

## Pattern of acute abdomen in a Tertiary hospital in Nigeria

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### Abstract

Acute abdomen is an acute painful abdominal condition that requires urgent surgical evaluation and treatment. This presents a diagnostic dilemma to emergency room physicians because it could be caused by a plethora of conditions. It is therefore necessary for these physicians to know the pattern of acute abdomen in their centres in terms of age and sex distribution, and causes, for prompt diagnosis and treatment.

### Aims and Objectives

- To determine the causes of acute abdomen in our environment
- To determine the age and sex distribution of acute abdomen
- To determine the presentation.
- To know the outcome of acute abdomen

**Materials and methods:** We retrospectively studied the medical records details of all adult patients admitted via the emergency room from 1 August 2018 to 31 July 2019, and information concerning age, sex, presenting complaints, examination findings, diagnosis, treatment, and outcome was obtained. Data was analyzed by SPSS statistical software.

**Results:** We had a total of 113 respondents consisting of 73(65%) females and 40(35%) males. Highest incidence occurred in the 20-29 age range with 30 (26.5%) respondents. Commonest presenting complaint was abdominal pain (99.1%) followed by vomiting 50(44.2%). Most common diagnosis was appendicitis 37(32.7%) comprising 19 males and 18 females with the highest incidence in the 20-29 age group. Intestinal obstruction is the next commonest cause of acute abdomen 11(9.73%) and occurring most frequently in the age group 50-59. Other causes include peritonitis secondary to perforated viscus. These include ileal typhoid perforation, perforated peptic ulcer disease, gall bladder perforation. A case of primary peritonitis was recorded. There were cases of vaso-occlusive crisis in the series. This could pose significant diagnostic dilemma. Overall, 108/113(95.6%) were treated and discharged. No death was recorded in the series (Table 14).

**Conclusion:** Good history, physical examination, easily accessible imaging, and laboratory tests ensure prompt surgical intervention for those who require surgery, thereby reducing morbidity and mortality.

**Keywords:** Acute abdomen; Abdominal pain; Intestinal obstruction; Appendicitis

### 1. Introduction

This is a painful severe condition requiring urgent surgical evaluation and treatment which may be surgical or medical. Abdominal pain is one of the commonest reasons for presentation in the Emergency Room<sup>1</sup>. Some of these conditions

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could be self-limiting<sup>2</sup>. There are many conditions that present this way, which occasionally causes diagnostic dilemma among doctors. It therefore requires that the attending Emergency Room physician is experienced and knowledgeable enough to make sound diagnosis and institute appropriate management and should have adequate knowledge about the pattern of acute abdomen in the country, which differs from place to place<sup>3,4</sup>. It is also necessary to know the pattern and outcome in elderly patients, which may slightly differ from young adults. This will help to develop management guidelines appropriate for our environment. There is no study that we are aware of that has addressed the pattern in this centre.

### *Aims and Objectives*

- To determine the causes of acute abdomen in our environment
- To determine the age and sex distribution of acute abdomen
- To determine the presentation.
- To know the outcome of acute abdomen

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## 2. Material and methods

WE undertook a retrospective descriptive study of all adult patients from 13 years, admitted to our Emergency Department between 1 August 2018 – 31 July 2019. Their case notes were obtained from the Medical Records and information concerning age, sex, presenting complaints and duration of symptoms, examination findings, diagnosis made, and treatment given was obtained. We also got information on number of days on admission and eventual outcome. Data was analyzed using SPSS statistical software.

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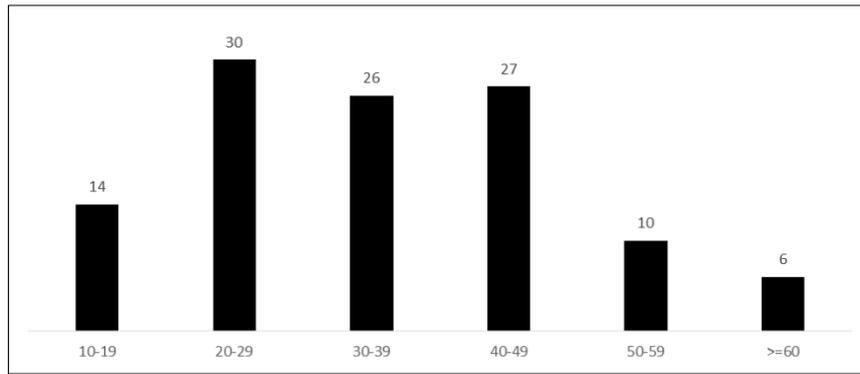
## 3. Results

The results are as outlined below.

