Pathological abnormalities in genital tract of cows slaughtered at Yaounde (Cameroon)

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Abstract

A descriptive cross-sectional study was carried out on 500 cows randomly selected at the SODEPA slaughterhouse in Yaounde from March to October 2022. After slaughter, visual inspection, palpation and dissection of the entire genital tract of each cow made it possible to search for macroscopic pathological conditions. The average age, Body Condition Score (BCS) and weight of the animals were respectively 6.5 years; 3.1 and 261 kg. The M'Bororos breed was in the majority (66.6%) and a percentage of 31.4% of cows were pregnant. The overall prevalence of pathologies of the genital organs was 51.4%, and the most represented were anestrus (19.6%), mucometra (10.8%), metritis (7.2%) and ovarian cysts (2.8%). Significant associations were observed between thin body condition (1-2) and anestrus; age range of 4-8 years and metritis and ovarian cysts. Anestrus, mucometra, metritis and ovarian cysts were the major pathologies responsible for infertility in cows and thin females, aged 4 to 8 years, were more sensitive.

Keywords: Cow, Genital pathologies, Slaughterhouse, Yaounde, Cameroon

INTRODUCTION

In Cameroon, livestock is an integral part of the primary sector, with 13% contribution to GDP (Gross Domestic Product). Livestock is mainly made of cattle, small ruminants, pigs, poultry, goats and other non-conventional animals. Livestock is the main source of income for 30% of the active population. Among the above-mentioned species, cattle raising occupies a privileged place. Practiced in extensive or pastoral (30% of the herd), semi-extensive or agro-pastoral (65% of the herd) and ranching (5% of the herd) systems, national cattle farming, estimated at around 10 million head, contributes to national consumption of red meat by 54%. 83% of the Cameroonian cattle herd are in the northern regions (North, Far North and Adamawa) and the remaining 17% are distributed in the West, North-West, South-West and East regions. Cattle represent 16% of national agricultural production and meet 61% of the national demand for meat. The major cattle breeds are the Gudali, the Akou and the Djafoun. They contribute 54% of all meat products produced locally and consumed by the population. Cattle provide 110,000 tonnes of meat and 174,000 tonnes of milk annually, entirely consumed locally. It contributes approximately 950 billion FCFA to capita GDP (Tsapi *et al.*, 2022).

Despite this, the national coverage rates for the meat and milk needs of the populations remain very low, despite the diversity of breeds raised. The pastoral livestock production system in Cameroon faces many constraints, including limited access to inputs, degraded pasture lands, limited feed resources and insufficient water points for herds; all of which have been worsened by climate change. Other major constraints concern health and sanitary problems, leading to endemic animal diseases (WBG, 2023) and especially reproductive diseases. Productivity of animals largely depends on their reproductive performance; hence regular and successful reproduction is a key to profitable animal production. Reproductive diseases are important contributor to the decline in fertility potential of large farm animals. Generally, in large dairy farm animals, infertility might result in decreased milk production, treatment and labor costs, and increased rate of culling. Pathological lesions of genital tracts are believed to be the major reason for economic losses associated with infertility, culling and slaughtering of cows (Getahun *et al.*, 2021). Infertility is the major problem in bovine reproduction in the dairy industry. There are several causes of infertility such as physiological, anatomical, nutritional and managemental that may be diagnosed (Gupta *et al.*, 2023).

Previously, abattoir-based studies on reproductive organs abnormalities of cows have been documented elsewhere in the world (Skovorodin *et al.*, 2020; Getahun *et al.*, 2023). According to these studies, ovario-bursal adhesion, follicular cyst, luteal cyst, paraovarian cyst, ovarian hypoplasia, vaginitis, cervicitis, hydrosalpinx, pyosalpinx, hydrometra, endometritis, cervical ring hypoplasia and hypoplasia of the uterus were some of the pathological lesions recorded.

