
Knowledge, Attitude and Practices of Farmers to Infertility in Female West African Dwarf Goats in Imo State, Nigeria

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ABSTRACT

The study assesses the knowledge, attitudes and practices (KAP) regarding infertility in female West African Dwarf (WAD) goats in Imo State, Nigeria. Three hundred and ten (310) goat farmers from seven Local Government Areas in Imo State were selected. The results reveal the involvement of more females than males in goat farming. A higher population (90.6%) of the farmers had formal education; 87.4% did not keep goats as their source of income. The respondents had good years of experience in goat farming. Their resultant years of experience had a positive influence on their general knowledge. The respondents (85.2%) accepted that infertility could be a problem for indigenous goats, while 92.3% were willing to release suspected infertile goats for proper investigation and research purposes. None of the socio-demographic characteristics of the respondents is significantly associated with their knowledge and practice in goat farming. The age and qualifications of the respondents are significantly related to their attitude towards goat farming. The practice metrics revealed most LGAs struggle with implementing effective reproductive management strategies. Hence, determination of the prevalence and causes of infertility in WAD goats in Imo State to improve reproductive health and promote the overall production of goat farming.

Keywords: *Infertility, West African Dwarf goat, Knowledge, Attitude, Practices*

INTRODUCTION

Infertility has incriminated reproductive inadequacy and economic losses in goats, evident through various reproductive tract abnormalities. Investigation of underlying factors contributing to female infertility is crucial in accurate diagnosis and suitable preventive and control measures. The West African Dwarf (WAD) goat is an indigenous breed in southern

Nigeria. WAD goats play crucial roles in contributing to nutrition and food security, family income and management of soil fertility, thereby assisting families in most rural areas (Oforo et al., 2021). WAD goats are recognized for their stiff, short and straight hair coat, varying in colour in Nigeria. Males and females are usually horned and have a pair of teats and a beard. Beard is possessed by all adult bucks or breeding bucks, but only a few females have beards. Both sexes could be bilateral or unilateral wattled, and bilateral wattles are more common (Odubote, 2021).

Infertility or temporary sterility is the inability to conceive and produce viable young ones within a specific time. Sterility occurs when there is a permanent problem preventing kid production. *Infertility in farm animals* is due to various *causes* such as developmental disorders, nutritional, environmental, management and infectious diseases. The WAD goats are the most prolific of all the domesticated ruminants under tropical and subtropical conditions and can breed throughout the year (Oppong and Yebuah, 1981; Casey et al., 1988; Greyline, 1988; Daramola and Adeloje, 2009; Chukwuka et al. (2010). WAD goats can breed at twelve to eighteen months, and multiple births are very common, with twins being normal and triplets frequent. The kidding interval averages about 220 days (Chukwuka et al., 2010). Deviation from all these reproductive characteristics of WAD goats may be infertility in this species. Infertility is a concern of ruminant farmers in Nigeria. The most important limiting factor of goat production in Southeast Nigeria is the lack of interest attributed to the low productivity of WAD breeds, placing the breed of goat “on the verge of extinction” (Anyanwu et al., 2020)

In a system where there are no strict policies guiding farmers and animal health workers or veterinarians, and void of government plans to prevent and control the epidemiology of a disease, knowledge, attitude and practices (KAP) survey has the potential to collect information on the existence of behaviour and believe which will help to generate data on the animal disease (Tiongco et al., 2012; Zegeye et al., 2023). Knowledge, Attitudes, and Practices (KAP) surveys can generate crucial information to investigate potential causes of disease and make available intervention strategies for disease management (Dernberg et al., 2005). Farmers’ behaviour greatly influenced their knowledge and attitude. Poor awareness of a disease could be related to the prevalence of the disease and increase the risk of undercover diseases (Mahmoodabad et al., 2008; Govindaraj et al., 2016; Montos et al., 2022).

Before this study, the researcher visited some goat markets within Imo State and discovered that most female goats sent to the market for sale were because of infertility. It was ascertained through the discussion with the goat sellers. There is a need to investigate the infertility of goats in Imo State and find out the possible causes of infertility of goats and the influence of farmers’ knowledge, attitude and practice of goat husbandry on goats’ infertility. The value of goats as an “economic reservoir” especially to goat farmers in rural communities is indisputable, understanding the magnitude and underlying factors contributing to infertility is crucial for developing effective breeding programmes,

improving reproductive health and enhancing livestock production. This study assessed the knowledge, attitude and practices (KAP) of farmers with infertility in female West African Dwarf (WAD) goats in Imo State, Nigeria.

