

Effect of Different Factors on Mortality Rate of Arsi- Bale Kids in Mid Rift Valley of Ethiopia

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Abstract: The study was conducted in Anano Shisho and Edogojola of Adami Tulu Jido Kombolcha district of East shawa zone during May 2009 to June 2010 to determine the effect of different factors on mortality rate of Arsi- Bale goats' kids. Purposive and simple random sampling was employed as sampling technique to select two PA and smallholder farmers. The study carried out in this study areas revealed that from a total of 536 kids born during May 2009 to June 2010 22.4% (n=120) kids were died. A higher percent 16.4% (n=88) kids were died in wet season followed by dry 4.5% (n=24) season of the year. The cause of death for these kids during this time is probable due to parasitic diseases, infectious diseases and cold stress of the summer season of the years. Kids weighing less than 2.9 kg birth weight had mortality rate of 20.7% (n=111) which decrease with the increase in kids birth weight. There was a general trend for decreasing in kids' mortality rate with increase in parity up to specific parity number. However, the highest kids' mortality rate was recorded in the first parity followed by the third parity. Litter size has a significant effect on kids mortality rate ($P < 0.0001$) and female kids were more susceptible to diseases than male kids (67.5 and 32.5%, respectively). Age has a significant effect on mortality rate Arsi-Bale goat's kids. Pre- weaning kids mortality rate is higher 34.2% (n=40) than post weaning kid's mortality rate up to yearling 26.7% (n=32). In conclusion further detail investigations of kids' mortality including every component of reproductive wastage must be done at regional level with representing different agro-ecological zones.

Key words: Reproductive wastage • Infectious diseases • Pre-weaning mortality rate

INTRODUCTION

The goat is the most important animal of the domestic animals to man in tropics. Goats have a variety of functions and in comparison with other ruminants, display a unique ability to adapt and maintain themselves in harsh environment. Goats proved to be a great benefit to poor and landless or marginal farmers. Goat has been described as poor man's cow, a befitting description of their immense contributions to the poor people's economy. In mid Rift Valley of Ethiopia, goats are the second most popular livestock species being an integral component of crop-animal mixed farming systems by Adami Tulu Agricultural Research Center [1]. Even if goats have many advantages, their production is affected by genetic and environmental factors. Kids' mortality has a direct effect on genetic progress by its effect on selection pressure that is the percentage of the

kids, which must be retained as replacement. Moreover high kids mortality rate can seriously affect the economic viability of small ruminant farming, jeopardize the beneficial impact of fecundity and litter size of the flocks. Non-genetic factors are largely expected to contribute to kid mortality by Alexandre *et al.* [2] and Ameh *et al.* [3]. According to the report of Nnadia *et al.* [4] and Hunsain [5] relatively low birth weight, slow growth rate and insufficient milk production by does, were identified as the major constraints directly associated with higher kid mortality and this responsible for reduction of the total productivity.

MATERIALS AND METHODS

Reducing the mortality of kids will increase productivity of small ruminants and this will increase the income of smallholder farmers and pastoralists. In order

to reduce high mortality of kids it is very important to know the causes and the effect of different factors on kids' mortality rates. Little is known the effect of different factors on mortality rates of Arsi- Bale goats' kids, Hence the present experiment was aimed to determine the effect of different factors such as season, birth weight, birth type, sex, age of kids, parity of does and study site on mortality rate Arsi- Bale goat's kids.

Description of the Study Area: The study was conducted in two PAs of Adami Tulu Jido Kombolcha District namely Anano Shisho and Edo Gojola of East Shawa Zone of Oromia regional state. The agro-ecological zone of the district is semi-arid and sub-humid in which 90% of the area is lowland while the remaining 10% is intermediate with altitude ranges from 1500 –2000 meter above sea level. The mean annual rainfall ranges from 750-1000mm and the distribution is highly variable between and within years. The mean annual temperature ranges from 22-28°C. Mixed crop-livestock farming system characterizes the agriculture of the district.

Study Population: The effects of different factors on mortality rate of all newly born kids started during May 2009 to June2010 in the selected two PAs namely Anano Shisho and Edogojola of Adami Tulu Jido Kombolcha district were assessed.

Sampling Size and Sampling Procedure: The present study was conducted in arid and semi arid areas of Adami Tulu Jido Kombolcha district of East shawa zone of oromia regional states. Purposive and simple random sampling was employed as sampling technique to select two PA and smallholder farmers in mix crop-livestock production systems based on huge potential of goats population and accessibility of the areas for data collection.

Data Management and Statistical Analysis

Methods of Study: Data's on different factors that influence kids' mortality rate such as season, birth weight, birth type, sex, age of kids, parity of does and study site was collected to evaluate the effect of these factors on kid's mortality rate.

