

# A Prospective Study: Is Routine Pre-operative Urinalysis Mandatory in Ambulatory Operations in Children

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**Abstract:** There are controversies regarding pre-operative routine investigations in ambulatory operations in the paediatric age group. Routinely, patients' packed cell volume (PCV), and genotype were the investigations done for children before surgery, but somewhere along the line, the anaesthesiologists now demand for pre-operative routine urinalysis in children going for ambulatory operations to help detect occult urinary tract diseases. The aim and objectives was to find out the benefits of doing routine preoperative urinalysis and whether it was really necessary in children undergoing ambulatory operations in Lagos, Nigeria? It was a one year prospective study, carried out from the 1<sup>st</sup> of September, 2018 to the 31<sup>st</sup> of August, 2019 in the Lagos State University Teaching Hospital, Ikeja, Lagos, Nigeria. Eighty four children, between the ages of 0 - 12 years, slated for ambulatory operations were mandated to do routine pre-operative urinalysis, routine packed cell volume estimation, and genotype studies. All the children were operated under general anaesthesia. Eighty four children were recruited, comprising of 72 (85.7%) males and 12 (14.3%) females with a male: female ratio of 6:1. The patients' age ranged from 0 to 12 years with a mean age of  $5 \pm 3$  STD. An average, minimum and maximum weights of 18.9kg, 5.0kg, and 44.0kg respectively were recorded, while the average PCV was 34.4%, with a minimum of 26.9% and maximum of 48.0%. The results of urinalysis were normal in 82.1% and abnormal in about 17.9% participants. In the abnormal group, (proteinuria trace = 7, leucocytes = 4, nitrites = 2, proteins + nitrites = 1, and urobilirubin = 1). All study subjects underwent the procedures successfully with no record of cancellation of any procedure as a result of an abnormal urine finding. We conclude that routine pre-operative urinalysis should be done on all our paediatric ambulatory surgery patients with a view to detecting any abnormalities that may require a follow-up.

**Keywords:** Pre-operative Urinalysis, Children, Ambulatory Surgery

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## 1. Introduction

Ambulatory surgery has taken shape in the developed world, and one of the main factors driving this phenomenon is the desire for cost containment [1, 2]. The modalities to make this successful are being fine-tuned as years go by. However, we may not be able to make a categorical statement about ambulatory operations in Nigeria, where we practice. We routinely did the patients' packed cell volume (PCV), and genotype, but somewhere along the line, the anaesthesiologists now demand for pre-operative routine urinalysis in children going for ambulatory operations to help detect occult urinary tract diseases. This therefore raised the question, "is routine pre-operative urinalysis necessary in

children undergoing ambulatory operations in Nigeria"?

We therefore executed this prospective study to document whether there were benefits in doing routine urinalysis in children undergoing ambulatory operations in our hospital.

## 2. Patients and Methods

This was a prospective study that was done in the Lagos University Teaching Hospital (LASUTH), Ikeja Lagos, Nigeria. LASUTH is located in the South-West of Nigeria, and offers free medical services to children between the ages of 0 and 12 years. This study was done from the 1<sup>st</sup> of September, 2018, to 31<sup>st</sup> of August, 2019. Ethical clearance was sought and obtained from the institution's Ethics'

Committee. The authors recruited all children within 0-12 years that were operated as day cases. The various clinical diagnoses in these children included the following: inguinal hernias, undescended testes, thyroglossal cysts, simple superficial lumps, and rectal biopsies for Hirschsprung's disease.

The children were first evaluated clinically in the outpatients' clinics and their parents were counseled and enlightened about the definitive treatment. Also, consents were obtained included urinalysis in their child's pre-operative evaluation as well as PCV and genotype (children above 6 months). Children who refused participate and those that had contra-indications for general anaesthesia as decided by the anaesthesiologist were excluded from the study. All study subjects also had an additional pre-operative assessment by the anaesthesiologist, who determined their fitness for general anaesthesia and they were also reassessed on the day of the operation, scrutinizing the urinalysis results. The urinalysis was done in the side laboratory if per adventure it was not carried out before to avoid the cancellation of the operation. The patient was weighed and baseline vital signs taken by the receiving nurses

While on the operating table, monitors were attached to the children and pre-operative vital signs such as the pulse rate, SpO<sub>2</sub>, ECG were taken and recorded. The children were pre-oxygenated with 100% oxygen for 3-5 minutes and were given intravenous glycopyrrolate 4µg/kg as premedication. Anaesthesia was induced with intravenous Propofol 2mg/kg, and a Laryngeal Mask Airway (LMA) was inserted after depth of anaesthesia was achieved. Also, endotracheal intubation was done for the children that underwent neck procedures, like Sistrunk's operation for thyroglossal cysts. After the administration of the induction agent, intravenous Propofol 2g/kg and Atracurium 0.5g/kg, the children were connected to the anaesthetic machine via the breathing circuit, after ensuring correct placement of the LMA or the endotracheal tube (ETT). The children on LMA breathed spontaneously, while the children on ETT were ventilated. Anaesthesia was maintained with 1.2% Isoflurane in oxygen, intravenous Fentanyl 1µg/kg and Paracetamol 20mg/kg for the patients on LMA, while intravenous Atracurium was added for the relaxation of the patients on ETT. Intra-operative monitoring of the vital signs was also constantly done.

