

# CLINICOPATHOLOGICAL PRESENTATION AND MANAGEMENT OUTCOME OF APPENDICITIS IN GOMBE, NORTH-EAST NIGERIA: A 7-YEAR RETROSPECTIVE AUDIT

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## ABSTRACT

### BACKGROUND

Acute appendicitis is a common cause of acute abdomen and right iliac fossa pain in the study centre with attendant negative appendicectomies.

### AIM

To study the demographic pattern, aetiology, clinical presentation and management outcome of appendicitis.

### METHODS

This is a retrospective study carried out on patients, who had appendicectomies between January 2007 and December 2014. A total of two hundred and thirteen (213) cases were operated during the study period. Only one hundred and forty one (141) folders retrieved. Relevant clinical information were entered in to a proforma designed for the study. Statistical analysis was done using Epi info (version 3.5.1). Quantitative data were presented in frequencies and percentages, mean and standard deviations were calculated.

### RESULT

Out of the 141 patients, 55(39.0%) were males while 86(61.0%) were females giving a M: F= 1: 1.6. Their ages range from 8 to 65 years. The peak age group was 21-30 years. Acute inflammation was seen in 69 (48.9%) patients, lymphoid hyperplasia in 39 (27.7%) patients while parasitic appendicitis was seen in one (0.7%) patient. Post-operative complications observed include surgical site infection in 7 (5.0%) patients, delayed wound healing in 11( 7.8%) patients and enterocutaneous fistula in one(0.7%) patient.

### CONCLUSION

The diagnosis of appendicitis still rests on the pillars of thorough clinical evaluation. The judicious use of modern diagnostic equipment will reduce the rate of negative appendicectomies.

**KEYWORDS:** Appendicitis, demography, aetiology, management outcome.

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## INTRODUCTION

**A**cute appendicitis refers to inflammation of the vermiform appendix. This condition is the most common cause of acute abdomen worldwide<sup>1,2</sup>. The occurrence of acute appendicitis has been observed to be increasing in our environment probably because of change in diet from our traditional fibre-rich to the fibre-depleted western diet<sup>1,3,4</sup>.

This disease entity occurs more in the younger age group but rare at extremes of life. The occurrence of appendicitis at extremes of life especially in the elderly

could be associated with disastrous complications. This is as a result of late diagnosis coupled with the anatomical and physiological changes that occur in the appendix at this age<sup>5</sup>.

The vermiform appendix is important to the surgeon because of the diverse surgical uses and complications that could arise from its inflammations. These include inflammation, rupture, gangrene, intra-abdominal abscess etc. Any of these could arise from either intra-luminal or extra-luminal obstruction. Intra-luminal obstruction could be due to faecolith or parasites while extra-luminal obstruction could arise from lymphoid hyperplasia and/or adhesions<sup>5</sup>.

Although a sound clinical acumen is required to make a diagnosis of appendicitis; adjunctive imaging

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techniques such as a high resolution sonography in the hands of the experienced could improve the degree of accuracy<sup>6</sup>. A doppler scan gives additional information about presence of hyperaemia in the wall of the appendix. However, the ultrasound should be used with great caution as it is operator-dependent<sup>7,8</sup>.

Other useful diagnostic facilities include laparoscopy, computerized tomography or magnetic resonance imaging. The final arbiter of diagnosis however, remains histopathological confirmation of transmural acute inflammatory cells<sup>9</sup>. This study therefore looked at the pattern of presentation, aetiology and management outcome of appendicitis at Federal Teaching Hospital, Gombe, Nigeria.

## METHODS

This is a retrospective study that was carried out on patients, who had appendicectomies between January 2007 and December 2014. A total of two hundred and thirteen (213) cases were operated during the study period. Only one hundred and forty one (141) folders retrieved contained the relevant information that formed the basis of this study. Relevant clinical information were extracted from the patients' folders and entered in to a proforma designed for the study. Statistical analysis was done using Epi info (version 3.5.1). Quantitative data were presented in frequencies and percentages, mean and standard deviations were calculated.

## RESULTS

Out of the one hundred and forty one (141) patients whose folders were retrieved, 55(39.0%) were males while 86(61.0%) were females giving a M: F= 1:1.6. Their ages range from 8 to 65 years. The peak age group was 21-30 years while the mean age is 24.99±10.19 years. Majority (64.5%) of the patients presented during the rainy season. Majority (85.1%) of the patients had open appendectomy (Table 1).