Determining the prevalence of conditions of the genital tract constitutes an essential first step in specifying the individual factors responsible for infertility and thus formulate recommendations that are as specific as possible to the farming conditions encountered (Galma, 2022). In Cameroon, however, limited documented information is available regarding female cows reproductive organs lesions. Hence, abattoirs are good sources for studying pathological lesions of reproductive organs that are severe enough to cause infertility and even sterility. Moreover, most female reproductive organ pathological lesions lack additional outward manifestations in which case most of these abnormalities can

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only be diagnosed when the animal is subjected to post-mortem examination. Thus, examination of gross and microscopic lesions of genital tract play a central role in the identification of these problems. That is why this study was carried out at the SODEPA slaughterhouse in Yaounde - Etoudi with the general objective of determining the prevalence and risk factors of pathologies of the genital organs in slaughtered cows.

METHODOLOGY

Ethical approval

This study was conducted according to the research ethics approved by the committee on research of the Industrial slaughterhouse of Yaounde (SODEPA), N° 025/PSA/2022/SODEPA/AIY/DA/SAFC/SC/PS/EFY/Sec, 11-03-2022.

Type and location of study

This cross-sectional descriptive study was carried out at the SODEPA slaughterhouse located in Yaounde, from March to October 2022. The SODEPA slaughterhouse in Yaounde is located in the Center region, Mfoundi Division and Etoudi District. The dominant climate in the Mfoundi Division in general is Sub-Equatorial type characterized by two dry seasons (December – February: large /June – July: small); and two cool seasons (August-December: large/ March-May: small). The average temperature is between 18°C and 28°C during the rainy seasons, and 19°C to 35°C during the dry season. The average rainfall is 1500 millimeters.

Animals

A total of 500 cows were examined. The choice of animals was randomly made and each cow was subject to a general examination before and after slaughter to determine the main characteristics. These characteristics included;

Breed: determined on the basis of phenotypic characteristics. The breeds consisted of the Gudali zebu, the M'Bororos breed (Akou or white fulani and the Djafoun or Red fulani), the Bokolo zebu, the Showa Arab zebu, the Kouri and Kapsiki (taurine cattle).

Age: determined by examining the teeth or horns (for animals that do not have horns). The determination of age based on the horns was made based on the following formula: Age (in years) = N + 2, with N representing the number of furrows and 2 a constant. The cows were classified into age groups: < 4 years, 4-8 years and > 8 years old.

Body condition score (BCS): Before slaughter, each cow was examined to establish the body condition score on a scale of 1 to 5 based on the prominence and protruding appearance of the underlying bones. Underlining the degree of coverage of the latter by muscle and fat. This grade was determined by observation of the flank, the anatomical landmarks of which are the tip of the hip, the transverse and lumbosacral spinous processes; the rear, whose anatomical landmarks are the base of the tail and the tip of the buttock, the sacrotuberal ligament, the caudal strait and the line of the back. The cows were

classified into three categories: score 1-2 (thin); grade 3 (normal) and grade 4-5 (fat).

Weight: Before slaughter, the thoracic perimeter (PTHO) of each cow was measured using a tape measure. The weight was calculated according to the following formula Weight (kg) = 124.69 - 3.171 x PTHO + 0.0276 x PTHO² (Njoya *et al.*, 1997).

The physiological status: After slaughter of the cows and evisceration, the uterus was examined to determine the pregnant state or not of each of them. Thus, the presence of the foetus or embryo in the uterus of the cow reflected the state of gravidity of the latter.

The interview with the butchers provided a general idea on the origin of the animals.

