Factors Affecting Pre-weaning Mortality in Non-native Goat Breeds Reared in Ampara District

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Abstract

Pre-weaning mortality in non-native goats causes serious economic losses to farmers due to the reduction in milk and meat production. Jamnapari and its crosses are the main nonnative goat breeds reared in Ampara District and are used primarily for meat and occasionally for milk production. A retrospective study was conducted in Ampara District to find out the factors affecting pre-weaning mortality in non-native goat breeds. Information about goat farming in randomly selected 20 farms in 5 Veterinary ranges in Ampara District was collected using a semi-structured questionnaire. Collected data was filled in MS excel and analyzed. Eight fecal samples were collected from suspected goats having diarrhoea. Our results revealed that the average pre-weaning mortality rate in non-native goats in Ampara district was 30%. Mean weaning age in Ampara district was 4.32 months. Two types of weaning methods were observed among the farmers in Ampara district; Feeding roughages, and wean until next kidding. Major factors identified for affecting pre-weaning mortality in non-native goats were disease (Parasitism, Tetanus, Pneumonia and Cerebrospinal nematodiasis) (15.61%), Prolong weaning age (7.8%), Heat stress (2.41%), Poor management (1.46%), Predatory attack (0.98%) and Cold weather (0.98%). It was found that the diseases are the major factors causing the pre- weaning mortality in kids. Majority (40.63%) of diseases which cause the pre-weaning mortality was parasitism such as Haemonchus spp, Oesophagostomum spp and Trichuris spp, while the other diseases are least important.

1. Main text

Goats are economically important species of livestock in Sri Lanka as it is used for meat, dairy, manure and fibre production. Their role in the livelihood of a large proportion of small and marginal farmers and employees are significant. Goat farming requires moderate care and reproduce quickly and start to bear kids from the age of one year old (Amundson, 2019). Most people involve in goat farming as it requires low investment and quick returns than other livestock, and goats require less feeds and space due to their smaller

size. Also, it has been promoted by various organizations to mitigate rural poverty especially in tropical environments due to their drought- tolerant ability, browsing of wild grasses, tree buds and leaves. There are three types of goats reared in Sri Lanka. They are native, non- native and crossbreed goats. Native type goats (Indigenous) are the breeds which do not have exotic inheritance mixture. Non- native type goats (Exotic) are the breeds which are imported from other countries. Crossbreed type breeds are having two/more gene combinations of above types (Anuththara, 2021). Table 1 shows the different types of goats and their purposes.

Table 1. Purpose of rearing goat breeds.

Goat breeds	Purpose of rearing goat breeds			
	Meat	Milk	Dual (Both meat and milk)	Hair
Saanen	✓	✓	✓	
Jamnapari	✓	✓	✓	
Anglo Nubian	✓	✓	✓	
Angora	✓			✓
Beetal	✓	✓	✓	
Black Bengal	✓			
Boer	✓	✓	✓	
Pygmy	✓			
Savanna	✓			
Alpine		✓		
Toggenburg		✓		
Oberhasli		✓		
Lamancha		✓		
Malabari	✓	✓	✓	
Sirohi	✓	✓	✓	
Cashmere				✓
Nigora				✓
Pygora				✓
Australian Rangeland	✓			
Brush	✓			
Damascus	✓			
Jebel Akhdar	✓			
Kalahari Red	✓			

Kiko	✓		
Spanish	✓		
Verata	✓		
Tenners Fainting Goat	✓		
Sudanese Male Desert Goat	✓		
Nigerian Dwarf		✓	
Sable		✓	
Barbari	✓	✓	✓

(Source: (Rout, 2021))

Kids can be weaned earlier than the traditional weaning age of 3 months. Kids can be successfully weaned at 9kg of body weight, 8weeks of age or at the time when at least 30g/day of solid feed are consumed (Datt, 2023). From the first day after birth to completion of neonatal age is considered as the period where pre-weaning mortality occurs. Kids face a number of physiological, behavioral and immunological challenges affecting the survival of neonates after birth (Bienboire-Frosini, 2023). Mortality among pre-weaning animal is one of the major factors causing significant economic losses to the goat producers. Therefore, it's important to find out the factors affecting preweaning mortality in goats.

2. Materials and Methods

Study was based on collecting data from goat farmers about goat farming in Ampara district over a period of 6 months. 20 farms among 05 veterinary ranges (Kalmunai Muslim division, Kalmunai Tamil division, Karaitivu, Ninthavur and Sainthamarthu) were selected to gather information via convenience sampling techniques. Semi-structured and pre-tested questionnaire was prepared with including, Herd composition, Land and grazing, Weaning, Health and disease, Nutrition of doe and kids, Housing based questions were considered.

Based on farmers' data; 04 farms were identified as suspected parasitism, although with the history of deworming, poor animal health and presence of diarrhea during the study period. 08 fecal samples were collected from randomly selected 2 goats in each suspected farm. Collected fecal samples were labelled, freeze and brought to veterinary investigation center (VIC) - Ampara for the laboratory analysis to find common types of parasitic eggs (coccidia oocyst, strongyle egg, strongyloidiasis egg, moniezia spp) by Salt floatation method and to determine eggs per gram (e.p.g) by Modified McMaster's technique (Shifaw, 2021).

2.1 Salt floatation method
2g of fecal sample was weighed and 12ml of saturated salt solution was added. Solution and faces were mixed, stirred, filled into a test tube, cover slip was placed, leaved it for 10 minutes, slide was prepared and observed under microscope.

