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Retrospective evaluation of cases of reproductive disorders and requests for reproduction related procedures in animals presented for veterinary care at the Veterinary Teaching Hospital, University of Nigeria, Nsukka, 2002 – 2021

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Abstract

Reproductive disorders (RDs) are one of the major constraints to animal production, and there is paucity of information in available literature on the occurrence of RDs and the frequency of requests for reproduction related procedures (RRP) in veterinary hospitals in Nigeria, and more specifically in Nsukka. This study was twenty year (2002 – 2021) retrospective survey of the occurrence of RDs and frequency of requests for RRP in animals presented for veterinary care at the Veterinary Teaching Hospital, University of Nigeria Nsukka (VTH-UNN). A total of 399 RDs and RRP were recorded during the study period. The percentage frequency of occurrence of RDs and RRP for the different animal species were as follows: canine – 44.6%, caprine – 41.6%, ovine – 8.5%, porcine – 3.3%, feline – 1.5%, and 0.3% each for bovine and leporine cases. Female cases predominated, with 60.2% frequency as against 39.8% male cases. The frequency of distribution of cases based on the diagnosis (in descending order of their frequency) were: dystocia – 36.8%, castration – 31.6%, transmissible venereal tumor (TVT) – 8.8%, uterine prolapse – 3.5%, vaginal prolapse – 2.0%, with approximately 1.8% frequency each for parturient paresis, mastitis and ovariohysterectomy, 1.5% frequency each for orchitis and abortion, and approximately 1.0% frequency each for pyometra, retained placenta, pseudopregnancy, paraphimosis, agalactia, vaginal fold prolapse and metritis. Dystocia was the most frequent RDs in small ruminants while TVT was the most frequent in dogs. Requests for castration were high, especially in dogs. It was concluded that during the survey period (2002 – 2021) at the VTH-UNN, RDs and requests for RRP were most frequent in dogs and goats, with females being the sex most frequently affected. Dystocia cases were the most frequent especially in small ruminants and requests for castration was very frequent, especially in dogs.

Keywords: Animals; Reproductive disorders; Reproduction related procedures; Retrospective survey; Veterinary Teaching Hospital; Nsukka Nigeria.

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Introduction

Livestock production contributes significantly to human food needs, regular revenue for households and employment (Leslie *et al*., 1999). One of the most important economic considerations in any livestock production enterprise is reproductive proficiency. Productivity is largely determined by reproductive performance, and for instance, dairy producers benefit the most when cows calve for the first time at 2 years of age, calve at approximately 12 to 13-month intervals, and have a relatively long herd lifespan (Coleman *et al*., 1985).

Disorders and diseases of the reproductive system are commonly observed in both veterinary and human medical practice. These include vaginal, uterine, pregnancy and lactation disorders, prostrate diseases, and neoplasms of the genital system and mammary gland. The productivity of domestic animals is primarily affected by reproductive disorders. These disorders reduce the reproductive efficiency and lifetime production of the animals (Lawson *et al*., 2004; Inchaisri *et al*., 2010). Several factors are known to affect farm animal production and reproductive performance, and it may be impossible to evaluate reproductive performance satisfactorily by focusing on any one particular disorder or symptom, due to the interrelationship of the predisposing factors (Shiferaw *et al*., 2005). These factors include managerial, environmental, metabolic and nutritional issues, as well as common reproductive disorders, all of which interact and have a negative impact on reproduction. Livestock diseases, especially those affecting the reproductive system and production efficiency, have been identified as one of the constraints to animal production (Abalti *et al*., 2006; Mulligan *et al*., 2006). Some farmers have limited knowledge of animal hygiene and reproductive management. Faulty management practices, such as failure to correctly identify estrus, poor management of herds practices, and poor record keeping, are some of the causes of reproductive disorders in domestic animals (Waldner and Garca Guerra, 2013; Crowe *et al*., 2018).

