Foetal wastages and some gross reproductive abnormalities in small ruminants slaughtered at Dogarawa slaughter slab Zaria, Kaduna State

*Khumran, A.M., *Abubakar, A., Bello, T.K. and Umar, M.S.

Introduction

In Nigeria, small ruminants contribute an estimated 35% to the total meat supply and represent 63.7% of the total grazing domestic livestock widely distributed in rural, urban and peri-urban areas; they are more important in northern Nigeria (70%) than in the south (Ajala et al., 2008) and more important in rural than in urban areas.

Nigeria falls among countries with very low per head production and consumption of animal protein (Nwakpu and Ugwu, 2004). Population estimate suggests that there are roughly 22.1 million sheep and 34.5 million goats in Nigeria (Waziri et al., 2012). The reports on slaughtering of pregnant animals resulting in foetal wastages abound in many countries of the world, for example Iran (Borji et al., 2011), Zambia (Zulu et al., 2013), Ethiopia (Simenew et al., 2011) and Nigeria (Alhaji and Odetokun, 2013).

One of the important contributory factors identified had been the dry season of the year in sub Saharan Africa, which often is associated with forage scarcity which in turn leads to increased sales of animals and less productive females in the extreme period to meet house-hold cash needs (Toulmin, 1984). The sales at this period hardly consider fertility status (Atawalna et al., 2013). Generally, both male and female animals are culled and sent to slaughter-houses either because they become uneconomical to maintain or are diseased (Azawi et al., 2008). Therefore, abattoirs are a good source for studying pathological lesions of reproductive organs of animals (Chethan et al., 2015).

In Nigeria, the practice of slaughtering of gravid animals is largely due to lower economic standards of the citizens and worthy to note that other factors including inadequate meat inspection practices have also been contributory. An undesirable effect of these lapses is the indiscriminate slaughtering of pregnant animals (Garba et al., 1992).

Foetuses are usually discovered during post-mortem meat inspection that may have negative effect on livestock growth capacity (Mutwedu, 2019), giving poor meat quality to consumers, and represent a serious problem for animal ethics (Atawalna et al., 2013). This leads toward not only wastage of scarce protein by supplying poor quality meat products to consumers, but also a decrease in livestock growth capacity at country level as well as low herd replacement rates (Okorie-Kanu et al., 2018). Poor herd management, absence of diagnosis of pregnancy before slaughter and attractive prices on pregnant animals are some major reasons for the slaughter of pregnant animals (Tchoumboue, 1989). Infertility or sterility is an impor-
tant factor that can lead to the sales of animals at a productive age for slaughtering. It can be caused by infection, poor nutrition, poor management and/or defects of the reproductive organs (Hanzen, 2004). As far as we known, there is currently no information available regarding the proportion of small ruminants with reproductive issues at the time of slaughter in Zaria metropolis. The objectives of this study are, to determine the incidence of pregnant animals slaughtered and identify gross pathologies and physiological abnormalities found in the reproductive tracts and organs of small ruminants slaughtered at the Dogarawa slaughter slab. Studies such as this will provide reliable data regarding foetal wastage, subsequent awareness in order to mitigate the trend and common reproductive abnormalities in small ruminants.

Materials and methods

The study was carried out at Dogarawa slaughter slab, adjacent local government secretariat of Sabon-gari local government area, along Zaria-Kano Road, Zaria, Kaduna State. The research was conducted over a two-month period from 1st August to 30th September 2019, on Saturdays and Sundays. Sheep (Ovis aries) and Goats (Capra hircus) were the research animals used for the study. The breeds of goats slaughtered at the abattoir were considered and they include Sokoto Red, Kano Brown, Sahel and West African Dwarf (WAD). The breeds of sheep slaughtered at the abattoir were the Uda and Yankasa. Detection and identification of both male and female reproductive tract abnormalities and foetal wastage in sheep and goats slaughtered at Dogarawa slaughter slab was carried out and by ante-mortem examination of the animals as well as post-mortem examination within the period stated. The breeds of the animals were first identified and then sex determined. The external reproductive organs were observed for abnormalities by visual examination and palpation. After slaughter and evisceration, the reproductive systems of the selected animals were examined first by noting the appearance, that is; the colour, shape and size of the genital organs as well as their positioning. Secondly, the genital organs were palpated for their consistency and all abnormalities noted. The sense of smell was used to note any unusual odour. Incisions were made into the reproductive organ to further ascertain other abnormalities. Gravid uterine horns were identified, incised and the foetuses were removed and counted. Foetometry enabled determination of foetal morphometric parameters that aided in categorizing recovered foetuses into respective trimesters.