**Table 1** Tabula representation of patient by sex, average and age group

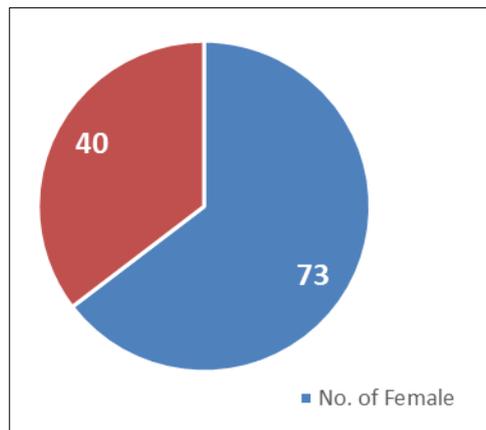
| Variable [n=113] | Frequency (%) |
|------------------|---------------|
| <b>Age</b>       |               |
| 10-19            | 14(12)        |
| 20-29            | 30(27)        |
| 30-39            | 26(23)        |
| 40-49            | 27(24)        |
| 50-59            | 10(9)         |
| >=60             | 6(5)          |
| <b>Sex</b>       |               |
| Female           | 73(65)        |
| Male             | 40(35)        |
| Overall mean age | 35±13.39      |

From the above, there were 113 respondents



**Figure 1** Age Range Incidence

This shows that the highest incidence occurred in the 20-29 age group.



**Figure 2** Number of Patient by sex

The female gender is represented by 73(65%) of the respondents while the male is 40(35%).

**Table 2** The commonest presenting complaint

| n=113                |           |            |
|----------------------|-----------|------------|
| Complaints           | Frequency | Percentage |
| Abdominal Distension | 3         | 2.65%      |
| Abdominal Pain       | 112       | 99.1%      |
| Bleeding PV          | 1         | 0.9%       |
| Blood in Stool       | 1         | 0.9%       |
| Chest Pain           | 1         | 0.9%       |
| Constipation         | 8         | 7%         |
| Diarrhea             | 15        | 13.3%      |
| Dysuria              | 1         | 0.9%       |
| Fever                | 11        | 9.7%       |
| Nausea               | 12        | 10.6%      |
| Stab                 | 1         | 0.9%       |
| Vomiting             | 50        | 44.2%      |
| Weakness             | 1         | 0.9%       |
| Total                | 217       |            |