At the end of the procedure, residual neuromuscular blockage was reversed with IV Neostigmine 0.05mg/kg, and IV Atropine 0.02/kg for those that had endotracheal tube placement. The endotracheal tubes were removed when signs of complete recovery from paralysis such as coughing, crying, good head lift, and firm hand grip were noticed. The LMA was also removed when patients were noticed to be fully conscious. The children were transferred to the post-anaesthetic care unit for post-operative monitoring of their vital signs. Children were discharged home same day after full recovery, and to be followed up on in the clinic on out-patient basis. At the follow-up clinic, parents were further counseled about the need for a follow-up from an incidental

finding in the urinalysis.

### 3. Results

Eighty four children, 72 (85.7%) males and 12 (14.3%) females with a male: female ratio of 6:1 (Figure 1) were recruited. The age range was 0 to 12 years old. The average, minimum and maximum weights were 18.9kg, 5.0kg, and 44.0kg respectively. The average PCV was 34.4% with, a minimum of 26.9% and maximum of 48.0% (Table 1).

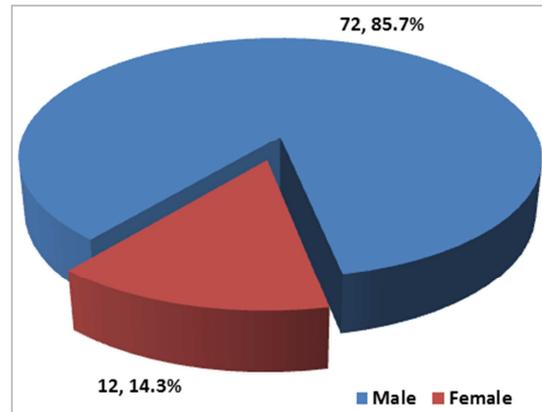


Figure 1. Gender distribution of patients.

Table 1. Average age, weight and PCV.

Parameter	Mean ± Std. Dev	Minimum	Maximum
Age (Years)	5 ± 3.0	0	12
Weight (Kg)	18.9 ± 8.8	5.0	44.0
PCV (%)	34.4 ± 3.7	26.9	48.0

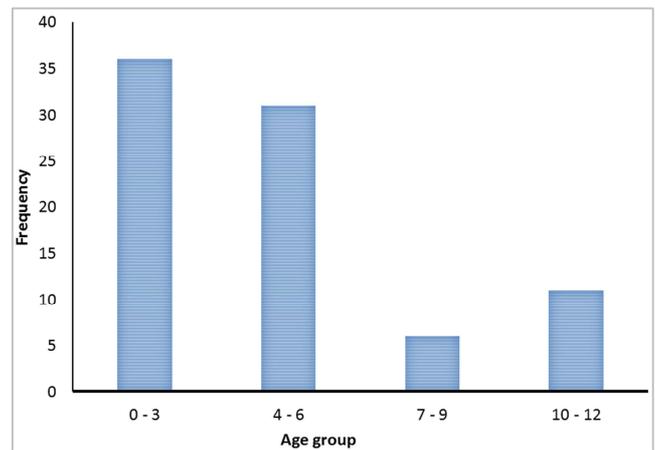


Figure 2. Age group of patients.

The ambulatory operations were performed on predominantly 0 - 6 years (79.8%) old children (Figure 2). The results of urinalysis showed 82.1% normal urine samples and 17.9% abnormal samples (proteinuria trace=7, leucocytes =4, nitrites =2, proteins +nitrites =1, and urobilirubin = 1). The most common clinical diagnoses made were hernias/hydroceles, 40 (47.6%). Other important diagnoses included undescended testes, 15.5%; hypospadias, 9.5% (Table 2).

