

*Full Length Research Paper*

# Gross pathological changes in the reproductive tracts of cows slaughtered at two abattoirs in Southern Ethiopia

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**Abattoir based study was conducted to assess the type and prevalence of reproductive abnormalities and pregnancy status of cows slaughtered at Hawassa municipality abattoir and Tula slaughter house. Out of the 345 genital tracts examined, one or two gross abnormalities with different degrees of severity were observed in 124 (35.9%) of genital tract. The most common abnormalities encountered were ovariobursal adhesions (6.38%, n=22), endometritis (4.93%, n=17), and follicular cysts (4.35%, n=15). On anatomical basis, ovarian abnormalities (14.78%, n=51) were more frequent followed by uterine (10.43%, n=36), cervico-vaginal (7.25%, n=25) and oviductal (4.93%, n=17) abnormalities. Both breed and study area showed no statistically significant effect in the prevalence of reproductive abnormalities. Pregnancy was recorded in 26.67% (n=92) of the slaughtered cows, of which 45.65% (n=42) were in the first trimester, while 30.43% (n=28) and 23.91% (n=22) in the second and third trimesters, respectively. The current study revealed that reproductive tract abnormalities are important diseases in the study areas with considerable impact on the reproductive performance of cows. Moreover, the large number of cyclical (36.52%) and pregnant cows (26.67%) slaughtered without any gross abnormalities indicates the absence of proper gynecological examination prior to slaughtering.**

**Key words:** Reproductive abnormalities, genital tract, slaughter, cows, Hawassa, Tula.

## INTRODUCTION

The traditional milk production system dominated by indigenous breeds of low genetic potential for milk production accounts for 97 to 98% of the total annual milk production in Ethiopia (Felleke, 2003). This system is constantly challenged by shortage of feed, lack of capital with dairy producers, unimproved animal husbandry system; inefficient and inadequate milk processing skill and prevailing diseases including uterine diseases and anestrus.

Diseases and abnormalities of the female genital tract are believed to be the major reason for economic loss associated with infertility, culling and slaughtering of cows (Singleton and Dobson, 1995; Ashenafi, 2004; Abalti et al.,

2006). Since most reproductive tract problems lack additional outward manifestation, hence, examination of gross and microscopic lesions of genital tract play a central role in the identification of these problems. Most of these abnormalities can only be diagnosed when the animal is subjected to postmortem examination (Buregelt, 1997). Though, in different regions of Ethiopia, studies have been conducted on reproductive abnormalities of cows based on abattoir material; in Addis Ababa (Gebrekidan et al., 2009), in Sululta (Simenew et al., 2011), in Tigray (Zerihun, 2001), in Jimma (Amare, 2002), in Nekemte (Samuel, 2002) in Asela (Endalew, 2001), in Bahir Dar (Abalti et al., 2006) and in Awassa (Ashenafi, 2004). However, more systematic work has to be done to assess the problem in depth. Hence, the present study aimed to identify the possible causes of

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slaughtering of female cattle with due emphasis to reproductive organs and to establish the reproductive status (ovarian cyclicity) of slaughtered mature female cattle.

## MATERIALS AND METHODS

### Study area

The study was conducted at Hawassa Municipal abattoir and Tula slaughter house. Hawassa is the capital city of Southern Nations, Nationalities and Peoples Regional State (SNNPRS). The town is located at 275 km South of Addis Ababa with area coverage of 162,804 hectares. The total human population of the town is about 180,500 (CSA, 2004). The abattoir and slaughter house are located in Tula sub city at 5 and 18 km away from the town, respectively. Active and routine meat inspection is carried out in the abattoir to provide a wholesome meat to the residents of the city. Animals for slaughter at the abattoir are brought mainly from Hawassa, Shashamane, Arsi-Negelle, Dilla and Wolyta Soddo towns. However, cattle slaughtered at Tula slaughter house are not thoroughly inspected and destined for local consumption.

### Study animals and design

The study animals included 345 cows (252 local, 58 Holstein Friesian and 35 cross) purchased from the aforementioned markets and brought to the abattoir for slaughtering purpose. All cows slaughtered at the municipality abattoir (n=95) and Tula slaughter house (n=250) during the six month study period were included in the study.

### Experimental

Any relevant data about the productivity history like parity, reason for culling, breed, origin, and age of the slaughtered cows were collected from the owner to correlate with pathological finding of the reproductive organs. Age of the slaughtered cows was estimated according to the description given by De-Lahunta and Habel (1986). The genital tracts of all slaughtered cows were collected from both sources, placed in separate plastic bags and transported to Veterinary Parasitology and Pathology Laboratory, School of Veterinary Medicine, Hawassa University, for routine post-mortem examinations. The entire reproductive tract were visually examined and thoroughly palpated. Each reproductive tract was opened along the longitudinal axis starting from the vagina down to the horns and was observed for any abnormalities in color, odor, consistency and morphology (Feyissa and Bekana, 2000). Similarly, both ovaries were incised and inspected for any gross lesions. Moreover, the number of corpora albicantia and status of the corpus luteum (CL) were recorded. In pregnant tracts, the stage of pregnancy was determined based on crown rump length according to Evans and Sack (1973) and Elsayed et al. (1978) and was classified as early (<3 months), mid (3 to 6 months) and late (>6 months) using the formula for estimation of developmental stages (days) ( $X = 2.5(y+1)$ ): where y is the crown-rump length in cm and X is developmental stages in days). Methylene blue dye was infused in to the oviduct using disposable syringe through infundibulum to check for non-visible in patent state of oviduct as described by Herenda (1987) and Assey et al. (1998).