Data analysis

Data collected were analysed and presented as percentages using Microsoft excel, version 2016.

Results

A total of 1695 small ruminants were slaughtered over the weekends (Saturdays and Sundays) during the period of the study, of which 1422 were goats (264 does, 1158 bucks) and 273 were sheep (111 ewes and 162 were rams) as represented in Table 1 below.

Table 1. Incidence of goat and sheep slaughtered at Dogarawa slaughter slab, Zaria

| S/N | Animals         | No. of Animals | Percentage (%) |
|-----|-----------------|----------------|----------------|
| 1.  | Goats           |                |                |
|     | Males           | 1158           | 68.3           |
|     | Females         | 264            | 15.6           |
| 2.  | Sheep           |                |                |
|     | Males           | 162            | 9.6            |
|     | Females         | 111            | 6.5            |
|     | Total           | 1695           | 100            |

Gross abnormalities in does and ewes

Ante-mortem and post-mortem gross pathological conditions of the female reproductive tract examined showed an occurrence of 4.27%. A total of 16 females (11 does and 5 ewes) out of 375 showed abnormalities of the reproductive tract. Abnormalities of the ovaries observed include ovarian hypertrophy, cystic follicle and unilateral ovarian agenesis which were detected at post-mortem examination. Cystic follicle is a fluid filled membranous sac measuring above 1.3cm as seen in a doe. Abnormalities of the uterus observed include pyometra, hydrometra, metritis and uterine atrophy. Pu accumulation was observed within the uterine body which was foul smelling upon incision, indicating pyometra. Accumulation of clear viscous fluid was detected in the uterus of a doe by palpation and incision indicating hydrometra. Metritis was observed in an ewe and a doe, with enlarged and thickened uterine walls. Mammary glands abnormalities observed at ante-mortem examination include supernumerary teats and mastitis. Supernumerary teats were observed in three does and an ewe all of which were bilateral. Mastitis was observed in an ewe and two does, the mammary gland appeared swollen, warm to touch and hard when palpated (Table 2).

Table 2: Incidence of reproductive abnormalities seen in female animals slaughtered at Dogarawa slaughter slab, Zaria

| Nature of Abnormalities | Frequency | Doe | Ewe | Relative Frequency (%) |
|-------------------------|-----------|-----|-----|------------------------|
| Ovarian hypertrophy     | 1         | -   | -   | 6.25                   |
| Ovarian cyst            | 2         | -   | -   | 12.5                   |
| Unilateral ovarian     | 1         | 1   |     | 6.25                   |
|                        | agenesis  |     |     |                        |
| Pyometra                | 1         | -   | -   | 6.25                   |
| Hydrometra              | 1         | -   | -   | 6.25                   |
| Metritis                | 1         | 1   |     | 12.5                   |
| Uterine atrophy         | -         | 1   | -   | 6.25                   |
| Supernumerary teats     | 3         | 1   |     | 25.0                   |
| Mastitis                | 2         | 1   |     | 18.75                  |
| Total                   | 11        | 5   |     | 100                    |
**Gross abnormalities in bucks and rams**

Ante-mortem and post-mortem gross pathological conditions of the male reproductive tract examined are shown in Table 3, with an occurrence of 1.2%. A total of 17 males out of 1320 showed abnormalities of the reproductive tract. Cryptorchidism was observed in seven animals during ante mortem examination. The scrotal sac of five bucks and two rams were empty when palpated. Four out of the seven were bilateral while three were unilateral. Paraphimosis was observed in two bucks. Part of the penis protruded out of the prepuce and appeared dry and black in colour. At post-mortem examination epididymitis was seen in five bucks, the head of the epididymis was swollen in three of the bucks, the carpus was swollen in one while the entire epididymis was swollen in the other. Testicular hypoplasia was seen in a ram. Balanoposthitis was seen in two rams at post-mortem examination following palpation and incision of the penis.

