSD, however, suggest that impaired cardiac function, specifically left ventricular diastolic function, is associated with PTSD in the absence of other cardiac complications, though most studies did involve data from patients with preexisting complications. Other cardiac impairments, specifically within diastolic and systolic parameters, were found in patients with PTSD. Also identified in the existing research was a reversible condition called Takotsubo cardiomyopathy, in which heart attack-like symptoms can be brought on by extreme stress.

Supporting results from the existing literature, the case study presented by the current research serves as "proof of concept" that PPTE exposures can induce acute changes to cardiac function. Data from the case study indicate that occupational stress altered cardiac timing intervals in PPTE. That acute occupational stress can have a direct impact on the cardiac cycle is a new finding and has not been reported previously in the literature.

## Conclusions

The current study exemplifies how PPTE appear to alter cardiac function. Prolonged stress, without intervention, can cause further impairment, including a heightened risk for cardiac disease. The current results suggest noninvasive cardiac monitoring can be used to help identify the changes induced by PPTE exposures. Exposures to PPTE and other cumulative stressors can lead to chronic mental health challenges, including PTSD, therefore early detection of cardiac dysfunction is potentially a preventative measure.

The results of the current study help to continue advancing Canada's first-ever National Action Plan on Post-Traumatic Stress Injuries, including additional investment to support the health and well-being of first responders and other public safety personnel.

The original wording of the study was changed and condensed for the current research infographic.

The RCMP Study is funded by support from the RCMP, the Government of Canada, and the Ministry of Public Safety and Emergency Preparedness. The development, analyses, and distribution of the current article was made possible by a generous and much-appreciated grant from the Medavie Foundation.

Read the full study here:

Singh, J., Carleton, R.N., Neary, J.P. Cardiac function and posttraumatic stress disorder: A review of the literature and case report. *Health Promot Chronic Dis Prev Can.* 2023;43(10/11):472-80. https://doi.org/10.24095/hpcdp.43.10/11.05

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