The table shows that the commonest presenting complaint is abdominal pain

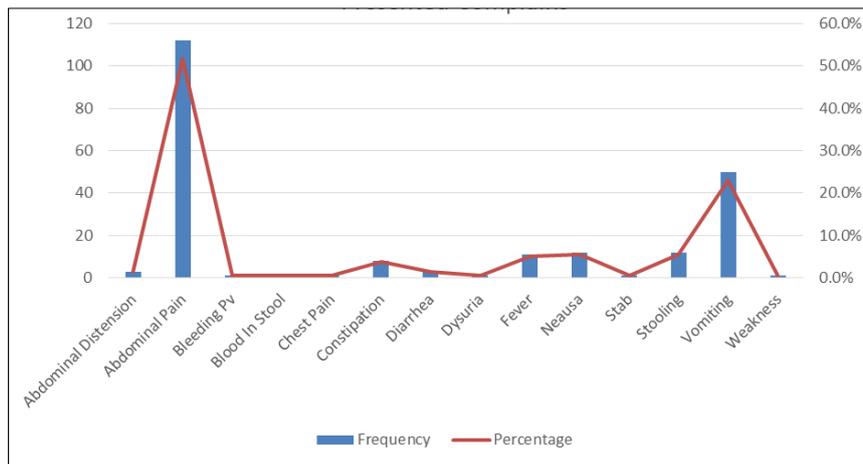


Figure 3 Presented Complains

Table 3 Diagnosis made

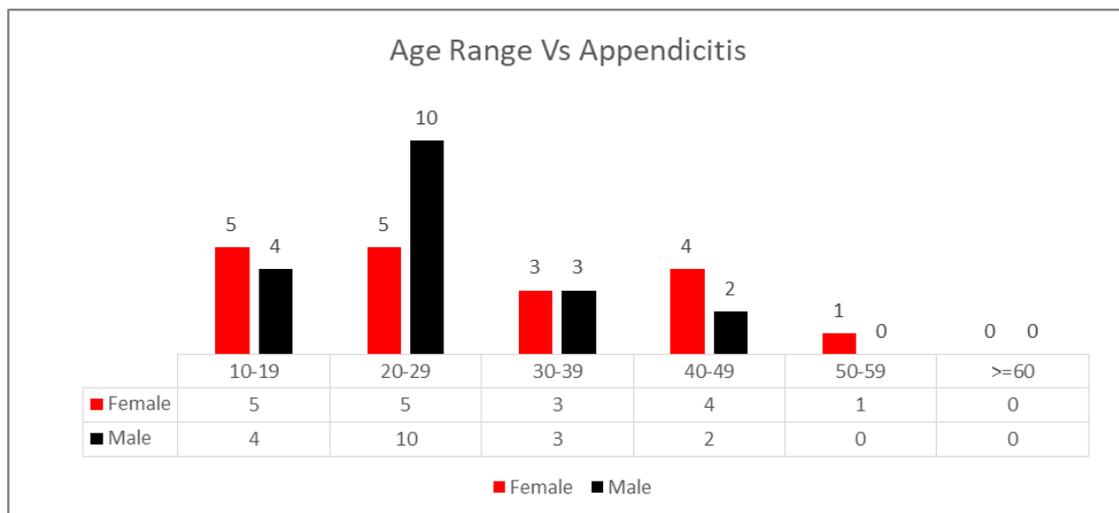
| Diagnosis/Age   | 10-19 | 20-29 | 30-39 | 40-49 | 50-59 | >=60 | Frequency | Percentage |
|---|-------|-------|-------|-------|-------|------|-----------|------------|
| Abscess/Collection                                    |       |       |       |       |       | 1    | 1         | 0.88%      |
| Appendicitis  | 9     | 15    | 6     | 6     | 1     |      | 37        | 32.7%      |
| Caecal Tumour   |       |       |       | 1     |       |      | 1         | 0.88%      |
| CAP   |       |       |       |       | 1     |      | 1         | 0.88%      |
| Calculous Cholecystitis                               |       | 1     | 1     | 4     |       | 1    | 7         | 6.1%       |
| Colitis   |       |       |       | 1     | 1     |      | 2         | 1.7%       |
| Ectopic Gestation                                     |       | 3     | 2     | 1     |       |      | 6         | 5.3%       |
| Ectopic Gestation (Ruptured)                          |       | 1     | 4     |       |       |      | 5         | 4.4%       |
| Endometritis  |       |       | 1     |       |       |      | 1         | 0.88%      |
| Blunt abdominal injury                                |       |       |       |       | 1     |      | 1         | 0.88%      |
| Fibroid   |       |       | 1     | 1     |       |      | 2         | 1.7%       |
| Gall bladder inflammation (Acalculous cholecystitis ) |       |       |       |       | 1     |      | 1         | 0.88%      |
| Gall bladder perforation                              |       |       | 1     | 1     |       |      | 2         | 1.7%       |
| Gangrenous Gall bladder                               |       |       |       | 1     |       |      | 1         | 0.88%      |
| Gall Stone & PUD                                      |       | 1     |       |       |       |      | 1         | 0.88%      |
| Gastroenteritis                                       | 1     |       |       |       |       |      | 1         | 0.88%      |
| Intestinal Obstruction                                | 1     | 1     | 1     | 2     | 4     | 2    | 11        | 9.7%       |
| Kidney Stone  |       |       | 1     |       |       |      | 1         | 0.88%      |
| Ovarian Tumour  |       |       |       | 1     |       |      | 1         | 0.88%      |
| Perforated Viscus                                     |       | 1     |       | 1     |       |      | 2         | 1.7%       |
| Primary Peritonitis                                   |       |       | 1     |       |       |      | 1         | 0.88%      |
| PUD   | 1     | 6     | 3     | 4     | 1     |      | 15        | 13.2%      |
| PUD & Appendicitis                                    |       |       |       |       | 1     |      | 1         | 0.88%      |
| Pyelonephritis  |       | 1     |       |       |       |      | 1         | 0.88%      |
| RPOC  |       | 1     |       |       |       |      | 1         | 0.88%      |
| Twisted Ovarian Cyst                                  | 1     |       | 2     |       | 1     |      | 4         | 3.5%       |