Macroscopic examination of the genital tract of slaughtered cows

After slaughter, the entire genital tract of each cow was visually examined and palpated with particular attention to each part of the tract for the detection of gross abnormalities. Then the tract was opened along the longitudinal axis starting from the ventral corner of the vulva to the oviducts and observed for any macroscopically visible abnormalities. Likewise, the ovaries were examined externally and internally to detect macroscopic abnormalities. The vulva was examined for the presence of abnormal discharge (purulent, hemorrhagic), mucosal color and inflammation. The vagina was examined for the presence of granules, mucus, pus, color of the mucosa, vaginal prolapse and inflammation. The cervix was examined for contents (pus, exudate), color, cervical prolapse, malformations (double cervix, uterine hypoplasia) and inflammation. The body and horns of the uterus were examined for their contents (mucus, exudate, pus), color of the lining, tumor and inflammation. Mucometra was considered to be any accumulation of variable amounts of thick, dense mucus in the uterus. Hydrometra was seen as accumulation of a clear aseptic fluid in the uterus. In this case, one or both horns and the body of the uterus are dilated, the uterine wall is thinner than normal and the corpus luteum is absent. Acute metritis was characterized by an abnormally enlarged uterus and the presence of fetid, watery, reddish-brownish uterine discharge. Chronic metritis or endometritis concerned very thick uteri with purulent contents and a dark red coloring of the mucosa, sometimes this anomaly is accompanied by blackening of the wattles. The oviducts were examined for cases of malformation (the presence of adhesion, double or absent oviduct), cases of inflammation, obstruction and for their contents (pus and exudate). The ovaries were examined for ovarian cysts and other abnormalities. Ovarian cysts are characterised as structures greater than 2.5 cm (approximately 1 inch) in diameter remaining on an ovary for more than 10 days. The absence of follicle or corpus luteum on the ovary in the presence of corpus albicans only indicated ovarian inactivity in cows that had already conceived. This condition is clinically known as anestrus.

Data analysis

Quantitative variables were represented by age and body condition score. The qualitative variables were represented by breed, physiological status, origin of the animal and pathologies of the genital tract of slaughtered cows. Once data collection was completed, the data generated by the ante-mortem and post-mortem inspections were recorded in a Microsoft Excel 2013 table and then analyzed using SPSS software version 25.0 (Statistical Package For the Social Sciences). The Chi-square test with a fixed significance threshold of $P < 0.05$ was used to evaluate the effects of breed, age, body condition score and physiological status on the prevalence of different pathologies. Multinomial logistic regression was applied for variables statistically correlated with pathologies of the genital tract, in order to determine the association between the variables and their 95% confidence intervals. Finally, a multivariate analysis will be carried out to see if, and to what extent, all the risk factors and each pathology of the genital tract were interdependent.

RESULTS

Characterization of cows slaughtered at the SODEPA abattoir

The animals came from several zones: Adamawa (13.6%), Far North (9%), North (41%) of Cameroon, Chad (31%), Sudan (5.4%) (Table 1). The M'Bororos breed was mainly represented (44.4 and 22.2; n=333). The mean age was 6.46 years with the range 3 to 13 years.

The average body condition score (BCS) of the animals was 3.08. The average weight of the animals was 261 kg with a minimum of 135 kg and a maximum of 396 kg. A total of 157 animals (31.4%) were pregnant.

Prevalence of pathologies of the genital organs of cows slaughtered

Of the 500 cows slaughtered, 257 were affected by at least one genital condition, for an overall prevalence of 51.4%. The most frequently observed pathologies were anoestrus or ovarian inactivity followed by mucometra, metritis (acute and chronic) and ovarian cysts.

At the level of the glandular portion: the ovaries

The overall ovarian pathologies was 24.6%. Of the 257 cows affected by at least one lesion, 98 (19.6%) presented cases of anestrus. Ovarian cyst was diagnosed in 2.8% of the cows examined (n=14). Of the 14 cases of ovarian cyst identified, two cases of luteal cysts were observed out of 14; these cysts, filled with fluids and exteriorized on the surface of the ovaries, had a diameter greater than 2.5 cm. Tumors that develop on the surface of the epithelium of the ovary (ovarian tumor) were identified in 1.6 % (n = 8). Ovarian adhesions were diagnosed in 12 cases (2.4 %) and one or both ovaries of each cow formed a mass following their attachment to the oviducts and uterine horns. Oophoritis was observed in 10 cases (2 %). All 2 % cases concerned the right ovary and the latter swollen presented liquid contents of light yellow color on the one hand and red on the other hand (Table 2).

