



## **Evaluation of the Main Risk Factors Impact on Mortality Rate of Turkish Lambs in the Kunduz Province of Afghanistan**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Author NZ designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author GA improved the English language, completed two-round revisions and proofreading by having a strong contribution role as a authors GA and GRF was contributed as the major's advisor of the study. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Aims:** The objective of this study was to find out the lamb's mortality rate of associated risk factors in Kunduz province that identify mortality problems, survival lambs, and risk factors in Turkish lambs.

**Design of Study:** Using survey methods sampling by distributing questionnaires to sheep farmers.

**Place and Duration of Study:** A total of 12 villages in two main districts (Imam Sahib and Ali Abad) of Kunduz province were observed from March to December 2020.

**Methodology:** All the 72 sheep farmers were selected that they had 500 -1000 Turkish sheep on average (lambs were 56% males and 44% females), and main risk associated factors impact the mortality rate of lambs based on means performed by One sample and Paired T-Test were determined.

**Results:** The results of the study indicate that the mortality rate of the lambs was observed at 21.696% (in Kunduz province), while the mortality rate of lambs was no significant difference in the mortality percentage of two districts with P-Value = 0.462, as in Imam Sahib district, the mortality rate of lambs was 20.995%, and Aliabad reported 22.34%, individually. The analyses of variance

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showed that the main risk factors impact in the district of Imam Sahib was observed highly significant differences in overall variables except for dystocia in comparison to the Aliabad district. The impact of risk factors on mortality rate of lambs in Kunduz province were recorded greater by 3.8261% abortion > 3.687% nutrition > 2.603% illness > climate change 2.341% > 1.338% accident > 1.115% housing > 0.969% care of pregnant > 0.819% management > 0.800% milk > 0.697% dystocia, respectively.

**Conclusion:** The mortality rates of lambs were found very high with abortion, nutrition, illness, and climate change. Hence, due to the impact level of main risk factors on mortality rate, efforts should be made to increase lambing supervision, improve management of newborn lambs, and prevent diseases by focusing on the good feeding of animals.

*Keywords: Mortality rate; main risk factor; impact; Turkish lamb; Kunduz province.*

## 1. INTRODUCTION

Livestock is an integral part of agriculture and it plays an important role in food security. sheep populations are progressing despite an attack marked by massive mortality during lambing, a total number of breeding populations formed by sheep [1]. sheep production is expected to be more important in the next years for two reasons; an increase in the human population and an increasing in skin production for meat, especially lamb and mutton [2]. The average mortality rate worldwide is 9 to 20 [3]. In Asia, [4] the average mortality rate lamb of 9-12% in Pakistan reported while in India [5] was reported 21% as the average lamb mortality rate. The mortality in lambs is complex; it may be due to various climatic, nutritional, management, infectious, genetic, and other factors. to be created, The reported results showed that focused services among sheep herd owners and workers were urgently needed for proper husbandry measures such as record-keeping, hygiene measures [6]. Lamb mortality is a major problem that makes this goal difficult. Reduction of lamb mortality can be achieved only by identifying and targeting its specific causes [7]. Environmental factors cause differences in the expression of important economic traits such as birth weight. Animal Performance records should be adjusted to reduce or mitigate known environmental differences between animals so that genetic differences among animals can be identified and for effective breeding plans to improve them [8].

Climate change is one of the factors associated with human activities to destroy the ecosystem. This factor leads to global warming, changing rainfall patterns, increasing the amount and severity of climate factors such as storms and rising sea levels [9]. Climate change will have far-reaching consequences for animal production, especially in vulnerable countries that

are critical to nutrition and livelihoods. The impact of climate change can increase the vulnerability of the livestock system and increase the pressure on them, including drought, Parasites and diseases are among the most severe factors that affect livestock production and productivity [10]. The reported shows higher mortality were during the wet season 37 (45.12%) than during the cold and hot season [11].

Nutrition plays a major role in the overall productivity, health, and well-being of the sheep. the cost of feed account for approximately two-thirds of the total cost of production [12]. The important role of nutrition earlier in pregnancy through its effects on fertilization, implantation, placental development, fetal organogenesis, and growth [13]. Limit feeding corn-based diets to ewes during gestation did not negatively affect ewe performance [14]. increased live weight of ewes during the last 6 weeks of pregnancy was associated with weight gain at the birth of single and twin lambs [15].