Abortion, dystocia, retained foetal membrane (RFM), pyometra, metritis, prolapse (uterine and vaginal), anoestrus and repeat breeding are among the major reproductive health problems that have been reported to have a direct impact on the reproductive performance of female animals (Lobago *et al*., 2006). Abortion in cattle is a relevant cause of reproductive waste and is of commercial significance as a single abortion in a dairy herd is costly and several of the infectious diseases causing abortion are zoonotic (Abdisa, 2018). Dystocia, or difficult parturition, is a true emergency for veterinarians, and in severe cases, death of the foetus or dam can occur within 48 hours (Dobson *et al*., 2008). Animals that have previously experienced dystocia are more likely to die in early lactation or later days of lactation (Dematawewa and Berger 1997; Tenhagen *et al*., 2007; De Vries *et al*., 2010). Dystocia in cattle has been extensively researched due to its effects on productivity (Youngquist and Norman, 2007). The overall incidence varies by species and breeds within species; however, in small ruminants, the overall incidence is low (5%) (Purohit and Mehta, 2006). Retained foetal membranes (RFM) occur when a cow fails to expel her foetal membrane within 12 hours of giving birth. Foetal membrane retention for more than 12 hours after parturition is associated with increased post-partum disease, decreased milk production, decreased reproductive performance and increased culling rates (Abdisa, 2018). RFM is one of the most common causes of cattle endometritis (Kaneene and Miller, 1995). It has been linked to post-partum reproductive and metabolic disorders (Chassagne *et al*., 1999). Endometritis, which is inflammation of endometrium, have a negative impact on the global livestock industry. Economic losses are

associated with a delay in resumption of ovarian activity, an increased number of services per conception, decreased milk yield and disease treatment costs. (Takele *et al*., 2005; LeBlanc, 2008). Retention of foetal membrane, injury to the reproductive tract due to difficulty in calving or excessive force used to assist in calving, injury during breeding, or uterine treatment contamination of the reproductive tract at calving are all possible causes of endometritis (Gilbert, 2016). Although vaginal prolapse is most common in mature animals in late pregnancy, it can occur in young, non-pregnant ewes and heifers, especially in fat animals (Butch and Dan, 2021).

In male animals, the common reproductive health problems that have direct impact on reproductive performance include orchitis, paramphimosis, posthitis etc. Orchitis is mostly associated with epididymitis (Foster, 2015). Most frequently, an infectious (bacterial, fungal, or viral) condition causes acute inflammation of the testis and/or epididymis (Davidson, 2020). The most common cause of orchitis is bacteria ascending from the prostate gland or urethra via the ductus deferens. Testicular inflammation can also be caused by trauma. Infection can occur through hematogenous, urologic, or direct inoculation (Davidson, 2020). Paraphimosis occurs when the penis protrudes from the prepuce and fails to return to its normal position (Davidson, 2020). Azoospermia, cryptozoospermia and posthitis are also possible disorders of the male reproductive system (Corea *et al*., 2005; Larsen, 2020). *Corynebacterium renale* commonly causes posthitis. The condition has been reported to be more common in male castrates, most likely due to the hypoplastic nature of the penis, which is worsened in some cases by the lack of penile-preputial separation, resulting in urine pooling in the prepuce (Larsen, 2020).

Infertility is an important problem that causes significant economic loss in the livestock industry. It is a common reason for farm animal culling (Ochiogu *et al*., 2013). The study of disorders and diseases using reported cases in clinics provides a wealth of information on the state of such problems in the field and their occurrences, as well as useful information on disease patterns that can be utilized for the designing of prevention strategies and creating policies for future management of prevalent disease. In the light of this, a number of studies have been carried out in veterinary hospitals and clinics using historical data. Retrospective case evaluations of reproductive disorders and diseases were reported to have been carried out at Ibadan (Idowu *et al*., 1977; Ugochukwu and Ephraim, 1985), Sokoto (Ebbo *et al*., 2003), Maiduguri and Damaturu (Waziri *et al.*, 2006; Ali *et al*., 2023). There had earlier been a study on the reproductive disease conditions handled in the University of Nigeria Veterinary Teaching Hospital (Wosu and Anene, 1990), however it was limited to small ruminants and the retrospective study covered a period more than three decades ago. The present study evaluated cases of reproductive disorders and requests for reproduction related procedures in animals presented for veterinary care at the Veterinary Teaching Hospital, University of Nigeria Nsukka from 2002 to 2021 (20-year period).