METHOD

Research Design, Area and Population of study

The research design was cross-sectional using an interviewer-administered questionnaire. The target population was all goat farmers and their goats in Imo State. The area of study was seven (7) out of twenty-seven (27) Local Government Areas (LGAs) of the State. This selection was based on the availability of goats and or goat farmers in these areas. The areas are Ahiazu mbaise, Aboh Mbaise, Ohaji Egbema, Oguta, Owerri West, Mbaitoli, and Ngor Okpala.

Sample size

In recent years, there have been no published data on the population of goat farmers and goats in Imo State. The researcher utilized a pilot study to determine the sample size. It involved the administration of the questionnaire to 50 respondents in the target population. The completed questionnaires were analyzed. In determining the sample size, the Thrusfield's (2007) formula was used.

$$N = \frac{Z^2 P(1-P)}{D^2}$$

$n = Z_{\alpha}^2 p(1 - p)/d^2$ where:

n = Minimum desired sample size

Z = the standard normal deviation, set as 1.96 which corresponds to 5% level of significance.

P = 50% was used

d = Degree of accuracy (precision) set at 5% (0.05)

$n = 1.962 \times 0.5 \times (1 - 0.5)/0.05^2 = 196.2$ approx 200 respondents.

Therefore, using a 5% degree of precision, the minimum sample size should be 200 respondents. The sample for this study was three hundred and ten (310) goat farmers, representing the total population of farmers in Imo State.

Instrument and Method for data collection

A semi-structured questionnaire was used in collecting data. The questionnaire consists of five sections. Section A to E. Section A sought the socio-demographic information of the



respondent. Sections B, C, D and E solicited knowledge from respondents on goat farming, their attitude towards goat farming, their practice in goat farming and the reproductive health of goats. An interpreter was also involved in solving the language barrier problems.

Method of data analysis

The collected data were sorted out, coded manually, entered into the computer and analysed with SPSS version 20.0. Frequency distribution, cross-tabulations and Chi-square test for associations between the variables of interest.

RESULTS AND DISCUSSION

Socio-demographic characteristics of WAD goat farmers in the study areas

Ngor Okpala has the highest population of goat farmers (41%), Ahiazu Mbaise (21%) and Ohaji Egbema (14.8%) with the least in Owerri West and Aboh Mbaise LGAs with the lowest percentage (3.9%) respectively. There were more female goat farmers (54.8%) than male farmers (45.2%). Also, a higher population of the farmers had formal education, while 9.4% were without formal education. In addition, 87.4 % of the respondents did not keep goats as their source of income, while 12.6% kept goats as their source of capital income. The highest percentage of goat farmers are between 40 years and above (Table I).

Knowledge of respondents on goat farming

Table II revealed that a large number of the respondents had good years of experience in goat farming; 43.2% of them had 1-10 years of experience, 37.1% had 11-20 years, 16.1% had 21 -30 years, 2.9% had 31-40 years, and 0.6 % had 41 -50 years of experience.

Attitude of respondents to goat farming

About 81% of respondents indicated that goats were their companion and food animals; 17.7% considered goats for food, while 1.3% regarded goats as companion animals. 85.2% accepted that infertility could be a problem for indigenous goats, and 92.3% were willing to release suspected infertile goats for proper investigation and research purposes. Figure 4.2 displays that 85.8% of the respondents had a good attitude against 14.2% of them with a poor attitude (Table III).

