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Paediatric endoscopy by adult gastroenterologists in Ile-Ife, Nigeria: A viable option to increase the access to paediatric endoscopy in low resource countries

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ABSTRACT

Background: Paediatric endoscopy performed by adult gastroenterologists is a service delivery model that increases the access of children to endoscopy in countries where paediatric gastroenterologists with endoscopy skills are scarce. However, studies on the usefulness of this model in Nigeria and Sub-Saharan Africa are scarce. We aimed to evaluate the indications, procedures, diagnostic yield and safety of paediatric endoscopy performed by adult gastroenterologists in a Nigerian tertiary health facility. **Materials and Methods:** It was a retrospective study that evaluated the records of paediatric (≤18 years old) endoscopies carried out in the endoscopy suite of Obafemi Awolowo University Teaching Hospital Complex Ile-Ife, Nigeria from January 2007 to December 2014. **Results:** A total of 63 procedures were successfully completed in children of whom 4 were repeat procedures which were excluded. Thus, 59 endoscopies performed on children were analysed. Most (49; 83.1%) of these procedures on the children were diagnostic with oesophagogastroduodenoscopy being the commonest (43; 72.9%). Epigastric pain (22; 37.3%), haematemesis (17; 28.8%) and dysphagia (9; 15.3%) were the predominant indication for upper gastrointestinal (GI) endoscopy while haematochezia (9; 15.3%) and rectal protrusion (2; 3.4%) were the indications for colonoscopy. Injection sclerotherapy (3; 5.1%) and variceal banding (2; 3.4%) were the therapeutic upper GI endoscopic procedures conducted while polypectomies were performed during colonoscopy in 5 children (8.5%). Abnormal endoscopy findings were observed in 53 out of the 59 children making the positive diagnostic yield to be 89.8%. No complication, either from the procedure or anaesthesia was observed. **Conclusion:** Paediatric endoscopy performed by adult gastroenterologists is useful, feasible and safe. It is being encouraged as a viable option to fill the gap created by dearth of skilled paediatric gastroenterologists.

Key words: Endoscopy, gastroenterology, gastrointestinal, Ile-Ife, Nigeria, paediatrics

INTRODUCTION

Paediatric endoscopy has become a key procedure in the practice of paediatric gastroenterology with both diagnostic and therapeutic indications. Paediatric gastroenterology is an evolving subspecialty in Sub-Saharan Africa with very few and far between the paediatric gastroenterologists who are skilled in endoscopy hence creating a vital gap in the management of gastroenterological disorders in children in this region.[1] As the adult gastroenterology practice is older and much more advanced in the scope and skill of services offered, adult service gastroenterology units often fill this gap and perform endoscopy in children when indicated.[2]

Despite the availability of this stop-gap measure, paediatric endoscopy services are poorly utilised. Studies that report the paediatric endoscopy practice

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in Sub-Saharan Africa would enlighten the medical practitioners especially paediatricians on the potential of this underutilised resource. We, therefore, conducted this review to determine the indications, yield and safety of paediatric endoscopy in an adult service endoscopy unit in Nigeria.

MATERIALS AND METHODS

This was a retrospective, descriptive and cross sectional study of consecutive children who underwent gastrointestinal (GI) endoscopy at the endoscopy suite of Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife, South-Western Nigeria, from January 1st, 2007 to December 31st, 2014. This is one of the three earliest endoscopy units in Nigeria. It operates on an open access basis and caters for both inpatients and outpatients from all the South-Western states and beyond. There were 4 gastroscopes (9-11 mm) and 2 paediatric colonoscopes fiberscopes with attached camera which were Pentax Models. In 2014, a paediatric videoscope of PCF-140 Olympus model was installed. The need for the endoscopy was decided on by the referring paediatric surgeon, the paediatrician or any other child health practitioner who subsequently referred to the adult gastroenterologists for the procedure. Pre-endoscopy preparation for upper GI endoscopy consisted of overnight fast for children above 3 years and 2-4 h for younger patients. For a colonoscopy, pre-endoscopy preparation included bowel preparation using polyethylene glycol or water enema depending on the indication for the procedure. The choice of the anaesthesia varied depending on the age of the patients and the expected level of cooperation. Usually children of 10 years and below were offered deep sedation using ketamine at the dose of 5 mg/kg. Top up doses are given as required. The last 24 months of the study witnessed the use of propofol for children younger than 10 years at a dose of 1 mg/kg titrated to achieve the appropriate response. Supplemental midazolam at the dose of 0.3-0.4 mg/kg was given as required. The older children received midazolam (2.5 mg). Opioids analgesics were added for patients undergoing colonoscopy. After the procedures, the patients were observed in a recovery room for a few hours before being discharged to either their home (for outpatients) or back to the ward (for inpatients). The need, or otherwise, for biopsy was decided by the endoscopist. Control of bleeding with injection sclerotherapy was performed using 50% dextrose water and adrenaline. Variceal eradication was achieved using rubber band ligation.