Materials and Methods

Study Area: The study was conducted at the Veterinary Teaching Hospital, University of Nigeria Nsukka (VTH-UNN), Enugu State, Nigeria. The hospital provides veterinary services principally to animal owners in Nsukka and environs and also serves as a referral veterinary facility for all south eastern and middle belt states of Nigeria. Nsukka is located at an altitude of 1,300 feet (396 metres) on the Udi Hills. It is situated between

6°51'24''N latitude and 7°23'45''E longitude. The vegetation is derived savanna, with a sub-humid tropical climate. It has a relative humidity of 70 to 80%. The annual rainfall ranges from 1,845 – 2000 mm, with the wet season lasting from March to October/November and the dry season lasting from November to March. The annual mean temperature ranges from 25°C to 29°C (Nwite and Obi, 2008).

Data Collection: Permission to use clinical records for research was sought for and obtained from the VTH-UNN management. Data were collected from records of all the clinical cases presented to the hospital from January 2002 to December 2021. Information on all reproductive disorders (RDs) and requests for reproduction related procedures (RRP) were collected. The information collected included case diagnosis, year of presentation, species, sex of affected animals, and whether or not the case was successfully handled. The frequency of occurrence of the RDs and requests for RRP was computed for the different years, species and sex.

Data analysis: Data generated was subjected to descriptive statistics using Microsoft Excel software (version 2003). Results were presented in Tables, graphs and bar charts.

Results

A total of 399 RDs and requests for RRP were recorded to have been presented to the hospital during the 20-year study period. The percentage species distribution of the RDs and requests for RRP showed that the canine species had the highest number of cases of 178 (44.6%), followed by caprine with 166 (41.6%), then ovine with 34 (8.5%), porcine with 13 (3.3%), and the lowest were feline (6 cases), bovine (1 case) and leporine (1 case) with a combined proportion of 2.0% for the lowest three species (Figure 1).

The distribution of the RDs and requests for RRP based on sex showed that females were predominantly affected, with a total of 240 cases (60.2%), while males accounted for 159 cases (39.8%) [Figure 2].

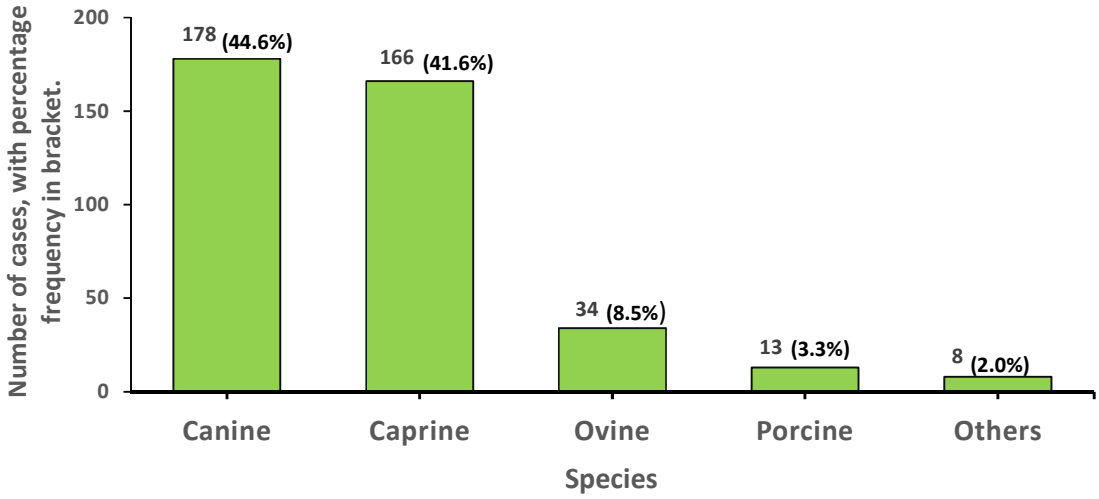

Figure 1. Species distribution of reproductive disorders (RDs) and requests for reproduction related procedures (RRP) in animals presented for veterinary care at the Veterinary Teaching Hospital University of Nigeria, Nsukka, 2002 – 2021.

