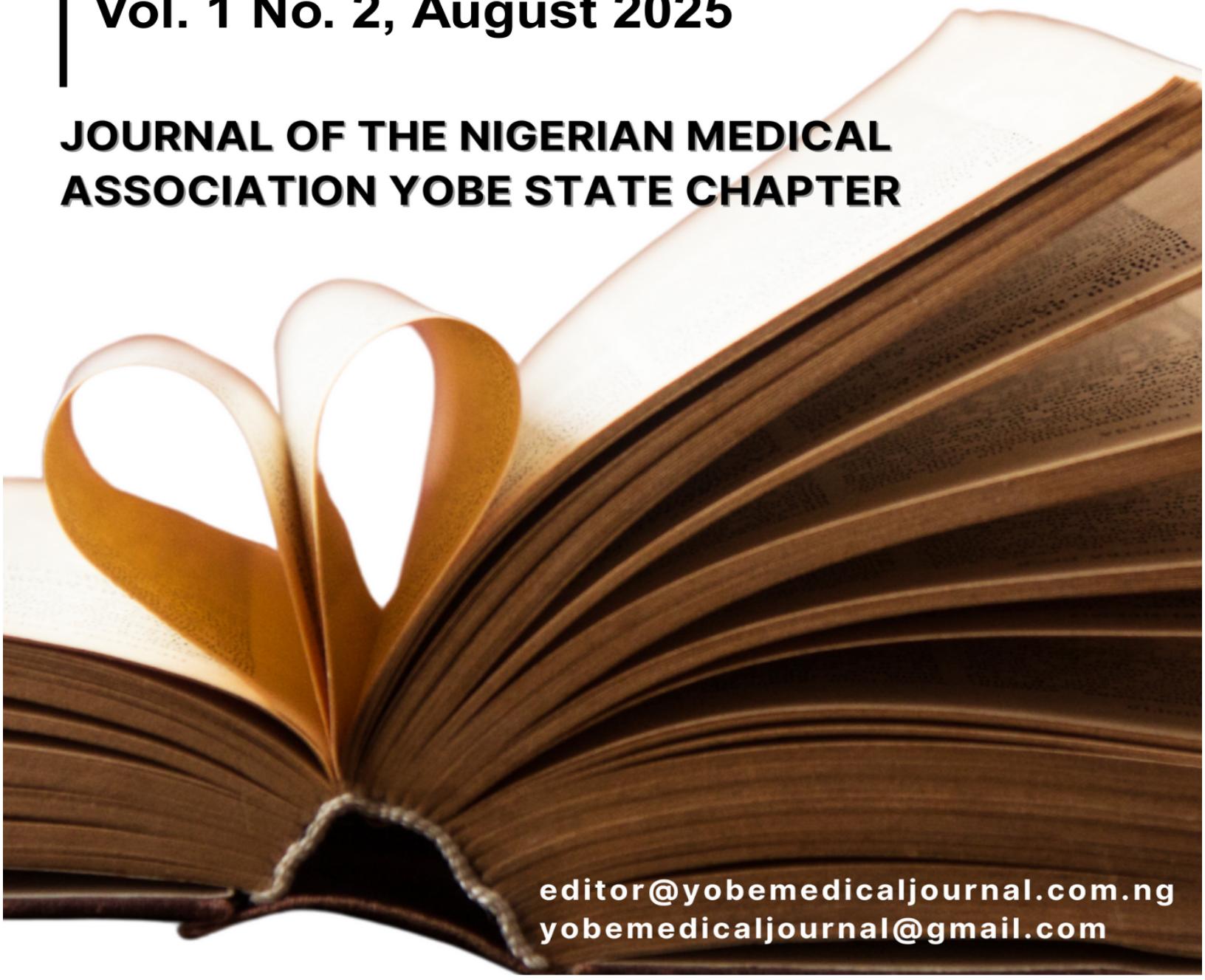




# Yobe Med J

**Vol. 1 No. 2, August 2025**

**JOURNAL OF THE NIGERIAN MEDICAL  
ASSOCIATION YOBE STATE CHAPTER**



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# **YOBE MEDICAL JOURNAL**

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These include original data that have not been published anywhere else (except as an abstract). Research articles should follow the structure of Abstract, Introduction, Methodology, Results, Discussion, Conclusion, Acknowledgements, Authors' contributions, Competing Interests, Funding, Consent (where applicable), Ethical approval (where applicable), and References. An original research article should not contain more than 5 illustrations/figures/tables, not more than 30 references, and should not exceed 4,000 words (all inclusive).

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## PAIN RELIEF FOLLOWING DAY CASE PAEDIATRIC INGUINAL HERNIOTOMY: ANALGESIC EFFICACY OF DEXMEDETOMIDINE FOR CAUDAL BLOCK WITH BUPIVACAINE

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### Abstract

**Background:** Many surgical procedures in children are of short duration and are increasingly being performed on day-case basis with consequent need for adequate post-operative pain relief. Caudal analgesia with bupivacaine alone for post-operative pain relief in paediatric day-case herniotomy has been found to be inadequate, hence the need for addition of adjuncts to prolong the analgesia. **Aim:** This study compared the effect of caudal block with bupivacaine alone and bupivacaine combined with dexmedetomidine on post-operative pain in paediatric day case inguinal herniotomy. **Methodology:** In this double-blind randomised controlled study, 80 ASA I or II patients aged between 3 and 8 years scheduled for day case inguinal herniotomy were randomized into two groups (B and BD). After induction of anaesthesia, all patients had caudal block using either 0.5ml/kg of 0.25% plain bupivacaine made up to 20ml with normal saline for group B or 0.5ml/kg of 0.25% plain bupivacaine mixed with 1 $\mu$ g/kg of dexmedetomidine made up to 20ml with normal saline for group BD. Surgery commenced 15 minutes later and anaesthesia was maintained with halothane. In the PACU, pain intensity was assessed on arrival (baseline), at 30 minutes, then every hour until discharge from PACU to the ward using the Objective Pain Scale (OPS). Fentanyl 0.5  $\mu$ g/kg was given when OPS was  $\geq 4$ . Pain assessment continued at home using NRS by parents/guardian for a total of 24hrs. Pain scores and haemodynamic parameters were documented. **Result:** In PACU, the mean baseline OPS in group BD was  $2.00 \pm 0.22$ , compared to  $3.00 \pm 0.17$  in group B ( $p<0.001$ ). At 240 min post-operatively, the group BD patients had a mean OPS of  $0.40 \pm 0.07$  and group B had a value of  $1.30 \pm 0.14$  ( $p<0.001$ ). At home, the mean pain score using the numeric rating scale (NRS) was  $3.06 \pm 1.15$  in group BD and  $4.15 \pm 0.86$  in group B ( $p<0.001$ ).

**Conclusion:** Dexmedetomidine (1 $\mu$ g/kg) in combination with caudal bupivacaine 0.25% reduce postoperative pain scores in day-case paediatric inguinal herniotomy.

**Keys words:** Dexmedetomidine, bupivacaine, caudal block

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## Introduction

It is well recognized that optimal postoperative pain management is essential for children, and that analgesia should be started even before surgery. Postoperative pain is a form of acute pain and it results from tissue destructions associated with surgical procedure.<sup>1,2</sup> Uncontrolled postoperative pain leads to discomfort, suffering, unwanted physical consequences such as risk of developing chronic pain, and increased risk of morbidity. A previous study has shown that postoperative pain management was suboptimal in day-care settings, with 15% of patients contacting the hospital postoperatively reporting pain problems.<sup>3</sup>

Inguinal hernia repair in children is a common minor surgical procedure, usually done as day-case.<sup>4</sup>

Children suffer postoperative pain in the same way as adults, in a study by Faponle and Usang,<sup>5</sup> it was found that in paediatric day case surgeries, post-operative pain constituted 72% of symptoms recorded by parents at home. Surgery-related pain has significant physiological impact. Postoperative pain control following minor surgery in children has been so poorly treated in this environment, untreated acute, recurrent or chronic pain related to disease or medical care may have significant physiological and psychological consequences in children.<sup>6</sup> Multimodal approach is employed for pain management in current practice. In a day-case setting, opioids are often avoided because of potential side effects such as respiratory depression, sedation, nausea, vomiting, pruritus, and reduction in bowel motility leading to ileus which may delay discharge.<sup>7</sup>

coagulation abnormalities, infection at the

Caudal block is a common regional technique used to provide intra and post-operative analgesia for surgical procedures below the umbilicus in paediatric patients. It has been described as simple, safe and effective in the treatment of acute post-operative pain following minor to moderate infra umbilical surgical procedures in children.<sup>8</sup> This is commonly by the single shot technique using the local anaesthetic agent bupivacaine with reported suboptimal efficacy.

The potent and highly selective  $\alpha_2$  adrenergic agonist, dexmedetomidine may be added as an adjuvant to bupivacaine to improve its efficacy. It has a sedative and sympatholytic effect, however, dexmedetomidine usage is just gaining interest in developing regions of the world and its analgesic effect as adjunct to bupivacaine for caudal block in day case paediatric inguinal hernia surgeries is yet to be evaluated.

This study compares the analgesic effect of addition of dexmedetomidine as adjunct to bupivacaine during caudal epidural block for paediatric patients scheduled for inguinal herniotomy.

## Methodology

This was a prospective, double-blind, randomized study carried out at Aminu Kano Teaching Hospital, a tertiary institution in northwest Nigeria. With Institutional Ethical Committee approval obtained, 80 children aged 3-8 years belonging to the American Society of Anesthesiologists' (ASA) physical status classification I or II and whose parent/guardian had given written consent were recruited into the study. These patients were scheduled for elective hernia surgeries on day-case basis. Patients excluded from this study included patients with known hypersensitivity to the study drugs,

caudal injection or sepsis, pre-existing neurological deficits or spinal deformity, children with cardiac problems, respiratory disorders, neurological disorders, gastrointestinal disorders, renal or hepatic impairments.

A detailed history from parent or guardian was obtained and physical examination was performed and documented on every patient on the day of surgery. Routine investigations including full blood count (FBC), electrolyte urea and creatinine (EUCr), and urinalysis were reviewed. Parents/guardian were asked about adherence to routine preoperative fasting guideline of 6 hours for solids and 2 hours for clear fluids before surgery. The patients were randomly allotted to either group B (bupivacaine) or group BD (bupivacaine/dexmedetomidine) after either the parent or guardian was asked to pick uniformly sized sheets of paper representing either of the two study groups from a large box. The patient's file number was written on a sheet of paper bearing the group which the patient belonged to and kept in a sealed separate envelope that was opened after evaluation was completed. Both the investigator and the patient were blinded to the group allocation. All patients were weighed preoperatively.

Nurses in the post anaesthesia care unit (PACU) had been taught the use of the Objective Pain Scale (OPS) as it relates to the study, parameters assessed with OPS include systolic blood pressure, crying, movement, agitation and complaint of pain. Children who could verbalise were taught to report pain or discomfort. Parents/guardians were taught the use of the Numeric Rating Pain Scores (NRS ranging from 0 = no pain to 10 = the worst imaginable pain) so that they were able to assess pain after discharge.

The study agents were then prepared under aseptic condition by the research assistant who is a resident doctor in the department and was not involved in data collection. A

multiparameter monitor (GE) to measure heart rate, blood pressure, respiratory rate, and pulse oximetry for arterial oxygen saturation were attached to the patient and baseline readings were obtain and recorded. A precordial stethoscope was placed. Anaesthesia was induced using a stepwise increment of halothane from 0.5% to 5% in 100% oxygen every 60 seconds, the patient was breathing via a Jackson Rees' modified Ayre's T-piece breathing system for patients < 25 kg or Bain Circuit for patients > 25 kg with appropriately sized face mask until consciousness was lost. Intravenous access was then secured with a 22-gauge cannula on the dorsum of the hand when the depth of anaesthesia was deemed adequate by observing the eyes to see if centrally placed, and regular respirations. Dextrose 4.3% in 0.19 saline solution was then set-up to correct the deficit and maintenance. Deficit was calculated with the formula (4:2:1 ml/kg/hr) and administered via a soluset, then an appropriately sized i-gel airway device was inserted based on the weight of the patient for maintenance of general anaesthesia and airway control. Caudal block in all patients was performed by the investigator, who was unaware of the group allocation and blinded to the study drugs. Patients in Group B (Bupivacaine alone) received 0.5ml/kg of 0.25% plain bupivacaine in 20ml syringe made up 20ml with normal saline, while those in Group BD (Bupivacaine plus Dexmedetomidine) received 0.5ml/kg of 0.25% plain bupivacaine mixed with 1 $\mu$ g/kg of dexmedetomidine in 20ml syringe made up to 20ml with normal saline for caudal block. Caudal block was performed by the investigator by placing each patient in the lateral decubitus position with knees drawn towards the chest. The sacral hiatus was identified as the apex of an equilateral triangle facing inferiorly with a line joining the posterior superior iliac spine as the base. Under sterile condition and draping, the

palpating finger was directed caudally from the midpoint of the line joining the posterior superior iliac spines or cranially from the coccyx until a depression was felt. A 22g cannula was inserted into the sacral hiatus at 45 degrees to the skin until a click was felt then it was angulated at 30 degrees with the spine. A 2 ml syringe filled with normal saline as test dose was then used to exclude subcutaneous placement before the local anaesthetic agent bupivacaine in group B or bupivacaine with dexmedetomidine in group BD was injected after a negative aspiration test. Patients were then positioned supine, and surgery allowed to begin 15-20 minutes later with patients breathing spontaneously via the i-gel device.