Abortion and stillborn lambs dead are usually caused by infections such as toxoplasmosis; vibriosis, chlamydiosis, or leptospirosis, and lambs may be born weakly and die shortly after birth from these infections. The result of poor farm health or poor biosafet [16]. Prenatal mortality is one of the main reasons for the low productivity of sheep In the UK, with an average annual prenatal mortality rate of perhaps 15% or more in Australia, with 15 to 20% lamb mortality reported in Jordan, reports show that lambs had a prenatal mortality rate 7.5% [17].

Dystocia is described as a difficult birth due to a prolonged unaided delivery or prolonged delivery that requires assistance [18]. It can be caused by either maternal or fetal factors. Maternally related dystocia is most commonly because of failure of

cervical dilation, narrow birth canal, and uterine inertia. Those related to fetal causes are usually associated with fetal malposition, fetal pelvic disproportion, oversized, and fetal malformation [19]. Lamb dystocia has been reported to account for up to 11% of lamb mortality [20].

Colostrum consumption shortly after birth, is vital for the lamb to survive, and lamb depends on colostrum as an essential source of nutrients. Also, intestinal absorption of colostrum immunoglobulins ensures inactive immunity in infants. Lambs born in poor conditions are often too weak to breastfeed. Unfortunately, environmental conditions and milk production or breast disorders in ewes are other reasons for insufficient colostrum consumption. It is colostrum intervention of farmworkers to help such lambs is likely to reduce mortality [21].

The present study aimed to identify mortality problems, survival lambs, and risk factors in lambs. According to this organization, time can be useful to reduce mortality and increase profitability for farmers.

## 2. MATERIALS AND METHODS

### 2.1 Selection of the Survey Area

The survey was conducted between March and December 2020 in Kunduz province, which includes two districts (Imam Sahib and Ali Abad districts) located in the northeastern part of Afghanistan. Kunduz province is higher than 404 meters and between in 68.6°52.5' E longitude and 36.22°58.12' N latitude. This province's climate in the semi-arid, dry, and wet seasons. Summer temperatures reach positive 45 degrees Celsius and the lowest winter temperatures reach negative 20 degrees Celsius, and there are severe storms in different seasons of the year [22].

### 2.2 Data Collection

This survey is exploratory research that collected data in order to investigate the relevant problems. Also, this research has been done qualitatively; qualitative research has been done using the methods of observation, interview, questionnaire, survey, and comprehensive focus on limited samples. It should be noted that in this study, the random sampling method was used to obtain accurate and reliable figures. To collect information, a closed questionnaire was distributed to 72 farmers in two districts, which included 12 villages.

## 2.3 Data Analysis

Data sorted in excel sheet 2016, and Minitab 17.0 statistical software (Minitab Inc. State College, PA, USA) was used for data analyses with performed general means to find out the impact of each main risk factor on the mortality rate of Turkish lambs. One-Sample T-Test was run to determine the impact of all associated risk factors on the mortality rate of lambs in Kunduz province, and Paired T-Test also had performed for that to measure the significant differences impact of each variable include climate change, nutrition, management, illness, housing, care of pregnant, dystocia, abortion, milking, and accident in the between two districts of understudy.

## 3. RESULTS AND DISCUSSION

### 3.1 Impact of Main Risk Factors on the Mortality Rate of Lambs in Kunduz

The present study is conducted on the impact of main risk factors on the mortality rate of lambs in the Kunduz province, and there are a number of the main risk resources that become cause mortality and reduce animal products, which are including climate change, nutrition, management, and diseases. So, each one of them with details is presented in Table 1.

Climate change and weather conditions are the main risk resources, which have direct and indirect impacts on animals and agriculture. The present study results have been shown that climate change is the one highlighted risk factor on the mortality rate of lambs after nutrition, abortion, and illness (Table 1). Among the 21.669% mortality rate of lambs in evaluated factors, the direct influence of climate change factor was observed 2.341% (Table 1). Indirectly, the climate change factor has a critical role in the mortality rate of lambs because neutrino, abortion, and some other factors are linked with climate change conditions, if the weather is not suitable for the normal living of sheep, the impacts of other risk factors can be increased mainly (Table 1). As researchers have been reported that the air temperature, humidity, and wind speed capable had direct effects on influencing growth rate, milk production, wool reproduction [23]. Also, the severity and distribution of diseases in livestock and parasites illness are a condition by climate change [10].