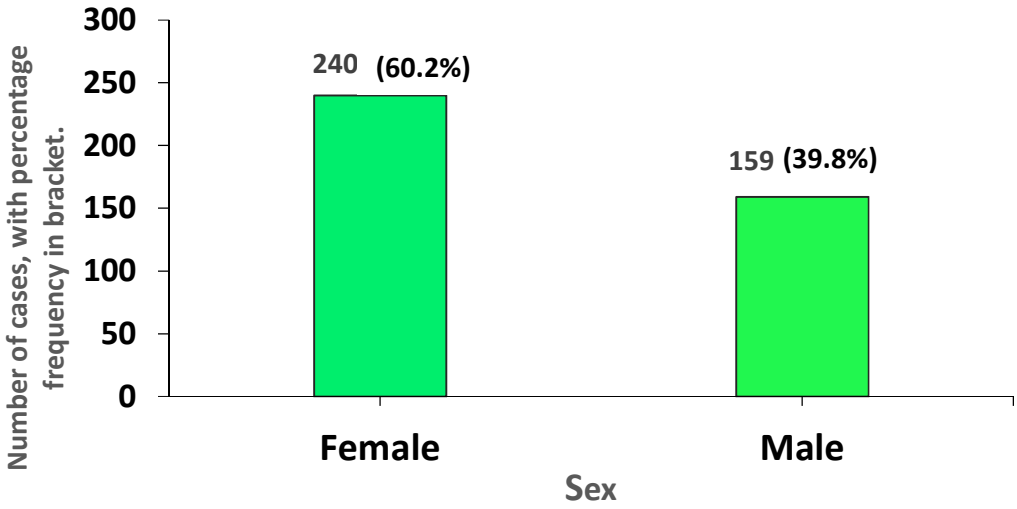

Figure 2. Sex distribution of reproductive disorders (RDs) and requests for reproduction related procedures (RRP) in animals presented for veterinary care at the Veterinary Teaching Hospital University of Nigeria, Nsukka, 2002 – 2021.

A listing of the RDs and requests for RRP in order of descending frequency, included dystocia – 147 (36.8%), castration – 126 (31.6%), transmissible venereal tumor – 35 (8.8%), uterine prolapse – 14 (3.5%) [Table 1]. Other cases with lower frequencies were vaginal prolapse – 8 (2.0%), parturient paresis – 7 (1.8%), mastitis – 7 (1.8%), ovariohysterectomy – 7 (1.8%), orchitis – 6 (1.5%), abortion – 6 (1.5%), pyometra – 4 (1.0%), retained placenta – 4 (1.0%), pseudopregnancy – 4 (.01%), paraphimosis – 4 (1.0%), agalactia – 3 (0.8%), vaginal fold prolapse – 2 (0.5%) and metritis – 2 (0.5%) [Table 1]. Furthermore, one case (0.3%) for each was recorded for the following disorders: pregnancy toxemia, hypomagnasaemic tetany, abortion with retained placenta, unilateral cryptorchidism, vaginal tumour, foetal mummification and retained placenta, benign tumor of the mammary gland, azoospermia, metritis-pyometra complex, posthitis, vaginal-rectal prolapse, primary infertility and secondary infertility (Table 1).

The species distributions of the frequency of the specific RDs and requests for RRP are presented in Tables 2 – 6. Dystocia predominantly occurred in sheep (82.4%) and goats (66.9%), with pigs (7.7%) and dogs (3.9%) having a lower frequency of dystocia (Table 2). Retained placenta was recorded in cattle (100%), sheep (5.8%) and goats (1.8%) only (Table 3). Agalactia was recorded only in rabbits (100%) and dogs (1.1%) (Table 4). Castration was requested for pigs (84.6%), cats (66.6%), dogs (50.6%) and goats (12.7%) only (Table 5).