Observation and monitoring of vital signs was continued at five-minute intervals until the end of surgery. Anaesthesia was maintained with halothane 0.5-1%, adequate anaesthesia was judged by lack of movement and stable vital signs within the baseline values following skin incision. Patients with failed caudal block had their anaesthesia deepened with increased halothane and intravenous fentanyl 1 to 2  $\mu$ g/kg was given. Failed caudal block was judged by movement of the limbs to surgical incision, and  $> 20\%$  increase in heart rate compared to baseline values. Patients who received intra-operative analgesia were excluded from the study. At the end of surgery, halothane was discontinued, i-gel removed immediately and oxygen was administered until after emergence from anaesthesia. Patients were managed by a nurse unaware of group allocation in the recovery room (PACU).

Postoperative pain was assessed and recorded on arrival at PACU (0 minute), then at 30, 60, 120, 180 and 240 minutes using the OPS. The observer scored pain based on points [none/insignificant pain (1-3), moderate pain (4-6), statistical package for the social sciences (SPSS) version 25 (International Business

severe pain (7-10)]. Patients that complain of moderate to severe pain had rescue analgesic of intravenous 0.5  $\mu$ g/kg fentanyl given. Oxygen saturation, blood pressure, pulse rate were documented in the recovery room at fifteen-minute intervals.

Patients were discharged to the ward from the PACU after 1 hr according to hospital protocol and when they satisfy the Aldrete score value  $\geq 9$  which is assessed different criteria including patient activity, respiration, circulation, consciousness level and colour. Monitoring of SpO<sub>2</sub>, PR, and NIBP was continued in the ward hourly. Pain assessment also continued using the OPS as detailed in the study protocol. Patients were discharged home from the ward on oral paracetamol at 20 mg/kg when they satisfy the Post Anaesthesia Discharge Scoring System (PADSS) value  $\geq 9$ , this is assessed using different criteria including vital signs, activity and mental status; pain, nausea and vomiting; surgical bleeding; intake and output. After discharge, information regarding the pain intensity (using NRS) and any other complications such as vomiting and irritability was obtained from parents. Pain was assessed at home 4 hourly, for a period of twenty-four hours after the surgery, information about pain score was obtained by the researcher via a telephone call. Patients with an NRS  $\geq 4$  was given paracetamol.

Data on demographic characteristics, haemodynamic variables, pain scores were documented. Quantitative data (age, weight and pain score) were summarized using means and standard deviation. Qualitative data (ASA classification) was summarized using percentage. Test for association for quantitative data was done using student t test and for qualitative data using chi test. A p-value  $\leq 0.05$  was considered statistically significant and the result processed using the Machines, IBM, New York, United States of America).

## Results

Eighty patients were recruited for this study; however, three patients were excluded from this study which include one from group BD and two from group B due to failed caudal block. Table I shows the age and weight of patients in each group. The demographic characteristics of the two groups were comparable.

Mean pain score was  $2.01 \pm 0.21$  in the immediate postoperative period for group BD, and  $3.02 \pm 0.15$  for group B ( $p < 0.001$ ) as seen in Table II. At 60 min pain score in Group BD had reduced to  $1.02 \pm 0.17$ , compared to a value of  $2.50 \pm 0.19$  min in group B ( $p < 0.0001$ ). There was also a statistically significant pain score difference between the two groups at 120, 180 and 240min.

The mean pain score (NRS scale) at the time to first analgesic requirement at home was significantly lower in group BD ( $3.06 \pm 1.15$ ) compared to group B which was  $4.15 \pm 0.86$  ( $p < 0.001$ ).

Intra operative baseline heart rate was  $106.10 \pm 13.01$  beats per minute in Group B, and  $111.42 \pm 11.48$  beats per minutes for BD,  $p = 0.064$ . A slight increase in heart rate was noticed in group B patients compared to those in group BD at 10 minutes,  $p = 0.243$ . Heart rate values were almost the same at 25 mins in group B ( $101.61 \pm 7.46$  beats  $\text{min}^{-1}$ ) and group BD ( $100.92 \pm 12.21$  beat  $\text{min}^{-1}$ )  $p = 0.723$ . At 35 and 40 minutes intraoperatively heart rate values of both groups BD and B were statistically different with higher values in group B ( $p = 0.027$  and  $0.016$  respectively). Baseline mean arterial blood pressure were  $70.01 \pm 7.11$  mmHg and  $71.12 \pm 8.10$  mmHg in for groups BD and B respectively,  $p = 0.749$ , a MAP decrease was observed as anaesthesia deepened in both groups. Patients in group BD had lower values compared to group B but the difference was not significant. At 15 minutes intra-operatively, group BD had a value of  $63.03 \pm 7.30$ , compared to  $66.53 \pm 5.35$  in Group B, with  $p = 0.143$ . Mean arterial blood pressure was also not significant at any time point between the groups, with a value of  $50.02 \pm 12.32$  mmHg in group BD and  $54.07 \pm 0.00$  mmHg in group B at the end of surgery ( $p = 0.784$ ).

**Table I: Demographic characteristics of the study groups.**

	Group BD (n=39)	Group B (n=38)	t-value	p-value
<b>Age (years)</b> Mean $\pm$ SD	5.28 $\pm$ 1.47	5.39 $\pm$ 1.69	-0.311	0.756
<b>Weight (kg)</b> Mean $\pm$ SD	19.85 $\pm$ 5.70	20.63 $\pm$ 4.00	-0.698	0.487
<b>ASA (%)</b>			$\chi^2$	
<b>I</b>	35 (89.7)	32 (84.2)	0.521	0.517
<b>II</b>	4 (10.3)	6 (15.8)		

\* p value  $\leq 0.05$  is statistically significant.

**Table II: The Objective pain scale (OPS)**

Time (mins)	Group BD (n=39)	Group B (n=38)	t-value	p-value
<b>0 min pain score</b> <b>Mean ±SD</b>	2.01±0.21	3.02±0.15	3.32	<0.001*
<b>30 mins pain score</b> <b>Mean ±SD</b>	1.5±0.17	2.3±0.11	3.19	<0.001*
<b>60 mins pain score</b> <b>Mean ±SD</b>	1.02±0.17	2.5±0.19	4.30	<0.001*
<b>120 mins pain score</b> <b>Mean ±SD</b>	0.80±0.09	1.5±0.14	7.19	<0.001*
<b>180 mins pain score</b> <b>Mean ±SD</b>	0.42±0.50	1.10±0.55	5.670	<0.001*
<b>240 mins pain score</b> <b>Mean ±SD</b>	0.58±0.50	1.08±0.81	3.243	0.002*

\* p value  $\leq 0.05$  is statistically significant.

Table III: Time to First Analgesia (TFA) and NRS

	Group BD (n=39)	Group B (n=38)	t-value	p-value
<b>Pain score at home (NRS)</b> <b>Mean ±SD</b>	3.06±1.15	4.15±0.86	-5.183	<0.001*

\* p value  $\leq 0.05$  is statistically significant.

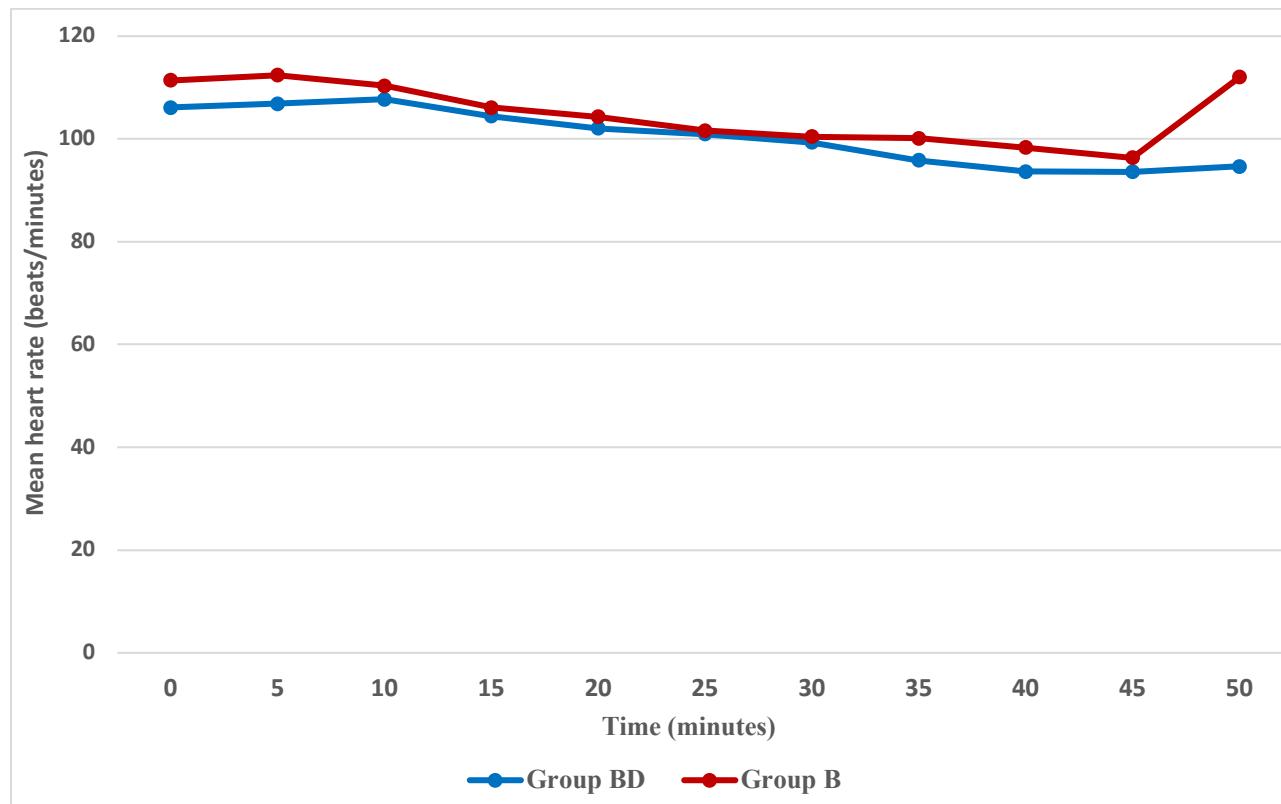
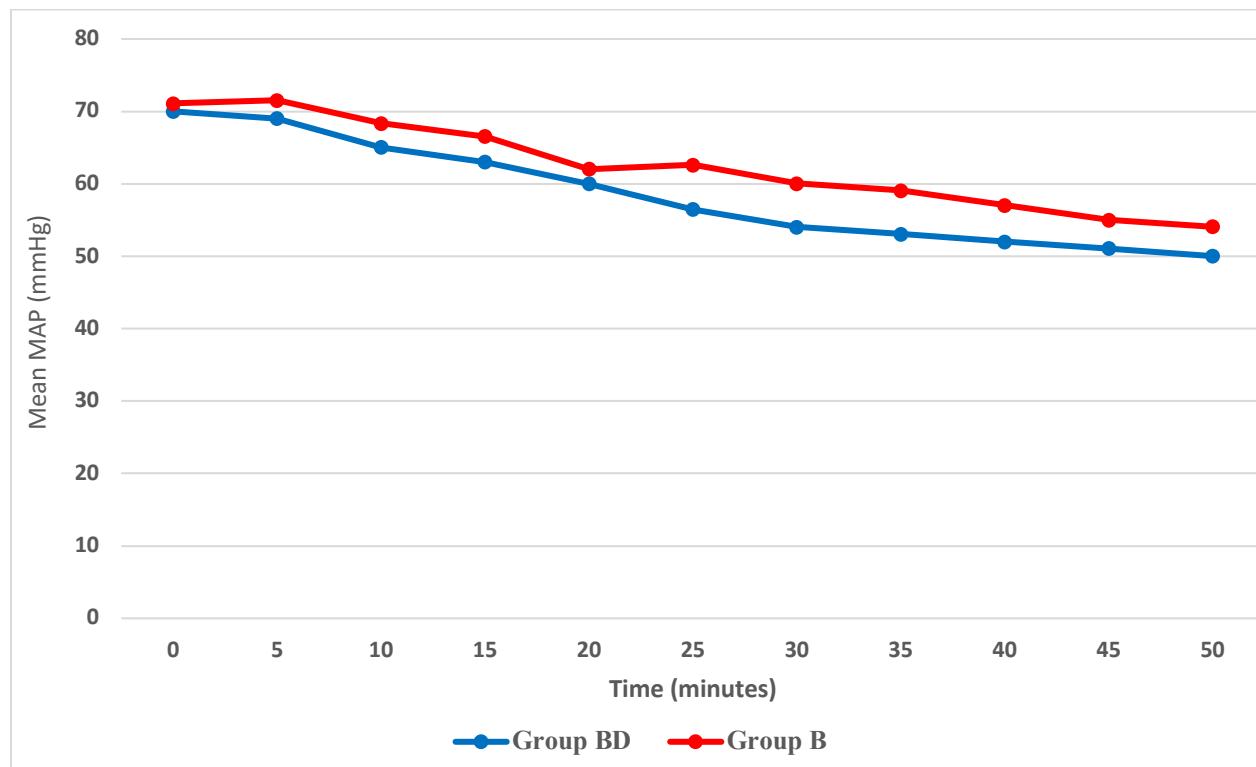


Fig. 1: Pattern of Intra-operative Heart rate



**Fig. 2: Pattern of Intra-operative MAP****Discussion**

The results obtained from this study revealed that 0.5ml/kg of 0.25% bupivacaine combined with 1 $\mu$ g/kg of dexmedetomidine when given for caudal epidural in day case paediatric inguinal herniotomy reduces post-operative pain when compared with bupivacaine (0.25%) alone. But haemodynamics and demographic parameters were comparable in the two groups.