The practice of respondents to goat farming

Table IV indicates that 72.9% of the respondents feed forage to their goat; 3.5% feed forage with household waste, 1.9% feed concentrate and household waste, 2.6% feed grain and

household waste, 12.6% feed cassava peels and 0.3% feed concentrate; 5.2% used household waste only, and 1% was monstrous about their goats feed. An extensive rearing system was their practice, with only 12.6% of the respondents rearing their goats in confined areas with the provision of pens. More than 97% of respondents kept male and female goats together, and 3% did not. The respondents kept no record except 17.7%, who kept the kidding record only. None of the respondents had adopted a modern method in getting their goat pregnant. Routine deworming was practised by 0.6% of the respondents, 87.7% never dewormed their goats. Vaccination of the goat was never done by any respondent; “self-treatment” or use of human oral drugs was practised by 85.4% and 6.4% of them consulted ambulatory animal health workers whenever their animals were sick. The percentage of respondents having access to veterinary clinics and ambulatory services was 6.8 and 25.5 respectively, and 67.7% had no access to veterinary services. The practice of 99.4% of the respondents was unacceptable (Figure 3).

Knowledge, Attitude and Practice of Goat Farmers across the study areas

Table VIII shows 41.2% of respondents possessing adequate knowledge and 45.9% displaying good attitudes in Ngor Okpala with a robust understanding of goat fertility, Oguta shows minimal comprehension, with only 5.9% of respondents having adequate knowledge and just 3.0% exhibiting positive attitudes towards goat reproductive health. Oguta and Ngor Okpala were the only areas that showed 50% acceptable practices, while others demonstrated zero acceptable practices.

Analysis of Reproductive health of goats

The data reveals considerable variability in key reproductive metrics as shown in Table IX.

Table I: Socio-demographic characteristics of WAD goat farmers of seven LGAs of Imo State, Nigeria

	Frequency	Percentage
1 Local Government Area		
Oguta	19	6.1
Ohaji Egbema	46	14.8
Owerri West	12	3.9
Aboh Mbaise	12	3.9
Mbaitolu	27	8.7
Ahiazu Mbaise	67	21.6
Ngor Okpaalla	127	41.0



International Journal of Health and Medical Information

Volume 7, Number 2, August 2024

ISSN: 2350-2169(Print) 2795-3068(Online)

Published By

International Centre for Integrated Development Research, Nigeria

In collaboration with

Copperstone University, Luanshya, Zambia

2	Gender		
	Male	140	45.2
	Female	170	54.8
3	Qualifications		
	No formal education	29	9.4
	Primary education	69	22.3
	Secondary education	102	32.9
	Tertiary education	110	35.5
4	Is goat keeping your major income?		
	Yes	39	12.6
	No	271	87.4
5	Age (in years)		
	20-29	9	2.9
	30-39	31	10.0
	40-49	68	21.9
	50-59	53	17.1
	60 and above	149	48.1

Table II: Knowledge of respondents in goat farming

	Frequency	Percentage
1 How long have you been rearing goat (in years)?		
1-10	134	43.2
11-20	115	37.1
21-30	50	16.1
31-40	9	2.9
41-50	2	0.6
2 What kind of food is best given to goats?		
Grasses and concentrates	119	38.4
Grasses only	149	48.1
Grains(maize and others)	29	9.4
Household wastes	13	4.1
3 What is the ideal ratio of male to female goat to be kept in rearing?		
1:10	30	9.7
1:5	133	42.9
1:2	37	11.9
1:1	0	0.0
Others	110	35.5

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4	What is the duration of pregnancy of goats?		
	One	4	1.3
	Two	2	0.6
	Three	5	1.6
	Five	114	36.8
	Six	185	59.7
5	What is the maximum number of kids a goat can deliver once?		
	4 kids and above	57	18.4
	3 kids	216	69.7
	2 kids	37	11.9
	1 kid	0	0.0
6	What is the best way to keep indigenous goats?		
	Semi Intensive	149	48
	Intensive	23	7.4
	Extensive	138	44.5
6	Do goats need regular deworming?		
	Yes	253	81.6
	No	57	18.4
7	Do you think goat should be given injection to prevent diseases (vaccination)?		
	Yes	265	85.5
	No	45	14.5

Table III: Attitudes of respondents to goat farming

		Frequency	Percentage
1	Do you consider goat as food or companion animal?		
	Food	55	17.7
	Companion	4	1.3
	Both	251	81.0
2	Do you consider provision of balanced diet for goat to be necessary?		
	Yes	284	91.6
	No	26	8.4
3	Do you consider provision of comfortable pen(s) as requirement for rearing indigenous goats?		
	Yes	294	94.8
	No	16	5.1
4	Do you think infertility can be a problem of indigenous goats?		