Table 1: Distribution of cows according to origin, breed, BCS and physiological status

Variables		Number of animals	Percentage (%)
Origin	Adamawa (Cameroon)	68	13.6
	Far North (Cameroon)	45	9.0
	North (Cameroon)	205	41.0
	Chad	155	31.0
	Sudan	27	5.4
Breed	Akou (white fulani breed)	111	22.2
	Arabe showa	47	9.4
	Bokolo	11	2.2
	Djafoun (red fulani breed)	222	44.4
	Gudali	41	8.2
	Kapsiki	45	9.0
	Kouri	23	4.6
Age	< 4 years	21	4.2
	4 - 8 years	437	87.4
	> 8 years	42	8.4
BCS	Thin (1 - 2)	105	21.0
	Normal (3)	252	50.4
	Fat (4 - 5)	143	28.6
Physiological status	Pregnant	157	31.4
	Not pregnant	343	68.6

Table 2: Ovarian pathologies

Pathologies	Number of animals	Percentage (%)
Anestrus	98	19.6
Ovarian cysts	14	2.8
Ovarian adhesions	12	2.4
Oophoritis	10	2.0
Ovarian tumors	8	1.6
Total	142	28.4

At the level of the tubular portion (oviducts and uterus) and copulatory portion (vulva and vagina)

The overall oviduct, uterine and vulvo-vaginal pathologies were 2.4%, 20.6% and 0.4%, respectively (Table 3). Salpingitis, hydrosalpinx and pyosalpinx had a respective frequency of 0.4 (n=2); 0.6 (n=3) and 0.4% (n=2). Paraovarian cyst was the common pathology of the oviducts identified, with a prevalence of 1% (n = 5). Cases of metritis infection were observed in 7.2% of uteri examined (n=36). Accumulation of pus followed by red discoloration and thickening of the uterus have been observed in cases of endometritis. The mucometra was present in 10.8% (n = 54) of uteri containing a large quantity of thick and dense mucus. Lymphosarcoma was identified in 2 cows examined (0.4%). In this case, the horns and body of the uterus appeared thick followed by numerous, firm, pedunculated masses resembling wattles. The accumulation of a large quantity of thick, red-colored liquid at the level of the horn (hemorrhagic discharge) was diagnostic in one cow (0.2%). Two cases (0.4%) of a uterus smaller than normal or not developed (uterine hypoplasia) were highlighted in cows. The vaginas with vaginitis were swollen and reddish in color.

Prevalence of pathologies of the genital organs of cows according to breed, BCS and age

The effect of breed, age and BCS was only considered for high frequency pathologies such as anoestrus (19.6%), mucometra (10.8%), metritis (7.2%) and ovarian cysts (2.8%) (Table 4).

It was observed that the breed, age and BCS of the cows studied did not cause a significant difference in the prevalence of all gross genital conditions (P>0.05), except in the case of anoestrus or BCS had a significant effect (P<0.05). The incidence of body condition anoestrus encountered was 55.2% in thin (1-2), 12.7% in normal (3) and 5.6% in fat cows (4-5). Also, the 4 to 8 year old age group was susceptible to metritis and ovarian cysts (P<0.05).

Table 3: Prevalence of pathologies of the tubular and copulatory portion

Pathologies	Number of animals	Percentage (%)
Oviduct pathologies	**12**	**2.4**
Salpingitis	2	0.4
Hydrosalpinx	3	0.6
Pyosalpinx	2	0.4
Paraovarian cyst	5	1.0
Uterine pathologies	**103**	**20.6**
Metritis	36	7.2
Hydrometra	8	1.6
Mucometra	54	10.8
Lymphosarcoma	2	0.4
Hemorrhagic discharge	1	0.2
Uterine hypoplasia	2	0.4
Vulvovaginal pathologies	**2**	**0.4**
Vaginitis	2	0.4
Total	117	23.4

Table 4: Prevalence of major pathologies of the genital organs of cows according to breed, age and BCS