The Objective Pain Scale (OPS), a validated pain scoring tool in children was used in the PACU to assess pain in the patients for this study. OPS in the immediate postoperative period were 3 and 2 for groups B and BD respectively. This trend of lower pain intensity score in group BD continued with a score of 1 in group BD and less than 3 for group B at the 60<sup>th</sup> min. It was less than 1 and less than 2 for groups BD and B respectively at 120 180- and 240 min periods of assessment, the differences between the groups were statistically significant. In PACU the initial higher OPS values seen may be due to arousal from Anaesthesia. Hasani et al,<sup>9</sup> in a study of 45 children aged 1 to 9 years scheduled for hypospadias surgery, obtained similar OPS of 2 in the group that had pre-operative caudal bupivacaine anaesthesia compared to the second group that had caudal block after the surgery, the average bupivacaine half-life of 4-6 hr may account for an optimal pain relief at about the 3rd hour seen in their study. Manoj et al,<sup>10</sup> reported similarly low and significant pain score differences in their dexmedetomidine group and control group, Goswami and Hazra<sup>11</sup> and Oruobu-Nwogu A et al<sup>12</sup> also reported lower pain score differences in both study groups using FLACC score in the immediate postoperative period. Effective management of pain in the paediatric patient has been receiving increasing attention over

the years due to the challenging nature of assessing pain in children. Adequate pain management in children depends on correct assessment. In the perioperative period, it is important to distinguish if their perceived pain is due to restlessness from hypotension, thirst, hunger, separation, anxiety, fear of strangers or strange places and desire to void. Pain assessment in the immediate post-operative period in this study was performed by PACU nurses. The reliability of pain assessment post operatively by nurses was reported in a study by Colwell et al,<sup>13</sup> they examined nurses' use of paediatric pain scale compared with child's self-report of pain. The study concluded that use of paediatric pain scale by nurses reflects the child's exact pain experience.

The NRS was used by parents for pain assessment at home. It is an assessment tool consisting of a line labelled from 0 (no pain) to 10 (worst possible pain) which has been validated for use in the Nigerian child. Eyelade et al,<sup>14</sup> in a study on convergent validity of pain measuring tools among children in Nigeria concluded that the VAS, NRS and Oucher pain scales are valid pain tools that can be used to assess pain in Nigerian children.

The pain score at home using the NRS in this study showed that patients in both study groups had a statistically significant difference in pain with group BD having a pain score of  $3.06 \pm 1.15$  and group B had  $4.15 \pm 0.86$ ,  $p < 0.0001$ .

Haemodynamic variables between groups BD and B were found to be comparable with no statistically significant difference intra and post operatively. The stable hemodynamic state may be as a result of effective caudal block. Haemodynamic stability was also reported in previous studies following caudal block in children that had lower abdominal surgeries.<sup>10,15</sup>

**Conclusion**

We conclude that the use of 1 $\mu$ g/kg dexmedetomidine in combination with 0.25% bupivacaine for caudal block reduce postoperative pain scores after inguinal herniotomy. Haemodynamics remained stable and comparable in patients that receive both dexmedetomidine as adjuvant to bupivacaine and those that receive bupivacaine alone throughout the study.

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Nil.

#### Conflicts of interest

There are no conflicts of interest.

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## PREVALENCE OF ADVERSE REACTIONS AMONG FIRST-TIME AND REPEAT WHOLE BLOOD DONORS IN NORTHWESTERN NIGERIA.

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### Abstract

**Introduction:** Blood donation is crucial for healthcare systems and generally safe. However, donors can experience adverse reactions, ranging from mild dizziness and bruising to more serious complications like vasovagal syncope and hematomas. Incidence rates vary globally and within Nigeria. This study aimed to determine the prevalence, and types of adverse donor reactions at Ahmadu Bello University Teaching Hospital (ABUTH) Zaria, Kaduna State.

**Material and Method:** This cross-sectional prospective study, was conducted at ABUTH Zaria over four months (April 2017-July 2017). After obtaining ethical approval and informed consent, 1022 donors, selected via convenient sampling, completed a semi-structured questionnaire detailing their socio-demographics, frequency of donation history, and any discomfort experienced before, during, immediately after, and 24 hours post-donation, with severity graded according to American Association of Blood Banks (AABB) standards. Data was collected using a checklist questionnaire and analyzed using SPSS version 20.0, with statistical significance set at  $p \leq 0.05$ .

**Results:** Over the four-months study period, our study of 1001 blood donors at ABUTH Zaria revealed a 28.1% prevalence of mild, grade 1 adverse reactions, primarily dizziness, with males significantly more affected than females. The mean age of the blood donors was  $31 \pm 10$  years, and while adverse reactions were associated with the 61-75kg weight range in males ( $p=0.012$ ), overall weight and donation frequency had no relationship with adverse reactions in either gender with  $p$  values of 0.887 and 0.623 respectively.

**Conclusion:** This study concluded that mild grade 1 adverse reactions, primarily dizziness, are prevalent among blood donors in Zaria, necessitating vigilant monitoring and tailored care, and suggesting broader, longitudinal studies to improve donor safety and blood supply.

**Keywords:** Adverse donor reactions, Whole blood donors, Dizziness, Frequency of donation and Weight

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## INTRODUCTION

Blood is a critical component of health systems worldwide, ensuring the availability of life-saving blood products for transfusion, surgeries, and emergency medical care.<sup>1</sup> However, while the process is generally safe donors can experience adverse reactions ranging from mild symptoms such as dizziness and bruising to more severe complications like vasovagal syncope, nerve injuries, or even hematomas.<sup>2,3</sup> Understanding these reactions is essential for improving donor safety, enhancing donor retention, and optimizing blood collection procedures.

Adverse blood donor reactions (ADRs) are generally infrequent and mild, but they do occur. Globally the incidence of adverse reactions among blood donors varies with studies reporting rate ranging from 0.08% to 13%.<sup>4</sup> In Asia, the occurrence of blood donor adverse reactions was influenced by sociodemographic factors such as age, donation type, donation history, and donation sites.<sup>5</sup> In a Nigerian tertiary hospital in the Southeast found a prevalence of 1.6% with vasovagal reactions accounting for 82.14% of cases.<sup>6</sup> Another study reported an overall adverse reaction rate of 2.05%, with higher rates observed among blood donors aged 18-25 years, female blood donors, first-time donors, and those with lower body weight.<sup>7</sup> These findings underscore the importance of implementing targeted strategies to mitigate risks among specific donor groups in Nigeria, such as first-time blood donors and younger individuals.

Blood donation is generally safe; however, some blood donors may experience vasovagal reactions (VVR) which are characterized by dizziness, lightheadedness, nausea, and fainting.<sup>8</sup> Haematoma occurs when blood leaks into the surrounding tissues at the venipuncture site, leading to bruising

and swelling. This can result from improper needle insertion, movement during donation, or fragile veins.<sup>9</sup> Certain blood donor characteristics can influence the likelihood of adverse reactions such as young blood donors aged 18-29 years, first-time blood component donors, and whole blood donors.<sup>5</sup> Psychological factors such as anxiety and fear particularly first-time donors are more susceptible to VVR.<sup>10</sup> Other psychological factors may result from previous negative experiences, coping mechanisms, and perceived self-efficacy.<sup>11-13</sup>

Conducting a study on blood donor adverse reactions in Zaria is imperative to address regional data gaps since studies were conducted in various parts of Nigeria, and there is a lack of data specific to Northwestern Nigeria, including Zaria. Research conducted in Asaba, Southern Nigeria, has an overall ADR rate of 2.18% for needle injuries and 2.83% for VVR.<sup>14</sup> Other rationales are to consider local demographic factors, improve blood donor safety, and inform national health policies.<sup>15,16</sup>

Our study aimed to determine the prevalence, and types of adverse donor reactions at ABUTH Zaria, Kaduna State.

## MATERIAL AND METHODS

### STUDY DESIGN AND SAMPLING TECHNIQUE

The study was a cross-sectional prospective study where a semi-structured questionnaire was administered to the blood donors after obtaining informed consent from the participants at the blood donation unit of the Haematology Department of Ahmadu Bello University Teaching Hospital (ABUTH) Zaria, Kaduna state. The study was approved by the Health Research Ethical Committee (HREC) of ABUTH-Zaria. Each donor consented in front of a witness. Donor privacy and confidentiality were secured.

Donors were given a chance to withdraw from the study if they did not feel comfortable. Convenient sampling of all consented blood donors was adopted. All blood donors that passed the selection criteria were recruited after being counseled that if they noticed or felt any discomfort before, during sample collection, immediately after collection, and 24 hours after collection of blood they should inform the researchers during phone calls. Exclusion criteria are those who did not give their consent. Blood donors were recruited over four months (April 2017 to July 2017).

## SAMPLE SIZE CALCULATION

The sample size was calculated using the formula  $n = \frac{N}{1+N(e^2)}$  where  $N$  is the approximate number of blood donors screened within the year and  $e$  is the margin of error (5%). In the blood donation unit of the haematology department ABUTH, an average of 6079 blood donors were screened annually in ABUTH, Zaria.<sup>17</sup> Therefore,  $n = \frac{6079}{1+6079(0.05^2)} = 375.31 \sim 375$  blood donors. However, 1022 blood donors were recruited to improve the validity of the result over the four months.

## STUDY SETTING

Zaria which is the Zazzau is a city in Kaduna State with a rich history spanning over a millennium.<sup>18</sup> Originating in the 11th century, it was among the foundational members of the Hausa Bakwai.<sup>18</sup> The town was a crucial hub for trans-Saharan trade, notably in the exchange of slaves, textiles, and various commodities.<sup>18</sup> Ahmadu Bello

University Teaching Hospital, (ABUTH) Zaria, is one of the earliest teaching hospitals in Nigeria, established in 1967 as the teaching hospital for Ahmadu Bello University (ABU) Zaria, one of the premier universities. The hospital provides specialized medical services in almost all specialties and training of health professionals while delivering high-quality medical care to the region, the whole country, and the neighboring countries like Chad and Niger Republic. The hospital is located in the north-western part of Nigeria.

## Data collection

Blood Donor screening was conducted using a checklist questionnaire organized by the blood donation unit, which included age  $\geq 18$  years, body weight  $>50\text{kg}$ , packed cell volume  $\geq 38.0\%$ , and blood pressure  $\frac{120}{80} \text{ mmHg}$ . Only those that passed the questions on the questionnaire and examination were able to donate. Socio-demographics, weight, frequency of blood donation, and phone number were assessed. Also, the type of discomfort or any unusual feeling, or pain was recorded before, during, and after blood donation. Then phone calls were made at 24 hours. Any adverse effects reported were recorded.

We adopted the grading of the severity from American Association of Blood Banks (AABB) (2014) of adverse donor reaction (ADR) which was graded into 1 to 5. However, grades 4 (life-threatening) and 5 (death) are not shown on the severity assessment tool because they are rare. For this study, we adopted grades 1, 2, and 3 as shown below.<sup>19</sup>

Severity grade	Factors to consider when assigning severity donor adverse event (DAE) tool	DAE examples
Grade 1	No Outside Medical Care (OMC) <i>AND</i> Short duration $\leq 2$ weeks <i>AND</i> No limitation on Activities of Daily	<ul style="list-style-type: none"> <li>Arterial puncture, pressure bandage applied, resolved without intervention or sequelae</li> <li>Vasovagal event that resolves with comfort care and/or oral hydration</li> <li>Citrate reaction resolved with oral calcium or</li> </ul>

	Living (ADL)  <i>AND</i> Resolved with no or minimal	reduction in infusion rate
Grade 2	OMC, no hospitalization  <i>OR</i> Duration >2 weeks- ≤ 6 months  <i>OR</i> Limitations on ADL for ≤2 weeks	<ul style="list-style-type: none"> <li>• Superficial thrombophlebitis resolved with oral antibiotics, no sequelae</li> <li>• Vasovagal event that requires transport to ER for IV hydration</li> <li>• Lacerations requiring sutures</li> </ul>
Grade 3	Not life-threatening  <i>AND any of the following</i>  Hospitalization  <i>OR</i> Duration >6 months  <i>OR</i> Limitations on ADL >2 weeks  <i>OR</i> Require surgery  <i>OR</i> Other serious complications (Category E)	<ul style="list-style-type: none"> <li>• Arteriovenous fistula requiring surgical repair</li> <li>• Fracture, dental injury, or concussion</li> <li>• TIA and other cardiovascular events, which are not life-threatening</li> </ul>

Adopted from American Association of Blood Banks (AABB)<sup>19</sup>

## STATISTICAL ANALYSIS

SPSS statistical software (version 20.0) was used for data entry and analysis. The frequencies of different reactions at the time of donation and the next day were collated. The results were presented in simple charts, tables, means, and standard deviation; chi-square was conducted as appropriate and the level of significance was set at  $P \leq 0.05$ .

## RESULTS

A total of 1022 blood donors were enrolled over four months at the blood donation unit of ABUTH Zaria, Kaduna State. Out of which 1001 completed the study, 21 of the participants opted out of the study by not responding to phone calls. All the ADRs occurred at the time of the blood collection. The prevalence of ADRs was 28.1% in this study and were of mild, grade 1 adverse reactions. The mean and standard deviation of the age of the study participants were  $31 \pm 10$  years and the age range of 18-76 years. Males made up 890 (88.9%) while 111 (11.1%) were females. The socio-

demographic profile and weight of the study participants are shown in Table 1. The frequency of donor blood reactions is presented in figure 1, while the distribution of donor adverse reactions by age and relation between blood donor weights, frequency of donation with blood donor reactions are represented in Tables 2 and 3 respectively.

