

Welfare Status and Type of Floor Associated with Hock Lesions in Dairy Cattle of University, Research and Private Farm of Chitwan District.

R. Jha*¹, Y.B. Gurung², D.K. Singh³

¹Institute of Agriculture and Animal Science (IAAS), TU

^{2,3}Department of Pathology and Clinics, IAAS, TU

*Corresponding author: ritikesh1@gmail.com

ABSTRACT

This research is an investigation of the prevalence of, and factors associated with, hock lesions on dairy cattle of University, Research and Private farm of Chitwan district. Cemented floor (n = 141), Muddy floor (27), Floor with Mat (35) and brick paved floored animals (n = 33) were visited. Cows were scored for hock (tarsus) lesions on a 3 point scale combining the attributes of hair loss, broken skin, and swelling. Type of farm (University, Research and Private) and type of floor measures were taken which were hypothesized to be risk factors for lesions. On university (AFU), research (NARC) and private farms the mean level prevalence of hock lesions was 1.827±0.384, 1.4±0.4905 and 1.465±0.68 respectively. On cemented floor, muddy floor, floor with rubber mat and brick paved floor, the mean prevalence of hock lesions was 1.63±0.489, 1.0165±0.577, 1.343±0.481 and 1.83±0.44 respectively. In conclusion muddy floor was associated with reduced hock lesions scoring compared to cemented, brick and rubber mat

Keywords: Hock lesion score, Welfare, Floor types

INTRODUCTION

Intensive farming systems are now common practice to meet the increasing demand for milk in different parts of the world. This has led to the introduction of dairy cows to an environment arbitrarily different from the cows' natural habitat, thereby triggering a range of welfare consequences. An animal is said to be in good welfare when it is able to express its innate behavior, free from distress and fear, in the absence of pain, and in good health (Duncan and Fraser, 1997). However, these fundamentals of optimal welfare are often lacking with the advent of confining cows and persistent demands for high milk yield. As a result of these practices, outcomes such as chronic pain, discomfort, increased susceptibility to infectious disease and metabolic or physical fatigue are now common in dairy cows within intensive farming systems (Cook *et.al.*, 2016). Lameness is a multifactorial condition and the most important welfare problem in dairy cows. Lameness is also regarded as a cause of economic loss owing to a reduction in milk yields, lowered reproductive performance and an increased risk of culling (Sogstad *et.al.*, 2006). Farmers are often reported to underestimate the prevalence of lameness, thereby prompting a low perception of its impact on cow welfare, health and production (Horseman *et.al.*, 2016). With the rising occurrence of lameness in dairy herds globally, attempts to reduce the impact on welfare and production are needed. However, certain animal-based measures such as body condition scoring (BCS), hock condition and leg hygiene have been employed in assessing cow welfare, with recent findings suggesting vital associations

with lameness. Poor hock condition have been reported to have a higher likelihood of becoming lame (Randall *et.al.* 2015). Housing design is vital for the maintenance of good welfare in dairy cows. Floor type and its influence on locomotion performance in dairy cattle were first suggested by Albright in 1997. Subsequently, floor features such as abrasiveness and hardness leading to insufficient friction and traction—as present in concrete floors (CF) were suggested to negatively impact the claw health and locomotion of dairy cows (Van der Tol *et.al.*, 2005).

Although claw lesions remain among the major causes of lameness in dairy cows (Manske *et.al.*, 2002), hock lesions and injuries are becoming a persistent problem in intensively managed dairy farms (Zaffino *et.al.*, 2014). The term “hock lesion” is used to describe various anomalies such as hair loss, visible wounds, broken skin, and localized and general swelling of the hock (Kielland *et.al.*, 2009). In dairy cows, the absence of fatty tissues and muscles around the hock makes the region prone to trauma and damage to the skin. Consequently, the development of hock lesions is directly influenced by the nature of the lying surface of hard and abrasive (Kester *et.al.*, 2014). In welfare assessment, the lateral aspect of the hock is often examined and suggested to be the most affected area. Poor hock conditions are often manifested as hair loss, swelling or ulceration (Potterton *et.al.*, 2011).

The hock condition score (HCS) measures the severity of hock lesions on various scoring scales based on features ranging from normal to substantial injuries. The assessment is important in free-stalls and loose cubicle housing, as such provisions encourage movement and interaction with stall designs. This makes it important to investigate the dairy animals for hock lesions and associated risk factors under field conditions. Keeping this in mind the present study was designed to determine the incidence of hock lesions as Welfare status in the study area and type of floor associated with hock lesions in dairy cattle of University, Research and Private farm of Chitwan district.