	Yes	264	85.2
	No	46	14.8
5	If any of your goats is discovered to be infertile, are you willing to release such goat(s) for proper investigation of problem and research purposes?		
	Yes	286	92.3
	No	24	7.7

Table IV: Practice of respondents in goat farming

S/NO		Frequency	Percentage
1	What do you feed your goats with?		
	Forage	226	72.9
	Forage and household waste	11	3.5
	Forage, Concentrates, and household waste	6	1.9
	Forage, grains and household waste	8	2.6
	Forage and cassava peel	39	12.6
	Forage and concentrates	1	0.3
	Household waste only	16	5.2
	Uncategorized	3	1
2	How do you keep your goats?		
	Housed not allowed to roam	39	12.6
	Housed, allowed to roam	150	48.4
	Both	7	2.3
	Allow to roam without house	114	36.7
3	Do you keep your male and female together?		
	Yes	301	97
	No	9	2.9
4	What kind of records do you keep?		
	Production record (kidding record)	55	17.7
	No record	255	82.2
5	Which of the modern methods have you used in getting your goats pregnant? - None	310	100
6	How often do you deworm?		
	Regularly	2	0.6
	Every 3 months	1	0.3
	Every 6 months	2	0.6
	Once a year	8	2.6
	When the need arises(when they are sick)	25	8.1
	Never deworm	272	87.7

7	How often do you vaccinate your goats?		
	Never vaccinate	310	100
8	How do you treat your goats when they are sick?		
	Self treatment (buy drugs or herbs)	265	85.4
	See animal health personnel	20	6.4
	Allow them to recover by themselves	25	8.1
9	What kind of veterinary service do you have access to?		
	Veterinary clinic	21	6.8
	Veterinary ambulatory	79	25.5
	Others (none)	210	67.7

Table V: Relationship between the Socio demographic characteristics and the knowledge level of respondents

	Variables	Knowledge levels		X ²	Df	p-value
		Adequate knowledge	Inadequate knowledge			
1.	Age					
	20-29	6(66.7)	3(33.3)	12.44	4	0.14
	30-39	20(64.5)	11(35.5)			
	40-49	52(64.5)	16(23.5)			
	50-59	32(60.4)	21(39.6)			
	60 and above	77(51.7)	72(48.3)			
2.	Gender					
	Male	84(60.0)	56(40.0)	0.00	1	1.00
	Female	103(60.6)	67(39.4)			
3.	Qualification					
	No formal education	12(41.4)	17(58.6)	7.44	3	0.06
	Primary	40(58.0)	29(42.0)			
	Secondary	60(58.8)	42(41.2)			
	Tertiary	75(60.3)	123(39.7)			
4.	Is goat keeping your major source of income					
	Yes	19(48.7)	20(51.3)	1.99	1	0.16
	No	168(62.0)	103(38.0)			

*Pvalues ≤ 0.05 are significant

None of the socio-demographic characteristics is significantly associated with knowledge

Table VI: Relationship between the Socio demographic characteristics and the attitude level of respondent

Variable	Attitude levels		X ²	Df	p-value
	Good attitude	Poor Attitude			
1. Age					
20-29	5(55.6)	4(44.4)	10.04	4	0.04*
30-39	25(80.6)	6(19.4)			
40-49	56(82.4)	12(17.6)			
50-59	48(90.6)	5(9.4)			
60 and above	132(88.6)	17(11.4)			
2. Gender					
Male	117(83.6)	23(16.4)	0.74	1	0.39
Female	149(87.6)	21(12.4)			
3. Qualification					
No formal education	23(79.3)	6(20.7)	8.74	3	0.03*
Primary	54(78.3)	15(21.7)			
Secondary	95(93.1)	7(6.9)			
Tertiary	94(85.5)	16(14.5)			
4. Is goat keeping your major source of income					
Yes	30(76.9)	9(23.1)	2.12	1	0.15
No	236(87.1)	35(12.9)			

*Pvalues ≤ 0.05 are significant

The age and qualifications of the respondents are significantly associated with their attitude towards goat farming.