The case distribution across the study period (2002 – 2021) showed that the frequency of RDs and requests for RRP was high in the earlier years (2002 to 2014) with a noticeable decline from 2015 down to 2021, although 2004 recorded the lowest frequency of RDs and requests for RRP (Table 6). Table 7 shows the annual number of successfully handled cases, unsuccessfully handled cases and cases of uncertain end.

Table 1. Distribution of reproductive disorders (RDs) and requests for reproduction related procedures (RRP) in animals presented for veterinary care at the Veterinary Teaching Hospital University of Nigeria, Nsukka, 2002 – 2021 (arranged in descending order of frequency).

Cases Presented	Total Number	Frequency (%)
Dystocia	147	36.8
Castration	126	31.6
Transmissible venereal tumour	35	8.8
Uterine prolapsed	14	3.5
Vaginal prolapsed	8	2.0
Paturient paresis	7	1.8
Mastitis	7	1.8
Spaying/ Ovariohysterectomy	7	1.8
Orchitis	6	1.5
Abortion	6	1.5
Pseudopregnancy	4	1.0
Paraphimosis	4	1.0
Pyometra	4	1.0
Retained placenta	4	1.0
Agalactia	3	0.8
Vaginal fold prolapse	2	0.8
Metritis	2	0.8
Pregnancy toxemia	1	0.3
Abortion and retained placenta	1	0.3
Vaginal and rectal prolapsed	1	0.3
Primary infertility	1	0.3
Secondary infertility	1	0.3
Hypomagnasaemic Tetany	1	0.3
Unilateral cryptochidism and castration	1	0.3
Vaginal tumour	1	0.3
Foetal mummification and retained placenta	1	0.3
Benign tumour of the mammary gland	1	0.3
Azoospermia	1	0.3
Metritis-pyometra complex	1	0.3
Posthitis	1	0.3

Table 2. Species distribution of dystocia cases in animals presented for veterinary care at the Veterinary Teaching Hospital University of Nigeria, Nsukka, 2002 – 2021 (arranged in descending order of frequency).

Species	Total number	No of Dystocia cases	Frequency (%)
Ovine	34	28	82.4
Caprine	166	111	66.9
Porcine	13	1	7.7
Canine	178	7	3.9
Bovine	1	0	0
Feline	6	0	0
Leporine	1	0	0

Table 3. Species distribution of retained placenta cases in animals presented for veterinary care at the Veterinary Teaching Hospital University of Nigeria, Nsukka, 2002 – 2021 (arranged in descending order of frequency).

Species	Total number	No of retained placenta cases	Frequency (%)
Bovine	1	1	100
Ovine	34	2	5.8
Caprine	166	3	1.8
Canine	178	0	0
Feline	6	0	0
Leporine	1	0	0
Porcine	13	0	0

Table 4. Species distribution of agalactia cases in animals presented for veterinary care at the Veterinary Teaching Hospital University of Nigeria, Nsukka, 2002 – 2021 (arranged in descending order of frequency).

Species	Total number	No of agalactia cases	Frequency (%)
Leporine	1	1	100
Canine	178	2	1.1
Bovine	1	0	0
Caprine	166	0	0
Feline	6	0	0
Ovine	34	0	0
Porcine	13	0	0

Table 5. Species distribution for castration requests in animals presented for veterinary care at the Veterinary Teaching Hospital University of Nigeria, Nsukka, 2002 – 2021 (arranged in descending order of frequency).

