

Prevalence of Gross Urogenital Lesions and Abnormalities in Female Goats Slaughtered at Dire Dawa Municipal Abattoir, Eastern Ethiopia

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Abstract

A cross sectional study was carried out from November, 2017 to April, 2018 to estimate the prevalence of urogenital tracts/organs lesions and abnormalities in female goats slaughter at Dire Dawa Municipal Abattoir, Dire Dawa, eastern Ethiopia. Morpho-pathological lesions and abnormalities of reproductive and urinary tracts of a total 384 female goat were examined by incision and macroscopic examination via visual inspection and palpation. The study showed that there was an overall occurrence 17.4% of reproductive and urinary organ/tract abnormalities. Out this total of prevalence of 9.9% genital organ abnormalities were identified, among which ovarian hypoplasia was the reproductive abnormality with the highest occurrence (34.2%). And a total of 7.6% of occurrence of urinary lesion and abnormalities were examined. Renal calculi were the urinary organ abnormality with the highest occurrence (41.4%). The present study revealed that 9.1% were found pregnant out of 384 female goats slaughtered at Dire Dawa abattoir due to lack of accurate ante-mortem inspection. The difference in the prevalence of urogenital tracts/organs lesions and abnormalities with regard to age of animals was statistically significant ($p < 0.05$), but the difference was not statistically significant ($p > 0.05$) with regard to the body condition of goat. It can be concluded that morpho-pathological lesions are prevalent in goats that are brought to the abattoirs in the study area, which requires serious attention.

Keywords: Morpho-pathological lesions; Prevalence; Urogenital abnormalities

Introduction

Ethiopia has the largest number of livestock in Africa, approximately 44.3 million cattle, 46.9 million shoats, more than 1.0 million camels, 4.5 million equine, and 40.0 million chickens. Among livestock, small ruminants play a significant role in socio-economic life of the people of Ethiopia [1]. The total livestock population in Dire Dawa administrative council is estimated to be about 300,000, including 95,000 goats, 77,000 sheep, 63,000 cattle, 20,000 equine, 19,000 camel and 17,000 poultry. The administrative council is composed of 9 urban and 38 rural kebeles administrations. Large proportion of livestock kept in the arid part of the region mainly by pastoral community [2]. Goats are commonly slaughtered at around yearling age when their body weights are 15 to 20 kg. Because of their relatively low growth potential, increased meat production from the indigenous breeds so far evaluated is expected to come from increased numbers of animals rather than from increased growth rates [3].

Due to their extraordinary adaptability to hostile environments, goats assume important position in Ethiopian livestock economy. In combination with sheep, they supply more than 30% of all domestic meat consumption, and generate income from exports of live animal, meat and skin [4]. They have been estimated to provide up to 30% of the meat, and 15% milk supply in sub-Sahara Africa where they thrived in wide range of ecological region better than cattle. Small ruminants can survive better under drought conditions than cattle due to their low body mass and low metabolic requirement, and maintenance needed in arid and semi-arid areas [5].

One of the major constraints of goat production is poor reproductive performance of the animals. When infertility and sterility levels are higher in female goats, it incurs heavy economic losses and the farmers are forced to cull such animals [6]. Male and female infertility result in reduced productivity in goats. It has previously been contended that reproductive and urinary tract abnormalities may cause pain which in turn may have a negative effect on mating behavior in livestock [7].

Pathology of the genital tract abnormalities that significantly reduce herd productivity and may mean that rearing these animals is uneconomical and most of this information has, historically, been obtained through abattoir surveys [8]. Abnormalities of genital tract play a significant role in animal breeding either by causing sterility or infertility and thus cause substantial economic losses [9,10]. The uterus and ovary that are affected by lesions prominently contribute to infertility or sterility in goats and otherwise compromise enterprise profitability. As the age of the animals increases susceptibility to reproductive abnormalities is also increased [10,11]. According to some past studied on female genital tract, (16.30%) showed gross abnormalities with overall 23.32% incidence of pathological conditions. Pathological contribution of the uterus was the highest (62.96%), followed by the ovaries (25%) and other organs. Major uterine condition observed was endometritis (5.60%) [12].

