

COMPARATIVE PREGNANCY DIAGNOSIS WITH DIGITAL RECTAL PALPATION TECHNIQUE IN RED SOKOTO GOAT – PART II

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ABSTRACT

Comparative pregnancy diagnosis were carried out to evaluate effectiveness of digital rectal palpation technique in Red Sokoto goat. Experiment had 51 goats with 42 does and 9 bucks. Does were divided into three groups: group A (Recto-vaginal artificial insemination by digital rectal palpation; n = 14), group B (Vaginal speculum method artificial insemination; n = 14) and group C (Natural service; n = 14). Oestrus was synchronised with prostaglandin F₂-alpha. Bucks were used for oestrus detection (n = 3) and breeding (n = 6). Pregnancy was diagnosed on day 21 using ultrasonography (US), digital rectal palpation (DRP), progesterone assay (P₄) and non-return-to-heat (NRH). Pregnancy rates for group A was 64.3%, 42.9%, 78.6% and 85.7% for US, DRP, P₄ and NRH respectively; group B had 92.9%, 57.1%, 78.6% and 78.6% for US, DRP, P₄ and NRH, respectively; while group C was 100%, 57.1%, 100% and 92.9% for US, DRP, P₄ and NRH, respectively. There was no significant (P > 0.05) difference between US, DRP, P₄ and NRH in group A. There was significant (P < 0.05) difference between US, DRP, P₄ and NRH in groups B and C. It was concluded that digital rectal palpation technique was effective in pregnancy diagnosis on day 21 and comparable to ultrasonography, progesterone assay and non-return-to-heat in Red Sokoto goat does; and result was consistent and confirms Part I of the experiment.

Key words: comparative; digital rectal palpation; goat; pregnancy diagnosis

INTRODUCTION

Pregnancy examination in goats may be requested by the owner, who would like to know the pregnancy status of the doe. Perhaps, the most important reason for pregnancy diagnosis is the detection of non-pregnancy, pseudo-pregnancy or hydrometra, which may occur in pet and commercial goats, especially in dairy herds where breeding is delayed to adjust milk supplies (Karadaev, 2015; Lone, 2016). Ultrasonography, progesterone assay, estrone sulphate, radiography, rectal abdominal palpation, vaginal biopsy, abdominal palpation and ballottement, palpation of the uterus via laparotomy, pregnancy specific antigen, bimanual palpation technique and non-return to oestrus have been used to diagnose pregnancy (Ishwar, 1995; Kutty, 1999; Bello, 2019). The study is a repeat experiment of Part I (Bello *et al.*, 2022b); aimed at comparing four (4) methods of pregnancy diagnosis with digital rectal palpation (DRP) technique, to assess effectiveness and consistency of DRP in detecting early pregnancy in Red Sokoto goat does.

MATERIALS AND METHODS

Location, animals and grouping

The study was carried out at Small Ruminant Research Programme of National Animal Production Research Institute (NAPRI), Shika, Zaria, Nigeria. The repeat experiment was carried out in same breed and season but different animal population and year with Part I.

A total of 51 animals with 42 does and 9 bucks were used for the experiment. Does were matured adult, non-pregnant, pluriparous (two to three parities). Bucks were matured adults. Six bucks were used for breeding while three for oestrus detection.

Group A: Artificial insemination by digital rectal palpation technique (AIDRP; n = 14)

Group B: Artificial insemination by vaginal speculum method (AIVSM; n = 14)

Group C: Natural service (NS; n = 14) – Control.

Semen collection

Semen was collected from two selected breeding bucks using the artificial vagina (AV) collection method. Semen was evaluated, processed and stored at 4 °C.

Oestrus synchronization and detection

All does in groups A, B, and C, were synchronized for oestrus with prostaglandin F₂-alpha (PGF₂α; *Dinoprost tromethamine*, Lutalyse®). Animals were treated with 12.5 mg per animal by deep intramuscular, double injection, 12 days apart, protocol (Voh Jr., 1996; Bello, 2019). Three mature bucks (one per group) that demonstrated high libido were apronised and used for oestrus detection.

Breeding of animals

Does detected in oestrus were bred following second PGF₂□ injection by AI (Groups A and B) and by NS (Group C).

- Artificial insemination

Artificial insemination gun size 0.5 mL was used to inseminate does. Insemination was carried out 12 h after observed standing oestrus. Site for semen deposition was intracervical. Double insemination protocol (0.5 ml per insemination), 12 h apart was adopted (Leethongdee and Ponglowhapan, 2014; Farin, 2015).

Group A (Recto-vaginal AI by DRP technique): Does were restrained standing by an assistant and faecal pellets and urine evacuated as described in DRP technique. Insemination was achieved by insertion of a gloved lubricated left index finger into the rectum to palpate and locate the cervix, while the right hand manipulated entry of AI gun per vagina into the cervix to deposit the semen (Bello *et al.*, 2022a).

Group B (Vaginal speculum AI): Method described by Leethongdee and Ponglowhapan (2014), Farin (2015) and Bello *et al.* (2022a) was adopted.

- Natural Service

Group C (Natural Service): Does were bred by natural service using hand mating breeding method, twice, 12 h apart, following detected spontaneous oestrus.

Pregnancy diagnosis

- Ultrasonography

Ultrasonography (Sonostar Laptop-C5®, 5 MHz Curvilinear Probe, China) was carried out to diagnose pregnancy on day 21 post-breeding. Ishwar (1995) was adopted.

- Digital rectal palpation

Digital rectal palpation (DRP) technique was used to diagnose pregnancy 21 days post-breeding.

