J. Dairy Sci. 99:1–11
http://dx.doi.org/10.3168/jds.2014-9210

Human-animal interactions and safety during dairy cattle handling—Comparing moving cows to milking and hoof trimming

C. Lindahl,*†[1] S. Pinzke,* A. Herlin,‡ and L. J. Keeling§
*Department of Work Science, Business Economics and Environmental Psychology, Swedish University of Agricultural Sciences, PO Box 88, SE-230 53, Alnarp, Sweden
†Swedish Institute of Agricultural and Environmental Engineering, PO Box 7033, SE-750 07, Uppsala, Sweden
‡Department of Biosystems and Technology, and
§Department of Animal Environment and Health, Swedish University of Agricultural Sciences, PO Box 7068, SE-750 07, Uppsala, Sweden

ABSTRACT

Cattle handling is a dangerous activity on dairy farms, and cows are a major cause of injuries to livestock handlers. Even if dairy cows are generally tranquil and docile, when situations occur that they perceive or remember as aversive, they may become agitated and hazardous to handle. This study aimed to compare human-animal interactions, cow behavior, and handler safety when moving cows to daily milking and moving cows to more rarely occurring and possibly aversive hoof trimming. These processes were observed on 12 Swedish commercial dairy farms. The study included behavioral observations of handler and cows and cow heart rate recordings, as well as recording frequencies of situations and incidents related to an increased injury risk to the handler. At milking, cows were quite easily moved using few interactions. As expected, the cows showed no behavioral signs of stress, fear, or resistance and their heart rate only rose slightly from the baseline (i.e., the average heart rate during an undisturbed period before handling). Moving cows to hoof trimming involved more forceful and gentle interactions compared with moving cows to milking. Furthermore, the cows showed much higher frequencies of behaviors indicative of aversion and fear (e.g., freezing, balking, and resistance), as well as a higher increase in heart rate. The risk of injury to which handlers were exposed also increased when moving cows to hoof trimming rather than to routine milking. Some interactions (such as forceful tactile interactions with an object and pulling a neck strap or halter) appeared to be related to potentially dangerous incidents where the handler was being kicked, head-butted, or run over by a cow. In conclusion, moving cows to hoof trimming resulted in higher frequencies of behaviors indicating fear, more forceful interactions, and increased injury risks to the handler than moving cows to milking. Improving potentially stressful handling procedures (e.g., by better animal handling practices and preparation of cows to cope with such procedures) can increase handler safety, animal welfare, ease of handling, and efficiency.
Key words: injury risk, work safety, moving cattle, claw trimming

INTRODUCTION

Cattle handling is a dangerous activity on dairy farms (Douphrate et al., 2013), and animals are a major source of injuries to livestock handlers. In a case-control study of Dutch farmers' sick leave insurance claims, animals were the major cause of work-related injury among farmers. In a Swedish study, animals were involved in 36% of the accidental injuries occurring in agriculture and 24% of the total number of injuries occurring during work with dairy cows (Pinzke and Lundqvist, 2007). American studies have reported animals as the source of 24 to 38% of total injuries on dairy farms (Brison and Pickett, 1992; Pratt et al., 1992; Douphrate et al., 2006; Douphrate et al., 2009). Similar figures have been reported for Australia (Fragar et al., 2006) and Denmark (Carstensen et al., 1995).

Being kicked, stepped on, and pushed by the cow are the most frequent animal actions resulting in worker injury (Waller, 1992; Douphrate et al., 2009). Other mechanisms of injury reported are farm workers being caught between a cow and a stall, a cow knocking something onto the person, a cow falling on the person, or the person falling while wrestling the animal (Waller, 1992). Thus, proximity to the animals and handling animals in confined spaces seem to be important risk factors for animal-related injuries.