Gross disorders of the urinary system are not common in abattoir studies. About 10.6% of overall occurrence of urinary organ/tract abnormalities which consisted of renal calculi, renal infarction, renal necrosis, renal abscess, pyelonephritis, hydronephrosis, and cystitis were observed in does slaughtered at the Nyagatare abattoir in Rwanda [13]. But at the Helmex abattoir in Ethiopia a total of 6.8% of the kidneys were condemned for nephritis in apparently healthy sheep and

goats [12]. According to the above all studies hydronephrosis, nephritis and renal calculi are the most common abnormalities observed. Hence, the objectives of this study were to estimate the prevalence of gross urogenital lesions and abnormalities of the female goats slaughtered at Dire Dawa municipal abattoir and to determine the associate risk factors (age and body condition) with the occurrence of urogenital lesions.

Materials and Methods

Study site

This study was conducted from November, 2017 to April, 2018 at Dire Dawa Administration (DDA). Dire Dawa is located in the eastern part of Ethiopia and lies between 9°27' N and 9°49' N latitudes and between 41°38' E and 42° 19' E longitudes, 515 Km from Addis Ababa, the capital city of Ethiopia. The total area of the administration is 128,802 hectare and the administration shares boundaries with Somali National Regional States in the West, North and East and with the Oromia National Regional State in the South. Its altitude ranges from 960 meters above sea level (m.a.s.l) in the Northeast to 2450 m.a.s.l in the Southwest. The rainfall is bimodal and characterized by small rainy season from February to May and high rainy season from July to September. The dry season extends from October to January. The mean annual rainfall in the study area varies from 550 mm in the lowland Northern part to 850 mm in the Southern mountain ranges. The monthly mean maximum temperature ranges from 28.1°C, to 34.6°C. Likewise, the monthly mean minimum temperature varies from 14.5°C in December to 21.6°C in June [14].

Study population

The study was conducted on a total 384 female goat slaughtered at Dire Dawa municipal abattoir. The goat production systems in the area are intensive, semi-intensive and extensive. During this period of the study age of female goats above 6 months were included.

Study design and sample size determination

The cross sectional study was conducted at Dire Dawa municipal abattoir. The study was conducted from a period of November, 2017 to April, 2018. As there is no comprehensive study on the incidence of gross urogenital lesions and abnormalities on female goats in Dire Dawa municipal abattoir the sample size for the study was estimated by taking expected prevalence of 50%, accepted error 5% and confidence interval of 95%, according to the formula given by Thrusfield [15].

The sample size was determined using the following formula:

$$N = \frac{1.96^2 \times P_{exp} (1 - P_{exp})}{d^2}$$

Where n=number of sample size, p=expected prevalence, d=absolute precision.

Accordingly, the sample size of the study was determined to be 384.

Sampling method and sample collection

Systematic random sampling method was used at Dire Dawa municipal abattoir to observe the gross urogenital lesions and abnormalities on a total numbers of 384 female goats during slaughtering. After slaughtering the intact and complete reproductive and urinary organs of female goat was taken carefully and transported into nearest laboratory for further investigation on abnormalities in shape, size, and/or color. At the laboratory, each reproductive tract was cut open from the vulva, through the vagina, past to the cervix and uterine body into each uterine horn up to the ovaries. The urinary bladder and both kidneys were also cut open. A full macroscopic appreciation by visual inspection and palpation were conducted for the identification of the color, size, shape, and consistency of any lesions found on the reproductive organs and urinary tracts and the results were carefully recorded. Hypoplasia was defined in this study as an ovary that was less than 0.5 cm diameter without grossly visible corpora lutea or follicles in an animal that was older than 8 months [16].

Data analysis

Collected raw data was stored in Microsoft Excel database system used for data management. The occurrence of the urogenital lesions and abnormalities was described using frequency distribution. Chi-square was performed to evaluate the differences in the occurrence of urogenital lesions and abnormalities with categorical variables by using SPSS version 20 software of computer program. P-value<0.05 was considered statistically significant.

Results

The present study revealed an overall occurrence of 17.4% (n=384) of urogenital abnormalities and lesions. Of these, 9.9% (n=384) female goat had genital tracts abnormality. The most commonly observed abnormality was ovarian hypoplasia which occurred in 34.2% (=38) of the goats with reproductive organ/tract abnormalities followed by ovarian cyst 26.3% and endometritis 18.4% (Table 1).