Pregnancy diagnosis was carried out by palpating the uterus to detect amniotic vesicle. Amniotic vesicle, a positive sign of pregnancy by rectal palpation, was identified as a fluctuating fluid in the uterine horn that had tone. Precautions: examination was carried out before feeding and watering; faecal pellets were evacuated from the rectum; urinary bladder was emptied before examination (Kutty, 1999; Bello, 2019; Bello *et al.*, 2022b).

- Radioimmunoassay

Five (5) mL blood sample was collected by veni-puncture of the jugular vein of does on day 21 post-breeding and subsequently taken to laboratory for serum separation and storage. The serum was assayed for progesterone concentration using ELISA (AccuBind® - Monobind Inc., Lake Forest, CA 92630, USA; Product Code: 4825-300). The intra-and-interassay coefficients of variation were 5.3 % and 7.9 %, respectively. Progesterone concentrations of ≥ 0.5 ng/ml in bred does was considered diagnostic of pregnancy, while concentrations of ≤ 0.4 ng/ml indicated non pregnancy.

- Non-return to oestrus

Pregnancy was diagnosed in bred does by observing return to oestrus after 21 days post-breeding as described by Ishwar (1995).

Data collection and analyses

Data on breeding, oestrus response, non-return to oestrus, conception and pregnancy rates were collected. Data were subjected to one-way analysis of variance (ANOVA) and GraphPad Prism Version 5.0. Values of $P < 0.05$ were considered significant (SPSS, 2011; letter superscript was used to separate means of significant differences).

RESULTS

Table 1 shows comparative pregnancy diagnosis of Red Sokoto goat does on day 21 using US, DRP, P₄ and NRH for groups A, B and C. Pregnancy rates were 64.3 %, 92.9 % and 100 % (US); 42.9 %, 57.1 % and 57.1 % (DRP); 78.6 %, 78.6 % and 100 % (P₄); 85.7 %, 78.6 % and 92.9 % (NRH) for groups A, B and C, respectively. There was significant ($P < 0.05$) difference between US, DRP, P₄ and NRH in group B and C.

Table 1: Comparative pregnancy diagnosis rates using ultrasonography, digital rectal palpation, progesterone assay and non-return to heat in Red Sokoto recto-vaginal and vagina speculum artificial insemination and natural service groups (Groups A, B and C).

S/N	Method of Diagnosis	Day	Pregnancy diagnosis and rates; N = 42		
			Group A; n = 14	Group B; n = 14	Group C; n = 14
			PR (%)	PR (%)	PR (%)
1.	US	21	64.3	92.9 ^a	100 ^a
2.	DRP	21	42.9	57.1 ^b	57.1 ^b
3.	P ₄	21	78.6	78.6 ^c	100 ^c
4.	NRH	21	85.7	78.6 ^d	92.9 ^d

^{abcd} Different letter superscription indicate significant ($P < 0.05$) difference. There was no significant ($P > 0.05$) difference between US, DRP, P₄ and NRH in group A. There was significant ($P < 0.05$) difference between US, DRP, P₄ and NRH in groups B and C.

Key: - DRP – digital rectal palpation, NRH - non-return heat, P₄ – progesterone assay, PR – pregnancy rate, US – ultrasonography, % - percentage, group A – recto-vaginal AI, group B – vaginal speculum AI and group C – control.

DISCUSSION

The various pregnancy diagnostic techniques used in each group, showed similarities and did not differ significantly; and both agreed with reports of different authors (Ishwar, 1995; Kutty, 1999; Abou-El-Roos and Shawki, 2003; Bello *et al.*, 2012; Lone, 2016; Bello, 2019, Bello *et al.*, 2022c). Comparison for US, DRP, P₄ and NRH showed values obtained were similar with little variation for both techniques; and results were good and acceptable. Generally, results indicated that US, P₄ and NRH gave higher PR values and DRP the least. However, overall summary results showed P₄ was the best diagnostic method. The aim of this work was to evaluate how DRP, as a new technique of pregnancy diagnosis compared with the established methods. Results indicated that ultrasonography fairly remained consistent across groups (A to C) with minor variations. Similarly, observation was true for progesterone and non-return to heat. Physiological indices, used for diagnosis in US, P₄ and NRH, which varied minimally across the days of diagnosis, may be responsible for the consistency and similarities. However, different observation was made with DRP technique, which relied solely on anatomical indices such as increase in size, change in position, fluctuation, detection of muscles and bones etc, for pregnancy diagnosis. Across groups (A to C), values increased with increase slightly. The reasons may be the practice of palpation procedure which began with group A to C and only realized after the experiment, enabled experience to be gained, with skill developed and technique perfected from the first (group A) to the last (group C) doe. All the methods effectively diagnosed pregnancy in Red Sokoto goats with acceptable pregnancy rates (Bello *et al.*, 2022c).

The result suggests that the technique may be comparable with ultrasonography as a reliable method of pregnancy diagnosis, which however, is sometimes not field friendly especially in developing countries where source of power is serious predicament. Similarly, results shows close comparison with progesterone assay and non-return-to-heat as established diagnostic methods. Digital rectal palpation (DRP) technique may therefore serve as a viable alternative for ultrasonography, progesterone assay and non-return-to-heat. The study, therefore, showed that digital rectal palpation was effective and successful in diagnosing pregnancy in Red Sokoto goat does; thereby appear to show a consistency and confirms

Part I (Bello *et al.*, 2022b) of the experiment (Bello *et al.*, 2022c).

It was concluded that digital rectal palpation technique was effective in pregnancy diagnosis on day 21 and comparable to ultrasonography, progesterone assay and non-return-to-heat in Red Sokoto goat does; and confirms Part I of the experiment.

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