Factors		Number of animals	Anestrus	Mucometra	Metritis	Ovarian cysts
		N	n (%)	n (%)	n (%)	n (%)
Breed	Akou	111	24(21.6)	9(8.10)	10(9)	5(4.5)
	Arabe showa	47	9(19.1)	7(14.9)	2(4.3)	1(2.1)
	Bokolo	11	5(45.5)	3(27.3)	0(0)	0(0)
	Djafoun	222	32(14.4)	22(10)	18(8.1)	8(3.6)
	Gudali	41	14(34.1)	1(2.4)	3(7.3)	0(0)
	Kapsiki	45	12(26.7)	8(17.8)	2(4.4)	0(0)
	Kouri	23	2(8.7)	4(17.4)	1(4.3)	0(0)
	P-value		0.85	0.68	0.9	0.33
BCS	Thin (1-2)	105	58(55.2)[a]	19(18.1)	15(14.3)	8(7.6)
	Normal (3)	252	32(12.7)[b]	24(9.5)	17(6.7)	6(2.4)
	Fat (4-5)	143	8(5.6)[c]	11(7.7)	4(2.8)	0(0)
	P-value		0.031	0.33	0.81	0.09
Age (years)	< 4	21	0(0)	1(4.8)	1(4.8)[a]	0(0)[a]
	4 - 8	437	91(20.8)	49(11.2)	33(7.6)[b]	13(3)[b]
	> 8	42	7(16.7)	4(9.5)	2(4.8)[a]	1(2.4)[a]
	P-value		0.92	0.48	0.029	0.018

[a,b,c,d] *Different letters indicate that the difference is significant between breeds at P<0.05.*

Association between breed, BCS, age and genital pathologies

Of all the pathologies diagnosed, three associations were observed. There was an association between BCS and anestrus; age and metritis, age and ovarian cysts (Table 5).

Cows with a thin body condition score (1-2) were 1.8 times more likely to be in anoestrus (p=0.018, OR= 1.8 [CI=1.03 -1.93]) compared to others. Cows in the [4-8] age group were 2.241 times more likely to be affected by metritis infection compared to others (p=0.018, OR=2.241 [CI=1.14 - 5.16]). Cows in the [4-8] age group have 1.5 times the risk of developing ovarian cysts compared to others (p=0.013, OR=1.5 [CI=1.24 - 3.23]).

DISCUSSION

The average age and BCS of the cows slaughtered were similar to those of Kouamo et al. (2016) at the Municipal slaughterhouse of Ngaoundere who obtained an average age and BCS of 6.62 ± 0.11 years and 3.14 ± 0.04, respectively. The percentage of pregnant animals observed was 31.4%, which represents a huge economic loss. This result is higher than that of (Kouamo et al., 2016) (20.4%), but lower than that reported by Bah et al. (2010) at the Municipal slaughterhouse of Ngaoundere (37.3%). This difference would be linked to the absence of pregnancy diagnosis before slaughter, the size of the sample which varies from one study to another, environmental stress, reproductive status (culled, active or in exhaustion). An important factor contributing to the increased slaughter of pregnant cows in Cameroon is the poor enforcement of existing livestock legislation. Three important policy objectives are emphasized in Cameroon's livestock sector: to increase domestic animal protein production so as to attain national self-sufficiency in meat production; to increase farmers' incomes in order to raise their standards of living; and to cut down on meat imports in order to conserve scarce foreign currency. In line with these policy objectives, Article 17 of Decree No. 76/420 of September 1976, modified by Decree No. 86/755 of 24 June 1986 and recently by Decree N° 2018/759 of 10 December 2018, strictly prohibits cattle producers, middlemen and butchers from transporting and/or slaughtering calves and pregnant cows of all breeds. The decree also forbids the slaughter of female and male cattle below 24 months, except in cases of accidents, sterility or incurable diseases certified by a veterinary officer. The veterinary officers are to inspect and issue certificates for all cattle destined for the abattoir. In cases of pregnancy, no certificates are to be issued. No sanctions or punitive measures are imposed on those who violate existing regulations. Poor enforcement of government regulations on livestock, therefore, perpetuates the slaughter of pregnant cows.

Out of all 500 cows slaughtered and examined, 257 presented at least one condition in their genital organ (51.4%). This result is close to that reported by Kouamo et al. (2016) which was 58.28%. On the other hand, it is higher than that recorded by Getahun et al. (2021) and Skovorodin et al. (2020) which reported a prevalence of 36.4% and 20 %, respectively. The difference may probably result from the different context of studies linked to the breed and the number of animals studied, their geographical origins, their health status and or their nutritional level.