Type of abnormalities	Frequency	Relative frequency (%)
Ovarian hypoplasia	13	34.2
Ovarian cysts	10	26.3
Endometritis	7	18.4
Hydrometra	2	5.3
Pyometra	2	5.3
Hydrosalpinx	1	2.6

Vaginitis	1	2.6
Cervical atresia	1	2.6
Mummified fetus	1	2.6
Salpingitis	0	0
Vulvovaginitis	0	0
Total	38	100%

Table 1: Overall frequency genital tracts abnormalities and lesions in female goats at Dire Daw Municipal abattoir.

About 7.6% (29/384) of the female goats examined at abattoir had urinary organ/tract abnormality (Table 2). The most commonly observed urinary organ abnormality were renal calculi which occurred in 41.4% (12/29) followed by hydronephrosis 24.1% (7/29) (Table 2).

Type of abnormalities	Frequency	Relative frequency (%)
Renal calculi	12	41.4
Hydronephrosis	7	24.1
Pyelonephritis	4	13.8
Renal necrosis	3	10.3
Renal infraction	1	3.4
Cystitis	1	3.4
Renal abscess	1	3.4
Total	29	100

Table 2: Total incidents of urinary tract abnormalities of female goats at Dire Daw Municipal abattoir.

As shown in Table 3, in the current study, among 384 female goats slaughtered in Dire Dawa abattoir 9.1% (n=35) were pregnant and 90.9% (n=349) were non-pregnant according to Table 3.

Pregnancy status	Frequency	Relative frequency (%)
Non-pregnant	349	90.9
Pregnant	35	9.1
Total	384	100

Table 3: The total occurrence of pregnancy in female goats at Dire Daw Municipal abattoir.

The prevalence of genital abnormalities were significantly higher ($p < 0.05$) in old age (7.6%) than adult age (2.3%) female goats (Table 4). In the present study, body condition score had no significant association ($p > 0.05$) with the prevalence of genital organ/tract of female goats (Table 4).

Risk factors		No slaughtered	No. positive	Prevalence (%)	χ^2 (P-value)
Age	Adult	189	9	2.3	11.002 (0.001)
	Old	195	29	7.6	
Total		384	38	9.9	

Body condition score	Poor	32	1	0.3	2.627 (0.269)
	Medium	128	17	4.4	
	Good	214	20	5.2	
Total		384	38	9.9	

Table 4: Occurrence of genital abnormalities on the basis of age and body condition score of female goats.

The prevalence of urinary tract abnormality was numerically higher in adult than old age female goats, but there was no significant difference ($p < 0.05$) between the age and prevalence. Similarly,

although the prevalence of urinary tract abnormalities is numerically higher in animals with good body conditions than other animals, yet the difference was not statistically significant ($p > 0.05$) (Table 5).

Risk factors		No slaughtered	No. positive	Prevalence (%)	χ^2 (P-value)
Age	Adult	189	15	3.9	0.079 (0.779)
	Old	384	14	3.6	
Total		384	29	7.6	
Body condition score	Poor	32	2	0.5	0.426 (0.808)
	Medium	128	12	3.1	
	Good	214	15	3.9	
Total		384	29	7.6	

Table 5: Occurrence of urinary tract abnormalities on the basis of age and body condition score of female goats.

Discussion

In this study out of 384 female goats examined a total of 67 (17.4%) had urogenital abnormalities and lesion, among these 38 (9.9%) represent the occurrence of genital tracts abnormalities and lesions were examined in female goats slaughtered at Dire Dawa municipal abattoir. The genital abnormalities examined were ovarian hypoplasia, ovarian cyst, endometritis, pyometra, hydrometra, haematosalpinx, salpingitis, cervical atresia, vaginitis, and vulvovaginitis. This finding is slightly greater than others previous finding [17], who reported a prevalence of 7.11% and 8.08% uterine abnormalities in sheep and goats respectively. Other authors [13] also found 7.8% on the genital abnormalities on female goats. The present finding was almost similar with other researcher who reported prevalence of 10.11% on pathological occurrence of reproductive disease [18]. However, some authors reported prevalence which almost doubled the prevalence of the present finding such as the 20.22% on genital abnormalities in ewes [19,20].