Table VII: Relationship between the Socio demographic characteristics and the practice levels of respondents

Variable	Practice levels		X ²	Df	p-value
	Acceptable Practice	Unacceptable Practice			
1. Age					
20-29	0(0.0)	9(100.0)	2.17	4	0.70
30-39	0(0.0)	31(100.0)			
40-49	0(0.0)	68(100.0)			
50-59	0(0.0)	53(100.0)			
60 and above	2(0.0)	147(100.0)			
2. Gender					
Male	1(0.6)	169(99.4)	0.00	1	1.0
Female	1(0.7)	139(99.30)			

3.	Qualification					
	No formal education	0(0.0)	29(100.0)	1.66	3	0.64
	Primary	1(1.4)	68(98.6)			
	Secondary	0(0.0)	102(100.0)			
	Tertiary	1(0.9)	109(99.1)			
4.	Is goat keeping your major source of income					
	Yes	0(0.0)	39(100.0)	0.00	1	1.00
	No	2(0.7)	269(99.3)			

*Pvalues ≤ 0.05 are significant

None of the socio-demographic characteristics is significantly associated with practice

Table VIII: Knowledge, Attitude and Practice of Goat farmers across seven LGAs of Imo State, Nigeria

LGA	Knowledge		Attitude		Practice	
	Adequate n(%)	Inadequate n(%)	Good n(%)	Poor n(%)	Acceptable n(%)	Unacceptable n(%)
Oguta	11(5.9)	8(6.5)	8(3.0)	11(25.0)	1(50.0)	18(5.8)
Ohaji Egbema	21(11.2)	25(20.3)	26(9.8)	20(45.5)	0(0.0)	46(14.9)
Owerri West	9(4.8)	3(2.4)	8(3.0)	4(9.1)	0(0.0)	12(3.9)
Aboh Mbaise	5(2.7)	7(5.7)	11(4.1)	1(2.3)	0(0.0)	12(3.9)
Mbaitolu	17(9.1)	10(8.1)	26(9.8)	1(2.3)	0(0.0)	27(8.8)
Ahiazu Mbaise	47(25.1)	20(16.3)	65(24.4)	2(4.5)	0(0.0)	67(21.8)
Ngor Okpala	77(41.2)	50(40.7)	122(45.9)	5(11.4)	1(50.0)	126(40.9)

Table IX: Reproductive health of goats

Variable	Minimum	Maximum	Mean	Standard deviation
Mature female goats	1	12	4.78	3.09
Mature male goats	0	6	1.89	1.50
Young female goats	0	12	3.53	2.53
Young male goats	0	6	1.76	1.49
Age female goats starts to reproduce (in months)	10	84	16.08	20.107
Age adult goats stop giving birth (in months)	60	180	142.85	36.379
Age goats are weaned (in months)?	3	6	4.95	1.28
How long it takes mothers to get pregnant (in months)?	0.13	10	2.31	2.37