Data Analysis: Data collected during the study period were entered into a computer on a Microsoft Excel spreadsheet. Statistical analysis was performed using 'Statistical package for the social sciences' (SPSS),

version 11.5 (for Windows). Least squares analyses were used for the traits applying the general linear model procedures of the Statistical Analysis System (SAS) software packages to determine the effect of different factors on kids' mortality rate.

RESULTS

The study carried out in Anano Shisho and Edogojola Pas of Adami Tulu District revealed that from a total of 536 kids born from May 2009 to June 2010 22.4% (n=120) kids were died. A higher percent 16.4 % (n=88) kids were died in wet season followed by dry 4.5 % (n=24) season of the year. The result was presented in Table 1.

Effect of Birth Weight of Kids: Categorization of birth weight of kids were 1.5-2.0, 2.1-2.9, 3.0-3.9, ≥4 kg each having 67, 371, 92 and 6 kids. Kids weighing less than 2.9 kg birth weight had mortality 20.7% (n=111) which decrease with the increase in kids birth weight.

Effect of Birth Season on Kid's Mortality: Birth season were classified as dry (December to February), short rainy (March to May), wet (June to August) and early dry (September to November) having 33, 197, 253 and 53 birth record in each seasons respectively. Wet 34.8% and dry 11.3% period had significantly higher kids mortality than short rainy 11.3% and early dry season 1%. Kids born in short rainy and early dry season had significantly (P<.05) has higher rate of pre-weaning survival those born in the other seasons.

Effect of Parity: A total 106, 114, 109, 86, 43,31,8, 7and 2 birth records were recorded 1st, 2nd, 3rd, 4th, 5th,6th,7th, 8th and 9th parity respectively. The highest birth record was obtained in second parity whereas the least birth record found in ninth parity. The highest kids' mortality rate was observed in the first parity followed by the third parity.

Table 1: Season -wise mortality pattern of kids

Seasons	Kids entered	No of died	Mortality rate %
I (Dec-Feb)	33	24	72.3
II (March to May)	197	2	1.0
III (June to August)	253	88	34.8
IV(Sept-Nov)	53	6	11.3
Overall	536	120	22.4

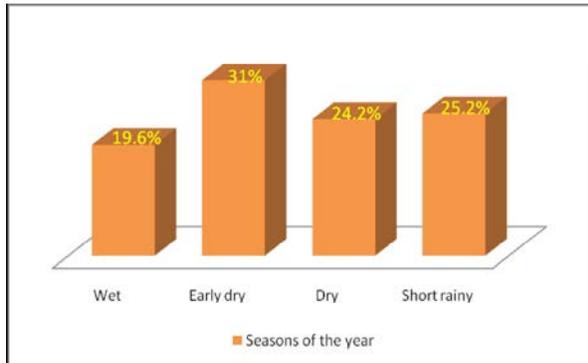


Fig. 1: Percentages of flock exist from the study areas in different seasons of the year

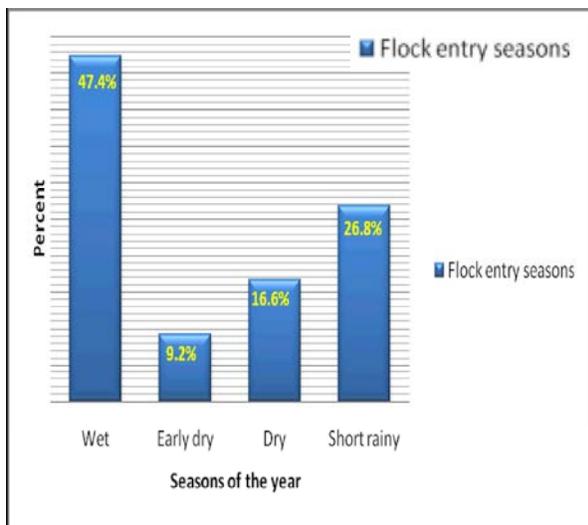


Fig. 2: Movement goats into the study areas in different seasons of the year

Effect of Litter Size: Of 536 observations 224, 303 and 9 birth were recorded for single, twine and triple kidding respectively. The current study conducted on major causes of Arsi- Bale kids mortality show that litter size has a significant effect on kids mortality rate ($P < 0.0001$).

Effect of Sex of Kids: Female kids were more susceptible to diseases than male, which is 67.5% and 32.5% respectively. Male kids had better rate of survival than females.