|                       |   |   |   |   |  |  |     |       |
|-----------------------|---|---|---|---|--|--|-----|-------|
| UTI                   | 1 |   |   |   |  |  | 1   | 0.88% |
| UTI & Fibroids        |   |   | 1 |   |  |  | 1   | 0.88% |
| UTI in Pregnancy      |   |   |   | 1 |  |  | 1   | 0.88% |
| Vaso-occlusive crisis |   | 2 |   |   |  |  | 2   | 1.7%  |
| TOTAL                 |   |   |   |   |  |  | 113 | 100   |

From the above table, appendicitis is the most common diagnosis with thirty-seven 37(32.7%) followed by PUD with fifteen 15(13.2%) and intestinal obstruction, 11(9.7%).

**Table 4** Age and sex distribution of Appendicitis

| AGE          | Female | Male | Frequency | Percentage |
|--------------|--------|------|-----------|------------|
| 10-19        | 5      | 4    | 9         | 24%        |
| 20-29        | 5      | 10   | 15        | 41%        |
| 30-39        | 3      | 3    | 6         | 16%        |
| 40-49        | 4      | 2    | 6         | 16%        |
| 50-59        | 1      | 0    | 1         | 3%         |
| >=60         | 0      | 0    | 0         | 0%         |
| <b>Total</b> | 18     | 19   | 37        | 100%       |



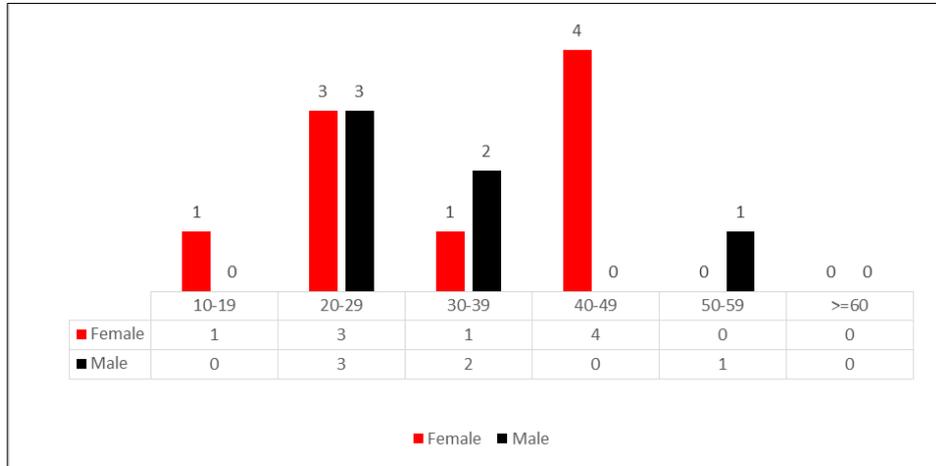
**Figure 4** Age Range Vs Appendicitis

From the above table and Figure, appendicitis is commonest with the age range of 20-29 where there are 15/37(41%) consisting of ten (10) males and five (5) females, followed by 10-19 with 9/37(24%) consisting of five (5) females and four (4) males.

**Table 5** Age and sex distribution of PUD

| AGE   | Female | Male | Frequency | Percentage |
|-------|--------|------|-----------|------------|
| 10-19 | 1      | 0    | 1         | 7%         |
| 20-29 | 3      | 3    | 6         | 40%        |

|              |   |   |    |      |
|--------------|---|---|----|------|
| 30-39        | 1 | 2 | 3  | 20%  |
| 40-49        | 4 | 0 | 4  | 27%  |
| 50-59        | 0 | 1 | 1  | 7%   |
| >=60         | 0 | 0 | 0  | 0%   |
| <b>Total</b> | 9 | 6 | 15 | 100% |



**Figure 5** age range VS PUD

From the above table and figure, PUD is commonest in the 20-29 age group, with 6/15 (40%) consisting of 3 males and 3 females.