2.2 *Modified McMaster's technique*

3g of faces was weighed, 42ml of saturated salt solution was added while faces were crushed and mixed well. Then the solution was stirred and it was drawn up from the top of the solution by pipette and placed it at the edge of the slide. Two chambers were filled with the solution and slide was observed under the microscope.

$$epg = 100Y$$ (Y- Number of eggs)

And some farms were identified as suspected pneumonia, tetanus and CSN according to the history and clinical signs. Collected data from questionnaire was filled in MS excel and analysed.

3. Results and Discussion

According to the findings, average pre-weaning mortality rate of the studied area was 30% in non- native goats (Table 2). Contributing factors for pre-weaning mortality were birth weight, doe weight at kidding, diseases, weaning age, nutrition, season of birth, environment and management of the farm. Higher birth weight of pre-weaning kids and higher doe weight at kidding had better survival.

Table 2. Average pre-weaning mortality rate and causing factors in study area

Average kids born	Average kids died	Mortality rate (%)
10	3	30
Cause of mortality	Number of kids died due to the cause	Contributing factor of each cause (%)
Disease condition	32	15.61
Prolong weaning age	16	7.80
Heat stress	5	2.41
Management	3	1.46
Predatory attack	2	0.98
Cold weather	2	0.98

Disease condition, prolong weaning age, heat stress, management, predatory attack and cold weather were identified as a cause factors of the pre-weaning mortality and among disease condition was 15.61% recorded (Table 2) which reported in 7 farms. Based on the survey, parasitism, Tetanus, Pneumonia and CSN were identified for the disease condition of the pre-weaning mortality of goats in studied area. Pre-weaning mortality was affected by parasitism, tetanus, CSN, and pneumonia. Fecal samples from suspected instances of diarrhea were checked for parasitism using the salt floatation method (Khanal, 2016; Dibaba, 2017; Ratsep, 2020; Rout et al., 2021; Shifaw et al., 2021; Nisan, 2022). Among the diseases, Parasitism caused high mortality rate in kids which was 40.63% (Table 3). Haemonchus spp., Oesophagostomum spp., Trichuris spp. were the parasites identified by salt floatation method in suspected farms and reported average 800 e.p.g from Modified McMaster's technique.

Table 3. Pre-weaning mortality rate of each disease

Diseases	Number kids died due to disease	Mortality rate (%)
Parasitism	13	40.63
Tetanus	4	12.50
CSN	5	15.63
Parasitism+Tetanus+Pneumonia	10	31.25

Farms that were found to be free of parasitic eggs after 6 months may have been so because the deworming treatment was effective after the mortality, while for positive farms, the presence of a high level of e.p.g in the current faces may indicate that the previous shedding of eggs was excessive or that the deworming treatment was ineffective which is justify by Rendle, (2019). Due to poor farm construction, insufficient vaccination records, and the prevalence of clinical symptoms such muscle stiffness, hyperesthesia, erect ears and tails, and an inability to eat or drink, farms suspected of having tetanus had a history of deep wounds in kids (Terrill, 2009). Clinical indicators include ataxia, recumbency, head pressing, circling, and full or incomplete posterior paresis raised suspicions of CSN (Kustritz, 2022). Additionally, CSN surmised that certain farms had a history of goat rearing in tropical climate. Kids with pneumonia presented the clinical indications of runny nose, loss of appetite, trouble breathing, and cough. Pneumonia was primarily suspected during cold weather conditions (Underwood, 2015; Mani, 2018; Hunter, 2020).

Pre-weaning goat mortality has been linked to farms that delay weaning because locals in the Ampara District raise goats primarily for meat production. Farmers allow kids to take milk from their does up until the following kidding even though that was occasionally used for milking. The weaning age for goats at these farms' young as 06 months. Due to this malpractice, newborn kids in the following litter may not receive enough milk or colostrum, or may be delivered when weak, both of which increase the risk of newborn kids' mortality (Hunter, 2020). The survey found that the typical weaning age was 4 months. The farmers used two different weaning techniques; It's began to feed roughage and wean till the following kidding.

Due to the hot weather in the Ampara district and the lack of land for goats because of the overpopulation, farms have been recognized as the cause of pre-weaning mortality. The intensive management technique used in such farms also makes the animals more stressed (Rout et al., 2021). Pre-weaning mortality was seen on designated cold weather farms during the rainy season. Pre-weaning mortality of kids as a result of the temperature drop in tropical climatic area according to Luo, (2020) study.

Pre-weaning mortality is also a result of inadequate management and environmental factors (Nisan et al., 2022). Kids from such farms had a history of ingesting polythene bags, and bloating and constipation were the clinical indications (Underwood et al., 2015). It was primarily because of their bad management techniques, such as inappropriate rubbish disposal, and also because it was their first effort at farming and they had no experience with goat farming. Additionally, several farms were in close proximity to a cattle abattoir, making them highly accessible to predators, namely dogs. Predators attack also one of the key factors in pre-weaning mortality of kids in studied area.

4. Conclusion

The average pre-weaning mortality rate and mean weaning age in non-native goats in Ampara district were 30% and 4.32 months respectively. The study identified diseases as major factors which are affecting pre-weaning mortality in non-native goats are more than the next important cause which is prolong weaning age. As study further identified parasitism as the major disease causing the pre-weaning mortality, the disease could be controlled by maintaining proper deworming treatment, good hygienic practices, and proper history of vaccination. Furthermore, pre-weaning mortality can be further controlled by proper wound treatment, making the farmer aware of cattle farm surrounding the goat farming, proper management during cold weather condition, reducing the weaning age to 2 months, supplementary feeding during pregnancy, providing adequate space, ventilation, and density of animals to eliminate heat stress in house, proper garbage disposal and well fenced farm to prevent animal discomfort and the entry of predators. Consequently, by proper management during pre-weaning age could reduce the pre-weaning mortality.

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