In terms of ovarian pathologies, the prevalence of anestrus (19.6%) was lower to that reported by Dutta et al. (2023) which obtained a prevalence of 36.20%. The prevalence of anestrus in dairy cattle is herd-specific and varies widely from one herd to another. The postpartum anestrus is one of the major reasons causing infertility in dairy cattle. Although a short period of ovarian acyclicity during the immediate postpartum period is considered normal, the prolonged anestrus beyond 60 days postpartum in dairy cattle has negative impact on the calving to conception interval. Postpartum anestrus in turn is related to the delayed resumption of ovarian cyclicity postpartum. Many factors influence cyclic activity resuming after calving: nutrition, reduction in body condition score, suckling calf, lactation, dystocia, breed, age, month of calving, uterine pathology, debilitating disease (Lin et al., 2021; Gautam, 2023). The prevalence of ovarian cysts (2.8%) was lower than 3.8% reported by Kouamo et al. (2016) in Ngaoundere, Cameroon. Cystic ovarian disease is an exceeding reproductive disorder that causes a prolonged open period after parturition. In

Table 5: Association between breed, BCS, age and anestrus, metritis and ovarian cysts

Factors	Variables	Anestrus	P - value	Metritis	P - value	Ovarian cysts	P - value
		n (%)	OR [CI 95%]	n (%)	OR [CI 95%]	n(%)	OR [CI 95%]
	Akou	24(21.6)		10(9)		5(4.50)	
	Arabe Showa	9(19.1)		2(4.3)		1(2.1)	
	Bokolo	5(45.5)		0(0)		0(0)	
Breed	Djafoun	32(14.4)		18(8.1)		8(3.6)	
	Gudali	14(34.1)		3(7.3)		0(0)	
	Kapsiki	12(26.7)		2(4.4)		0(0)	
	Kouri	2(8.7)		1(4.3)		0(0)	
	Thin (1-2)	58(55.2)[a]	0.018	15(14.3)		8(7.61)	
BCS	Normal (3)	32(12.7)[b]	1.8 [1.03-1.93]	17(6.7)		6(2.4)	
	Fat (4-5)	8(5.6)		4(2.8)		0(0)[a]	
Age (years)	< 4	0(0)		1(4.8)[a]	0.018	0(0)[a]	0.013
	4-8	91(20.8)		33(7.6)[b]	2.241 [1.14-5.16]	13(3)[b]	1.5 [1.24-3.23]
	> 8	7(16.7)		2(4.8)[a]		1(2.4)[c]	

[a,b,c,d] *Different letters indicate that the difference is significant between breeds at P<0,05. OR: Odd Ratio; CI: Confidence Interval*

high producing animals, it causes subfertility, increasing postpartum open periods, and reduced reproductive performance that causes huge economic loss in the dairy industry (Xu *et al.*, 2021). According to Channo *et al.* (2022), the frequency of cystic ovarian disease in cattle ranges from 5-30% in all reproductive diseases. Factors predisposing to cystic ovaries include metabolic diseases, negative energy balance, high productivity, mycotoxins, phytoestrogens and genetics. In cows that were lactating, there was a decrease in follicle stimulating hormone and luteinizing hormone levels and a significant increase in the value of prolactin hormone which caused ovarian cysts. Timely weaning and balanced feeding could reduce risk factors associated with cystic ovary syndrome (Utomo *et al.*, 2024). The prevalence of ovarian adhesion (2.4 %) was lower than that reported by Berhanu *et al.* (2013) in two slaughterhouses in southern Ethiopia (6.38%). This variation could be attributed to the enucleation of the corpus luteum, cesarian section, peritonitis, breed, age and health status of the animals.