Case records of all patients who were ≤18 years old (based on the World Health Organisation definition of a child) and had GI endoscopy for the period of 8 years were included in the study. Repeat endoscopies performed on the same patient during the study period were excluded. Any procedure that was rescheduled for another day after an initial attempt was classified as failed. The socio-demographic data, indication for the procedure, type of procedure, anaesthesia administered, findings at endoscopy and presence or absence of procedure associated complications were abstracted to a proforma specially formulated for this study.

The data was analysed using SPSS statistical package for social sciences (SPSS, version 15.0; Chicago, IL, USA) program. Means, proportions and medians were calculated for continuous variables while Chi-square and Fisher's exact tests were performed on categorical variables where appropriate. Statistical significance was determined for the tests when $P < 0.05$.

RESULTS

During the study period, 3311 GI endoscopies were performed at all ages. Of these, 65 procedures (1.9%) were performed in children aged 18 years or less. Sixty-three procedures were successfully completed while two were not completed due to poor bowel preparation (in 1 patient) and lack of cooperation (in 1 patient). Four procedures were performed as repeat investigation for evaluation in the same patient. Thus, GI endoscopies performed on a total of 59 children were analysed. The ages of the children ranged from 1-year to 18 years with a mean age of 12.9 ± 0.6 years. The majority of the children (43 [72.9%]) were between 10 and 18 years. There was near equal sex distribution as 28 were males while 31 were females. [Table 1]. Sixteen of the subjects were referred from other facilities to our centre while the rest were from either the inpatient or outpatient departments of our facility. The procedures performed were diagnostic in 49 and therapeutic in ten children. The proportion of the types of the procedure is shown in Table 1. Most (49; 83.1%) of the procedures were diagnostic with oesophagogastroduodenoscopy being the commonest (43; 72.9 %). Referral status was not related either to age group ($\chi = 1.458$; df = 2; $P = 0.482$) or indication ($\chi = 13.207$; df = 8; $P = 0.105$).

Epigastric pain (22; 37.3%), haematemesis (17; 28.8%) and dysphagia (9; 15.3%) were the predominant indication for upper GI endoscopy while haematochezia (9; 15.3%) and rectal protrusion (2; 3.4%) were the indications for colonoscopy [Table 2]. Injection sclerotherapy (3; 5.1%) and variceal banding (2; 3.4%) were the therapeutic upper GI endoscopic procedures

Table 1: Baseline sociodemographics and procedures

Characteristic	*n* (%)
Age groups (years)	
0-4	2 (3.4)
5-9	14 (23.7)
10-18	43 (72.9)
Sex	
Male	28 (47.5)
Female	31 (52.3)
Referral status	
Referred from another facility	19 (32.2)
Non-referred (from our facility)	40 (67.8)
Procedure	
Diagnostic	
Oesophagoscopy (alone)	2 (3.4)
OGD (alone)	43 (72.9)
Colonoscopy (alone)	4 (6.8)
Therapeutic	
Upper GI endoscopy with sclerotherapy	3 (5.1)
Upper GI endoscopy with variceal banding	2 (3.4)
Colonoscopy with polypectomy	5 (8.5)
Total	59 (100.0)