## DISCUSSION

Blood donors remain the backbone of the blood bank as, without them the blood bank will not exist. A 28.1% prevalence of mild (grade 1) adverse reactions was observed in our study of consenting donors. This finding was higher than that of John et al in Nnewi<sup>6</sup> and that of Smajic et al in Tuzla<sup>7</sup> which were both retrospective studies and had a higher sample size than our study. The higher prevalence may be a result of the relatively lower number of blood donors evaluated in our study. Also, many Nigeria hospitals including ours do not have a system for reporting donor ADRs as stated by the World Health Organization.<sup>20</sup>

The higher number of male blood donors in this study is not surprising in our environment because of the low number of female blood donors. This was also reported by Oluwumi et al, who stated that women tend to donate less compared to males because of the poor attitude of hospital staff and lack of confidentiality among others.<sup>21</sup> Not only that, women tend to believe that their Packed Cell Volume is always low due to menstruation and childbirth.<sup>22,23</sup>

Dizziness has been identified as the most prevalent with a frequency of 74.1% among blood donors. This observation aligns with the findings from Smajic et al in Tuzla<sup>7</sup> and that of Eluke et al in Nigeria.<sup>14</sup> This may be a result of a sudden decrease in volume which leads to a drop in blood pressure which may cause dizziness or lightheadedness, especially if the body does not compensate quickly.<sup>24</sup> "Dizziness can be caused by factors such as VVR, dehydration, and rapid movement after donation.<sup>24-26</sup> To prevent donors from having dizziness, they should be advised to take plenty of fluid before and after the procedures.<sup>27,28</sup> But when it occurs during or after the blood collection, the client's foot of the bed should be elevated to improve blood circulation to the brain.<sup>29</sup>

The age group 25-35 years was mostly affected (45.9%) and this was contrary to the finding of Sun et al in shenzhen<sup>5</sup> and that of Sultan et al in Pakistan<sup>30</sup> who reported ADRs in the younger age group of 18-29 years and 30 years respectively. This change in the age group may be influenced by regional factors such as donor recruitment strategies, health status, and reporting practice.

In our study, ADRs were observed predominantly in individuals weighing between 61-75 kg. This finding is similar to the research from Pakistan, where blood donors weighing less than 70kg experienced a higher incidence of VVR and nausea.<sup>30</sup> Similarly, a study in Saudi Arabia identified

blood donors weighing less than 75 kg as having a higher risk of ADR post donation. Implementing measures such as ensuring proper hydration, providing pre-donation counseling, and close monitoring during and after donation can help mitigate risks.<sup>16</sup>

Repeat blood donors were the most affected by adverse ADRs and this was contrary to the findings of Eluke et al in Nigeria<sup>14</sup> and that of Gupta et al<sup>15</sup> in India which were found in first-time blood donors. First-time donors are the most likely to have ADRs because of anxiety about what will transpire during the donation process. ADRs in repeat blood donors can deter donors from future donation which will affect the blood supply in the centre.<sup>31</sup> However, the first-time blood donors were few in our study, which may be the reason, effort should be put in place to counsel all blood donors irrespective of their donation times. This will minimize the occurrence of adverse effects among blood donors.

Our study indicates a statistically significant association between increased weight and risk of ADRs in males ( $p = 0.012$ ), whereas no such association was observed in females ( $p = 0.743$ ). This was similar to the finding in Pakistan reporting a significant association between VVR in males only.<sup>30</sup> Conversely, research from Ethiopia found no significant between weight and ADRs.<sup>32</sup> Our blood donors were predominantly male with few females, and factors attributing to the low number of females include menarche, pregnancy, and lactation.<sup>32</sup>

The frequency of blood donation does not significantly impact the occurrence of adverse donor reactions in both male and female blood donors, with p-values of 0.887 and 0.623, respectively. This was contrary to the study by Demircioğlu et al<sup>33</sup> who found a significant number of first-time donors having reactions. Therefore, adverse donor reactions should be looked for in all

categories of blood donors. Understanding that donation frequency does not impact ADRs in Zaria suggests that efforts to encourage repeat donations can be pursued without increasing donor risk. However,

continuous monitoring and individualized assessment remain crucial to maintaining donor safety and addressing any ADRs promptly.

Table 1: Socio-demographic and weight of blood donors

Characteristics n(%)	Age (Years)					Weight (Kg)				
	18-24	25-35	36-50	≥ 51	Mean $\pm$ SD	50–60	61-75	76-90	≥ 91	Mean $\pm$ SD
Total number of donors 1001, (100)	261 26.1	483 48.2	172 17.2	85 8.5	31.65 $\pm$ 10	332 33.2	530 52.9	117 11.7	22 2.2	66.06 $\pm$ 10
Males 890 (88.9)	209 23.5	443 49.8	160 18.0	78 8.8	32.08 $\pm$ 10	293 32.9	474 52.3	101 11.3	22 2.5	66.20 $\pm$ 80
Females 111 (11.1)	52 46.8	40 36.6	12 36.6	7 6.3	30.00 $\pm$ 35	39 35.1	56 50.5	16 14.4	16 14.4	
First-time donors 31 (3.1)	9 29.0	14 45.6	8 25.8	0 0	30.35 $\pm$ 80	8 26.8	21 67.7	0 0	2 6.5	67.06 $\pm$ 10
Repeat donors 970 (96.9)	252 26.0	469 48.4	164 16.9	85 8.8	31.60 $\pm$ 10	324 33.4	509 52.5	117 12.1	20 2.1	66.03 $\pm$ 10

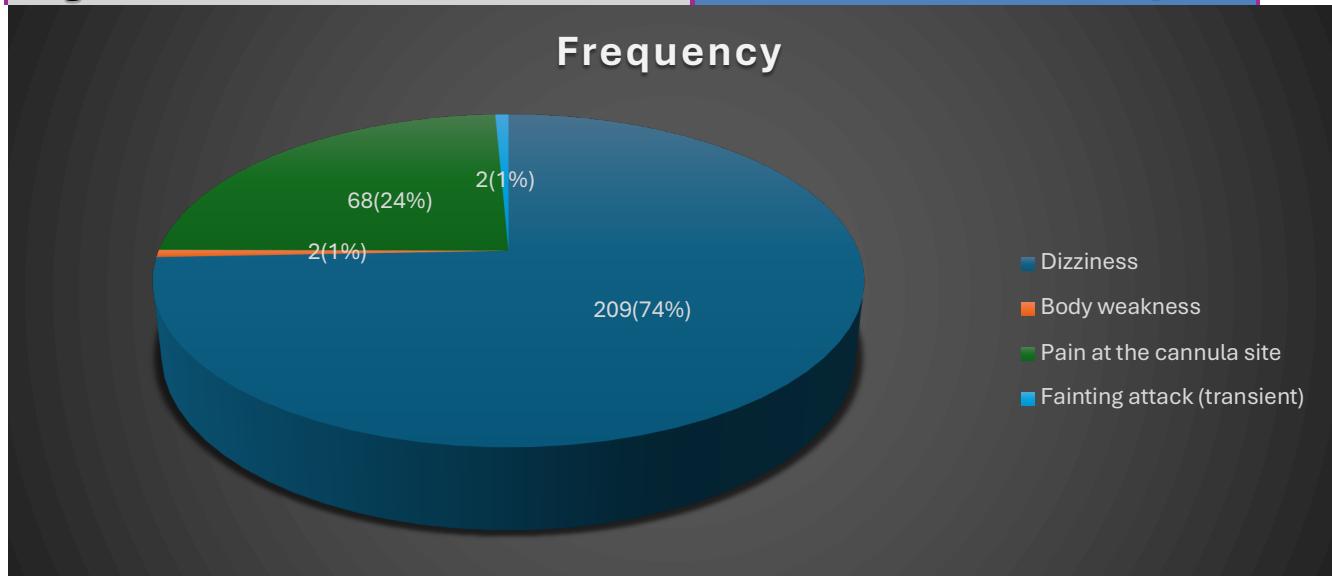


Figure 1: Frequency of blood donor reactions among blood donors

Table 2: Distribution of blood donor adverse reactions by age group

Adverse reaction	Age distribution (years)				Total
	18-24	25-35	36-50	>50	
Dizziness	54	97	44	14	209
Pain in the cannula	6	31	9	22	68
Body weakness	0	1	0	1	2
Fainting attack (transient)	1	0	0	1	2
Total	61	129	53	38	281

Table 3: Relation between blood donor weights, frequency of donation with blood donor reactions

Sex	Type of reaction	Weight (Kg)				Chi-square p-value	First timer	Repeat blood donor	Chi-square p-value
		≤ 60	61-75	76-90	≥ 91				
	Dizziness	62	106	23	2		6	187	

Male	Pain in the cannula	38	10	10	2	0.012	2	58	0.887
	Body weakness	1	1	0	0		0	2	
	Fainting attack	0	0	0	0		0	0	
Female	Dizziness	6	10	0	-	0.743	0	16	0.449
	Pain in the cannula	4	4	0	-		0	8	
	Body weakness	0	0	0	0		0	0	
	Fainting attack	0	2	0	-		0	2	

## CONCLUSION

In conclusion, this study revealed a significant prevalence of mild ADRs, predominantly dizziness, among blood donors at ABUTH Zaria, highlighting the importance of vigilant monitoring and tailored donor care. While the findings indicate that male repeat donors and those within the 61-75kg weight range are at a higher risk and that donation frequency doesn't significantly influence reactions, the study underscores the necessity for continuous monitoring and individualized assessment to ensure blood donor safety.

The limitations of this study, including its single-center scope and limited follow-up, suggest the need for broader, longitudinal studies across Northwestern Nigeria, incorporating standardized data collection and extended follow-up periods.

Addressing these limitations will enhance our understanding of ADRs, improve blood donor retention, and ultimately strengthen the blood supply system.

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## Conflicts of interest

The authors declare that they have no financial or personal relationships which may have inappropriately influenced them in writing this paper.

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## MINIMALLY INVASIVE ENDOSCOPIC DISCECTOMY FOR LUMBAR DISC HERNIATION: A RETROSPECTIVE EVALUATION OF PAIN OUTCOMES AND SURGICAL EFFICACY AT A NIGERIAN TERTIARY HOSPITAL

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### ABSTRACT

**Background:** Lumbar disc herniation (LDH), a significant cause of lower back pain and radiculopathy, significantly impairs quality of life. Endoscopic discectomy has emerged as a minimally invasive alternative to conventional open discectomy, with potential benefits such as reduced complications and shorter recovery time. However, its outcomes have not been systematically assessed in our setting.

**Objective:** To evaluate the pain outcome and complication rates of endoscopic lumbar discectomy among patients with symptomatic lumbar disc herniation at an Orthopedic referral Hospital in Kano, Nigeria.

**Materials and Methods:** A retrospective study was conducted on 26 adults aged 18–65 years with lumbar disc herniation who underwent single-level endoscopic discectomy between June 2022 and May 2023. Pain outcomes were assessed using the Visual Analogue Scale (VAS) at 24 hours, 3 months, and 6 months postoperatively. Endoscopic discectomy procedure associated complication rate was also documented. Statistical analysis was performed using SPSS version 26, with a significance threshold of  $p < 0.05$ . **Results:** A total of 26 patients met the inclusion criteria. The mean operative time was  $83.5 \pm 13.38$  minutes. The most affected levels were L4/L5 and L5/S1 (88.5%). There was a statistically significant reduction in VAS scores for both low back pain and radicular pain at 24 hours, 3 months, and 6 months ( $p < 0.001$ ). The overall complication rate was 7.6%, with no major adverse events reported.

**Conclusion:** Endoscopic lumbar discectomy is a safe and effective alternative to traditional discectomy, offering significant pain relief with minimal complications. Proper patient selection and precise surgical techniques are key to optimizing outcomes.

**Keywords:** Endoscopic Discectomy, Lumbar disc herniation, Pain Outcome, Visual Analogue Scale

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## INTRODUCTION

Lumbar disc herniation (LDH) is a common spinal disorder resulting from protrusion of the intervertebral disc, leading to nerve root compression and associated pain syndromes<sup>1</sup>. The lifetime prevalence of LDH is approximately 2-3% in the general population<sup>2</sup>. Conventional management includes conservative treatment modalities such as physiotherapy, analgesics, and epidural steroid injections.<sup>3</sup> However, in cases where symptoms persist despite conservative therapy, surgical intervention becomes necessary.<sup>3</sup>

Endoscopic discectomy is a minimally invasive alternative to open microdiscectomy, offering advantages such as reduced tissue trauma, shorter hospital stays, and faster recovery.<sup>4</sup> This technique has gained popularity globally, yet there is a paucity of data on its outcomes in Nigeria.

The present study aims to evaluate the pain outcomes and complications of endoscopic lumbar discectomy among patients with symptomatic lumbar disc herniation at an orthopedic referral center in Kano.

## MATERIALS AND METHODS

This retrospective, hospital-based study was conducted at the National Orthopedic Hospital, Dala-Kano, a major referral center for spine surgery in Northern Nigeria. The study included all adult patients (18–65 years) who underwent single-level endoscopic discectomy for symptomatic LDH between June 2022 and May 2023.