Food is one of the main factors for the survival of animals. Therefore, a good nutrition program is one of the best ways to avoid perinatal and postnatal problems of sheep farms. The present survey found that the specific role of nutrition factor on the mortality rate of lambs is much greater than other factors except abortion factor (Table 1). Overall factors impact in the study has cleared that the influence of nutrition was high in the rate of 3.687%, after abortion (Table 1). The related research report has shown that in adult ewes, temporary nutrient restriction during early pregnancy results in better lamb survival, and mild nutrient restriction in mid-pregnancy tends to improve neonatal behavior and result in lambs with longer skeletal size [13]. Similarly, the report has shown that nutrient restriction during the pregnancy period could reduce fetal weight and muscle mass [24]. According to the obtained information in this survey, there are two types of rearing and breeding systems that in the extensive type, feed the animals pasture (freely use the pasture) regarding the type of forage and weather conditions. The type of intensive, in small and large farms, whenever pasture is covered by snow and rain in the rainy and snowy seasons, farmers have to feed the animals from the dry harvested food (hay). Therefore, access to adequate and nutritious food resources varies according to the economic situation of sheep farmers in different areas under study.

The strategy and good management can be reduced the mortality rate of lambs and animal products. Management factors are including care during pregnancy, lactation, housing or barn hygiene, animal diseases, dystocia, abortion, and accident. The analysis of data based on One Sample T-test of sheep farmers have shown in Table 1, which among 21.669% mortality rate of Turkish lambs recorded, the direct impact of risk management factors was 0.819%. However, the

associated risk factors with management including illness, housing, care of pregnant, dystocia, abortion, milk, and accident were influenced by 12.167%, indirectly (Table 1). Our study was found that all variables of associate risk factors on mortality rate of lambs take place by rate of abortion 3.8261 > nutrition 3.687 illness 2.603% > 2.341% climate change > accident 1.338% > housing 1.115% > care of pregnant 0.969% > management 0.819% > milk 0.800% > dystocia 0.697%, respectively (Table 1). According to the conducted survey, there would be suggested that by improving the above-mentioned factors, the mortality rate of lambs could be reduced. The factors independently associated with increased neonatal survival were continuous monitoring of the ewes during the lambing season, active support to ensure sufficient colostrum intake of the lambs, feeding a combination of grass silage and hay compared with grass silage alone, and supplying roughage at least twice per day versus only once. As well, measuring in sheep flocks targeted at feeding practices during the indoor feeding period and management practice during lambing season would be expected to reduce neonatal lamb mortality [21].

**3.2 Impact of Main Risk Factor on Mortality of Lambs in Two Districts**

Our survey results were indicated that there are some differences among risk factors on the mortality rate of lambs in between two districts of understudy (Imam Sahib and Aliabad), here is referred to run a compression analysis test (Paired T-Test) to find out the individual impact as significant differences in among of variables with comparing two districts of Kunduz province, which the results of each factor is presented in the following tables (Table 2 -12).

**Table 1. shows the impact of main risk factors associate with the mortality rate (21.668%) of Turkish lambs in Kunduz province based on the one-sample t-test**

Main risk factor	N	Mean	StDev	SE Mean	95%	CI
Climate change	72	2.341	1.837	0.216	1.909,	2.773
Nutrition	72	3.687	1.921	0.226	3.235,	4.138
Management	72	0.819	0.977	0.115	0.589,	1.048
Illness	72	2.603	1.530	0.180	2.243,	2.962
Housing	72	1.115	1.197	0.141	0.834,	1.397
Care of pregnant	72	0.969	1.064	0.125	0.718,	1.219
Dystocia	72	0.697	0.973	0.115	0.469,	0.926
Abortion	72	3.826	2.617	0.308	3.211,	4.441
Milk	72	0.800	0.931	0.110	0.579,	1.020
Accident	72	1.338	1.391	0.164	1.011,	1.665

**Table 2. Paired t-test and CI: For mortality% in two districts**

Paired T for mortality% variables				
District	N	Mean	StDev	SE Mean
Imam Sahib	36	20.995	4.81	0.80
Aliabad	36	22.34	10.48	1.75
Difference	36	-1.35	10.88	1.81
95% CI for mean difference: (-5.03, 2.33)				
<i>T-Test of mean difference = 0 (vs ≠ 0): T-Value = -0.74 P-Value = 0.462</i>				