Species	Total number	No of castration cases	Frequency (%)
Porcine	13	11	84.6
Feline	6	4	66.6
Canine	178	90	50.6
Caprine	166	21	12.7
Bovine	1	0	0
Leporine	1	0	0
Ovine	34	0	0

Discussion

It is noteworthy that a higher proportion of RDs and requests for RRP in this study were in dogs, goats and sheep. This high occurrence in dogs and small ruminants concurs with the reports of Waziri *et al*. (2006) at the State Veterinary Clinic Maiduguri, Nigeria. This is understandable as dogs and small ruminants are more numerous when compared to the bigger animal species in the Nsukka locality. It is also relatively easier to rear them within the Nsukka metropolis. The present study, which showed that RDs and requests for RRP was highest in the canine species (44.6%), followed by the caprine species (41.6%), then ovine (8.5%), differs from the reports of Waziri *et al*. (2006) at the State Veterinary Clinic Maiduguri, Nigeria, which recorded that canine species had the least proportion of 4.2% while the ovine species ranked the highest with proportion of 60.0%, followed by the caprine species with proportion of 29.8%. In Nsukka metropolis, dogs are commonly kept as pets and for security purposes, and so, health problems with them will commonly be brought to a veterinary clinic, unlike the small ruminants, which would rather be culled and sold, so as to save the cost of taking them to the veterinary clinic. The finding in this present study that the frequency of RDs and requests for RRP was higher in caprine species when compared to the ovine specie agrees with the earlier reports of Wosu and Anene (1990) on the incidence of reproductive diseases in Nsukka, Nigeria. This higher proportion of goats when compared to sheep is believed to be due to the earlier reported 'tilt in favour of goats' in the distribution and ownership of small ruminants in south eastern Nigeria (Wosu and Ibekwe, 1990; Gefu *et al*., 1994). The very low relative frequency of RDs and requests for RRP recorded for the feline and leporine species is probably because these species are not commonly kept by individuals in Nsukka area (Wosu and Ibekwe, 1990).

The predominance of RDs and requests for RRP in females when compared to males is believed to be due to the fact that females are kept for comparatively longer time (to give birth and nurture young ones) than males that are commonly sold off at maturity. Additionally, the relatively complicated nature of the female reproductive system when compared to that of the male makes it vulnerable to disorders and diseases (Hoffman *et al*., 2008). This comparatively higher frequency of RDs and requests for RRP in females that is reported in the present study concurs with earlier reports by Waziri *et al*. (2006) and Ali *et al*. (2023) at Maiduguri and Damaturu veterinary hospitals in Northern Nigeria.

Table 6: Annual case distribution of reproductive disorders (RDs) and requests for reproduction related procedures (RRP) in animals presented for veterinary care at the Veterinary Teaching Hospital University of Nigeria, Nsukka, 2002 – 2021.

Year	Total number of cases presented	Frequency (%)
2002	23	5.8
2003	21	5.3
2004	4	1.0
2005	31	7.8
2006	24	6.0
2007	30	7.5
2008	18	4.5
2009	30	7.5
2010	37	9.3
2011	23	5.8
2012	22	5.5
2013	21	5.3
2014	25	6.3
2015	17	4.3
2016	14	3.5
2017	12	3.0
2018	18	4.5
2019	5	1.3
2020	16	4.0
2021	8	2.0

Table 7. Annual distribution of successful/unsuccessful cases of reproductive disorders (RDs) and requests for reproduction related procedures (RRP) in animals presented for veterinary care at the Veterinary Teaching Hospital University of Nigeria, Nsukka, 2002 – 2021.

Study year	Number of cases with a certain end			Number of cases with an uncertain end
	Successfully handled	Unsuccessfully handled	Total certain cases	
2002	8	0	8	15
2003	8	2	10	11
2004	0	1	1	3
2005	12	1	13	18
2006	8	2	10	14
2007	12	1	13	17
2008	11	0	11	7
2009	10	0	10	20
2010	2	0	2	35
2011	5	1	6	18
2012	3	0	3	19
2013	2	0	2	19
2014	5	0	5	20
2015	5	0	5	12
2016	0	0	0	14
2017	8	0	8	4
2018	10	1	11	7
2019	0	0	0	5
2020	7	0	7	9
2021	7	0	7	1

The high frequency of dystocia in small ruminants recorded in this study is consistent with reports of Wosu and Anene (1990) and Waziri *et al*. (2006), both of which showed that dystocia was the most frequent RD in Nsukka and Maiduguri, respectively. The higher frequency of dystocia is believed to be due to the fact that most of the animals are reared in semi-intensive and extensive systems, as such methods of animals keeping make animals more prone to develop diseases (Aliyu *et al*., 2005). Semi-intensive and extensive animal rearing systems permits animals to run together, no matter the age, which promotes indiscriminate mating between the animals. Relatively young female animals have the potential to develop dystocia especially when mated at such early age to bigger males. A high incidence of dystocia has also been reported to be related to twinning and inadequate feeding (Arthur *et al*., 1998).