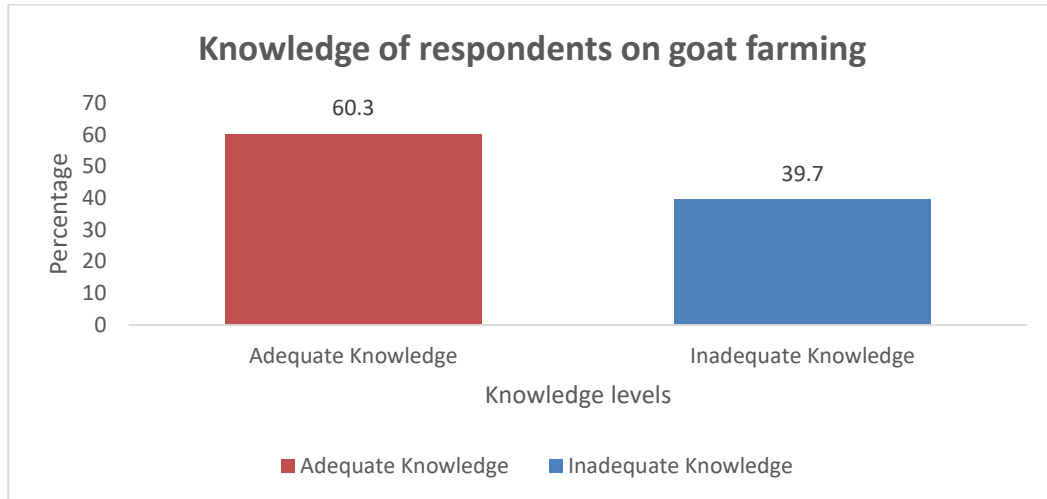


Figure 1: Knowledge of respondents on goat farming

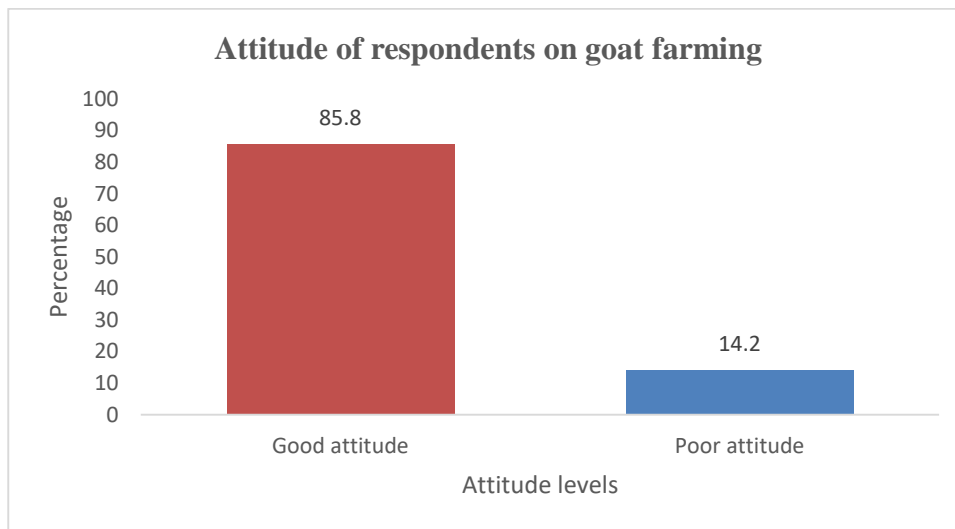


Figure 2: Attitude of respondents on goat farming

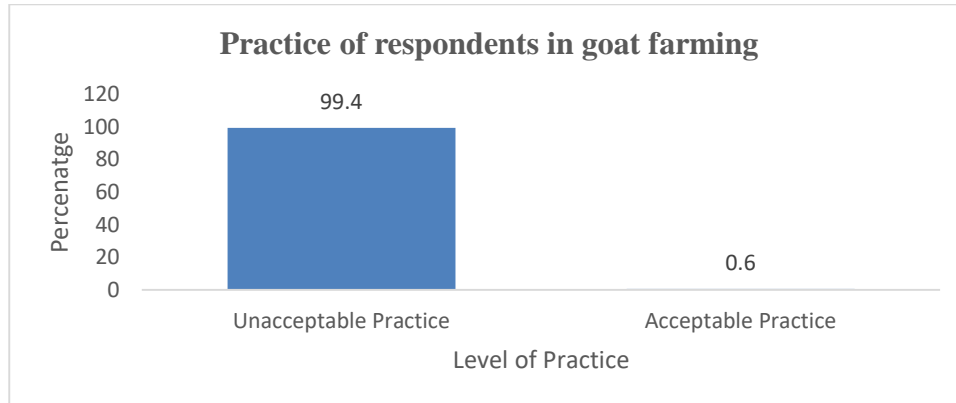


Figure 3: Practice of respondents in goat farming

The distribution of the farmers in this study showed that the highest population of WAD goats and goat farmers are in the rural areas. It affirmed that goat production is domicile in rural communities (Chukwuka *et al.*, 2010; Anyanwu, 2020). Owerri West and Aboh Mbaise LGAs were the lowest (3.9%) in both urban areas, and Aboh Mbaise is the semi-urban area (Agulanna, 2008). Ngor Okpala has the highest population of goat farmers (41%), and Ahiazu Mbaise and Ohaji Egbema have 21% and 14.8%, respectively. The distribution of WAD goats and goat farmers may be proportionate to the space available per time. These LGAs are among the biggest LGAs in Imo State. It is interesting to know that there are more female goat farmers than male goat farmers (54.8% and 45.2%, respectively) following the report of Chukwuka *et al.* (2010) on the reproductive potentials of WAD goats. A higher population of farmers had formal education, but only 9.4% were without formal education. It indicated that 87.4% of the respondents did not keep goats as their source of capital income, while 12.6% kept goats as their source of capital income. The highest percentage of goat farmers were between 40 years and above (Table I). These outcomes are relatively close to the findings of Anyanwu *et al.* (2020) in a similar study in Imo State, Nigeria. The majority of WAD goat farmers are old adults. The underlying reason for the respondents is generous years of experience in goat farming (TABLE II). Their years of involvement influenced their general knowledge (Figure 1). Moutos *et al.* (2022) disclosed that age and years of experience have increased knowledge levels.