Inclusion criteria included patients with symptomatic LDH diagnosed via MRI, those that underwent single-level endoscopic discectomy and completed at least a six-month follow-up. Patients with multilevel

degenerative lumbar spine disease, tandem stenosis and those that underwent pedicle screw fixation and those with incomplete follow-up data were excluded from the study. All procedures were performed using the transforaminal endoscopic discectomy (TELD) technique under local anesthesia and mild sedation. The surgical approach was guided by fluoroscopy, and decompression was achieved by fragment removal with endoscopic forceps.<sup>5</sup>

Pain outcomes were assessed using the Visual Analogue Scale (VAS) at 24 hours, 3 months, and 6 months postoperatively. Complications such as dural tears, infections, and recurrence were documented.

Data were analyzed using SPSS version 26. Continuous variables were expressed as mean  $\pm$  standard deviation (SD), and paired t-tests were used to compare preoperative and postoperative VAS scores. Statistical significance was set at  $p < 0.05$ .

## RESULTS

### Demographic and Clinical Characteristics

The study included patients with a mean age of  $45.6 \pm 11.9$  years, with a slightly higher proportion of females (53.8%) compared to males (46.2%). The most commonly affected spinal levels were L4/L5 and L5/S1, accounting for 88.5% of cases.

### Pain Outcome Assessment

Preoperatively, patients reported significant pain, with mean Visual Analog Scale (VAS) scores of  $7.6 \pm 1.2$  for low back pain and  $8.1 \pm 1.3$  for radicular pain. At 24 hours postoperatively, there was a notable reduction in pain intensity, with mean VAS scores of  $5.5 \pm 1.0$  for low back pain and  $5.0$

$\pm 0.9$  for radicular pain ( $p < 0.001$ ). Further improvements were observed at three months, with mean scores decreasing to  $3.2 \pm 0.8$  and  $2.9 \pm 0.9$ , respectively ( $p < 0.001$ ). By six months, pain relief was sustained, with mean VAS scores of  $2.1 \pm 0.7$  for low back pain and  $2.5 \pm 1.0$  for radicular pain ( $p < 0.001$ ).

### Complications

The overall complication rate was 7.6%. Minor complications included two cases of transient dysesthesia, both of which resolved without intervention. No cases of dural tears, infections, or reoperations were recorded during the follow-up period.

## DISCUSSION

This study reviewed the outcomes of patients who underwent endoscopic discectomy within the study period. The mean age of the study population was within the fourth to fifth decades of life, consistent with findings from previous studies in Nigeria and globally.<sup>6,7</sup> This age range is likely due to the degenerative changes in the intervertebral disc and the increased physical activity levels observed in this demographic. However, some studies have reported a higher mean age at diagnosis.<sup>8</sup>

There was a slightly higher proportion of females in this study, contrary to findings from other studies that reported a male predominance.<sup>7,8,9</sup> This discrepancy may be attributed to differences in health-seeking behaviour, as females tend to visit clinics more frequently. Additionally, obesity, a known risk factor for disc herniation, is more prevalent among females in this region.

The most frequently affected spinal levels were L4/L5 and L5/S1, consistent with previous studies.<sup>6,7,8,10</sup> This is likely due to the increased mechanical stress and mobility at these levels, as well as the thinner annulus

fibrosus and reduced support from the posterior longitudinal ligament. Similar findings have been reported globally, reinforcing the biomechanical predisposition of these levels to disc herniation.

Most patients presented with symptoms persisting between six months and two years before seeking surgical intervention. This delayed presentation may be due to initial conservative management, including physiotherapy and transforaminal steroid injections, which provide temporary symptom relief. However, studies have shown that early surgical intervention often yields better clinical outcomes. The predominant symptoms reported were low back pain and radicular pain, similar to previous findings.<sup>6</sup>

Pain relief was objectively assessed using the Visual Analog Scale (VAS). The results demonstrated a significant reduction in both low back and radicular pain following surgery. The reduction in VAS scores remained significant across all postoperative follow-up periods, with a substantial improvement observed within 24 hours. These findings align with previous reports<sup>10,12</sup> that have demonstrated the effectiveness of endoscopic discectomy in providing rapid and sustained pain relief. The overall success rates observed in this study are consistent with reports from other researchers, which have shown high success rates with this procedure.<sup>11</sup>

The complication rate was relatively low, with only two recorded cases. One patient experienced transient hyperesthesia that resolved with conservative treatment, whereas another patient required reoperation due to a postoperative hematoma. These findings are in line with previously reported low complication rates for endoscopic discectomy.<sup>10,12</sup> Some studies have even reported zero complication rates,

further highlighting the safety of the procedure.<sup>13</sup>

Postoperative recovery was also favourable, with most patients returning to their premorbid activities within two to four weeks. This early return to function can be attributed to the minimally invasive nature of the procedure, which involves minimal tissue disruption, reduced blood loss, and the use of local anaesthesia where possible.

This study shows the safety and efficacy of endoscopic discectomy for lumbar disc herniation, with minimum complication rates, an early functional recovery, and good pain management. The findings align with existing literature and further validate the role of this minimally invasive approach in the management of lumbar disc disease.

However, the study is limited by its retrospective nature and small sample size. Future research should focus on prospective, multi-center studies with larger sample sizes.

## CONCLUSION

Endoscopic lumbar discectomy is a successful, safe, and minimally invasive surgical option for symptomatic lumbar disc herniation. It provides significant pain relief with low complication rates. Careful patient selection and precise surgical technique are key to optimizing outcomes.

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## AUTHORS' CONTRIBUTIONS

AIA conceptualized and conducted the study, collected data, analyzed results, and wrote the manuscript.

CN, MI and MAA supervised the conduct of the research and approved the final version of the manuscript

ARM participated in writing the final version of the manuscript and proof read the final version to be published

## CONFLICT OF INTEREST

None declared.

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## ETHICAL APPROVAL

Approved by the National Orthopedic Hospital Dala Research Ethics Committee (NHREC/NOH-DALA/6th/06/2023) dated 18<sup>th</sup> July, 2024.

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## PARENTAL KNOWLEDGE AND WILLINGNESS FOR HUMAN PAPILLOMAVIRUS VACCINATION OF ADOLESCENTS IN MAIDUGURI, BORNO STATE

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### ABSTRACT

**Background:** The World Health Organization (WHO) states that HPV infection, affecting 50-80% of sexually active women, is the most prevalent sexually transmitted infection globally. Worldwide, HPV infection prevalence is 11.7% in women and 21% in men, with peak rates in adolescents of both sexes. **Objectives:** The study aims to assess the knowledge and readiness of parents and guardians of adolescent boys and girls regarding the use of the human papillomavirus vaccine in Maiduguri, Borno State. **Methods:** The study employed a multi-stage sampling technique and distributed four hundred semi-structured questionnaires as part of a descriptive cross-sectional study. The data was analyzed using IBM SPSS version 25. **Results:** Most respondents, 34.3%, were between the ages of 30 and 39, with a mean age of  $46.4 \pm 6.9$ . Up to 88% of respondents demonstrated poor knowledge about HPV infection and vaccines, while 65% identified vaccination and 70.7% recognized abstinence as preventive measures. The majority of respondents who were knowledgeable about HPV infection (41.9%) reported that they sourced their knowledge from healthcare workers. The study found that religion, level of education, and occupational status were statistically significant with a  $p$ -value  $\leq 0.05$ . **Conclusion:** The study revealed that many caregivers had poor knowledge, and factors such as religion, education level, and occupational status were significantly associated with knowledge. The study findings support future efforts to implement public-level HPV education.

**Keywords:** Knowledge, Readiness, Human Papillomavirus, uptake of HPV vaccine, Adolescents

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## Introduction

Human papillomavirus HPV is a group of over 100 highly transmissible, common viruses primarily transmitted through sexual contact.<sup>1,2</sup> It is the main risk factor for cervical cancer. It can lead to a variety of other malignant tumours, including oropharyngeal (12–63%), vulva (40–50%), vaginal (40–64%), anus (90–93%), and penile (36–40%).<sup>2–5</sup> The genital human papillomavirus infection is the most prevalent sexually transmitted infection (STI) globally.<sup>6</sup> HPV genital infections are typically asymptomatic, with 80% of infected individuals experiencing spontaneous recovery within a year.<sup>7</sup> Persistent high-risk infection can lead to cancer in the genital tract, affecting both men and women.<sup>7,8</sup> HPV infection is primarily prevalent among young women under 25 years old.<sup>8</sup> The global prevalence of cervical cancer is 11.7% in women with normal cytology and 21.0% in men, with peak rates in adolescents of both sexes.<sup>9</sup> Type 16 is the most virulent of the twelve oncogenic HPV types that are categorized as high risk, which include types 16, 18, 31, 33, 35, 39, 45, 52, 56, 58, and 59<sup>7,8,10]</sup> and types 16 and 18 account for approximately 70% of cervical cancer cases.<sup>11</sup> Cervical cancer cases and deaths in developing countries are estimated to exceed 80,000 annually, with the proportion expected to rise to 90% by 2020.<sup>12</sup> About 70% of cervical cancer cases worldwide are caused by HPV strains 16 and 18, which are primarily preventable through vaccination. However, 30% of cases are caused by other HPV types.<sup>13</sup> The vaccine's success relies on parental knowledge, consent and uptake, as it targets Nigerian 'legal minors', ensuring their health and well-being.<sup>14</sup> Implementing effective screening programs in low-resource settings is challenging, contributing to higher cervical cancer mortality rates in the developing world.<sup>15</sup>

The HPV vaccine is an evidence-based intervention for preventing cervical cancer-related illnesses and mortality in resource-limited nations compared to cytology screening or DNA testing.<sup>16</sup>

In 2017, 68% of women in high-income nations, 28% of middle-income countries, and 7.5% of lower-middle-income countries among females aged 10–20 years had received the HPV vaccine, while the global coverage rate was 39.7%.<sup>17</sup> Low HPV vaccination uptake is influenced by factors like low vaccine knowledge, side effects, school attendance, and parental fears of promiscuity and unsafe sexual behaviour.<sup>18</sup> Parental knowledge and willingness towards HPV disease and vaccine, along with the convenience of receiving the vaccine, are additional barriers.<sup>19</sup> Most African cervical cancer researchers focus on secondary prevention, such as cervical screening, with only 23.4% of publications on primary prevention, particularly HPV vaccination, being published.<sup>20,21</sup> The study aimed to assess the parental knowledge and willingness for HPV vaccination of adolescents in Maiduguri, Borno State.

## Methods

### Study area

Borno State, situated in Nigeria's northeastern geopolitical zone, comprises 27 Local Government Areas and has a population of 4,151,193, according to the 2006 Census. Jere LGA has twelve wards with a population of 211,204, while Maiduguri Metropolitan Council (MMC), the capital and largest city in Borno State, has fifteen wards and an estimated population of 1,907,600.

### Study design

A cross-sectional study was conducted in the Maiduguri Metropolitan Council and Jere LGA from April 15 to July 30, 2023.

### Study population

The study focused on parents of adolescent boys and girls in Maiduguri and Jere Local Government Areas of Borno State.

Parents/guardians of adolescent boys and girls aged 10-19 years and those residing in study areas for at least six months were included in our study, while parents and guardians of adolescent boys and girls who were severely sick or mentally ill were excluded.

### Sample size and sampling procedure

The sample size was determined using a single population proportion formula, considering a previous study's finding of 48.7% HPV vaccination readiness in Ethiopia, a 95% confidence level, and a 5% margin of error. Thus, the final sample size, after accounting for a 10% non-response rate, became 422. A multi-stage sampling technique was employed to select study participants, consisting of four stages: the selection of wards, settlements, houses/households, and respondents.

### Data collection procedure and techniques

The study employed a structured, interviewer-administered questionnaire, which was translated into Hausa and then back into English by language experts to ensure consistency. The study involved the recruitment of Community Health Extension Workers (CHEWs) and resident doctors who are fluent in local languages and customs as data collectors and supervisors. Two days of training were provided to data collectors and supervisors on data collection procedures, questionnaire content, and confidentiality of respondents' information.

### Data quality assurance

A pretest was conducted on 10% of the sample to ensure data quality, with on-site supervision by the principal investigator and supervisors, and daily review of questionnaires by the research team.

### Data analysis

The questionnaire data were statistically analyzed using SPSS software version 26, with descriptive analyses summarized and presented in frequency tables. The study employed Pearson's Chi-square test for categorical data to identify factors associated with knowledge and willingness to undergo HPV vaccination, with a p-value of  $\leq 0.05$  considered statistically significant. Each question on knowledge is scored 1 out of 14, with scores ranging from 0 to 7 indicating poor knowledge and from 8 to 14 indicating good knowledge.

### Ethical clearance

The Ministry of Health and Human Services' ethical review committee in Borno State granted ethical clearance for this study (SHREC approval No.31/2023). After informing the eligible respondents of the study's goal, the right to withdraw at any time during data collection, and the privacy and confidentiality of all data collected, their informed consent was obtained.

### Results

The study involved participants with a mean age of  $46.4 \pm 6.9$  years, comprising 53.8% females, and reflected the major tribes in the study areas: Kanuri (34.8%), Hausa (15.6%), Babur (10.8%), Marghi (10.5%), and Shuwa-Arabb (9.8%). The majority of respondents are Muslims (78.7%), with 86.5% being married, 35.2% having received Qur'anic education, and 39% being traders. 14.2% are civil servants, while the majority, 88.5%, have an adolescent number between 1 and 5 (Table 1).