Castration which was the most predominantly requested RRP in the present study was more common in canine species than in other species. Domestic animals not meant for breeding are typically castrated to prevent unwanted pregnancy (Ladd *et al*., 1994). Castration, also known as neutering, is commonly recommended for pets in order to reduce the number of unwanted animals in the community and to lower the incidence of certain diseases like testicular cancer and prostate disease in male dogs (Teske *et al*., 2002). Porcine species had the highest occurrence of castration requests (84.6%) during the study period was for castration. The high frequency of castration requests in pigs may be related to the reported presence of androsterone and skatole concentrations stored in the fat tissues of domestic pigs after sexual maturity, which is the cause of the undesirable odour known as "boar taint" in uncastrated males (Needham *et al*., 2017). Castration in small ruminants has also been demonstrated to enhance the palatability of the resulting meat because intact male goat meat is believed to have an unpleasant flavour and aroma known as "buck odour" (Zamiri *et al*., 2012). In general, requests for castration may also be frequent in livestock because of the reported lower metabolic rate of castrates with the risk of obesity (Abdisa, 2018), which favours speedy fattening to desired market size.

Transmissible venereal tumor (TVT) was the second most frequent RDs at VTH UNN during the study period. It was reported only in dogs and this may be because it is a sexually transmitted tumour that typically affects a dog's external genitalia (Cohen, 1985). According to Eze and Idowu (2001), TVT is endemic in Nsukka and was reported to have accounted for 11% of surgical cases treated at UNN-VTH between 1985 and 1995. The high frequency of TVT recorded in the present study concurs with the reports of Amber and Adeyanju (1986) which recorded 47 TVT cases in a two-year period at Ahmadu Bello University Veterinary Teaching Hospital (ABUVTH), Kaduna, Nigeria. It has been reported that dogs that roam freely and engage in sexual activity in areas where leash laws are not strictly enforced are more vulnerable to contracting the disease because the disease is spread through sexual contact (Eze *et al*., 2007). According to earlier reports by Luga *et al*. (2018) on the dog population in Kaduna, only 24.1% of dogs in urban areas were always confined, whereas no dog was constantly confined in a rural area; this could account for the high frequency of TVT occurrence.

For other diseases and conditions presented, their low frequency of occurrence might be due to lack of awareness on the side of the farmers and animal owners on the existence of such conditions and the interventions available for such conditions.

From the case distribution across the study years, it was noted that the frequency of occurrence of RDs and requests for RRP were

high from 2001 to 2014 with a noticeable decline from 2015 down to 2021. It is thought that the initial high frequency of presentation could be because of greater awareness by animal owners of the availability of veterinary intervention for their animals with RDs and the RRP needed. The decline recorded from 2015 to 2021 could be because, over the years, other private veterinary clinics were established in and around the study area (Nsukka) and these clinics might be closer to or be preferred by some former clients of the VTH UNN.

The occurrence of cases with an uncertain end is noteworthy and this might be because of poor documentation on the part of the hospital or it could also be because some clients could not report back on or come back with their animals for various reasons (distance from client's house to the hospital, apparent recovery of the patients, death of the patients, lack of money to continue treatment, etc.). Thus, documenting further interventions for these types of patients was not possible.

Conclusion: Based on the results of the study, it was concluded that during the twenty-year survey period (2002 – 2021) at the VTH-UNN, RDs and requests for RRP were most frequent in dogs, goats and sheep, with females being the sex predominantly affected. Dystocia cases were the most frequent RDs, followed by TVT, but castration was the most frequently requested RRP.

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Conflict of interest

The authors declare no conflict of interest.

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