Right lower abdominal pain, and right lower abdominal tenderness were seen in most (>90%) of the patients (Figure 1). A mean total white cell count of 3800-8500 (±1067.73) cells/mm<sup>3</sup> was found in these patients. The presentation-operation interval was 2-24hrs (±3.01) hours with a mean period of 5.6 hours.

Intra-operative findings revealed faecoliths found in 14 (10%) patients. Inflamed retrocaecal appendix was found in 82% of the patients followed by para-ileal [pre-ileal, post-ileal] (11%) and pelvic (6%) types. The length of the appendix was 5 to 20cm with a mean length of 11.23 ± 2.91cm. Histopathology reports revealed acute inflammation in (69, 48.9%) followed by lymphoid hyperplasia (39, 27.7%), schistosoma ova was seen in one (0.7%) patient while normal appendix

(which denote negative appendicectomy) was seen in 33 (23.4%) patients (Table 2).

## DISCUSSION

In this study, acute appendicitis was found to be predominant in the second and third decades. Similar observations have been made by other workers<sup>10, 11, 12</sup>. The mean age of patients in this study was 31.39 (± 11.57) years. The observed mean age in this study is comparable to that reported from Ghana (32.4±15.0 years)<sup>12</sup>. Our observation also conforms to that of other authors from Nigeria<sup>13-15</sup>. The occurrence of appendicitis in the second and third decades of life has been related to the high lymphoreticular activities at this period of life exhibited by the mucosal-associated lymphoid tissues which are predominant in the vermiform appendix<sup>10</sup>.

There were more female patients than males in our study (M: F=1: 1.6). Our observation conforms to the pattern reported from other centres<sup>13, 16</sup>. The preponderance of females in this study and other similar studies may be attributed to the presence of right tubo-ovarian diseases whose symptoms may mimic that of appendicitis. Researchers have also purported that social lifestyle of females with respect to consumption of confectionary products and fast foods which are fibre-depleted may also explain why more females develop appendicitis<sup>20</sup>. In contrast to our observation, some authors observed a male preponderance in their studies<sup>12,17,18,19</sup>. Reasons for this were not stated. Ahmed et al from Zaria, North-central Nigeria however reported that both sexes were equally affected<sup>21</sup>.

The occurrence of appendicitis has been linked to seasonal variation. The summer season in the temperate countries has been observed to be a period when patients present more with appendicitis. Reasons put forward to justify this include occurrence of enteric infection (with resultant lymphoid hyperplasia) and the relative high rate of consumption of low fibre diet (causing reduced transit time) at this period of the year<sup>18, 22, 23</sup>. Majority (64.5%) patients in our study presented during the rainy season (April to October). An earlier study by Oguntola et al also affirms this<sup>10</sup>. The rainy season is usually characterized by a rise in gastrointestinal and respiratory tract infections which could cause immune modulation with consequent lymphoid hyperplasia. As planting and harvesting take place during the rainy season; allergens from plants pollens have been incriminated to cause immune reactions which could lead to lymphoid hyperplasia<sup>24</sup>.

Right lower abdominal pain and right lower abdominal tenderness were the prominent symptoms that were consistent in all the patients that presented with appendicitis in this study. This is in contrast to the somato-visceral sequence of events earlier described by Muphy<sup>25</sup>. This comprises of colicky abdominal pain that starts at the periumbilical region, with pain intensification with 24 hours which later shifts to settle at the right iliac fossa; anorexia, nausea, vomiting. These symptoms have been found to in 50% of patients therefore; our observations about patients' symptomatology and those reported from other centres are not out of place<sup>26,27</sup>.

Operative intervention was carried out with open and laparoscopic methods. Like other centres in Nigeria, laparoscopic appendectomy is a relatively new operative modality in our centre. Laparoscopic appendectomy is now gradually being embraced by our patients because of the benefits of shortened hospital stay and fewer complications<sup>28</sup>. Intra-operatively, faecoliths and fibrous adhesion bands were noted to be present in 10% and 31% of the patients respectively. The fibrous adhesions were probably responsible for the kinking and subsequent luminal obstruction of the appendix.

