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Skin Lesions Score in Large White Yorkshire Piglets during Postweaning Period Reared on Different Floor Types

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ABSTRACT

The present study was conducted during Jully, 2020 to November, 2020 at Pig Unit, Livestock Farm Complex (LFC), College of Veterinary Science, Rajendranagar, Hyderabad, Telangana, India to study the effect of different types of floors on performance, behavior, and carcass traits of Large White Yorkshire piglets during different phases of growth under intensive system. 24 Large White Yorkshire piglets were reared on four types of flooring systems consisting of 6 piglets in each group i.e., T_1 (control group) reared on the concrete floor, T_2 rubber mat, T_3 elevated slatted floor, and T4 on soil floor from weaning to 126 days. The piglets were individually examined for the presence of skin lesions of the carpus, hock, abdomen, and teats, face, and tail every fortnight from the start of the experiment. The severity of the lesions was scored as 0, 1, 2, or 3. The initial mean skin lesion score of LWY piglets was 0.20±0.09, 0.30±0.10, 0.23±0.10, and 0.20±0.07 and it was decreased to 0.00±0.00, 0.00±0.00, 0.20±0.09, and 0.00±0.00 in T_1, T_2, T_3, and T_4 floor types respectively. Statistical analysis revealed non-significant (p>0.05) differences in mean skin lesion score among the piglets reared on four floor types during the initial, first, second, third, fourth, and fifth fortnight. The mean skin lesion score of piglets reared on the elevated slatted floor was higher during the sixth, seventh, eighth, and ninth fortnight and differed significantly with concrete, rubber mat, and soil floor.

KEYWORDS: Skin lesions score, large white yorkshire, postweaning period

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Data Availability Statement: Legal restrictions are imposed on the public sharing of raw data. However, authors have full right to transfer or share the data in raw form upon request subject to either meeting the conditions of the original consents and the original research study. Further, access of data needs to meet whether the user complies with the ethical and legal obligations as data controllers to allow for secondary use of the data outside of the original study.

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1. INTRODUCTION

The challenges faced by the country in securing food as well as nutritional security for the fast-growing population need an integrated approach in livestock farming. Pig farming has the potential to provide employment opportunities to seasonally employed rural farmers and supplementary income to improve their living standards. Pig has got one of the highest feed conversion efficiency i.e. they produce more live weight gain from a given weight of feed than any other class of meat-producing animals except the broilers. Pigs can utilize a wide variety of feedstuffs viz. grains, forages, damaged feeds, and garbage and convert them into valuable nutritious meat. Pigs are one of the most prolific breeders with high fecundity and shorter generation interval. They have high growth potential of reaching market weight at an early age under better management conditions. Large White Yorkshire is a large sized and most extensively used exotic pig breed in India. Their body is solid white colored with erect ears, dished face and snout of medium length. An adult boar (male pig) weighs around 300 to 400 kg and an adult sow weighs around 230 to 320 kg. Pig farming requires a small investment on buildings, equipment and for protection against diseases. Pigs are known for their meat yield, which in terms of dressing percentage or carcass yield ranges from 60 to 80%, which in comparison to ruminants (55%) is high. Pork provides one of the most nutritious meat with high fat and low water content and has got better energy value than that of other meats. It is rich in vitamins like thiamin, niacin, and riboflavin. Pigs store fat rapidly for which there is an increasing demand from poultry feed, soap, paints, and other chemical industries.

In recent years there has been a growing concern about animal welfare due to the undesirable consequences on general productivity performance (Miro et al., 2016). Animal welfare, among other things, depends on the type of floor in their housing (Mills et al., 2010). The floor as the main part of the house influences animal welfare through its design and material, which is then manifested in species-specific behavior, the occurrence of lesions and diseases, and convenience (Kymalainen et al., 2009). Problems such as lameness and claw and skin lesions are also linked to floor characteristics such as slip resistance, hardness, and surface profile (Calderon Diaz et al., 2013). The frequency of skin lesions increases significantly over the first 3 days of life (Zoric et al., 2004, Zoric et al., 2008, and Hoy and Ziron, 1998) and if the floor is hard and rough the healing process may be delayed. Although (straw) bedding may ensure more comfort, it is incompatible with the manure disposal systems, holds increased risk for disease, costs more, and requires extra labor (Tuyttens, 2005). Rubber coverings may be a good alternative to exposed concrete: a softer rubber layer increases lying comfort and the cushioning effect protects skin, claws, and legs (Tuyttens et al., 2008 and Elmore et al., 2010).