**Table 3. Paired t-test and CI for climate change factor in two districts**

Paired T for climate change variables				
District	N	Mean	StDev	SE Mean
Imam Sahib	36	3.433	1.845	0.308
Aliabad	36	1.249	0.992	0.165
Difference	36	2.185	2.198	0.366
95% CI for mean difference: (1.441, 2.929)				
<i>T-Test of mean difference = 0 (vs ≠ 0): T-Value = 5.96; P-Value = 0.000</i>				

**Table 4. Paired t-test and CI for climate change factor in two districts**

Paired T for nutrition variables				
District	N	Mean	StDev	SE Mean
Imam Sahib	36	4.800	1.782	0.297
Aliabad	36	2.574	1.328	0.221
Difference	36	2.226	2.086	0.348
95% CI for mean difference: (1.521, 2.932)				
<i>T-Test of mean difference = 0 (vs ≠ 0): T-Value = 6.41; P-Value = 0.000</i>				

**Table 5. Paired t-test and CI: For management in two districts**

Paired T for management variables				
District	N	Mean	StDev	SE Mean
Imam Sahib	36	1.132	1.217	0.203
Aliabad	36	0.506	0.503	0.084
Difference	36	0.626	1.287	0.214
95% CI for mean difference: (0.191, 1.062)				
<i>T-Test of mean difference = 0 (vs ≠ 0): T-Value = 2.92 P-Value = 0.006</i>				

**Table 6. Paired t-test and CI: For illness factor in two districts**

Paired T for illness variables				
District	N	Mean	StDev	SE Mean
Imam Sahib	36	3.167	1.448	0.241
Aliabad	36	2.039	1.413	0.236
Difference	36	1.128	1.939	0.323
95% CI for mean difference: (0.472, 1.784)				
<i>T-Test of mean difference = 0 (vs ≠ 0): T-Value = 3.49; P-Value = 0.001</i>				

**Table 7. Paired t-test and CI: Housing factor in two districts**

Paired T for housing variables				
District	N	Mean	StDev	SE Mean
Imam Sahib	36	1.564	1.393	0.232
Aliabad	36	0.667	0.742	0.124
Difference	36	0.897	1.243	0.207
95% CI for mean difference: (0.477, 1.318)				
<i>T-Test of mean difference = 0 (vs ≠ 0): T-Value = 4.33; P-Value = 0.000</i>				

**Table 8. Paired t-test and CI: Care of pregnant in two districts**

Paired T for the care of pregnant variables				
District	N	Mean	StDev	SE Mean
Imam Sahib	36	1.308	1.327	0.221
Aliabad	36	0.629	0.547	0.091
Difference	36	0.679	1.423	0.237
95% CI for mean difference: (0.197, 1.160)				

*T-Test of mean difference = 0 (vs ≠ 0): T-Value = 2.86 P-Value = 0.007*

**Table 9. Paired t-test and CI: Dystocia factor in two districts**

Paired T for dystocia variables				
District	N	Mean	StDev	SE Mean
Imam Sahib	36	0.898	1.216	0.203
Aliabad	36	0.496	0.600	0.100
Difference	36	0.402	1.204	0.201
95% CI for mean difference: (-0.005, 0.809)				

*T-Test of mean difference = 0 (vs ≠ 0): T-Value = 2.00 P-Value = 0.053*

**Table 10. Paired t-test and CI: Abortion factor in two districts**

Paired T for abortion variables				
District	N	Mean	StDev	SE Mean
Imam Sahib	36	5.233	2.604	0.434
Aliabad	36	2.419	1.743	0.290
Difference	36	2.815	2.518	0.420
95% CI for mean difference: (1.963, 3.667)				

*T-Test of mean difference = 0 (vs ≠ 0): T-Value = 2.30; P-Value = 0.027*

**Table 11. Paired t-test and CI: Milk factor in two districts**

Paired T for milk variables				
District	N	Mean	StDev	SE Mean
Imam Sahib	36	1.051	1.041	0.176
Aliabad	36	0.571	0.749	0.127
Difference	36	0.480	1.234	0.209
95% CI for mean difference: (0.057, 0.904)				