HPV infection is known to only 15% of respondents, with 41.9% receiving information from healthcare workers. 23.3% believe it's exclusively female-related, while 53.3% don't. 41.7% of respondents believe HPV is symptomatic, 10% think antibiotics can treat it, and 41.7% believe vaccination can treat it (Table 2). The majority of respondents are aware of the potential

benefits of abstinence (70.7%) and condom (58.6%) use in preventing HPV. Still, only five per cent are aware of the HPV vaccine's existence, and 10% have received it. The majority of respondents, 88%, have a low understanding of HPV infection and vaccination. The study found that despite low awareness of HPV, 90% of respondents were willing and supportive of HPV vaccination for adolescent boys and girls. The majority, 78.3% of respondents, show a parental willingness to vaccinate their children, with 26.9% not knowing about vaccination centres, 34.6% vaccine not available, and

7.7% fearing risky sexual behaviour. Out of 60 respondents, 46.7% are unaware of the HPV vaccine's efficacy in preventing genital warts, 33.3% are unsure if it prevents HPV-induced cancers, 38.3% are uncertain if it treats genital warts, and 26.7% believe it's effective, with up to eighty-eight per cent (88%) of respondents having poor knowledge (Table 3). Additionally, the study found that religion, education level, and occupation were significant factors in understanding HPV knowledge, with all having a P-value of  $\leq 0.005$  (Table 4).

**Table 1: Socio-demographic characteristics of respondents.**

Variables	Frequency (n=400)	Percentage (%)
<b>Age (years)</b>		
20-29	5	1.3
30-39	137	34.3
40-49	115	28.7
50-59	80	20.0
60-69	42	10.5
70-79	17	4.2
80-89	4	1.0
<b>Mean age 46.4±6.9</b>		
<b>Gender</b>		
Male	185	46.2
Female	215	53.8
<b>Tribe</b>		
Kanuri	139	34.8
Hausa/Fulani	63	15.6
Babur	43	10.8

Marghi	42	10.5
Shuwa	39	9.8
Others	74	18.5
<b>Religion</b>		
Christianity	85	21.3
Islam	315	78.7
<b>Marital Status</b>		
Single	6	1.5
Married	346	86.5
Divorced	14	3.5
Widow/Widower	21	5.2
Separated	13	3.3

Current level of education			
No education	47	11.8	
Qur'anic	141	35.2	
Primary	53	13.2	
Secondary	63	15.8	
Tertiary	96	24.0	
Occupation			
Civil Servant	91	22.8	

Farming	30	7.5	
Trading	156	39.0	
Unemployed	39	9.7	
Others	84	21.0	
Number of adolescents			
1-5	354	88.5	
6-10	41	10.3	
≥11	5	1.2	

**Table 2: Knowledge of HPV Infection among Parents/Guardians of Adolescent Boys and Girls.**

Variables	Frequency (n)	Percentage (%)
<b>Heard of HPV Infection</b>		
Yes	60	15.0
No	340	85.0
<b>Source of Information</b>		
Health care worker	31	41.9
Social media	11	14.9
Television	10	13.5
Radio	14	18.9
Family/Friends	8	10.8

<b>HPV infection is limited to females</b>		
Yes	14	23.3
No	32	53.3
I don't know	14	23.3
<b>HPV is</b>		
Always symptomatic	25	41.7
Not always symptomatic	15	25.0
I don't know	20	33.3
<b>HPV infection can be treated</b>		
Vaccination	25	41.7
Antibiotics	6	10.0
I don't know	29	48.3

<b>Knows lesions related to HPV</b>		
Yes	16	26.7
No	18	30.0
I don't know	26	43.3
<b>HPV can be transmitted through the following</b>		
Skin to Skin	23	24.2
Unprotected sex	43	45.3
Fingers	16	16.8
I don't know	13	13.7
<b>A person with no symptoms cannot transmit HPV.</b>		

<b>Yes</b>	17	28.3
No	20	33.3
I don't know	23	38.3
<b>Most sexually active people will get HPV at some point in their lives.</b>		
Yes	29	48.3
No	14	23.3
I don't know	17	28.3
<b>People who can be infected with HPV</b>		
Only men can get infected	1	1.7
Only women can get infected	7	11.7
Only young people can get infected	1	1.7
Anyone can get infected	37	61.7
I don't know	14	23.3
<b>Circumcision reduces the risk of getting HPV infection.</b>		
Yes	28	46.7
No	11	18.3
I don't know	21	35.0
<b>Having multiple partners exposes one to a high risk of HPV infection.</b>		

Yes	48	80.0
No	2	3.3
I don't know	10	16.7


**Table 3: Knowledge and Willingness to uptake of HPV vaccination respondents.**

Variables	Frequency(n)	Percentage (%)
<b>HPV can be prevented by</b>		
Vaccination	38	26.2
Use of Condom	34	23.5
Abstinence	41	28.3
Avoid direct contact	23	15.8
I don't know	9	6.2
<b>You need more than one dose to complete the HPV vaccination.</b>		
Yes	28	46.7
No	12	20.0
I don't know	20	33.3
<b>HPV Vaccination offers protection against all sexually transmitted infections</b>		
Yes	23	38.3
No	19	31.7

I don't know	18	30.0
<b>You can cure HPV by getting the HPV vaccine.</b>		
Yes	30	50.0
No	21	35.0
I don't know	9	15.0
<b>The HPV vaccine is most effective if given to people who are not exposed.</b>		
Yes	39	65.0
No	7	11.7
I don't know	14	23.3
<b>Have you received the HPV vaccine?</b>		
Yes	6	10.0
No	51	85.0
I don't know	3	5.0
<b>Do you have a personal history of HPV infection?</b>		
Yes	2	10.0

No	49	81.7	I don't know the vaccination centre for the HPV vaccine.	21	26.9
I don't know	9	15.0	Vaccine not available.	27	34.6
<b>Knowledge Score</b>			May expose adolescents to risky sexual behavior.	6	7.6
Poor	352	88.0	I don't have sufficient information about the vaccine.	18	23.1
Good	48	12.0	HPV vaccination is expensive.	2	2.6
<b>Willing my son/daughter to get vaccinated</b>			The HPV vaccine could have side effects.	3	3.9
Yes	54	90.0	No reason.	1	1.3
No	6	10.0			
<b>Willing to pay for the vaccine if it is not free</b>					
Yes	47	78.3			
No	13	21.7			
<b>Is your daughter/son vaccinated against HPV?</b>					
Yes	0	0.0			
No	60	100.0			
<b>Reasons for not vaccinating my children</b>					

Table 4: Factors Associated with Knowledge of HPV Infection and Vaccination Among Respondents.

Variables	Poor Knowledge	Good Knowledge	Test Statistics	P-value
<b>Age (Years)</b>				
20-59	294	43	1.169	0.280
60-89	58	5		
<b>Gender</b>				
Male	160	25	0.747	0.388

Female	192	23		
<b>Tribe</b>				
Kanuri	128	11	3.369	0.066
Others	224	37		
<b>Religion</b>				
Christianity	63	22	19.698	$\leq 0.001^*$
Islam	289	26		
<b>Marital Status</b>				
Married	304	42	0.047	0.829
Others	48	6		
<b>Current level of education</b>				
Informal	180	8	20.148	$\leq 0.001^*$
Formal	172	40		
<b>Occupation</b>				
Trading	151	5	18.732	$\leq 0.001^*$
Others	201	43		

Statistically significant

## Discussion

The study found that parents in Maiduguri, Borno State, Nigeria, who participated in a survey, exhibited poor knowledge about HPV infection and vaccination. Comparable research indicated a low level of awareness of the HPV vaccine and its relation to the development of cervical cancer among parents. However, researchers found a high level of knowledge about the HPV vaccine and infection.<sup>9,11,12,23</sup> Studies that are not similar to this study were conducted in Nigeria,<sup>21</sup> Uganda,<sup>14</sup> and Mali.<sup>16</sup>

Parents showed a significant willingness to vaccinate their adolescent boys and girls, similar to a study conducted in Nigeria,<sup>23</sup> the

Kingdom of Bahrain,<sup>11</sup> Uganda,<sup>14</sup> and Mali.<sup>16</sup> A study reported willingness among parents towards the HPV vaccine, while a contrary report was also found in a study in Oyo state, Nigeria.<sup>21</sup> Respondents' negative willingness towards HPV vaccine uptake is likely due to their religious beliefs, as Nigeria has diverse religions that prohibit drugs, vaccines, and healthcare procedures. The study revealed mixed opinions on sexually transmitted infection prevention messages, particularly at young ages, and highlighted the ongoing conversation between adolescents and healthcare providers about sexual health.

Strengthening vaccination channels for adolescents and their parents is crucial due to

factors such as education, religion, and occupation influencing their knowledge and willingness to take up HPV vaccines. Studies have shown that the level of knowledge about the HPV vaccine significantly impacts its uptake.<sup>21</sup> Despite Ibadan South-West parents' good knowledge of the HPV vaccine, several factors have been identified that hinder parents and their children's participation. The increase in cervical cancer incidence in Ibadan may be attributed to this.<sup>22</sup> The issue requires effective communication, subsidization of vaccination, and increased availability of vaccines.

The generalization of our results is greatly enhanced by the questionnaire's validity, high response rate, and sampling technique. The study's limitations include its cross-sectional nature, making it difficult to infer causal relationships between adolescent parents and guardians' knowledge of HPV infection and vaccination and their willingness to use HPV vaccination. The study provides baseline data on HPV vaccination, which will guide further research on knowledge, attitudes, perceived barriers, and associated factors.

### Conclusion

The majority of respondents had poor knowledge about HPV infection and vaccines, and the study found that religion, education status, and occupation were statistically significant. Knowing the advantages of HPV vaccination, the Nigerian government should make these vaccines widely available and reasonably priced, as it has been integrated into the National Program on Immunization (NPI) in Nigeria, and also the study findings support future efforts to implement public-level HPV education.

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## DETERMINANTS OF SURVIVAL OF CERVICAL CANCER PATIENTS IN A LOW-RESOURCE SETTING: A SINGLE INSTITUTION STUDY

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### ABSTRACT

**Introduction:** Cervical cancer is the second commonest cancer, and foremost cause of death from cancer in Sub-Saharan Africa accounting for 117,944 new cases and 76,140 deaths in 2022. In Nigeria, Cervical cancer is the third commonest malignancy and third commonest cause of death from cancer patients. In low-resource countries, over 80% of cervical cancer cases are very advanced at presentation and poor access to treatment, and many socio-demographic and cultural barriers; ultimately cumulating into poor clinical outcomes. **Objective:** The objective of the study was to determine the 2-year and 5-year survival of cervical cancer patients and factors that determine them. **Methodology:** This was a retrospective cross-sectional study. Patients' data which include socio-demographic characteristics, clinic-pathological variables and treatments received, were obtained from the clinical and treatment notes from the health information unit as well as the radiotherapy treatment room. Patients who were treated in the Department of Radiotherapy and Oncology, Ahmadu Bello University Teaching Hospital Zaria, Kaduna state, Nigeria from January 2008 to December 2012 were considered for the study. Survival analysis was done using the Kaplan-Meier method and Cox regression. **Result:** A total of 243 patients were included in the study. Their age ranged between 25.0-80.0 years with the mean age been  $50.7 \pm 11.1$  years. Most of the patients 225(92.6%) presented with locally advanced disease (FIGO stage IIB- IVA). Only 19(8%) of patients received concurrent chemoradiation, while 159 (65.4%) received external beam radiotherapy to total dose of 50Gy. A total of 113 (46%), 121(50%), and 9(4%) of patients had complete, partial and no response following treatment, respectively. The 2-year and 5-year overall survival were 85.2% and 31.7% respectively. Following adjustment for independent variables using Cox regression, age of patient, clinical stage at diagnosis and response following treatment were significantly associated with survival. **Conclusion:** Survival of cervical cancer in this study was low and similar to survival studies in Nigeria and other Sub-Saharan African countries; when compared to survival of the same disease for high income countries. Factors that are associated with survival include age and stage of disease at diagnosis, and clinical response following treatment. Multi-facet efforts need to be put in place towards designing and implementing strategies that will help address the problems of cervical cancer care in low-resource settings, which will ultimately improve its overall survival.

**Keywords:** Cervical cancer, survival, FIGO stage, response, age

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## INTRODUCTION

Cancer of the cervix is a major health problem world globally with estimated 662,301 new cases and 348,874, making it the 8<sup>th</sup> commonest cancer, and 9<sup>th</sup> commonest cause of death from cancer in 2022.<sup>1</sup> The large majority of global burden of cervical cancer occurs in the less developed regions like Africa, Southeast Asia and Latin America which accounts for about 85% of the global burden of cervical cancer.<sup>1,2</sup> For instance, cervical cancer is the second commonest cancer, and foremost cause of death from cancer in Sub-Saharan Africa accounting for 117,944 new cases and 76,140 deaths in 2022.<sup>3</sup> In Nigeria, Cervical cancer is the third commonest malignancy and third commonest cause of death from cancer patients.<sup>4</sup>

The morbidity and mortality from cervical cancer in Nigeria and other Sub-Saharan Africa countries reflect the absence of effective national cancer control programs, including vaccination, screening, early detection and financial access to radiotherapy and other treatments.<sup>5</sup> In low-resource countries, over 80% of cervical cancer cases are very advanced at presentation and poor access to treatment, and many socio-demographic and cultural barriers; ultimately cumulating into poor clinical outcomes.<sup>6</sup> To put it clearly, the mortality-incidence ratio for cervical cancer is currently 0.65 for Sub-Saharan Africa.<sup>3</sup>

The management of cervical cancer usually involved the use of multiple modalities which include surgery, radiotherapy, chemotherapy and other supportive care.<sup>7</sup> It is an established fact that increased survival is associated with treatment using radiation therapy and concomitant chemotherapy, compared to use of surgery or radiotherapy alone. Many randomized studies have laid credence to this fact.<sup>9,10</sup> Other tumour factors like stage, histological type, duration of illness with cancer, presence of

comorbid conditions affect clinical outcome of cervical cancer independent of treatment received.<sup>10,11</sup>

Overall, the 5-year survival rate for cervical cancer varies widely with stage at diagnosis, with values of about 91%, 60% and 19% for early, locally advanced and metastatic diseases respectively.<sup>11</sup> On the average, 5-year survival for cervical cancer in sub-Saharan Africa is 33%,<sup>12-14</sup> which is in sharp contrast with values of 90%<sup>15</sup> and 67%<sup>16</sup> for the United States and United Kingdom which are high-income countries. There are very few studies that accessed survival rates of cervical cancer in Nigeria. This research is a single-institution-based study that aim to assess the survival of cervical cancer patients and factors associated with their survival.