**Table 3. Incidence of reproductive abnormalities seen in male animals slaughtered at Dogarawa slaughter slab, Zaria**

| Nature of abnormalities | Frequency | Relative frequency (%) |
|-------------------------|-----------|------------------------|
| Cryptorchidism          | 5 (Bucks) 2 (Rams) | 41.18                  |
| Paraphimosis            | 2 (Rams) - (Bucks) | 11.76                  |
| Testicular hypoplasia   | - (Bucks) 1 (Rams) | 5.88                   |
| Epididymitis            | 5 (Bucks) - (Rams) | 29.41                  |
| Balanoposthitis         | - (Rams) 2 (Bucks) | 11.76                  |
| Total                   | 12 (Bucks) 5 (Rams) | 100                    |

**Foetal wastage in sheep and goat**

Table 4 shows a total of 375 female animals were slaughtered, 34 (9.07%) of which were pregnant and 341 (90.93%) not pregnant. From the 34 pregnant animals 24 (70.59%) were ewe while 10 (29.41%) were does. There was a total foetal wastage of 52 foetuses from which 37 (71.15%) sheep and 15 goats (28.85%).

**Table 4. Incidence of pregnant ewe and does slaughtered at Dogarawa slaughter slab, Zaria**

| S/N | Status          | No. of Animals | Percentage (%) |
|-----|----------------|----------------|----------------|
| 1.  | Non-pregnant animals |                |                |
|     | Ewes            | 240            | 90.93          |
|     | Does            | 101            |                 |
| 2.  | Pregnant animals |                |                |
|     | Ewes            | 24             | 6.40           |
|     | Does            | 10             | 2.67           |
|     | Total           | 375            | 100            |

Results in Table 5 show fecundity rate in the animals slaughtered with the twinning rate of 61.54% highest followed by single birth at 32.55%.

**Table 5. Incidence of foetal wastage showing the fecundity rate of pregnant animals slaughtered and the number at the slaughter slab**

| S/N | Status   | No. of foetuses | Percentage (%) |
|-----|----------|-----------------|----------------|
| 1.  | Ewe      | 11              | 21.15          |
|     | One      | 4 (26)          | 50             |
|     | Two (Twinning) | 13       |                 |
| 2.  | Doe      |                 |                |
|     | One      | 6               | 11.4           |
|     | Two (Twinning) | 3 (6)    | 11.54          |
|     | Three (Triple) | 1 (3)    | 5.77           |
|     | Total    | 52              | 100            |

Table 6 shows the number of male and female foetuses in both sheep and goats, out of a total of 52 foetal wastages, 31 were males and 21 were females. Foetal wastages encountered during the study in small ruminants, grouped according to the estimated age of gestation (days) is presented in Table 7 below.

**Table 6. Incidence of foetal wastage showing sex of the foetuses from slaughtered pregnant animals at Dogarawa slaughter slab, Zaria**

| S/N | Animals | No. of Animals | Percentage (%) |
|-----|---------|----------------|----------------|
| 1.  | Ewe     | 25             | 48.08          |
|     | Male    | 12             | 23.08          |
|     | Female  | 9              | 17.31          |
| 2.  | Doe     | 6              | 11.54          |
|     | Male    | 6              |                |
|     | Female  | 9              |                |
|     | Total   | 52             | 100            |

**Table 7. Incidence of foetal wastage in trimesters of slaughtered pregnant animals at Dogarawa slaughter slab, Zaria**

| S/N | Age          | No. of Foetuses | Relative frequency (%) |
|-----|--------------|----------------|------------------------|
| 1.  | 1-50 days    | 17             | 32.69                  |
| 2.  | 51-100 days  | 9              | 17.31                  |
| 3.  | 101-150 days | 26             | 50.00                  |
|     | Total        | 52             | 100                    |