Effect of Age: In this study, age has a significant effect on Arsi-Bale kid's mortality rate. Pre- weaning kids mortality rate is higher 34.2% ($n=40$) than post weaning kid's mortality rate up to yearling 26.7% ($n=32$). There is no significant difference in kids' mortality rate between two PAs. However, the highest mortality is observed in Anano Shisho site.

Flock Mobility

Movement of Goats of the Study Areas: There were movements of goats out from the study areas in each season of the year due to different reasons. Among these reasons 43.3, 19.8, 3.3, 3.1 and 30.4% of goats were exist from the study areas due to sold, died, theft, slaughter and others, respectively. Most of goats about 31% were exist from their original place to other places during the early dry season followed by short rainy (25%) seasons of the years. In this study area, females (69.2%) more exist than males goats. About 39.6% of goats were migrating from the study areas almost at age of greater than one year due to different reasons of mentioned above.

Movement of Goats into the Study Areas: There was migration of goats from different areas into the study areas in different season of the years due to many reasons. Among these 3.7, 1.2 and 1% of goats were migrating into the study areas due to feeds problem, purchase and gift respectively. From the total movement of goats into the study areas about 47.5% of goats were migrate into the study areas during the wet (from June to August) season of the year. Whereas, the least (9.2%) of goats were move into the study areas during the early dry season of the year.

DISCUSSION

In this study areas seasons has a significance effect on kids' mortality rate. Many kids were died during the wet season of the years as compare to others seasons. This finding is in agreement with Awemu *et al.* [6] who reported that high rate of kids' mortality in the wet season. The cause of death of these kids during this time is probable due to parasitic diseases, infectious diseases and cold stress of the summer season of the years. After the end of the short rainy season, some infectious disease might be aggravating the death of growing kids due to the season is very conducive for multiplication of some bacteria and viruses. According to Acharya [7] season of birth, type of birth; birth weight and parity all have significant effect on kid mortality. In this study kids weighing less than 2.9 kg birth weight had mortality 20.7% ($n=111$) which decrease with the increase in kids birth weight. Kid's birth weight has a significant effect on kids mortality rate. The current finding is similar with the founding of Husain [5], Gupta and Sengar [8] and Malik *et al.* [9]. Kids born in short rainy and early dry season had significantly has higher rate of pre-weaning survival than those born in wet and

dry season of the years. Hailu [10] reported that there is a lower survival rate for Borana and Arsi-Bale kids, which is born in the dry season than those born in the wet season. The effect of season birth on kids' mortality rate is in agreement with the finding of El- Abid and AbuNikhaila [11]. This might be due to the variation of incidence of diseases and feed availability between seasons. The highest kids' mortality rate was observed in the first parity followed by the third parity. Kids' losses were high from does giving parturition for the first time due to insufficient milk production, delivery of small and weak kids. The general trend for decreasing in kids' mortality rate with increase in parity up to specific parity number may be due to attainment of mature body weight by doe and consequently to a large quantity of milk produced with increased parity. There was a significance difference among the parities. Chowdhury *et al.* [12] found that kid mortality decrease linearly with increase in parity. Awemu *et al.* [12] reported linear increase in survival rate with parity and observed maximum survival at the highest parity (parity 6). However, in this study maximum survival rate is observed in eighth parity. The current study conducted on major causes of Arsi- Bale kids mortality show that litter size has a significant effect on kids' mortality rate. Female kids were more susceptible to diseases than male, which is 67.5% and 32.5% respectively. Male kids had better rate of survival than females. This finding was in agreement with the finding of Alexander *et al.* [2] and Hailu *et al.* [9]. In this study, age has a significant effect on Arsi-Bale kid's mortality rate. Pre- weaning kids mortality rate is higher 34.2% (n=40) than post weaning kid's mortality rate up to yearling 26.7 % (n=32). There is no significant difference in kids' mortality rate between two PAs. However, the highest mortality is observed in Anano Shisho site. This is probable because of different management level provided by the farmers for his flock special during the wet season in order to overcome feed shortage in between two PAs. Most of goats in the study areas were infected by internal parasite during the wet and early dry season of the year. Growing Kids are more susceptible to internal parasite than adult goats, 80.2 and 19.8%, respectively.

From the study it was concluded that majority of the kids were died during the wet and dry seasons of the years. The cause of death of these kids during this time is probable due to parasitic diseases, infectious diseases and cold stress of the summer and shortage feeds during the dry season of the years. The higher

mortality in extensive goats rearing systems possibly due to increased stresses on animal to which they responded by higher diseases and mortality. In this study, areas birth weight, season of birth, birth type age, parity of doe and study site has a significant effect on kid's mortality rate. However, sex does not have a significant effect on kid's mortality rate. Further detail investigations of kids' mortality including every component of reproductive wastage must be done at regional level with representing different agro-ecological zones.

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