Fearful and agitated animals are believed to be a major cause of animal-handling injuries (Grandin, 1999). A key factor in the determination of the animal's fear responses to humans is a good human-animal

Received December 19, 2014.
Accepted November 16, 2015.
[1]Corresponding author: Cecilia.Lindahl@jti.se

relationship (Boivin et al., 2001). Aversive handling, in particular, has been shown to increase cows' fear of humans (Munksgaard et al., 1997). Waiblinger et al. (2002) showed a clear relationship between handler behavior and cow behavior, particularly in terms of avoidance, but also in the number of kick, step, and flinch responses during milking. Whereas negative handling (e.g., punches, slaps, blows) can induce fear of humans, gentle handling can reduce fear responses and thereby make handling safer (Waiblinger et al., 2004). A good human-animal relationship and a low fear level of humans by cows have also been shown to improve animal welfare and productivity (Hemsworth, 2003).

The outcome of an interaction between a human and an animal is dependent on handler behavior, animal behavior, and the environment in which the interaction takes place (Lindahl et al., 2012). Therefore, several studies have suggested that knowledge of safe and effective animal handling techniques and well-designed handling facilities can reduce the incidence of injury (Casey et al., 1997; Langley and Morrow, 2010).

Even if dairy cows are generally tranquil and docile, when situations occur that they perceive or remember as aversive they may become agitated and hazardous to handle. Also, a novel situation can be a strong stressor to the cows (Grandin, 1984). Milking is a daily routine procedure and the cows are used to the routine and the environment. Hoof trimming only occurs a few times a year, but involves new experiences for the cows, restraint, and, possibly, painful treatment. When moved to hoof trimming, a subgroup of cows is commonly separated from the larger group, which can be stressful to the cows. Thus, moving cows to milking is generally a nonstressful situation, whereas moving cows to hoof trimming may be perceived as stressful and aversive to the cows. The aim of the current study was to compare human-animal interactions and handler safety when moving cows to daily milking and moving cows to more rarely occurring hoof trimming.

MATERIALS AND METHODS

The study was designed as an observational study and 12 commercial dairy farms participated. Farms were identified through agricultural advisors and professional hoof trimmers. All farms had freestall housing and parlor milking and the mean herd size was 158 dairy cows (range = 45–430 dairy cows). The farms were visited twice, once to observe cows being collected and moved to milking and once to observe cows being collected and moved to hoof trimming. Half the farms were visited for the first time at milking, and the other half for the first at hoof trimming. At each visit, behavioral observations of both handler and cows and cow heart rate recordings were carried out. The visits were performed between April 2012 and February 2013.

The same person on each farm was observed handling the cows on the 2 visits. The participating handlers ranged in age from 23 to 64 yr (mean 36.8 yr). Eight of the handlers were employees and 4 were farm owners. Three of the handlers were female and 9 were male, and their experience of working with dairy cattle ranged from 3 to 40 yr (mean 15.6 yr).

When moving cows to milking, the whole group of cows was collected and moved to the holding pen at the same time. Four farms used a transfer alley to the holding pen, 4 farms had the holding pen in direct connection with the freestall, and 4 farms used a section of the freestall as a holding pen. All farms shared the routine of cleaning the cubicles at the same time as collecting cows for milking and of using the hand-held manure scraper to direct the cows.

When moving cows to hoof trimming, cows were collected from the pen individually or in groups of 2 to 12 cows at a time. On some farms the cows were moved to a waiting pen from where a single-file alley led to the trimming chute, whereas others moved the cows straight into a single-file alley. On 6 farms, the trimming chute was placed in a scraped or slatted floor alley in the freestall. On 3 farms, a transfer alley connected with the freestall was used. Two farms used one side of the milking parlor as a transfer alley, with the trimming chute placed in connection with the return alley from the parlor; one farm placed the trimming chute outdoors, just outside the barn door.

Behavioral Observations

The observations were conducted simultaneously by the same 2 researchers on each farm, one observing the handler and one observing the cows. The observers strove for minimum disturbance by strategic stationing and remaining unobtrusive. The observation started when the handler began to move the cows to milking or hoof trimming (at the same time as the first observation of any of the behaviors in our ethograms) and ended when the cows were in the holding pen waiting to be moved into the parlor to be milked or in the trimming chute (i.e., before the actual milking or hoof trimming started). A stopwatch was used to monitor the duration. The behavior during moving was recorded continuously by counting the number of different behaviors occurring within each minute using all occurrence sampling. Thus, the data included total observation time and observed handler and cow behaviors during each separate minute. More details of other