



Work-related musculoskeletal disorders in veterinary echocardiographers: A cross-sectional study on prevalence and risk factors

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Abstract *Objective:* Assess the relationship between work-related musculoskeletal disorders (WRMSDs) and performing echocardiograms (ECHOS) in veterinarians with a cardiology focus.

Methods: Prospective study. A survey was submitted to the ACVIM veterinary cardiology list-serve regarding pain associated with performing ECHOS (ECHOPain). Associations of demographic and work habit variables with ECHOPain and WRMSD were evaluated with logistic regression.

Results: Respondents included 198 of 487 (41%) members, evenly divided in gender. Most (69%) were 31–50 years old. Almost all (96%) currently perform ECHOS, usually 4–5 ECHOS/week (74%), every week except vacation (93%). ECHOPain was reported by 87 people (44%), which was classified as mild/occasional in 77%, frequent/moderate in 21%, and frequent/severe in 2%. Of those with ECHOPain, 52% reported ECHOS as the sole cause, 31% reported ECHOS aggravating pain from a pre-existing problem, and 17% reported unrelated pain. The most common areas of pain were neck (54%), shoulder (52%), wrist (42%), and back (35%) with 78% reporting pain at 2 or more sites. Pain impaired job performance in 36%, required sick leave or disability in 12%, required reduction in ECHOS/day in 36%, and affected lifestyle in 22%. Ten percent of people have been diagnosed with WRMSD, of which 21% have a permanent disability. Both gender and weeks/year predicted pain with ECHOS ($\chi^2(3) = 11.38, P = 0.01$). The odds ratio for females versus males with ECHOPain was 2.23.

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Conclusion: ECHOPain is common (44%) in veterinary echocardiographers, is significantly associated with gender, and affects job performance for over one-third of pain sufferers.

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Abbreviations

ECHOS	Echocardiograms
ECHOPain	Pain associated with performing echocardiograms
WRMSD	Work related musculoskeletal disorder

Introduction

Work-related musculoskeletal disorders (WRMSDs) are conditions that involve the nerves, tendons, muscles and supporting structures of the body as a result of cumulative trauma related to non-neutral body postures, sustained static postures, and repetitive motions as well as psychosocial factors and individual characteristics such as gender and age. Work-related musculoskeletal disorders account for over 70 million physician visits, a median 8 days away from work, and over 45 billion dollars annually.^{1,2} Approximately 32% of these cases are from overexertion or repetitive motion, with workers in the health industry having some of the highest incidence rates of all professions.³

Little, however, is known about WRMSD in veterinarians, particularly veterinary sonographers. Veterinary echocardiographers typically scan from beneath the animal to optimize acoustic windows and minimize lung-air interference, which creates additional ergonomic strain on the shoulder muscles caused by pushing up while abducting the shoulder. Non-neutral body positions intrinsic to performing echocardiograms include: a twisted or bent back, head, and neck, a flexed and/or twisted wrist, an unsupported and extended elbow, and an elevated abducted shoulder with an extended arm that concurrently applies upward-sustained pressure. In a survey of veterinary specialists who perform small and large animal ultrasounds, 62% of respondents reported pain when performing exams and that pain was associated with increasing age, female gender, not consistently using normal height chair, and shoulder abduction of 15–45°.⁴

While WRMSDs are not well studied in veterinary sonographers, valuable information is available in

human sonographers, including alarmingly high prevalence rates of 80–90% of human sonographers being affected by WRMSDs.^{5–10} Human sonographers typically report symptoms after working in the profession for approximately 5 years, yet over a quarter report first occurrences within the first year of practice,¹¹ and 80% of human sonographers work in pain for over half of their career.⁹ Pain is most commonly characterized as aching (96%), sharp (36%), and/or numbness (16%).¹¹ Of the 80% of sonographers suffering from WRMSDs, 67% have major or disabling discomfort, 20% have difficulty carrying out everyday tasks due to pain, and 55% have pain that disrupt sleep.¹² Forty percent of affected sonographers must take sick leave or disability, and 20% must prematurely end their career due to the symptoms and injuries.^{9,11,12} Despite the high prevalence of WRMSDs, only 27% of human sonographers report being injured, and only half of people seek medical attention.⁹ In addition to the individual impact of WRMSDs, there is also a tremendous cost to employers for an injured sonographer, which averages over a half a million dollars a year per injured individual.⁹

The primary hypothesis of this study was that performing echocardiograms (ECHOS) on animals is associated with prevalence of musculoskeletal disorders in veterinary echocardiographers, specifically that pain when performing ECHOS and WRMSDs are related to amount of hours a day, numbers of days a week, and numbers of weeks a year performing ECHOS. It was also hypothesized that veterinary demographics, specifically gender and years of experience, and additional work habits, specifically hours and days spent at sitting tasks, would be associated with pain with ECHOS and WRMSDs.

Materials and methods

An anonymous survey to assess the prevalence and factors of WRMSDs of veterinary echocardiographers was distributed to members of the ACVIM veterinary cardiology list-serve, including board certified veterinary cardiologists (ACVIM and ECVIM), cardiology residents, and veterinarians with a cardiology focus in their practice who subscribe to the list-serve.

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