In the present study 7.6% (n=384) of female goats examined at abattoir had urinary organ/tract abnormalities. The abnormalities observed include renal calculi, hydronephrosis, pyelonephritis, renal abscess, renal infarction, renal necrosis, and cystitis. Contrary to the present study Mushonga et al. [13] reported a higher prevalence (10.6%) of urinary tract abnormalities and lesions. On the other hand Mandefro et al. [21] reported relatively lower prevalence of 6.4% of kidney lesion in a study at abattoir. Baghban and Yaripour [22] still reported very low prevalence (1.2%) of kidney abnormalities.

The present study revealed that the incidence of the major urinary lesions and abnormalities at Dire Dawa municipal abattoir were renal calculi, hydronephrosis followed by pyelonephritis which accounted for

41.4%, 24.1%, and 13.8% respectively. Similarly Mushonga et al. [13] observed renal calculi (38.1%) followed by hydronephrosis (23.8%) in doe at Nyagatare Slaughterhouse, Eastern Province, Rwanda. On the contrary Baghban and Yaripour [22] reported interstitial nephritis to be the most abundant condition that was observed in 69 cases (71.13%) of sheep kidneys and 68 cases (72.34%) of goat kidneys at Yasuj Abattoir, Iran.

In the present study ovarian hypoplasia (34.2%) was the major genital abnormalities observed. Ovarian hypoplasia was reported to directly participate to infertility in female goat [23]. Other authors also have reported ovarian hypoplasia as the most important trait to genital abnormalities, which is attributed in the present study, 23.6%, the 384 examined reproductive organs revealed an ovarian cyst [13,24]. This result was in close agreement with previous works of Agrawal et al. [25] who reported 20% incidence of ovarian cyst in sheep. However triples other reports on urogenital lesion and abnormalities reported in other studies done elsewhere [11,13,26]. These discrepancies might be attributed to variations in management and nutrition of the animals. Infertility was greatly affected by ovarian cyst [27]. In the current study lesions of endometritis (18.4%) were recorded slightly greater than results of other previous studies such as Mushonga et al. [13] and Azawi et al. [9] who reported prevalence of 16% and 12.3%, respectively. Endometritis was considered as major cause of infertility among animals either by direct embryo cytolysis or by embryonic loss due to disruption of uterine tissues [28]. Prevalence of 5.3% of both hydrometra and pyometra were recorded in the present study. This finding was in a close agreement with other authors who reported 4.74% of hydrometra and 2.63% of pyometra in sheep [29]. The present study examined 2.6% of hydrosalpinx and similar result was reported by other authors [13]. Hydrosalpinx is inflammatory conditions that

may result from invasion of infectious organisms and it might lead to sterility of the affected animal.

The present study had revealed 9.1% were found pregnant out of 384 female goats slaughtered at Dire Dawa abattoir. These finding was almost similar with other author who reported about 8.95% of pregnant goat slaughtered due to lack ante-mortem inspection [29]. On the contrary a report at Urmia University showed 17.88% goats and 30.10% ewes were pregnant [30,31]. The present study has revealed that genital abnormalities were higher in old age than adult age female goat demonstrating that age had a significant effect on the occurrence of genital lesion and abnormalities. Other authors also strongly agree with this statement [10,11]. With regard to age the current study revealed that goats with good body condition (3.9%) were found with more urinary lesions and abnormalities than those with medium (3.1%) and poor body condition (0.5%) animals, but the difference was not statistically significant ($p>0.05$). This finding was in agreement with other report on cattle slaughtered in Gondar, Northwest Ethiopia [32].

Conclusion

The present study showed high incidence of 9.9% and 7.6% of genital and urinary organ abnormalities, respectively. The present study had also revealed 9.1% of incidence of pregnant uterus out of 384 female goats slaughtered at Dire Dawa abattoir due to lack ante-mortem inspection. This may have a direct impact on the production of goats by decreasing number of pregnant goat. Proper control and prevention strategies on genital and urinary organs abnormalities should be implemented to reduce infertility and reproductive inefficiency of goats as well as to prevent economic loss due to condemnation of edible organs like kidneys. Pregnancy testing method should be practiced at the slaughter house in order to decrease loss of pregnant animals due to slaughtering.

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