Rubber mats have not yet been widely used in pig production. However, studies of their effect on breeding female welfare have shown favorable results, including improved lying comfort, and sows and gilts find them preferable at low environmental temperatures (Pavicic et al., 2014 and Ostovic et al., 2015). Rubber mats in the lying area bring about improvements in some aspects of claw and leg health in fattening pigs (Falke et al., 2018). The floors in modern pig pens often consist of concrete, which is harsh and abrasive for sensitive feet and legs. (Olsson et al., 2016). Ulcerative skin lesions can develop in many regions, such as the limbs, tail, flank, udder, legs or ears by a hard floor and prolonged lying time (Kschonek et al., 2025). Heel bruising and main claw coronary band lesions were seen more frequently and at greater degrees severity in piglets kept on slatted plastic floors than in piglets kept on rubber mats with litter (Heimann et al., 2024). Pigs in raised floors suffer from lameness and injuries while those of deep floor suffer only from diarrhea (Tracy et al., 2018)

In commercial pig production, pigs are mostly kept on a slatted, semi-slatted concrete or concrete floor. These floor types are advantageous in terms of durability, hygiene, and human resources, but offer poor comfort to the animals (Tuyttens et al., 2008).

2. MATERIALS AND METHODS

2.1. Location of the study

The experiment was conducted at Pig Unit, Livestock Farm Complex (LFC), College of Veterinary Science, Rajendranagar, Hyderabad during Jully, 2020 to November, 2020.

2.2. Environmental conditions

Hyderabad is located in central Telangana and the city lies at 17.366° N latitude and 78.476° E longitude in the Deccan Plateau and rises to an average height of 536 m above the sea level. Hyderabad has a unique combination of a tropical wet and dry climate that borders on a hot semi-arid climate (Koppen climate classification). During the period of the study, the average maximum temperature recorded was 31.5°C while the average minimum temperature was 21.7°C.

2.3. Selection of experimental animals

The present study was undertaken at the pig unit of the Livestock Farm Complex (LFC). 24 Large White Yorkshire piglets weaned at 56-day age were allotted randomly to 4 experimental groups with 6 piglets in each group in a Completely Randomized Design (CRD) under an intensive system. Weaning was done in the morning hours of the day. Piglets were reared on four types of flooring systems i.e., T_1

(control group) was reared on the concrete floor, T_2 rubber mat, T_3 elevated slatted floor, and T_4 was reared on the soil floor. The experimental duration for the postweaning period i.e., experiment II was of 126 days after weaning.

2.4. Housing and management of experimental animals

The floor space provided was 1.5 m^2 per piglet during the post-weaning period. All the piglets were dewormed after weaning. All the experimental animals were kept under hygienic conditions throughout the experimental period. Healthy surroundings and proper cleanliness were maintained in the experimental sheds. Proper feeding and watering arrangements were made hygienically.

2.5. Feeding and watering management

During the postweaning period, all piglets were fed with a concentrate mixture twice a day, i.e., 9.00 AM and 5.00 PM, following the nutrient requirements as per the ICAR (2013). Leftover feed, if any, was recorded the next day morning at 24-hour intervals throughout the experiment to calculate the total feed consumed per day. Potable, clean and fresh drinking water was made available to each animal in separate water troughs throughout the experimental period.

The piglets were individually examined every fortnight from birth to weaning during the postweaning period. Piglets were restrained and examined for the presence of skin lesions of the carpus, hock, abdomen, and teats, face, and tail. The severity of the lesions was scored as 0, 1, 2, or 3 as per the lesion score given by Zoric et al. (2004) (Table 1).

Table 1: Skin lesions score

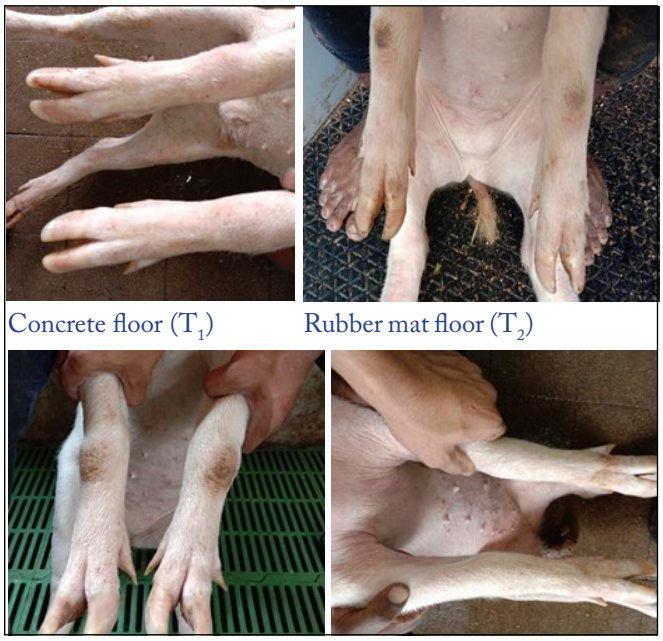
Score	Skin lesions
0 – No lesion	
1 – Mild	Hairless patches or loss of hair and mild hyperkeratosis
2 – Moderate	Skin abrasions i.e., skin on worn away
3 – Severe	Skin wounds. Spots of induration or scab that is a hard mass mainly of dried blood

3. RESULTS AND DISCUSSION

The skin lesion score of LWY piglets reared on four different floor types is presented in Table 2 and represented in Figure 1.