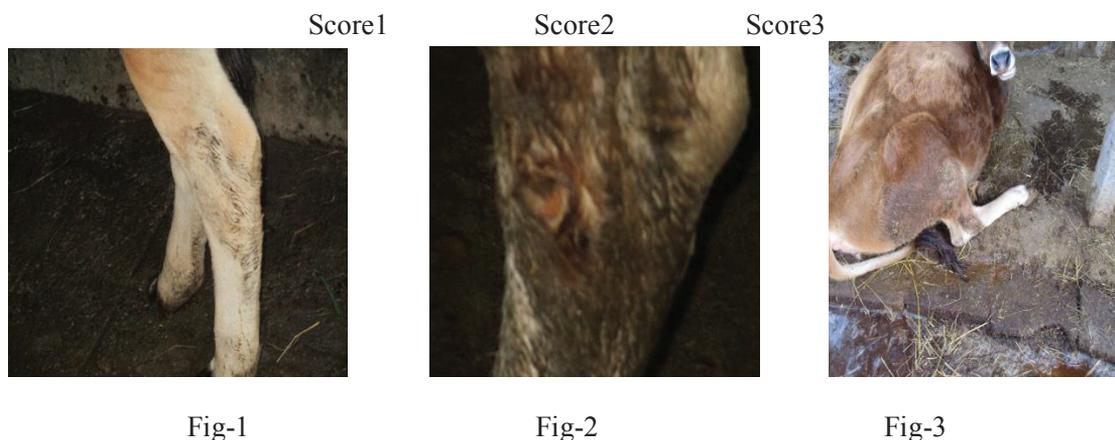
METHODOLOGY

The present study was carried out in Chitwan District, Nepal during December 2015 to May 2016. Majority of farmers and university and research farm in the study area were rearing Holstein Friesian (HF) crossbred and Jersey crossbred dairy cattle. Number of animal maintained per household was two to five mature cows along with their progenies. Number of animals maintained at research (NARC) farm and university farm (AFU) was 71 and 29 respectively. The floor type in university farm was completely cemented where as in research farm, it was in combination of mat and cemented. However in private farm it was in combination of brick, mud and cemented floor. Therefore, all the mature animals were investigated for once during the study period to determine the incidence of hock lesions and floor types associated with incidence of hock lesions by recording of animal level and farm level factors associated with hock lesions using standard observation methods. A total of 250 crossbred dairy cattle were investigated during the study period regardless of their lactation status.

Hock lesions scoring was assessed using a 3 point ordinal scale where 1 scores (fig.1) were considered clinically normal hocks, 2 (fig. 2) with skin loss and 3 (fig. 3) with swelling and ulceration scores (Lombard *et.al.*, 2010). The floor type which was prevalent in area were categorized into cemented, muddy, rubber mat and brick paved.

Statistic

Data obtained was entered in MS Excel 2007 and then loaded into OpenEpi software. Basic descriptive analysis was done and the ANOVA was performed to find out the association among various type of farms and various types of floor associated with the hock lesions. A p value less than 0.05 was considered significant.



RESULT

Results are shown in table 1 and table 2. The average hock lesions score in university farm was significantly higher in comparison to research and private farm. Although non-significant the hock lesion score was less in muddy floor as compare to cemented, brick paved and rubber mat floor.

Table 1. Overall distribution of mean hock lesion score with S.D. among different types of farm.

Type of Farm	Number	Mean hock lesions score±S.D.
University (AFU)	29	1.827±0.384
Research (NARC)	71	1.4±0.905
Private farm	150	1.465±0.68

P-value=0.00168295.

Table 2. The overall distribution of mean hock lesion score with S.D. among different types of floor.

Type of Flooring	Number	Mean Hock lesion score±S.D.
Cemented	141	1.63±0.489
Mud	27	1.0165±0.577
Rubber Mat	35	1.343±0.481
Brick Paved	33	1.83±0.44

P-value=0.525189

DISCUSSION

Our research showed that university livestock farm having more hock lesion score compared to research and private farm. It might be due to prolonged standing and walking on hard or abrasive surfaces in university farm. At research farm although animals are also maintained on cemented floor but some animals are maintained on rubber mat. At private farm the animals are maintained on combination of cemented, brick and muddy floor that might result into less hock lesion score compared to university farm. From our results it has been shown that less hock lesion score, when animals are maintained on muddy floor. Fjeldaas *et.al.*, (2011) reported that the risk of higher lameness score (LS) was three times higher in cows on cemented floor (CF) compared to rubber floor (RF). Several studies have demonstrated the inter-relationship between occurrence of hock lesions and lameness in dairy cow (Cook *et.al.*, 2016, Whay *et.al.*, 2002, Rutherford *et.al.*, 2009).

The level of comfort from the lying surface might influence the severity of hock lesions as well as increase the risk of lameness (Brenninkmeyer *et.al.* 2013). Hence, the pathogenesis of hock lesions and the direction of the event as related to lameness need to be investigated. Severe hock lesions could initiate painful sensations leading to lameness, while a prolonged duration of lying down in lame cows on hard and abrasive surfaces might precipitate hock injuries. Another aspect that might contribute to the occurrence of severe hock injury is floor slipperiness. A recent study reported higher odds (Odds ratio, OR = 2.0) of cows being lame and with hock lesions (OR = 1.4) when reared on slippery floors compared to non-slippery floors (Solano *et.al.*, 2015). Telezhenko *et.al.* (2017), in a recent study involving gait analysis and skid resistance of different flooring systems in dairy housing, showed that rubber mats had the highest coefficient of friction and skid resistance values compared to concrete and mastic asphalt floors. This further depicts lower slipping tendencies in cows when housed on rubber mats or floors. Our observation also showed that university farm having dung soiled cemented floor which become slippery that might lead to more hock lesions score.

Overall, aforementioned events and our results show that preventive measures for hock lesions have the potential of reducing lameness incidence contributing to general improvements in cow welfare. Mostafa and Maharan (2016) have reported higher hock injury in a tie stall barn with concrete floor (11.9%). Higher hock injury in the tie-stall barn can be attributed to confinement of the animal at one place due to which their movements are confined which have an effect on hock injury and may be the reason behind more stress on hock in tie-stall barns.

CONCLUSION

Our research showed that muddy floor produce less hock lesion score compared to cemented, rubber mat, and brick paved floor in dairy animals.

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