OGD: Oesophagogastroduodenoscopy; GI: Gastrointestinal

Table 2: Indications for endoscopy

Indications	No (%)
Upper GI endoscopy	
Epigastric pain	22 (37.3)
Haematemesis	17 (28.8)
Dysphagia	9 (15.3)
Dyspepsia	2 (3.4)
Achalasia	1 (1.7)
Melaena	1 (1.7)
Gastric outlet obstruction	1 (1.7)
Colonoscopy	
Haematochezia	9 (15.3)

N.B: Some of the subjects had more than one indication for the procedure;
GI: Gastrointestinal

conducted while polypectomies were performed during colonoscopy in 5 children (8.5%).

Abnormal endoscopy findings were observed in 53 out of the 59 children making the positive diagnostic yield be 89.8%. In the patients whom the indication was an epigastric pain, the most common endoscopic diagnoses were gastritis (14; 35.9%) and duodenal ulcer (8; 20.5%) [Table 3]. Among the 17 children whose indication for endoscopy was haematemesis, the most frequent endoscopic diagnoses were oesophageal varices (6; 35.3%) and duodenal ulcer (4; 23.5%). Among children that had endoscopy based on dysphagia, the findings were corrosive oesophagitis (3), gastritis (2), oesophageal varix (1), Colorectal polyps (5 patients), bleeding colonic ulcer (1) and rectal cancer (1) were the findings in the children who presented with haematochezia. The positive diagnostic yield of each indication for endoscopy is shown in Table 4. There was a high yield across all indications ranging from 50% to 100%. No complications were observed both during and after the procedure either from anaesthesia or from the procedure itself.

DISCUSSION

This study adds to the growing body of knowledge on paediatric GI endoscopy in Nigeria and also in Sub-Saharan Africa. The first publication from Nigeria[3] was in 2015, and it was a report of a preconference workshop in which the endoscopy was performed on three children as a demonstration for training. Our study found that paediatric GI endoscopy was only 1.9% of the total GI endoscopies performed in our centre during the same period. This proportion is smaller than the 6.7% observed in Uganda[4] as well as 6% in Kathmandu, Nepal.[5] The reason for this is not clear, but it could be postulated that hospital care-seeking for GI disease is less common among our population. A more likely explanation is underutilisation of the facility by the paediatric patients due to the low awareness by the paediatric care providers of its existence and the indications for its use. The relatively low proportion (29%) of the cases that were direct referrals from other facilities also lend credence to this explanation. Therapeutic endoscopies, which were the injection sclerotherapy and variceal banding for oesophageal varices and polypectomy for colorectal polyps, further demonstrate the utility of endoscopy in children by adult endoscopists at our facility.

Epigastric/upper abdominal pain was the commonest indication for performing endoscopy in these children which is similar to the observation among Ugandan adolescents.[4] Its prevalence of 41.5% in all endoscopies compares favourably with the range of 8-43% which has been reported from similar studies in other developing countries.[5-8] The indications for colonoscopy in the study were haematochaezia and rectal protrusion. In similar studies in Colombia[9] and Sudan,[6] rectal bleeding was responsible for 81.2% and 87% of indications, respectively, making it the key indication by far in those studies. The absence of other indications in our centre may result from a low prevalence of some potential contributory lesions such as inflammatory bowel diseases as well as lack of awareness about the availability of paediatric colonoscopy services in our adult gastroenterology unit.

The most common findings at the upper gastrointestinal endoscopy (UGIE) in the current study were gastritis

Table 3: Frequency of endoscopic findings for children with various indications

Findings	Frequency	Percentages
For children with haematemesis		
Oesophageal varices	6	35.3
Duodenal ulcer	4	23.5
Gastric erosion	2	11.8
GORD	1	5.9
Duodenitis	1	5.9
Gastritis	1	5.9
Haemangioma	1	5.9
Normal findings	1	5.9
For children with epigastric pain		
Gastritis	14	63.6
Duodenal ulcer	8	36.4
Duodenitis	7	31.8
Oesophagitis	3	13.6
Bile reflux	2	9.1
Gastric submucosal polyps	1	4.5
Gastric outlet obstruction	1	4.5
Gastric erosion	1	4.5
Failed procedure	1	4.5
Normal findings	1	4.5
For children with haematochezia		
Colorectal polyps	5	55.6
Colonic bleeding ulcer	1	11.1
Rectal cancer	1	11.1
Ulcerative colitis	1	11.1
Failed procedure	1	11.1
For children with dysphagia		
Oesophagitis	3	33.3
Gastritis	2	22.2
Oesophageal varices	1	11.1
Duodenitis	1	11.1
Normal findings	2	22.2

