Risk factors for musculoskeletal problems in veterinarians

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Introduction

If risk factors for musculoskeletal problems amongst veterinarians are identified, veterinarians, as well as veterinarian practices, can take appropriate steps to manage the risks in order to minimise their impact. Thus, this paper reviews literature that has attempted to identify risk factors for musculoskeletal problems in veterinarians.


Musculoskeletal discomfort (MSD) is one facet in the occupational health of veterinarians for which there is a paucity of information concerning prevalence, risk factors and effects. Internationally, a high proportion of work related injuries are attributed to musculoskeletal disorders and these result in absenteeism from the workplace, reduced productivity and personal costs (MacDonald 2004, Buckle 2005). Musculoskeletal disorders are the most common occupational injury workplace insurance claim in New Zealand (Pezzullo and Crook 2006, ACC 2008).

The majority of veterinarians in New Zealand work in clinical practice and undertake a wide range of tasks which are likely to contribute to MSD. Large animal veterinary practice in New Zealand is predominantly seasonal, which means that the yearly cycle of work is characterised by periods where different physical activities predominate. For instance, rectal palpation of cattle and horses to diagnose pregnancy or reproductive disorders is undertaken during short intense time periods. This task involves lifting, bending, twisting, arm and shoulder extension and torque, forceful pushing, and resisting unpredictable movements of the animal (Darmody et al. 1998). In small animal practice a common procedure is surgery, which involves lifting of animals and/or cages to tables, bending, twisting, crouching, arm extension, and prolonged standing. Regulatory veterinarians, on the other hand, have a role that includes tasks such as administration, animal and public health, animal welfare, ante and post mortem animal inspections, biosecurity, food safety and quality assurance inspections.

To date, only partial surveys of workplace musculoskeletal problems have been undertaken in veterinarians. These indicate a high prevalence of MSD between 50% and 96% (Faucett and Werner 1999, Fritschi et al. 2006, Scuffham et al. 2010b). This high range may be real or it may be due to a number of factors related to study methodologies (such as different definitions, no standardised questionnaires used, studying different populations etc).

MSD includes musculoskeletal trouble, symptoms, aches and pains which are self-assessed, subjective and can result in musculoskeletal disorders or diseases (Hamberg-van Reenen et al. 2008) whereas musculoskeletal...
disorders and diseases are usually medically diagnosed (Hagberg et al. 1995). Descatha et al. (2007) demonstrated an association between musculoskeletal discomfort and musculoskeletal disorders: individuals with musculoskeletal symptoms subsequently developed musculoskeletal disorders three years later. In order to avoid this confusion, and because accurate diagnosis of injury or discomfort may not be achievable in many cases, in the present paper we have used the term musculoskeletal problems (MSP) to encompass musculoskeletal discomfort, pain, injury and disorders.

**Prevalence of musculoskeletal problems**

A cross-sectional survey of 3003 New Zealand workers (Widanarko et al. 20110 demonstrated a prevalence of MSP of 92%. The highest prevalence was for low back (54%), neck (43%), and shoulders (42%).

There have been few studies on the prevalence of MSP in veterinarians. These have varied in survey tools, populations, methodologies and response rates. The prevalence of musculoskeletal problems in veterinarians is highly varied. The measured average response rates of the studies were 35% (range 10% to 67%).

The annual prevalence of MSP for large animal veterinarians ranges from 65% for swine veterinarians (Hafer et al. 1996), 82% for cattle veterinarians (Cattell 2000), equine veterinarians, 72% (Loomans et al. 20080, 100% (Scuffham et al. 2010b) and large animal veterinarians 100% (Scuffham et al. 2010b). The prevalence of MSP in veterinary populations ranges from 50% for Australian veterinarian graduates (Fritschi et al. 2006), Dutch veterinarians 55% (Haverkamp 2006), veterinarians in Flanders 82% (Meers et al. 2008) to 96% in New Zealand veterinarians (Scuffham et al. 2010b). The body sites most affected were: lower back, with a mean prevalence of 51% (range 45% to 67% of studies), followed by the shoulder, 44% (range 20% to 59%), neck, 40% (range 23% to 58%), hands/wrists/fingers, 31% (range 14% to 52%) and elbows 28% (range 12% to 40%).