*T-Test of mean difference = 0 (vs ≠ 0): T-Value = 6.71; P-Value = 0.000*

**Table 12. Paired t-test and CI for accident factor in two districts**

Paired T for accident variables				
District	N	Mean	StDev	SE Mean
Imam Sahib	36	1.911	1.674	0.279
Aliabad	36	0.765	0.670	0.112
Difference	36	1.146	1.456	0.243
95% CI for mean difference: (0.653, 1.638)				

*T-Test of mean difference = 0 (vs ≠ 0): T-Value = 4.72 P-Value = 0.000*

The analysis of data has been shown that there are some differences between the two districts (Imam Sahib and Aliabad), in which the impact of the main risk factor on mortality% of sheep lambs in Imam Sahib district is lower than Aliabad in Table 2. While there was observed no statistically differences in the level of  $P < 0.05$ .

Based on the obtained result, the impact of the main risk factor on the mortality rate of lambs was observed at 22.34% in Aliabad and 20.995% in Imam Sahib Districts (Table 2).

The mortality rate of sheep lambs influenced by climate change factors in Imam Sahib and

Aliabad districts of Kunduz province is shown in Table 3, which analysis of variance showed that there is a highly significant difference in the variable of climate change at the level of P-Value = 0.000, in the Imam Sahib district compare to the Aliabad district (Table 3). According to the results, climatic factors such as humidity and drought are some of the most important and extraordinary factors that harm the number of neonatal lambs due to the breeding of Turkish sheep, as the data related to mortality influenced by climate change showed that the rates of mortality lambs are 3.433% in Imam Sahib and 1.249% in Aliabad (Table 3). Evidence shows that the pregnant period of Turkish sheep generation is about 5 months, and the lambs are more sensitive to environmental conditions in the absence of shelter and cause the lambs to die more [10].

The paired T-test of nutrition variable has been shown that there is existed a much difference between two districts of understudy that a highly significant difference at the P-Value = 0.000 (Table 4). While the received information about farm sheep farmers in these two districts upgrade our understanding that the feeding resource and farmer's economy are very important for providing effective and sufficient food for animals. The mortality rate of lambs with associate nutrition factor in Imam Sahib District is much greater (4.800%) than in Aliabad district at 2.574% (Table 4). These results may have related to the differences in food resources and adequate feed of animals for survival and production, which is considered an important principle [13]. As we are understood that the most of the owners of the Imam Sahib district are nomads and do not have enough land to cultivate forage crops, and they need to buy food for animals from the market.

The mortality rate of sheep lambs influenced by the associate risk factor of management in Imam Sahib and Aliabad districts is shown in Table 5. Management is a critical factor that could have direct and indirect influences on the mortality rate of lambs, which has been observed the higher significant difference in Imam Sahib sheep farmers compare to Aliabad sheep farmers (Table 5). This study disclosed that the mismanagement factor had a highly significant impact on the increasing mortality rate of lambs at the P-Value = 0.006, in Imam Sahib compare to the Aliabad district (Table 5). Since the management factor has a different effect on other variables, better management will reduce the mortality rate of lambs [21].

The mortality rate of lambs influenced by associate risk factor of illness in two districts based on paired T-test is presented in Table 6. The comparison analysis of variance on the associate factor of illness showed that the impact of the illness variable was significantly higher at the P-Value = 0.001 (Table 6). Our study result has been shown that the factor of illness had higher influences on the mortality rate of lambs in the district of Imam Sahib than Aliabad district by the percentage of  $3.167 > 2.039$  (Table 6). According to research reports, the difference in the mortality rate of lambs may be thought that the management procedure, food resources, and sheep farmer's types, which have more role on the issue [25].

The impact of housing factors on the mortality rate of lambs in comparison two districts (Imam Sahib and Aliabad) is shown in Table 7. The analysis of housing variable on the mortality rate of lambs has been shown that the impact of the associate factor of housing was significantly decreased in Aliabad district Compare to Imam Sahib at the level of P-Value = 0.000 (Table 7), while the rate of lamb's mortality influenced by housing factor was recorded 1.564% in Imam Sahib, and 0.667% in Aliabad district (Table 7). The increased role of housing in the Imam Sahib Region compare to the Aliabad district has been thought to be the difference of sheep farmers in knowledge and economic condition. Similarly, another study approved this finding [21].