At the level of the tubular portion, uterine disease is still undoubtedly a major concern on most high-producing dairy cattle farms, as it affects about 21% cows in this study and can cause serious consequences regarding reproductive performance and milk production. The economic costs of uterine disease consist of a lower milk yield, decreased pregnancy rate, higher chances of premature culling and increased replacement costs (Várhidi *et al.*, 2024). The prevalence of metritis in this study (7.2%) was similar to that obtained by Abebe *et al.* (2024), but lower than those reported in Ethiopia by Mekibib *et al.* (2024) and in USA by Manríquez *et al.* (2020) who obtained 11.4% and 4.9%, respectively. This difference may be due not only to the breed effect, but also to microbial infections (*Actinomyces pyogenes, Brucella abortus, Coxiella burnetii*), postpartum complications, husbandry conditions and age of the animals. Mekibib *et al.* (2024) reported that the most commonly bacteria responsible for metritis were *Escherichia coli* (45%), coagulase-positive staphylococci (30%), and *Klebsiella spp.* (22.5%). Indeed, microbial agents play a key role in the development of metritis. Poor breeding conditions and postpartum complications favor ascending infection in the onset of this condition. Cows aged 4 to 8 years were predisposed to metritis. Previous studies have reported the relationship between age and the metritis (Abebe *et al.,* 2024). The mucometra was observed in 10.8% of cases. A lower prevalence was obtained by Hamouda *et al.* (2024) (1.78%). The prevalence of hydrometra (1.6%) was higher than that reported by Ali *et al.* (2023) who found a prevalence of 0.01%. In bovines, mucometra or hydrometra may occur secondary to an imperforate hymen or uterus unicornis or long standing cases of cystic ovarian diseases or rarely with a persistent corpus luteum. Vulvovaginal disorders were observed in two specimens. Vagina is the female copulatory organ that extends from cervical caudal segment of cervix to vestibular border at the external urethral orifice. One important function of vagina (similar to cervix) is to serve as a line of defence against bacterial invasion by secreting fluids that inhibit undesirable bacterial growth. Vaginitis may occur as a result of ascending infection or exposure to irritants, or secondary to pneumovagina, urovagina, perineal laceration, rectovaginal fistulas, breeding, endometritis, abortion, parturition, or dystocia. Occasionally, traumatic wounds may be infected with clostridial or anaerobic organisms; however, most infection is nonspecific.

After a multi-varied analysis between the risk factors and pathologies of the genital organs it emerges that cows having obtained the thin BCS (1-2) were 1.8 times more at risk of being in anestrus. Body condition score is the most used indicator of a cow's energy balance through external visual assessment. Rearte *et al.* (2023) reported that the cows and heifers calving with low BCS or losing much BCS postpartum are those at the highest risk for disease (e.g., anestrus and metritis) and with the poorest fertility at the cow level agree with previous reports. The explanation for the association between BCS indicators and disease risk and fertility is that transition dairy cows are not able to consume enough energy to fulfill their increased requirements, which makes them susceptible to experiencing a delayed uterine involution and/or a delayed resumption of ovarian activity postpartum. In turn, delayed uterine involution and/or delayed cyclicity have been associated with a higher risk for uterine diseases such as metritis and endometritis, and, also, with anestrus. Metritis and ovarian cysts were also dependent on the age of the animals. Thus, cows in the age group of [4-8] years were 2.241 times more at risk of being affected by metritis infection. Therefore, multiparous cows have higher odds of being diagnosed with uterine disease than primiparous ones (Várhidi *et al.*, 2024). There is a difference between the efficacy of the defence mechanisms of primiparous versus multiparous cows. Older cows have lower uterine elasticity and slower involution than younger ones. On the other hand, young animals have a lot of vaginal wound during the parturition. Also cows in the age group of [4-8] years were 1.5 times more at risk of developing ovarian cysts. Similarly, Utomo *et al.* (2024) reported that cows aged two to three years had a percentage of reproductive disorders of more than 60% compared to cows of other ages. Most cases occur within 3–8 weeks of parturition, at the first attempted postpartum ovulation, coinciding with peak daily milk production and rapidly decreasing body condition.

CONCLUSION

At the end of this study, it appears that:

• The M'Bororos breed was the most slaughtered (66.6%);

• 31.4% of cows slaughtered were pregnant;

• The overall prevalence of pathologies of the genital organs was 51.4%;

• Anestrus (19.6%), mucometra (10.8%), metritis (7.2%), and ovarian cysts (2.8%) constitute the major pathologies of the genital tract responsible for infertility in cows.

These findings offer valuable insights into the potential causes and drivers of these disorders, informing future research and intervention efforts aimed at reducing their incidence.

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