**Risk factors of musculoskeletal discomfort**

It is generally acknowledged that MSP is a multi-factorial problem. Physical and psychosocial factors are generally considered to be risk factors for MSPs. Physical factors include exposure to physical load (weight), awkward postures, prolonged static postures, vibration, repetitive tasks, sedentary tasks and prolonged periods of conducting a given task (Bernard 1997, Fredriksson et al. 2000, Hoogendoorn et al. 2000, Thorbjornsson et al. 2000, Hoogendoorn et al. 2002, Leclerc et al. 2004, MacDonald 2004, Menzel et al. 2004, Cote et al. 2008).

As stress is implicated as a psychosocial risk factor for MSP (see below), it is worth noting that several studies have reported moderate to high stress levels amongst veterinarians. High job demands, poor interpersonal relationships, requirements to keep up to date with current veterinary knowledge, financial pressure, career prospects, staffing issues, lack of job clarity, as well as the pressure of living in isolated communities have all been associated with stress (Chambers et al. 2001, Reijula et al. 2003, Gardner and Hini 2006, Hansez et al. 2008, Loomans et al. 2008, Smith et al. 2009, Scuffham et al. 2010b).


Other risk factors for MSP include smoking (Battie et al. 1991, Leino-Arjas 1998, Bach 2001), gender (Hafer et al. 1996, Wijnhoven et al. 2006, Hooffman et al. 2009), obesity, arthritis, gout and muscle strength (Punnett and Wegman 2004). Tanaka et al. (2001) estimated that 37% of upper limb musculoskeletal disorders were attributable to work-related activities. Punnett and Wegman (2004) argue that there are many non-work activities such as sporting activities and housework that are related to musculoskeletal disorders. It is notable that musculoskeletal problems are cumulative – i.e. crafts, tasks, sporting activities and housework often use the same muscles as those used for work and it is difficult to demonstrate work relatedness of MSP.

**Risk factors for musculoskeletal problems in veterinarians**

Lifting weights greater than 18.5kg, manual handling and movement of pigs, manual handling of zoo animals have been associated with MSP (Hafer et al. 1996, Hill et al. 1998, Gabel and Gerberich 2002). Veterinarians
considered that handling and lifting animals are tasks associated with MSP (O’Sullivan and Curran 2008, Scuffham et al. 2010a).

Within small animal veterinary clinics in the United Kingdom, 40% of practices used a trolley and 68% used a stretcher to transport animals (D’Souza et al. 2009). D’Souza et al. also found that it was routine in 95% of practices to treat heavy dogs on the floor. Treating heavy dogs on the floor may reduce the risk of injury due to lifting, however, the veterinarians will place themselves at risk of MSP by assuming awkward postures (D’Souza et al. 2009).

According to Reijula et al. (2003), over 33% of veterinarians worked in awkward postures and 15% worked with arms raised over shoulder level for over one hour per day. Working with arms raised is a risk factor for neck and shoulder MSP (Palmer et al. 2003). Scuffham et al. (2010b) found that awkward and tiring postures as well as carrying out repetitive tasks were associated with MSP.

Rogers (2011) recently published a thesis “Identifying and Evaluating Risk Factors for Musculoskeletal Disorders in Equine Veterinary Work”. Rogers analysed tasks, postures, spinal forces and undertook a strain index to determine tasks that have a musculoskeletal risk to equine veterinarians. Undertaking lameness examinations, lifting, and undertaking ultrasound examinations were the three high-risk tasks, followed by rectal palpation which was considered an ‘increased risk’ for equine veterinarians to develop upper extremity musculoskeletal disorders. The tasks that resulted in the greatest lower back spinal compression forces were lifting and conducting lameness examinations. The overall analysis demonstrated that undertaking ultrasonography examinations and foot trimming.