The location of the inflamed appendix was found to be retrocaecal in 82% of the patients in our study. Although medical literature has reported that retrocaecal appendix occurs in 74% of the populace, this was found to be true in non-inflamed appendix<sup>3,5</sup>. Yeboah's report of inflamed retrocaecal appendix in 72.8% of his patients is consistent with our finding<sup>12</sup>. On the contrary, a study from Accra, Ghana, observed a rate of 56.7% for retrocaecal appendix<sup>29</sup>. Nevertheless, it is evident that the retrocaecal position of the inflamed appendix remains the commonest both in our environment and the Western countries<sup>5,12,29</sup>. Pelvic appendix was found in 6% of our patients as against the 19-22% reported from other climes<sup>5,12,29</sup>. The variations in the different positions of the inflamed appendix may be difficult to explain however, racial factors have been implicated but this fact remains unproven<sup>29</sup>.

Histopathological examination of the appendix specimens revealed normal appendix present in (33, 23.4%) patients. This represents our negative appendectomies (23.4%). Studies from Jos, North-central Nigeria and Benin, South-south Nigeria reported negative appendectomy rates of 29.5%<sup>30</sup> and 32.2%<sup>31</sup> respectively. These figures are comparable with that from our study. Edino et al<sup>27</sup> however reported a lower rate of negative appendectomy (14.1%). The seemingly high negative appendectomy rates from our study and other studies may be due to operative intervention in patients that did not actually

have appendicitis. Diagnostic laparoscopy when available, could avoid such unwarranted surgeries. Adisa et al<sup>28</sup> in their series have actually proven this. They observed that some of their patients predominantly females; who presented with symptoms that mimic appendicitis actually had associated pelvic organ pathologies. Such patients were managed with appropriate medications and interventions obviating the need for appendectomy.

Other specimens examined revealed acute inflammation without any obstructive agent in (69, 48.9%) patients. Reports from other similar studies reported higher rates of inflamed appendix<sup>13,32,33</sup>. Lymphoid hyperplasia and faecoliths were found in (27.7%) patients and (10%) patients respectively. Lymphoid hyperplasia as a principal cause of appendicitis has been reported by other workers in this environment<sup>13,34</sup>. The occurrence of lymphoid hyperplasia from this study and other similar studies may corroborate the diet and hygiene theories of appendicitis which revolves around activation of lymphoreticular cells.

The diet theory explains that the reduction in the fibre-cellulose content in the diet leads to a reduced colonic transit time and this invariably causes luminal occlusion, lymphoid hyperplasia and eventually obstruction and infection. The gradual change in the typical fibre-rich African to that of the fibre-depleted Western diet may be the culprit. This may explain the reason why some of our patients had faecoliths.

On the other hand, the hygiene theory describes the poor standard of living conditions and emphasizes the role of good sanitary habits, availability of safe and portable water as well as having good housing structure in the prevention of appendicitis<sup>34</sup>. This theory also explains the reason why parasitic infestation (ova and worms) could be a cause of appendicitis. The occurrence of schistosomal appendicitis observed in this study is not out of place as same has been reported earlier by Adebamowo et al<sup>36</sup> and Badmos et al<sup>37</sup>. This finding may not be too surprising as majority (>70%) of our patients reside in semi-urban and rural areas. Monoparasitic and polyparasitic infestations of the appendix have been reported and this is a reflection of the poor hygiene level that has plagued most communities in the third world<sup>11,13,27</sup>.

Intra-operative complications encountered include appendiceal rupture with localized abscess (28, 19.9%) patients, gangrene of the appendix (8, 5.7%) patients and vascular injury necessitating conversion to open procedure (1, 0.7%). Post-operative complications that ensued include incisional superficial surgical site

infection (7, 5.0%) patients, delayed wound healing (11, 7.8%) patients and low output controlled enterocutaneous fistula (1, 0.7%) patient. All these were seen with complicated appendicitis and the observed pattern is not different from what has been reported from other studies<sup>27,32,38</sup>.

## CONCLUSION

The presentation and management of appendicitis in our study is not different from what has been reported from other climes. Not all right lower abdominal pains are caused by appendicitis therefore, evaluating patients suspected of having appendicitis entails a thorough clinical assessment as well as appropriate use and interpretation of readily available diagnostic facilities.

The advent of laparoscopic surgery which is becoming increasingly popular in our centre and the country will aid in achieving a decline in negative appendectomy rates; as such capacity building in terms of personnel training should be encouraged for us to have this new modality of treatment readily available in our hospitals.