**Discussion**

Previous research surveys revealed that the rates of slaughtered does are usually higher than ewes as observed by Ahemen and Zahraddeen (2010) and Alhaji and Odetokun (2013), which are in agreement with the finding in this study but contrary to the findings of Bokko (2011) who reported higher numbers of ewes slaughtered. The percentage of foetal wastage in this study falls within the range reported by Ahemen and Zahraddeen (2010) at
Plate I. Supernumerary teats in slaughtered female animal

Plate II. Follicular cyst located on the ovary of a slaughtered female animal

Plate III. Pyometra, accumulation of pus within the uterus in a slaughtered female animal
Plate IV. Paraphimosis in a buck

Plate V. Gravid Uterus; uterus containing foetuses in a slaughtered female animal

Plate VI. Foetuses showing twinning at third trimester from a Yankasa ewe
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Conflict of interest

Authors declare that there is no conflict of interest what so ever regarding this work

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Jalingo. The incidence of foetal wastage seen in this study is far less than 34.0% reported by Muhammed et al. (2007), 29.5% by Idahor et al. (2009), 35.96% by Alade et al. (2011). This could be due to differences in sampling frequencies. Pregnant animals could be brought to slaughter because of the financial constraint of their owners who sell the animals to take care of their financial needs, lacking proper pregnancy check and detection especially animals in the early gestation (Atawalna et al., 2013).

The low percentage of ram slaughter as compared to bucks in this study can be attributed to the practice of setting rams aside and fattened before sale for specific occasions to fetch higher price than ordinary market days (Bokko, 2011). In this study, more bucks were slaughtered as compared to does, which could be due to high prolific nature of does, showing of more hardiness to endemic livestock diseases compared to cattle and sheep (Kombate and Abassa, 1987).

This study confirms the prolific nature of sheep and goats with high twinning rate accounting for greater percentage of the total foetal wastage. This finding is in tandem with what was reported by Okorie-Kanu (2018), where twins accounted for the (66.3%) in terms of foetal wastage in small ruminants slaughtered in Nsukka, Nigeria. This is different from what was reported by Salami et al. (2010), who reported foetal wastage of singleton (41.7%) as the highest with twining foetal wastage, next with a value of 32.9% in Zaria abattoir. Also, these variable proportions could be due to different sampling from what was performed by Salami et al (2010). From the wasted foetuses recorded by the present study, the 21 females would have been used as replacement stock in order to multiply the flock while the 31 males fattened there by meeting up with increasing meat demand by the growing population. The cohort age of presentation of wasted foetuses ranged from 0–5 months for both sheep and goats. Foetal crown-rump length (CRL) ranged from 3–55 cm and bi-parietal diameter (BPD) ranged from 1.1–8.5 cm, corresponding to 21–151 days of gestation (Bokko, 2011). Even though various types of abnormalities were recorded, less than 2% were found to have reproductive abnormalities from the population studied. Abnormalities of the female were nearly four folds that of the males, seemingly suggesting the females to be more prone to reproductive abnormalities than the males. The female reproductive tract abnormalities observed were mainly ovarian and uterine abnormalities such as ovarian hypertrophy, cystic follicle and unilateral ovarian agenesis. Similar findings were reported by Azawi et al. (2008) in buffalo cows brought for slaughter at the abattoir. In the males, the abnormalities noticed were cryptorchidism, paraphimosis, testicular hypoplasia, epididymitis and balanoposthitis. These findings are similar to what was reported by Gemed (2017) in bulls brought for slaughter. The practice in this slaughter slab after post-mortem examination for small ruminants (especially goats) is burning, in order to prepare the skin for consumption.

Conclusion

The study revealed the practice of slaughtering of pregnant animals at Dogarawa slaughter slab, Zaria, resulting in foetal wastage and reproductive abnormalities common amongst small ruminants brought for slaughter.
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