The mortality rate of lambs influenced by the associated risk factors of the pregnant care variable is discussed in Table 8. The analysis of data in the care of pregnant in two districts has indicated that the influence of the pregnant care factor was greater in Imam Sahib compare to the Aliabad district at the value of  $P = 0.007$  (Table 8). Our study showed that the rate of lamb's mortality rate was highly significantly decreased by the care of pregnant factor in Aliabad compare to Imam Sahib districts with a rate of  $0.629\% < 1.308\%$  (Table 8). The result of this study following a similar study reported that the impact of care pregnant factor was very important due to the mortality rate of lambs related to abortion factor, so focusing better on the care of pregnant would be reduced the rate of mortality of lambs due to abortion too [13].

The mortality rate of lambs influenced by the associated risk factors of dystocia is presented in Table 9. The analysis of variance in dystocia factor in two districts has been shown that the

influence of dystocia factor was greater in Imam Sahib compare to Aliabad district at the value of  $P = 0.053$ , while there was observed no statistical difference (Table 9). The result of the study showed that the rate of lamb's mortality rate was decreased by dystocia factor in Aliabad compare to Imam Sahib districts with a range of  $0.629\% < 1.308\%$  (Table 9). This result is according to the study of Ismail that He reports the dystocia problem in lambs could be associate with factors of overfeeding [19].

The impact of abortion factor on the mortality rate of lambs in comparison two districts (Imam Sahib and Aliabad) is indicated in Table 10. The comparison analysis of abortion variables in two districts has been expressed that the abortion factor had the highest impact on the mortality rate of lambs among variables in the district of Imam Sahib compare to Aliabad district at the P-Value = 0.000, (Table 10). Our result showed that the rate of lamb's mortality rate was highly significantly decreased by the care of pregnant factor in Aliabad compare to Imam Sahib Districts with a rate of  $2.419\% < 5.233\%$ , respectively (Table 10). As well, the result of this study with a similar study found that the impact of abortion factor very important to the influence on the mortality rate of lambs, which is needed to focus more to find the reasons that have associations with the increasing rate of mortality in lambs, in the result mortality rate of lamb's decrease [16].

The mortality rate of lambs influenced by the associated risk factors of the milk variable indicates in Table 11. The pair T-test analysis of milk factor in two districts has been shown that the milk factor had a significantly increased influence on the mortality rate of lambs in the district of Imam Sahib compare to the Aliabad district at the P-Value = 0.027, (Table 11). So, the result of the study showed that the rate of lamb's mortality rate was decreased by milk factor in Aliabad compare to Imam Sahib Districts with the rate of  $0.571\% < 1.051\%$ , respectively (Table 11). Also, the result of this survey is very closed with the similar study of Holmey et al., which milk factor could be important to newborn lambs to have received necessary nutrients from milk [21].

The mortality rate of lambs influenced by the associated risk factor of accident variable is shown in Table 12. The impact of accident factor on the mortality rate of lambs in two districts has been shown that the accident cases were

recorded a highly significant increase in Imam Sahib compare to Aliabad at P-Value = 0.000, (Table 12). While the happened cases' role on mortality of lambs was observed at the lower rate in Aliabad compare to Imam Sahib at the rate of  $0.765\% < 1.911\%$ , respectively (Table 12). According to the obtained information, the case of the accident could be happening more in Imam Sahib than in Aliabad due to the existing different types of predatory valid animals, insecurity problems, and vehicles on the road and the main street [26].

#### 4. CONCLUSION

The mortality rate was found 21.696% in Kunduz province, while the mortality rate of lambs has been shown different between two districts, as in the Aliabad district the mortality rate of lambs is greater (22.43%) in comparison to Imam Sahib (20.995%). Overall risk factors impact on the district of Imam Sahib were a highly significant increase in comparison to the Aliabad district expect dystocia factor. In conclusion, the mortality rates of lambs were found very high with abortion, nutrition, illness, and climate change. According to the impact level of risk factors on the mortality rate of lambs, we have suggested that many efforts are needed to pay attention to increase lambing supervision, improve management of newborn lambs, and prevent illness by considering a good strategy for animal feeding and treatment.

#### CONSENT

The research assistant and volunteers were well aware of the objectives of the study. According to international or university standards, sheep owners' written consent is modified and maintained by the authors.

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#### COMPETING INTERESTS

Authors have declared that no competing interests exist.



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