Goats can be regarded as companion animals among rural dwellers, as some of the goats live within their owners' residences; attitudes of goat farmers in Imo State attested to this study; 81% of respondents indicated that goats are both companion and food animals, and 1.3% of them regarded goats as companion animals. Infertility was revealed as a major challenge of WAD goats in Imo State that a large population of the farmers must have experienced in their course of goat farming. A majority (85.2%) of the respondents accepted that infertility could be a problem of Indigenous goats, with a close percentage of 92.3 who

showed a willingness to release suspected infertile goats for proper investigation and research purposes (TABLE II). This response revealed farmers' involvement in infertility situation(s). The low productivity of goat production in studies by Nwachukwu and Berekwu (2020) and Anyanwu (2020) in Imo State is traceable to infertility, especially in WAD goats. Figure 3 discloses the great extent (99.4%) of unacceptable practices of the respondents; none of them has ever vaccinated their goat against any form of infectious disease, self-treatment was the order of the day, although extension and Veterinary services were lacking or limited in these areas. It conforms to this study by Nwachukwu and Berekwu (2020) in Ezinnihite Mbaise LGA of Imo State. Goats are kept on extensive systems, and breeding and reproductive activities are uncontrolled. The practice may give rise to many production and health challenges, including reproduction and infertility. Generally, the practice of respondents was unacceptable.

An overview of the study showed that Ngor Okpala demonstrated the most robust understanding of goat infertility, with 41.2% of farmers possessing adequate knowledge and 45.9% displaying good attitudes. In contrast, regions like Oguta show minimal comprehension, while only 5.9% of farmers knew and just 3.0% exhibited positive attitudes towards goat reproductive health. The practice metrics are particularly revealing most LGAs struggle with implementing effective reproductive management strategies. Oguta and Ngor Okpala were the only areas where 50% accepted practices, while others like Ohaji Egbema, Owerri West, Aboh Mbaise, and Mbaitolu demonstrated zero acceptable practices (Table VIII). Table IX delves deeper into the reproductive intricacies of goats, offering a nuanced view of their reproductive lifecycle. The data revealed considerable variability in key reproductive metrics suggestive of irregular breeding or conception and kidding, implicative of increased risk of infertility.

CONCLUSION AND RECOMMENDATION

Evaluating the farmers' knowledge, attitudes and practices is an appropriate tool and a solid foundation for determining the prevalence and causes of infertility of female WAD goats in Imo State, Nigeria. This study revealed good knowledge and attitudes of goat farmers in goat farming and reproductive health. In contrast, their practices were unacceptable owing to some factors they are partially responsible for. Infertility is undercover in the area of study. However, data revealed considerable variability in key reproductive metrics, suggesting the existence and risk of infertility. Determination of the prevalence and causes of infertility in WAD goats in Imo State, Nigeria, is therefore recommended. It is crucial to improve reproductive health and promote the overall production of goat farming in Imo State, Nigeria.

ACKNOWLEDGMENT

The authors appreciate the contribution of the following persons:

Dr. Bamidele Ogunro (VTH, University of Ibadan, Nigeria) for his assistance in the validation of the instrument for data collection.

Dr. Onyedika Callistus Emejuo and Mr Emeka Onyeonula for their assistance in the interpretation and administration of the questionnaire.

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International Journal of Health and Medical Information

Volume 7, Number 2, August 2024

ISSN: 2350-2169(Print) 2795-3068(Online)

Published By

International Centre for Integrated Development Research, Nigeria

In collaboration with

Copperstone University, Luanshya, Zambia

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