**Table 2.** Clinical Diagnosis of pediatrics patients prepared for ambulatory operations.

Diagnosis	Frequency	Percent
Hernia/Hydrocoele	40	47.6
Undescended Testes	13	15.5
Hypospadias	8	9.5
Biopsy	5	6.0
Tongue-tie	5	6.0
Meatal stenosis	4	4.8
Redundant prepuce	2	2.4
Thyroglossal cyst	2	2.4
Others	5	6.0
Total	84	100.0

Others: Post Urethroplasty stricture, Lipoma (2), Accessory breast, and Labial agglutination separation

About 79.2% of male urinalysis were normal and all (100.0%) of female results were also normal with no statistically significant difference between male and female urinalysis  $p > 0.05$  (Table 3). The day surgical operations were predominantly performed in males and

females of age 0 - 6 with 77.8% for males and 91.6% for females. No significant difference was observed between male and female ages, with  $p > 0.05$  as the level of significance (Table 4).

**Table 3.** Gender versus urinalysis findings.

Gender (%)	Urinalysis		Total	X <sup>2</sup>	P
	Abnormal	Normal			
Male	15 (20.8%)	57 (79.2%)	72 (100.0%)	3.048	0.081
Female	0 (0.0%)	12 (100.0%)	12 (100.0%)		
Total	15 (17.9%)	69 (82.1%)	84 (100.0%)		

**Table 4.** Sex distribution within age groups.

Gender	Age Category				Total	X <sup>2</sup>	P
	0 - 3	4 - 6	7 - 9	10 - 12			
Male	29 (40.3%)	27 (37.5%)	6 (8.3%)	10 (13.9%)	72 (100.0%)	2.073	0.557
Female	7 (58.3%)	4 (33.3%)	0 (0.0%)	1 (8.3%)	12 (100.0%)		
Total	36 (42.9%)	31 (36.9%)	6 (7.1%)	11 (13.1%)	84 (100.0%)		

## 4. Discussion

As institutions have embarked on cost containment in operations, ambulatory operations have come to stay in most paediatric surgical units [1, 2]. Some of the cases routinely done on ambulatory basis include herniotomies, which are the most common operations in paediatric surgery [3], orchidopexies, Sistrunk's operation for thyroglossal cysts, and rectal biopsies, for Hirschsprung's disease. These procedures require general anaesthesia. There is a controversy regarding the pre-operative investigations to be carried out on out-patient basis before the child undergoes general anaesthesia in an ambulatory setting. Such investigations include the full blood count, serum urea and creatinine, genotype studies for infants above 6 months of age, chest x-rays, and routine urinalysis. Indeed there is a paucity of literature regarding routine urinalysis in children undergoing ambulatory surgery in our environment. Ugo de Luca et al [1] produced some evidence based guidelines on the feasibility of day surgery in relation to different paediatric surgical procedures, including the pre-operative assessment of the children. The main aspects of pre-operative assessments were discussed among other arms of ambulatory surgery. They noted that 60-80% of operations in modern

paediatric hospitals were performed on a day surgery basis [1, 2]. It is noteworthy that they emphasized that pre-operative investigations (laboratory tests, x-rays, and ECG) were rarely performed, but may be requested by the surgeon during their clinical and anaesthetic evaluation.

In addition, Brennan L J [4], in 1999 suggested that routine pre-operative investigations for children before day surgery was unnecessary in the majority of children undergoing day care surgery are healthy [3], although pre-operative sickle cell screening is still being carried out in the United Kingdom. In other publications [5-7], routine pre-operative laboratory investigations for healthy children were not recommended.

Elliot Kraine et al. [8], while discussing the evaluation of the child for ambulatory surgery, pointed out that the preoperative evaluation is not different from that of the child undergoing in-patient surgery, and includes a full health assessment, physical examination, laboratory testing, where indicated, etc [7, 8].

In this study, 84 children that underwent ambulatory operations for various diagnoses, had both abnormal and normal urinalysis pictures, although, all had their operations done without further investigations. If 15 out of 84 urine samples were abnormal, clearly, approximately 18 of every 100 urine samples of paediatric ambulatory surgery children may be abnormal. These children were clinically healthy, but

had abnormal findings in their urinalysis. They may have had occult renal abnormalities that would require further investigations. Although the theme of this manuscript is not on renal diseases, it is noteworthy to mention that any abnormality detected should be further investigated. Ronit Calderon-Margalit et. al. stated that childhood kidney disease was associated with a significant increased risk of end stage renal disease in adulthood [9]. Also, in 2016, during the World Kidney Day, childhood kidney disease was a point of reference as a source chronic renal disease in childhood and a precursor to kidney disease in adulthood [10]. These abnormal findings were out of serendipity, because the children were clinically healthy. This study agrees with Utsch et. al. that urinalysis in infancy and early childhood is a simple and informative test as long as it is properly done [11].

## 5. Conclusion

We suggest that routine pre-operative urinalysis should be done on all our paediatric ambulatory surgery patients with a view to detecting any abnormalities that may require a follow-up.

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