## MATERIAL AND METHODS

### Study Area

The study was conducted in Ahmadu Bello University Teaching Hospital Zaria (ABUTH), which is a tertiary healthcare facility and a Centre of excellence for cervical cancer care in Northern Nigeria. Nigeria in the period from January 2008 to December 2012.

### Study Design

It was a retrospective cross- sectional study.

### Study Population

The study population comprised of all histologically confirmed locally advanced cervical cancer (FIGO Stages IIa-IVa) cancer patients who were treated in ABUTH within the period from January 2008 to December 2012 that received at least 3 cycles of chemotherapy, external beam radiotherapy to the primary site, and had at least 1 follow up visit following treatment. Patients with missing or incomplete information about treatment received were excluded from the study.

### Data Collection Tool

Data was collected from patients' clinical case notes and treatment records in the radiotherapy and brachytherapy treatment rooms. These were recorded using a semi-structured questionnaire.

### Measurement of study variables

The categorical variables were recorded using frequencies and percentage, while the numerical variables will be presented using mean and standard deviation, for normally distributed data; and median and interquartile range for skewed data.

### Statistical analysis

Data was saved using Microsoft Excel application and then transferred into the Statistical Packages for Social Sciences (SPSS) version 20.0 manufactured by the International Business Machines Corporation (IBM), California. The variables were analysed and summarized using tables and charts. Sociodemographic, clinical and treatment variables of patients were presented in tables, graphs, histogram and charts using frequency and percentages. The survival probabilities were computed using Kaplan-Meier method of estimating the survival times for patients. Log-rank test was used to identify predictors of survival. The P value of, 0.05 was considered statistically significant

### Ethical consideration

Ethical approval was obtained from Ahmadu Bello University Teaching Hospital Health Research and Ethics Committee, and was given identity number ABUTHZ/HREC/D31/2018. The data obtained were de-identified to avoid tracing information obtained to any of the cancer patients of the study whether they are dead or alive.

## RESULTS

A total of 626 patients were seen during the study period, out of which 243 patient files who met the selection criteria were recruited in the study. The age of cervical cancer patients ranged between 25.0-80.0 years with the mean age been  $50.7 \pm 11.1$  years, the median and modal age was 50.0 years (Table 1)

Majority of the patients 139(57.2%) had given birth to five or more children. About a third 80 (32.9%) had sexual debut at age of 17 or less, while about half 120 (49%) had sexual debut between 18 to 20 years. Only 19 (7.8%) of patients were retroviral positive at the time of diagnosis; while about one-fifth 50(20.6%) of the patients had at least one pap smear done prior to diagnosis of cervical cancer (Table 1).

Out of all the enrolled patients, Only 18 (7.4%) presented with early disease (FIGO stage IIA), most 225 (92.6%) had locally advanced disease at diagnosis (FIGO stage IIB – IVA) (Table 1). Most of the patients 223 (91.8%) received platinum-based chemotherapy while 20 (8.2%) received other forms of chemotherapy. Most of the patients 172 (70.8%) received induction (neoadjuvant) chemotherapy, while 52 (21.4%) and 19 (7.8%) of patients received adjuvant and concurrent chemoradiation respectively.

The majority of patients 171 (70.4%) had EBRT as adjuvant treatment, while 53 (21.8%) and 19(7.8%) received it as primary treatment and concurrent chemo-radiotherapy respectively.

Only 25 (10.3%) of patients received low-dose brachytherapy following external beam radiotherapy to a total dose of 75 Gy or above; while majority 159 (64.5%) received 50 Gy of external beam radiotherapy, and 59 (24.3%) received external beam radiotherapy of 54 Gy.

**Table 1: Sociodemographic and clinic-pathological characteristics of respondents (n= 243)**

Variable	Frequency (%)
<b>Age (years)</b>	
< 40	35 (14.4)
40- 49	69 (28.4)
50- 59	83 (34.2)
≥ 60	56 (23.0)
<b>Marital status</b>	
Married	231 (95.0)
Single	6 (2.5)
Widowed	6 (2.5)
<b>Age at sexual debut (years)</b>	
≤ 17	80 (32.9)
18- 20	120 (49.4)
≥ 21	43 (17.7)
<b>Parity</b>	
Nulliparity	12 (4.9)
1 - 4	92 (37.9)
≥ 5	139 (57.2)
<b>Education</b>	
Non- formal	148 (60.9)
Formal	95 (39.1)
<b>Occupation</b>	
Civil servant	5 (2.1)
Farming	15 (6.2)
Trading	13 (5.3)
Others	44 (18.1)
Not employed	166 (68.3)
<b>Retroviral status</b>	
Positive	19 (7.8)
Negative	224 (92.2)
<b>Pap smear prior to diagnosis</b>	
Yes	50 (20.6)
No	193 (79.4)
<b>FIGO STAGE</b>	
IIA	18 (7.4)
IIB	106 (43.6)
IIIA	39 (16.1)
IIIB	70 (28.8)
IVA	10 (4.1)
<b>Histology type</b>	
Squamous cell carcinoma (SCC)	66 (27.2)
Large Cell non-Keratinising SCC	81 (33.3)
Large Cell Keratinising SCC	66 (27.2)
Adenocarcinoma	11 (4.5)
Others	19 (7.8)
<b>Histology grade</b>	
Well differentiated	12 (4.9)
Moderately differentiated	7 (2.9)
Poorly differentiated	31 (12.8)
Undocumented	193 (79.4)
<b>Width of tumour at diagnosis</b>	
≤ 4 cm	60 (24.7)
> 4cm	183 (75.3)

**Response to treatment:** A total of 113 (46.5%) of patients had complete response following treatment while 121(49.8%) had partial response and 9(3.9%) had no response to treatment.

**Survival Rates:** the 2-year survival among cervical cancer patients in this study was 85.2%, with 12.8% dead and 2.1% lost to follow-up. Conversely, the 5-year survival among cervical cancer patients had only 31.7% being alive, while 65.0% were dead and 3.3% lost to follow-up. The 2-year and 5-year survival rates were disaggregated based on age, source of referral, stage and grade of disease at presentation; retroviral

status of patient and illness duration and presented in Table 2.

### Cox Regression Model for Independent Variables

The median survival time is 46.0 months (CI:40.6-51.4). Only 3.3% of the study population died as a result of other causes. Unadjusted and adjusted hazards ratios on variables are presented in Table 3. Variables with significant unadjusted ratios hazard ratios include age (<40 and 40-49 years), length of tumor ( $\leq 4$ , 4.1-5.0 and 5.1-6.0 cm), width of tumor ( $\leq 4$ , 4.1-5.0 and 6.1-7.0 cm), stage at presentation(stage 2a, 2b, 3a and 3b), total doses of radiotherapy (50 and 54) and response to treatment (Table 3)

**Table 2. Distribution of the 2-year and 5-year survival rates of cervical cancer patients by selected variables**

Variable	2-year survival rate (%)	5 years survival rate (%)
<b>Age (years)</b>		
<40	88.6	57.1
40-49	95.7	34.8
50-59	79.5	28.9
60+	78.6	16.1
<b>Source of referral</b>		
Secondary	79.7	23.7
Tertiary	87.0	34.2
<b>Stage of presentation</b>		
Stage 2a	94.4	44.4
Stage 2b	94.3	40.6
Stage 3a	79.5	25.6
Stage 3b	72.9	21.4
Stage 4a	80.0	10.0

**Grade at presentation**

Well differentiated	100	58.3
Moderately differentiated	71.4	42.9
Poorly differentiated	74.2	29.0
Undocumented	86.5	30.1

**Retroviral status**

Positive	89.5	26.3
Negative	84.8	32.1

**Duration of illness prior to presentation**

<6 months	84.4	32.2
6-12 months	87.8	31.3
>12 months	78.9	31.6

**Table 3. Cox Regression Model for Independent Variables**

Variable	Unadjusted		Adjusted	
	HR (95%CI)	P value	HR (95%CI)	P value
<b>Age (years)</b>				
<40	0.261 (0.125-0.546)	<0.001	0.162 (0.070-0.375)	<0.001
40-49	0.307 (0.176-0.538)	<0.001	0.340 (0.189-0.610)	<0.001
50-59	0.531 (0.330-0.855)	0.531	0.548 (0.323-0.926)	0.026
60+ (ref)				
<b>Ethnic group</b>				
Hausa	1.257 (0.822-1.921)	0.291	1.171 (0.749-1.831)	0.489
Yoruba	1.297 (0.614-2.741)	0.496	0.848 (0.366-1.968)	0.702
Igbo	0.698 (0.169-2.880)	0.619	0.534 (0.121-2.347)	0.406
Others (ref)				

**Length of tumour (cm)** $\leq 4$ 

4.1-5.0	0.453 (0.236-0.876)	0.017	0.295 (0.090-0.965)	0.043
5.1-6.0	0.509 (0.290-0.893)	0.018	0.758 (0.300-1.913)	0.557
6.1-7.0	0.496 (0.274-0.897)	0.020	0.472 (0.209-1.066)	0.071
>7.0 (ref)	0.618 (0.327-1.167)	0.138	0.593 (0.274-1.281)	0.183

**Width of tumour (cm)**

$\leq 4$	0.727 (0.257-0.867)	0.016	2.435 (0.751-7.897)	0.138
4.1-5.0	0.311 (0.160-0.606)	0.001	1.111 (0.394-3.197)	0.842
5.1-6.0	0.676 (0.366-1.250)	0.212	2.025 (0.843-4.864)	0.114
6.1-7.0	0.504 (0.262-0.970)	0.040	0.665 (0.295-1.498)	0.325
>7.0 (ref)				

**Stage of disease at presentation**

Stage 2a

Stage 2b	0.195 (0.065-0.584)	0.003	0.326 (0.090-1.182)	0.088
Stage 3a	0.190 (0.090-0.404)	<0.001	0.243 (0.095-0.623)	0.003
Stage 3b	0.431 (0.196-0.949)	0.037	0.484 (0.191-1.229)	0.127
Stage 4a (ref)	0.477 (0.229-0.996)	0.049	0.512 (0.213-1.230)	0.134

**Total doses radiotherapy**

50

54	3.865 (1.405-10.636)	0.009	2.009 (0.668-6.047)	0.214
75 (ref)	4.616 (1.611-13.230)	0.004	2.748 (0.901-8.376)	0.075

**Response**

Complete	0.120 (0.049-0.293)	<0.001	0.080 (0.026-0.241)	<0.001
Partial	0.291 (0.124-0.682)	0.004	0.172 (0.061-0.483)	0.001
No response (ref)				

However, after adjusting for variables, patients aged < 40 years (HR=0.162, 95% CI=0.070-0.375), 40-49 years (HR=0.340; 95%CI=0.189-0.610) and 50-59 years (HR=0.548; 95%CI=0.323-0.926) were about four, three and two times less likely to die from cervical cancer compared to

those aged 60 years and above respectively (Table 3, Figure 1).

Patients who presented at stageIIa and stageIIb (HR=0.243; 95% CI=0.095-0.623) were about four times less likely to die from cervical cancer compared to those who

present at stage 4 a respectively (Table 3, Figure 2).

There was no significant difference in survival based on tumour length, tumour width and total dose of radiation received (Table 3).

However, patients who had complete and partial responses to treatment were about

twelve times (HR=0.080; 95%CI=0.026-0.241) and six times (HR=0.172; 95% CI=0.061-0.483) less likely to die from cervical cancer compared to those who had no response. These were statistically significant at  $p<0.05$  (Table 3).