### Data management and analysis

The results obtained from gross examination of the reproductive

tracts of slaughtered cows were recorded on spreadsheet of Microsoft Excel and analyzed using STATA 9 statistical software. Simple descriptive statistics was used for the analysis of the data obtained. Categorical data were analyzed with the Chi-square ( $\chi^2$ ) test for independence. In all the analysis P value < 0.05 was considered for significance.

## RESULTS

### Abnormalities of the reproductive tracts

The overall abattoir prevalence of one or more reproductive abnormalities in cows of the two study sites was 35.9% (124/345). Out of these, eight cows were having two problems at a time. The prevalence of the problem by study sites and breed is summarized in Table 1. During the study period, the most frequently observed abnormalities or disease of the reproductive tract were ovariohysterectomy with an occurrence rate of 6.38% (n=22) followed by an ovarian cyst of 5.22% (n=18), endometritis of 4.93% (n=17), mucometra of 3.77% (n=13), vaginitis of 3.19% (n=11) and other less frequently observed abnormalities. Moreover, ovariohysterectomy, endometritis and follicular cyst were relatively more common in improved dairy cows than the local zebu (Table 2). Based on anatomical classification, abnormalities of the ovary (n=51, 14.78%) were found with highest occurrence rate followed by uterine (n=36, 10.43%), cervico-vaginal (n=25, 7.25%) and oviduct abnormalities 4.93% (n=345). Moreover, one case of macerated fetus was also observed (Table 3).

### Pregnancy statuses

The total number of pregnant cows slaughtered during the study period in both study sites was 92. Of the total pregnancies, 45.65% (n=42) were found with early, 30.43% (n=28) were mid and 23.91% (n=22) were late stages. It was also found that the right ovaries had the highest physiological activities than the left ovaries and their percentage were 65.45 and 34.55% on the right and left, respectively.

### Ovarian cyclicity

A total of 126 cows slaughtered during the study period were found cyclic. Based on the location, cyclicity was found to be 49.21, 45.24 and 5.56% on the right, left and both ovaries, respectively (Table 4).

## DISCUSSION

The prevalence of reproductive tract abnormalities of cows recorded in the present study (35.94%) was in line with previous reports of Teklu (1999) (37.0%, Addis Ababa),

**Table 1.** Abattoir prevalence of reproductive tract abnormalities in cows (n=345).

Risk factor	Observation	Abnormality number	Prevalence (%)
<b>Study area</b>			
Hawassa	95	30	31.58
Tula	250	94	37.6
<b>Breed</b>			
Local	252	94	37.30
Holstein	58	19	32.76
Cross	35	11	31.45

**Table 2.** Prevalence of different reproductive abnormalities in different breeds.

Abnormality	Average age	Overall prevalence	Breed		
			Local	Holstein	Cross
Ovariobursal adhesion	7.2	6.38	5.56	8.62	5.71
Endometritis	6.7	4.93	4.36	5.17	8.57
Follicular cyst	6.8	4.35	3.97	5.17	5.71
Mucometra	7.8	3.77	4.76	1.72	-
Vaginitis	6.8	3.19	2.38	3.45	2.86
Hydrosalpinx	8.1	2.32	2.78	-	-
Cervicitis	7.2	2.32	1.19	5.17	-
Occluded oviduct	4.8	1.74	1.98	1.72	-
Parovarian cyst	7.1	1.74	1.98	1.72	-
Hydrometra	8.2	1.45	1.59	-	2.86
Ovarian hypoplasia/atrophy	6.5	1.16	1.59	-	-
Luteal cyst	6.3	0.87	0.79	-	2.86
Pyosalpinx	8.3	0.87	1.19	-	-
Tortuous cervical canal	9.5	0.58	0.79	-	-
Cervical ring hypoplasia	5	0.58	0.4	-	2.86
Vaginitis and cervicitis	5	0.58	0.79	-	-
Hypoplasia/atrophy of uterus	3	0.29	0.4	-	-
Macerated fetus	8	0.29	0.4	-	-

Ashenafi (2004) (33.3%, Hawassa), Abalti et al. (2006) (36.8%, Bahirdar) and Gebrekidan et al. (2009) (31.4%, Addis Ababa). However, it was higher than the reports of Abdissa (2000) (Bahirdar, 23.4%), Endalew (2001) (Assella, 26.3%), Zerihun (2001) (Raya valley, 22%), Samuel (2002) (Nekemte, 27.2%), Amare (2002) (Jimma, 29.2%), Assey et al. (1998) (Tanzania, 9%) and Chaudhari and Paul-Bokko (2000) (Nigeria, 12.5%). This variation could be due to the difference in geographical variation, sample size, breed, feed and health management of animals included in the study.