**Table 6** Age and sex distribution of Intestinal Obstruction

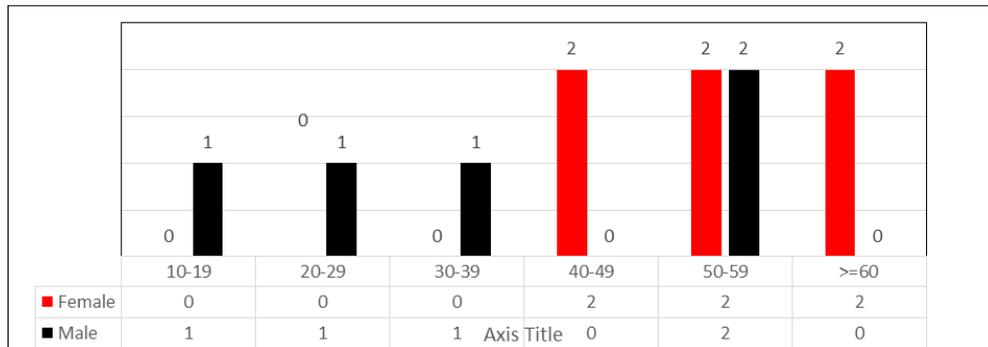
| AGE          | Female | Male | Frequency | Percentage |
|--------------|--------|------|-----------|------------|
| 10-19        | 0      | 1    | 1         | 7.1%       |
| 20-29        | 1      | 1    | 2         | 14.3%      |
| 30-39        | 0      | 2    | 2         | 14.3%      |
| 40-49        | 2      | 1    | 3         | 21.4%      |
| 50-59        | 2      | 2    | 4         | 28.6%      |
| >=60         | 2      | 0    | 2         | 14.3%      |
| <b>Total</b> | 7      | 7    | 14        | 100%       |

Intestinal Obstruction is commonest in the 50-59 age group with 4/14(28.6%) consisting of 2 males and 2 females.

**Table 7** Causes of Intestinal Obstruction

| Sex   | Adhesion | Hernia | Tumour  | Total |
|-------|----------|--------|---------|-------|
| M     | 4(44.4%) | 3(75%) | 0(0%)   | 7     |
| F     | 5(55.%)  | 1(25%) | 1(100%) | 7     |
| Total | 9        | 4      | 1       | 14    |

Adhesion was the cause of intestinal obstruction in 9/14(64.3%) consisting of 4 males and 5 females while Hernia accounted for 4/14 (28.6%) consisting of 3 males and 1 female. Tumour accounted for 1/14(7.1%) in a female.



**Figure 6** Age Range Vs Intestinal Obstruction

Intestinal Obstruction is commonest in the 50-59 age group with 4/14(28.6%) consisting of 2 males and 2 females.

**Table 8** Age distribution of Acute, Gangrenous and Ruptured Appendicitis

| Age          | Acute Appendicitis(%) | Gangrenous Appendicitis(%) | Ruptured Appendicitis(%) |
|--------------|-----------------------|----------------------------|--------------------------|
| 10-19        | 6                     | 1                          | 2                        |
| 20-29        | 11                    | 1                          | 3                        |
| 30-39        | 2                     | 1                          | 3                        |
| 40-49        | 4                     | 0                          | 2                        |
| 50-59        | 1                     | 0                          | 0                        |
| >=60         | 0                     | 0                          | 0                        |
| <b>Total</b> | <b>24(64.9)</b>       | <b>3(8.1)</b>              | <b>10(27.0)</b>          |

Acute appendicitis accounted for 24/37 (64.9%) of all cases of appendicitis with the highest in the age group 20-29 while Gangrenous Appendicitis accounted for 3/37(8.1%) and Ruptured Appendicitis accounted for 10/37 (27%).

**Table 9** Age and sex distribution of Acute Appendicitis

| Age          | Female    | Male      | Acute Appendicitis |
|--------------|-----------|-----------|--------------------|
| 10-19        | 4         | 2         | 6                  |
| 20-29        | 5         | 6         | 11                 |
| 30-39        | 1         | 1         | 2                  |
| 40-49        | 3         | 1         | 4                  |
| 50-59        | 0         | 1         | 1                  |
| >=60         | 0         | 0         | 0                  |
| <b>Total</b> | <b>13</b> | <b>11</b> | <b>24(64.9)</b>    |

Acute Appendicitis is commoner in females (13/24) than males (11/24). It occurred most in the age group 20-29.