NB: Some of the subjects had more than one endoscopic finding/diagnosis;
GORD: Gastro-oesophageal reflux disease

Table 4: The yield of endoscopy for each indication

Indication	Abnormal/total	Percentages
Haematemesis	14/17	82.3
Epigastric pain	21/22	95.5
Dyspepsia	1/2	50.0
Haematochezia	8/9	88.9
Achalasia	1/1	100.0
Dysphagia	5/7	71.4
Rectal protrusion	2/2	100.0
Melaena	1/1	100.0
Gastric outlet obstruction	1/1	100.0

and duodenal ulcer which is similar to the report from other studies where epigastric or upper abdominal pain were the major indications for UGIE.[4,5,10] In settings where failure to thrive were the commonest reasons for UGIE, coeliac disease was the most common finding.[11] Coeliac disease has not been reported in our region, its prevalence being believed to be very low. Moreover, no child had an endoscopy because of chronic diarrhoea of failure to thrive. Awareness of the usefulness of endoscopy in children with chronic diarrhoea needs to be created among the child health practitioners.

The overall yield of positive endoscopies in this study which was 89.8% is among the highest reported in the literature. Reports from the UK,[11] North America[12] and Australia[13] gave values ranging from 41% to 48% as their positive diagnostic yield. We believe that the underlying explanation for this observation is the highly selective nature of our group of patients as most of the requests for endoscopy were based on a 'last resort measure'. Though the procedure is relatively inexpensive in our institution (currently costing between 60 and 90 US dollars), the majority of the caregivers of children living below poverty line would have significant limitation to pay for the procedure in Nigeria as treatment is largely out-of-pocket. We, therefore, suggest further subsidization of the cost of this procedure for children so as increase its utilization in the management of children with GI disease. The lack of awareness among the child health practitioners about the indications for and safety of endoscopy in children is also partly contributory as it also limits the number of referrals from child health practitioners to the adult gastroenterologist as our endoscopy services are open access.

Regarding safety of the procedure, the absence of either procedure or anaesthesia related complications as was observed for both upper and lower GI endoscopy in reports from Sudan,[6] Pakistan,[8] Hong Kong,[10] Singapore,[14] UK[11] and Spain[15] is noteworthy and reassuring to child health practitioners and caregivers. Even in reports where complications were found,[9,16] almost all were minor and the rates of occurrence in both reports were low: (2/1740; 0.1%) and (20/345; 5.8%), respectively.

The retrospective nature of the study is a limitation of this study, and this should guide the interpretation of the result. Nevertheless, the findings are very relevant in settings like ours due to the scarcity of data on the paediatric GI endoscopy. We hope this will stimulate further prospective study in this regard.

CONCLUSION

Our study demonstrates that paediatric endoscopy by adult gastroenterology endoscopists is feasible, safe and effective. Medical officers involved in the care of children, as well as paediatricians, would benefit from the creation of increased awareness of the availability, appropriate indications for and safety of endoscopy in

children. The knowledge of appropriate indications would ensure that requests do not become abused and indiscriminate in the long run. The availability of trained paediatric gastroenterologists who are competent in endoscopy would increase the access and utilisation of this resource as child health practitioners may be more predisposed towards referring children for endoscopy if they are aware that it is being performed by a paediatrician. A further study among the paediatric healthcare providers on their awareness of the availability, appropriate indications for and safety of endoscopy would be helpful to identify the barriers to utilisation of GI endoscopy. It would also guide the future efforts to increase the access to endoscopy services for children in our region.

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Conflicts of interest
There are no conflicts of interest.

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