Ovariobursal adhesion (6.38%, n=22) was the most common reproductive abnormality encountered during the study followed by ovarian cyst (5.22%, n=18), endometritis (4.93%, n=17), mucometra (3.77%, n=13), vaginitis (3.19%, n=11). In line with this finding, Abalti et

al. (2006) encountered ovariobursal adhesion, endometritis and cystic ovaries as the most common abnormalities with respective prevalence of 5.5, 3.9 and 3.5%. Although, the exact mechanism by which adhesions develop is unclear (Roberts, 1986a, b), extreme adhesions have probably resulted from pregnancy complications that include retained fetal membranes and endometritis (Lewis, 1997). Mild adhesions could result from non-infectious conditions such as physical trauma as a result of rough manipulation of the genital tract during pregnancy diagnosis (Bondurant, 1999). Uterine infections were common findings in cows that had given birth with possible complications especially dystocia and retained fetal membrane.

Examination of ovarian cyclicity revealed 36.52% cyclic ovaries, which was lower than the report made by

**Table 3.** Prevalence of anatomical reproductive tract abnormalities of cows (n=345).

<b>Abnormality</b>	<b>Occurrence rate (%)</b>	<b>Proportional frequency (%)</b>
<b>Ovarian abnormalities</b>	<b>14.78 (n=51)</b>	
Ovariobursal adhesion	6.38	
Ovarian cyst	5.22	38.66
Parovarian cyst	1.74	
Ovarian hypoplasia/atrophy	11.45	
<b>Uterine abnormalities</b>	<b>10.43 (n=36)</b>	
Endometritis	4.93	
Mucometra	3.77	27.27
Hydrometra	1.45	
Hypoplasia/atrophy of uterus	0.29	
<b>Cervico- vaginal abnormalities</b>	<b>7.25 (n=25)</b>	
Vaginitis	3.19	
Cervicitis	2.32	
Cervicitis and vaginitis	0.58	18.94
Cervical ring hypoplasia	0.58	
Tortuous cervical canal	0.58	
<b>Oviduct abnormalities</b>	<b>4.93 (n=17)</b>	
Hydrosalpinx	2.32	
Occluded oviduct	1.74	12.88
Pyosalpinx	0.87	
<b>Miscellaneous</b>	<b>0.87 (n=3)</b>	
Ovariobursal adhesion and hydrosalpinx	0.29	
Ovariobursal adhesion and ovarian hypoplasia	0.29	2.27
Macerated fetus	0.29	

**Table 4.** Status of ovarian activities and pregnancy.

<b>Status</b>	<b>Right (%)</b>	<b>Left (%)</b>	<b>Bilateral (%)</b>
Cyclic (n=126)	49.21 (n=62)	45.24 (n=57)	5.5 (n=7)
Pregnancy (n=92)	65.45	34.55	-

Chaudhari and Paul-Bokko (2000) in Nigeria (55.49%), Samuel (2002) in Nekemte (65.55%), Amare (2002) in Jimma (62.2%) and Ashenafi (2004) in Hawassa (66.7%). This variation could be attributed to difference in breed, sample size and management. The presence of active corpus luteum in the right (49.21%), left (45.24%) and both ovaries (5.56%) was in agreement with the occurrence rate reported by Teklu (1999), who reported 55, 43, and 2% for the right, left and both ovaries, respectively. The result indicates that the right ovary is more physiologically active than the left ovary.

Pregnancy wastage (26.67%) noted in the present study was comparable with previous reports made by

Amare (2002) in Jimma (24.5%), Samuel (2002) in Nekemte (31.4%) and Ashenafi (2004) in Hawassa (29.91%). However, higher value was reported in East Africa Zebu by Assey et al. (1998) in Tanzania (54%), Abdissa (2000) in Bahirdar (37.8%) and Zerihun (2001) in Raya Valley (36.84%). Such high pregnancy wastage in slaughtered cows could be attributed to inadequate antemortem inspection of animals particularly on pregnancy diagnosis. Moreover, cattle owners in the area usually insist on sale of their pregnant cows, because of anticipated pregnancy failure or because of a comparably improved body condition during pregnancy. Though, it is difficult to estimate the total impact of slaughter of pregnant cows;

Chaudhari and Paul-Bokko (2000) concluded that pregnancy wastage accounts for 20 to 25% fall in livestock production particularly in the developing countries, especially sub-Saharan Africa.

## Conclusions

Based on the findings of this study and personal communication with cattle owner, low milk yield, infertility and economic conditions were the major factors for slaughter of cows. More than 60% of cows were slaughtered while they were potentially fertile. Slaughtering of potentially fertile cows, that is, pregnant and cyclic cows, indicates the absence of proper antemortem pregnancy diagnosis and lack of record keeping about the different events of reproductive cycle. Coupled with the prevailing reproductive abnormalities, slaughtering of fertile cows cause huge fetal wastage, reduced replacement stock, pose selection pressure and other detrimental effects on the dairy industry. To combat this problem, complete antemortem examination, awareness creation to the owners about the causes and effects of the problem, enforcing laws guiding slaughter of cows are safely recommended.

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