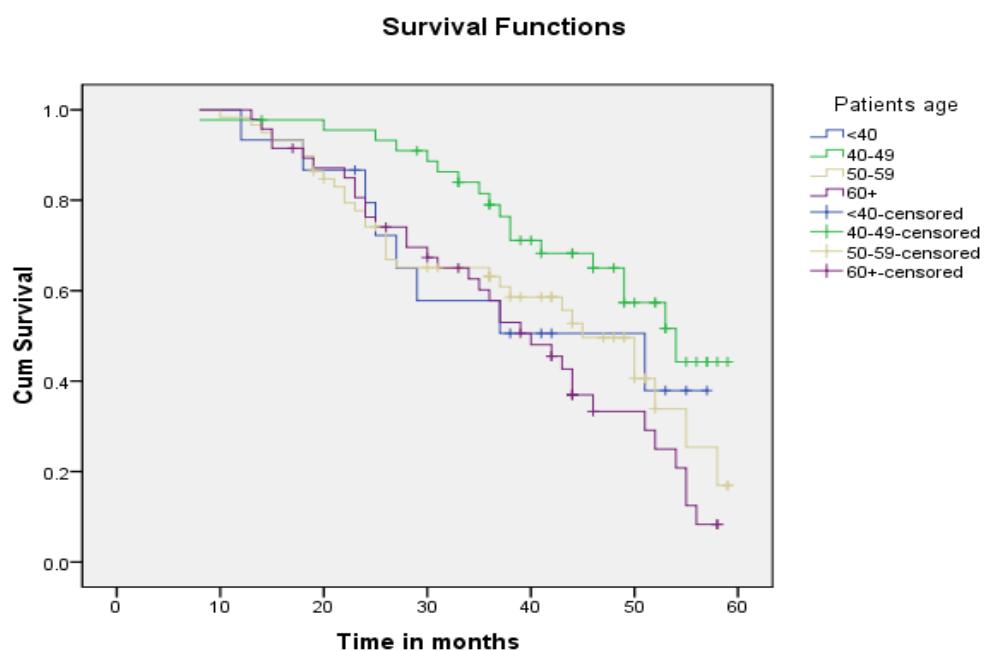


Figure 1. Survival segregated by age category of cervical cancer patients

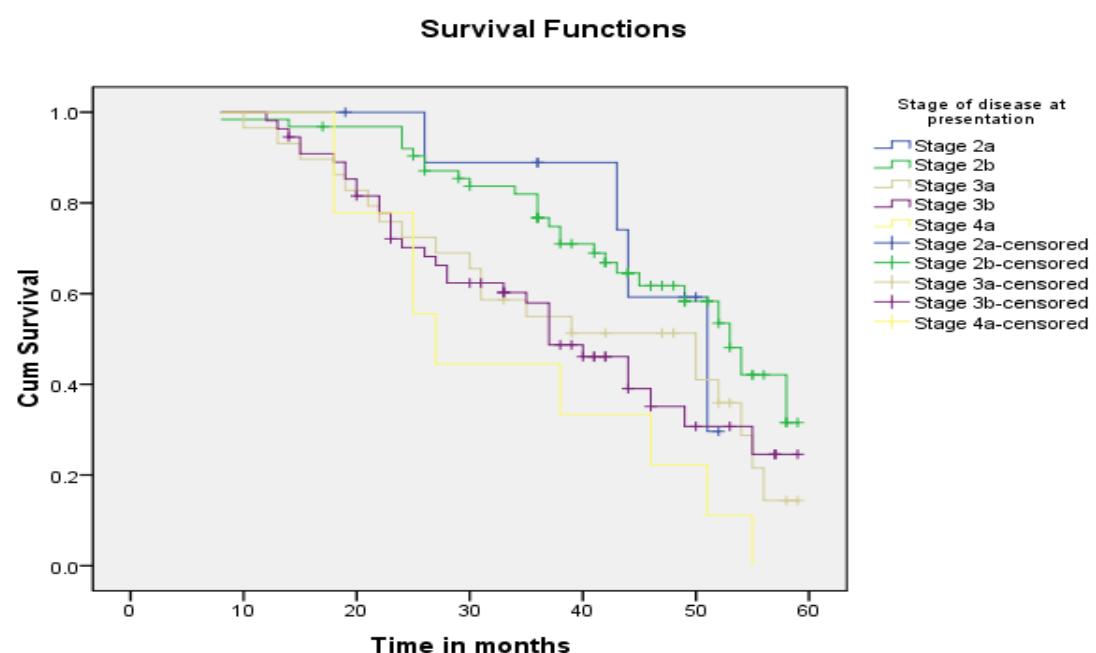


Figure 2. Survival segregated by stage at diagnosis of cervical cancer patients

## DISCUSSION

From the study, the overall 2-year and 5-year survival survival rate for cervical cancer patients were 85.2%, and 31.7% respectively. A similar study conducted in an apex tertiary hospital in Southwestern Nigeria, had the 2-year and 5-year survival for cervical cancer as 69.6% and 45.8% respectively.<sup>17</sup> The findings were equivocal when compared to the index study as the 2-year survival was higher, while the 5-year survival was lower in value to the index study. However, the findings of this study remained consistent with findings of other studies from Sub-saharan African region. For instance, a study conducted in Ghana showed 3-year and 5-year survival of 39% and 30% respectively.<sup>18</sup> Furthermore, another study from Ghana found 3-year and 5-year survival at 51.5% and 32.4% respectively.<sup>19</sup> The above studies, along with other studies have consistently demonstrated the relatively low survival as a result of poor clinical outcome for cervical cancer patients in low-resource settings as a result of combination of many factors.<sup>20, 21</sup>

This study demonstrated a wide disparity in survival between patients with FIGO stage IIA/IIB when compared to FIGO stage IVA as the later are four times likely to die compared to the former. This is consistent with other studies from low-resource setting which found those with lower stage at diagnosis having significant higher chance of survival.<sup>17-20</sup>

In this study, patients aged below 40 years, 40- 49 years and those 50-59 years were about four, three and two times less likely to die from cervical cancer compared to those aged 60 years and above respectively, due to more advanced stage at presentation, suboptimal treatments and associated comorbidities. This finding is consistent with a study in California, which found that 5- year survival of cervical cancer patients was significantly lower in women above 65 years compared to those 65 years or below.<sup>22</sup> Furthermore, a systematic review and

meta-analysis of East African studies on cervical cancer found age to be significantly associated with survival with younger age having better prognosis.<sup>23</sup> Other studies from Sub- Saharan Africa and Middle East have arrived at similar conclusions of age being significantly associated with survival in cervical cancer patients.<sup>13, 24</sup> However, another study in Jeddah Saudi Arabia, found no significant difference in survival across the age groups.<sup>25</sup>

The study also found that cervical cancer patients with complete response were twelve times more likely to survive than those with no response, while those with partial response were six times more likely to survive compared to those with no response following treatment. This finding was supported by a study in Botswana which clearly demonstrated that response to treatment affected the overall survival of cervical cancer patients.<sup>26</sup>

Overall, the findings from this study demonstrated that effective cervical cancer control in low-resource setting requires a multi-facet approach that involves raising awareness and knowledge on cervical cancer in the community and effective community-based screening. These measures will drastically reduce late presentation with advanced disease, and improve survival significantly as patients diagnosed at earlier stage disease have more likelihood of survival.<sup>20, 28</sup> In addition, more efforts will be required to ensure geographic and financial access to comprehensive treatment of cervical cancer which include chemotherapy, surgery, external beam radiotherapy, brachytherapy and supportive care.<sup>28,29</sup> This is because cervical cancer patients who received timely and appropriate treatment for the stage of their disease were more likely to have complete response to treatment, which in turn favours overall survival.<sup>10</sup>

Most definitely, the implementation of the World Health organization (WHO) strategy for elimination of cervical cancer will

address the gaps of management of cervical cancer in low-resource setting, ultimately eliminating factors that contribute to poor survival of cervical cancer patients.<sup>32</sup> This strategy targets getting 90% of girls less than 15 years vaccinated against human papilloma virus (HPV), screening 70% of women aged 35- 45 years with high quality tests and treating 90% of women who come down with diagnosis of cervical cancer.<sup>30</sup> The strength of this study is that it accrued a large number of patients across in a centre that served as an apex tertiary health institution that served for referral of cervical cancer patients across Northern Nigeria and beyond, over a 5-year period thereby giving it a good generalizability (external validity). However, the limitation of the study was it being a retrospective study with many missing dates, thereby having the possibility of introducing recruitment bias.

### CONCLUSION

Survival of cervical cancer in this study was low and similar to survival studies in Nigeria and other Sub-Saharan African countries; when compared to survival of the same disease for high income countries. Factors that are associated with survival include age and stage of disease at diagnosis, and clinical response following treatment. Multi-facet efforts need to be put in place towards designing and implementing strategies that will help address the problems of cervical cancer care in low-resource settings, which will ultimately improve its overall survival.

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**ACQUIRED COLONIC ATRESIA: A CASE REPORT OF A 15-YEAR-OLD GIRL**

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**Abstract**

A 15-year-old girl presented with abdominal pain, distension, bilious vomiting, and constipation five days after an ileostomy reversal procedure. She had a history of exploratory laparotomy and ileostomy for typhoid ileal perforation a year prior. Physical examination revealed a distended abdomen with visible peristalsis and hyperactive bowel sounds. Laboratory investigations were normal, but abdominal radiographs showed dilated bowel loops with multiple air-fluid levels. Laparotomy revealed extensive adhesions, a narrowed segment (fibrous cord) connecting the proximal and distal bowel segments and marked dilatation of the small intestines and colon. Resection of the atretic segment and end-to-end anastomosis was performed. Histopathology showed chronic inflammatory changes. The patient recovered satisfactorily and was discharged home. This case highlights a rare presentation of acquired type II colonic atresia in an adolescent girl, caused by post-operative adhesions rather than the more common necrotizing enterocolitis. The patient's age and non-NEC cause make this case uniquely rare. The successful surgical intervention emphasizes the importance of timely diagnosis and treatment in such cases. This report contributes to the limited literature on acquired colonic atresia, particularly in adolescents, and underscores the need for clinicians to consider rare diagnoses in patients with persistent symptoms after surgery.

**Key words:** *Acquired, Colonic atresia, non-NEC cause*

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## INTRODUCTION

Intestinal atresias are a group of congenital anomalies of the intestines resulting in obstruction of the intestine, commonly associated with a loss of tissue, with consequent disruption of intestinal continuity. An atresia can occur anywhere throughout the gut with an incidence of approximately 1:4000.<sup>1</sup> Acquired atresias of the intestine are extremely rare.<sup>2</sup> Acquired colonic atresias have been reported as a consequence of necrotizing enterocolitis and occasionally by some forms of intestinal adhesions, intussusception, systemic cardiovascular diseases and chronic inflammatory diseases.<sup>2,3,4</sup> In this article, we report a case of 15 year old girl with acquired colonic atresia.

## CASE PRESENTATION

A 15-year-old girl was referred to our facility with complaints of abdominal pain and abdominal distension of 5 days duration following an ileostomy reversal procedure done 10 days prior to presentation. The ileostomy reversal was performed at a peripheral hospital where she was commenced on graded oral feeds on the 3rd postoperative day. However, she developed colicky abdominal pain and progressive abdominal distension and associated bilious vomiting and constipation on the 5th postoperative day, she was then commenced on non-operative management. Following the persistence of symptoms 5 days after onset, she was referred to us. She was said to have had exploratory laparotomy for generalized peritonitis for typhoid ileal perforation with segmental ileal resection and ileostomy performed one year prior to the reversal. Other aspects of the history were not contributory.

Physical examination revealed an acutely ill child, febrile (axillary temp. 37.9C), with some dehydration. She was not pale, not jaundiced, not cyanosed and there was no peripheral oedema. Respiratory rate was 22 cycles per minute and her pulse rate 102 beats per minute. The abdomen was distended with visible peristalsis, but no significant tenderness. Auscultation revealed hyperactive bowel sounds. Per rectal examination revealed good perianal hygiene, *digital rectal* examination showed empty rectum, and the examining gloved finger was stained with mucous, no blood. Baseline laboratory investigations including complete blood count, urea, electrolytes and creatinine were within normal ranges. Blood was grouped and cross matched. Plain abdominal radiographs showed dilated bowel loops with multiple air-fluid levels. Our diagnosis at this point was postoperative adhesive intestinal obstruction. The patient and her parents were counseled and informed consent for exploratory laparotomy was obtained.

Exploratory laparotomy revealed extensive intra-peritoneal adhesions including inter-loops adhesions and adhesions between the loops and abdominal wall, marked dilatation of the small intestines and colon up to proximal sigmoid colon. Adhesiolysis revealed a narrowed segment (fibrous cord) about 5cm in length connecting the proximal dilated bowel with the distal collapsed bowel (type II colonic atresia). Resection of the narrowed segment and instillation of warm saline in the distal collapsed segment revealed patency by the egress of the saline at the anus. An end-to-end anastomosis was performed. Histopathological examination of the resected segment revealed chronic inflammatory changes. Normal gastrointestinal motility was achieved on the

4th postoperative day and patient was commenced on graded oral feed which was tolerated. Patient was discharged on the 10th postoperative day and was seen on follow-up 14 days after.

to the second surgery. We suggested an atresia with non-NEC aetiology. This is comparable with what Fouad et al reported in hit theory of the congenital intestinal atresia<sup>3</sup>. Acquired atresia has been previously reported, but typically involving the small bowel more commonly, whereas in this case it involved the colon. We presumed that the colon is more sensitive to intestinal ischaemia than the small bowel as suggested by Bubberman et al<sup>5</sup>. Acquired atresia of the bowel is known to occur in premature infants after recovery from necrotizing enterocolitis (NEC). Acquired intestinal atresia in non-NEC gastrointestinal conditions is rare<sup>1</sup>; however, in this case we found an acquired colonic

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## DISCUSSION

This is a rare case of acquired colonic atresia in an older patient who had no pre-existing gastrointestinal obstructive symptoms prior

their series of 3 infants with acquired atresia and suggested a cardiovascular compromise and likened it to the ischaemic atresia possibly due to entrapment of the bowel segment by adhesive bands. This is comparable to the report by Dian et al in a 15-year-old girl with acquired small bowel atresia following similar adhesive bowel entrapment<sup>1</sup>.

## CONCLUSION

This our patient presented with intestinal obstruction postoperatively which was confirmed to be a type II colonic atresia which is rare, and in an advanced age of 15 years and due to a non-NEC cause (adhesions).

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