

CARDIOAUTONOMIC LABILITY AND HEART RATE VARIABILITY AMONG RCMP CADETS

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Why study cardiac function among RCMP cadets?

The longitudinal Royal Canadian Mounted Police (RCMP) Study provides a unique opportunity to address several gaps in the existing research on RCMP mental health and cardioautonomic lability. Cardioautonomic lability refers to changes and fluctuations in the nervous system and its influence on the body's cardiovascular functions – like heart function, blood composition, and circulation.

RCMP members are frequently exposed to potentially psychologically traumatic events (PSTE) and other occupational stressors associated with higher prevalence of posttraumatic stress injury (PTSI). Observing potential differences and changes in cardioautonomic lability among RCMP cadets can provide the basis for developing tools to help identify physiological characteristics or precursors to PTSI.

Cardioautonomic lability refers to changes in heart and body function in response to external stress or stimuli.



The study

The current study was designed to examine differences in cardioautonomic lability during the 26-week RCMP Cadet Training Program (CTP) by comparing participating cadets who screened positive for one or more mental health disorders at the start of training to cadets who did not.

A total of 157 cadets wore Hexoskin biogarments, a type of wearable technology equipped with electrocardiogram (ECG) and heart rate monitoring, during the CTP. A total of 31 heart rate variability parameters were calculated. Participants were also screened for the following mental disorders using self-report surveys: posttraumatic stress disorder (PTSD), major depressive disorder (MDD), general anxiety disorder (GAD), panic disorder (PD), social anxiety disorder (SAD), and alcohol use disorder (AUD).

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Results

The current results indicated that participants had excellent cardiac health overall. The researchers hypothesized that the cadets in the current study who screened positive for any mental health disorder at the start of training would have lower heart rate variability (HRV) than cadets who did not screen positive. The current results were consistent with existing research, evidencing statistically significant differences between groups; specifically, cadets with clinically significant anxiety symptoms prior to training showed less variability in the Low Frequency (LF): High Frequency (HF) ratio during training than cadets who did not report symptoms. The relatively lower variability suggests decreased parasympathetic tone in those without clinically significant anxiety symptoms; parasympathetic tone is responsible for regulating involuntary bodily functions related to relaxation and recovery. The results may have important implications for future investigations of cardioautonomic dysfunction and chronic hypothalamic pituitary adrenal (HPA) axis deviations in policing populations with anxiety disorders; specifically, cardioautonomic inflexibility, or the inability of the autonomic nervous system to regulate cardiovascular functions in response to exertion or stress, which may be related to cardiovascular disease or death.

Conclusions

The current results provide an important baseline for future cardiac research with cadets and serving RCMP officers. Future studies will examine cardiac function in active duty officers to observe how cardiac changes may occur in the wake of a traumatic event exposure. The current results also have important implications for identifying the physiological risk factors associated with mental health challenges among policing populations, and informing mental health training and resources. The current results suggest that screening for GAD early in a PSP career may help to inform subsequent proactive solutions to protect mental and physical health.

These results 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.



Read the full study here:

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