There have been only three studies where any association between psychosocial risk factors and MSP has been examined. Scuffham et al. (2010b) found difficulty of work, varying pace, work organisation, organisational culture as well as dissatisfaction with the level and difficulty of work were associated with musculoskeletal discomfort. They found that veterinarians being satisfied with the level and difficulty of work was a protective factor, and they had reduced odds of having MSP. Smith et al. (2009) found stress, career structure, time pressures, client attitudes, lack of public and colleague recognition, lack of understanding and lack of holidays were all associated with MSP within specific body sites. Loomans et al. (2008) found that equine veterinarians considered that some MSP were caused by work-related stress.

Various tasks or commonly performed procedures have been shown to be associated with MSP in veterinarians. For example, Scuffham et al. (2010b) have shown that necropsy, dental, obstetric and surgical procedures (<1 hour) are associated with MSP. However the procedures most commonly shown to be associated with MSP are: rectal palpations; ultrasonographic examinations and foot trimming.

Scuffham et al. (2010a) asked veterinarians the reasons why ‘tasks likely to be the most risky’ result in MSP, and few (4%) veterinarians considered psychosocial risk factors to be associated with MSP. A possible explanation for this is that there is a tendency for the veterinary profession to think of a problem in terms of physical (i.e. tangible) issues as opposed to subjective (psychosocial) issues. Anecdotal evidence shows that most professionals find it easier to manage the physical risk factors rather than manage the psychosocial risk factors.
Fourie and Hoffman (2004), found that 83% of veterinary ultrasonographers reported MSP resulting from scanning. Awkward posture and poor scanning techniques were identified as the main contributory factors. In human ultrasonographers twisting, reaching, arm abduction and forceful gripping are associated with musculoskeletal dysfunction (Brown and Baker 2004). These risks may also apply to veterinary ultrasonographers. Human and veterinary ultrasonographers use similar equipment, but the differences between the various species and procedures must be taken into account.

Boyle et al. (1997) found an association with foot trimming of cattle and injury, while Scuffham et al. (2010b) demonstrated that foot trimming was associated with musculoskeletal discomfort.

Conclusions

Veterinarians are exposed to a range of physical and psychosocial occupational hazards that are associated with MSP.

There is a large range of reported prevalence of MSP - 50% (Fritschi et al. 2006) to 96% (Scuffham et al. 2010b) within veterinarians. This may be due to different definitions, methodologies used, a wide range of response rates as well as different populations being studied. The body site most affected in veterinarians is the lower back followed by the shoulders and neck.

Although there is a plethora of evidence which demonstrates that physical and psychosocial risk factors are associated with MSP in the general population and in many occupational groups, research into MSP in veterinarians has predominantly been focused on the physical risk factors, such as animal/manual handling (Hafer et al. 1996, Hill et al. 1998, Gabel and Gerberich 2002, D’Souza et al. 2009), rectal palpations (Carayon and Smith 2000, Chambers et al. 2001) or tasks (Hill et al. 1998, O’Sullivan and Curran 2008).

The variation and magnitude of the reported prevalence justifies the need for further research (e.g. prospective cohort studies, task analysis, verbal protocol analysis, postural analysis or biomechanical analysis), this research should be undertaken to triangulate data and determine other factors associated with MSD. It is essential that any further studies on MSP in veterinarians use a standardised musculoskeletal questionnaire with clear definitions of MSP to enable comparison between studies. The lack of studies into psychosocial risk factors and MSP is also an area that needs to be addressed, by using a standardised questionnaire, such as a job content questionnaire (Karasek et al. 1998). Future study should also include a proactive participative approach to identification of ways for veterinarians to avoid or minimise their risks of MSP, based on known risk factors as outlined in this paper.

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