Conflict of interest: None

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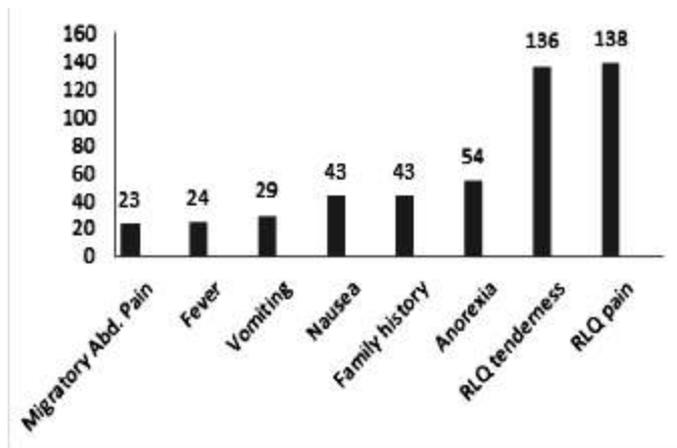
Table 1: Demography of patients

Characteristic	Frequency	Percentage
<b>Age group</b>		
< 10	3	2.1
10-20	54	38.3
21-30	57	40.4
31-40	17	12.1
41-50	6	4.2
51-60	2	1.4
61-70	2	1.4
<b>Sex</b>		
Male	55	39.0
Female	86	61.0
<b>Place of residence</b>		
Semi-urban	84	59.6
Rural	19	13.5
Urban	38	27.0
<b>Seasonality</b>		
Dry season	50	35.5
Rainy season	91	64.5
<b>Type of surgery</b>		
Open	120	85.1
Laparoscopic	21	14.9

Table 2: Histopathological findings of the removed appendices.

Findings	Frequency	Percentage.
Inflammation	69	42.6
Lymphoid hyperplasia	39	27.7
Normal	33	23.4
Gangrene	8	5.6
Schistosoma ova	1	0.7
Total	141	100.0

Figure 1: Pattern of the symptoms among the patients.



KEY: RLQ- Right lower quadrant

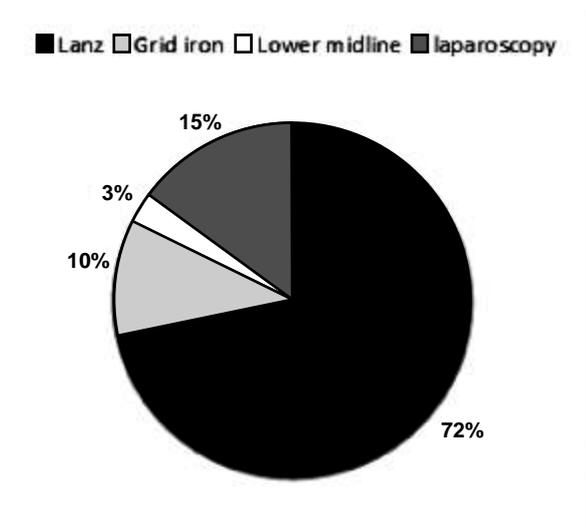


Figure 2: Various types of surgical access used.

■ Retrocaecal ■ Para-ileal □ Pelvic

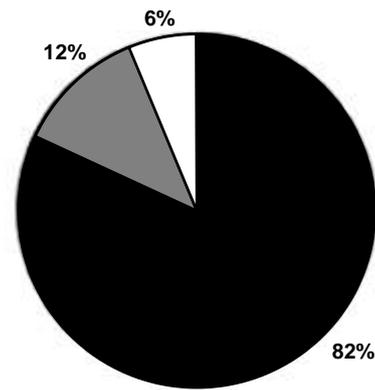


Figure 3: Various intra-operative positions of the appendix.

Table 3: Showing relationship between the pathological forms of appendices and post-operative complications

Complication.	Frequency				
	SSI	ECF	DH	Abscess	IH
Gangrene (n=8)	4	1	8	5	-
Inflammation(without perforation) (n=34)	-	-	-	-	-
Inflammation (with perforation) (n=27)	3	-	3	23	1
Lymphoid hyperplasia (n=39)	-	-	-	-	-
Normal (n=33)	-	-	-	-	-

KEY: SSI-surgical site infection, ECF-Enterocutaneous fistula, DH-Delayed wound healing, IH-Incisional hernia

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