From the data presented in Table 2, it was observed that the initial mean skin lesion score of LWY piglets was 0.20±0.09, 0.30±0.10, 0.23±0.10, and 0.20±0.07 and it was decreased to 0.00±0.00, 0.00±0.00, 0.20±0.09, and 0.00±0.00 in T_1, T_2, T_3, and T_4 floor types respectively. Statistical analysis revealed non-significant (p>0.05) differences in mean skin lesion score among the piglets reared on four floor types during the initial, first, second, third, fourth, and fifth fortnight.

The mean skin lesion score of piglets reared on the elevated



Concrete floor (T_1) Rubber mat floor (T_2)

Elevated slatted floor (T_3) Soil floor (T_4)

Figure 1: Skin lesions on carpal joint of piglets on different floor types

Table 2: Mean±SE values for skin lesion score of LWY piglets during the postweaning period

Floor type	Initial skin lesion score	Fortnights									Overall
		1	2	3	4	5	6	7	8	9	
T_1	0.20 ±0.09	0.50 ±0.17	0.00 ±0.00	0.00 ±0.00	0.00 ±0.00	0.00 ±0.00	0.00 ±0.00b	0.00 ±0.00b	0.00 ±0.00b	0.00 ±0.00b	0.07 ±0.02b
T_2	0.30 ±0.10	0.53 ±0.17	0.00 ±0.00	0.00 ±0.00	0.00 ±0.00	0.00 ±0.00	0.00 ±0.00b	0.00 ±0.00b	0.00 ±0.00b	0.00 ±0.00b	0.08 ±0.01b
T_3	0.23 ±0.10	0.63 ±0.11	0.07 ±0.07	0.07 ±0.07	0.07 ±0.07	0.13 ±0.08	0.13 ±0.07a	0.20 ±0.09a	0.20 ±0.05a	0.20 ±0.09a	0.19 ±0.04a
T_4	0.20 ±0.07	0.50 ±0.18	0.00 ±0.00	0.00 ±0.00	0.00 ±0.00	0.00 ±0.00	0.00 ±0.00b	0.00 ±0.00b	0.00 ±0.00b	0.00 ±0.00b	0.07 ±0.02b

Table 2: Continue...

Floor type	Initial skin lesion score	Fortnights									Overall
		1	2	3	4	5	6	7	8	9	
N	6	6	6	6	6	6	6	6	6	6	6
SEm±	0.043	0.075	0.017	0.017	0.017	0.023	0.020	0.028	0.022	0.028	0.016
p value	0.843	0.923	0.413	0.413	0.413	0.089	0.022	0.010	0.000	0.010	0.006

Means with different superscripts column wise differ significantly: $p<0.05$; $p<0.01$; T_1: Concrete floor; T_2: Rubber mat floor; T_3: Elevated slatted floor; T_4: Soil floor; N: No. of animals in each treatment; SEm±: Standard error mean; *p* value: Probability value

slatted floor was higher during the sixth, seventh, eighth, and ninth fortnight and differed significantly with concrete, rubber mat, and soil floor.

The mean skin lesion score of piglets reared on the elevated slatted floor was higher during the sixth, seventh, eighth, and ninth fortnight and differed significantly with concrete, rubber mat, and soil floor. The overall mean skin lesion score was higher in T_3 and differed significantly ($p<0.01$) with T_1, T_2 and T_4 floor types.

These findings of the higher skin lesion score in pigs reared on the slatted floor are in agreement with the findings of Lyons et al. (1995), Courboulay et al. (2003), Breuer et al. (2004), Scott et al. (2006), Ogunbode et al., 2022 and Lagoda et al. (2021). Non-significant differences in skin lesion score in pigs reared on different floor types were reported by Scott et al. (2006) and Bos et al. (2016), Bos et al., 2016.

Gurung et al. (2020), Islam et al. (2020), Ekman et al. (2018) and Shakya et al. (2021) found higher skin lesion score in dairy cows reared on concrete and rubber mat flooring. Wallgren et al., 2019 found higher lesions in pigs reared on concrete floor than extra straw floor

4. CONCLUSION

The mean skin lesion score of piglets reared on the elevated slatted floor was higher during the sixth, seventh, eighth, and ninth fortnight and differed significantly with concrete, rubber mat, and soil floor.

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