**Table 10** Age and sex distribution of Gangrenous Appendicitis

| Age   | Female | Male | Gangrenous Appendicitis |
|-------|--------|------|-------------------------|
| 10-19 | 0      | 1    | 1                       |
| 20-29 | 1      | 0    | 1                       |
| 30-39 | 0      | 1    | 1                       |
| 40-49 | 0      | 0    | 0                       |
| 50-59 | 0      | 0    | 0                       |
| >=60  | 0      | 0    | 0                       |
| Total | 1      | 2    | 3(8.1)                  |

Gangrenous appendicitis is commoner in males (2/3) than females (1/3)

**Table 11** Age and sex distribution of Ruptured Appendicitis

| Age   | Female | Male | Ruptured Appendicitis |
|-------|--------|------|-----------------------|
| 10-19 | 1      | 1    | 2                     |
| 20-29 | 0      | 3    | 3                     |
| 30-39 | 1      | 2    | 3                     |
| 40-49 | 0      | 2    | 2                     |
| 50-59 | 0      | 0    | 0                     |
| >=60  | 0      | 0    | 0                     |
| Total | 2      | 8    | 10(27)                |

Ruptured appendicitis was more common in males (8/10) than females (2/10).

| OUTCOME        | Count |
|----------------|-------|
| Discharged     | 108   |
| Repeat Surgery | 5     |
| TOTAL          | 112   |

**Table 12** Proportion that had surgery overall

| SEX   | Conservative | Surgery | Total |
|-------|--------------|---------|-------|
| F     | 32           | 41      | 73    |
| M     | 21           | 19      | 40    |
| Total | 53           | 60      | 113   |

**Table 13** Outcome after surgery

| SEX            | F  | M  | Total |
|----------------|----|----|-------|
| Discharged     | 36 | 19 | 55    |
| Repeat Surgery | 5  | 0  | 5     |
| Total          | 41 | 19 | 60    |

Fifty-five respondents, comprising of 36/60 (60%) females and 19/60 (31.7%) males were discharged after surgery while 5 /60 (8.3%) females had repeat surgery.

**Table 14** General Outcome

| After Diagnosis | Outcome |
|-----------------|---------|
| Discharged      | 108     |
| Repeat Surgery  | 5       |
| Death           | 0       |
| Total           | 113     |

Of all the respondents, 108/112(94.2%) were discharged after treatment. No death was recorded.

#### 4. Discussion

We had 113 respondents admitted with acute abdomen, which corresponds to 10.2% of the total emergency admissions. Hagos and Agboola *et al* reported 11.4%<sup>5</sup> and 9.6%<sup>6</sup> respectively. There were 73(65) females and 40(35), with a M:F ratio of 1:1.82. This female preponderance tallies with the finding of Ibrahim<sup>7</sup> *et al* who reported 549 females and 254 males. However, both Agboola<sup>6</sup> (M: F 2.5:1) and Nwashili<sup>8</sup> (M:F ratio 1.1:1) reported a male preponderance. There is no agreement among researchers on sex predilection. However, the difference could be due to the inclusion or otherwise of gynaecological emergencies which will give a higher number of females. Age range of respondents is 13-83. The mean age was 35 ±13.39. (Table 1).

Acute Abdomen occurred most in the age group 20-29 with 30(27%) while the least is in the above 60 age group with 6(5%) respondents. (Table 1, Fig. A). The finding of the third decade being the commonest age of occurrence is comparable to other findings elsewhere but the reason why this is so remains unclear. It could be because appendicitis is commonest in this age group.

The most frequent presenting complaint is abdominal pain 112(99.1%), followed by vomiting 50(44.6%), diarrhoea 15 (13.3%), Nausea 12(9.6%) Abdominal distension 3(2.65%). Usually, acute abdomen is heralded by abdominal pain, which is the reason the patient seeks help. Other complaints are additional issues usually specific to the cause. (Table 2).

The commonest cause of acute abdomen in this series is acute appendicitis 37(34%). This tallies with the findings in Ethiopia<sup>5</sup> (53.2%), Ilorin<sup>6</sup> (30.4%), Benin<sup>8</sup> (46.2%), Sokoto<sup>9</sup> (55.26%), Port harcourt<sup>10</sup>(47.2%). It was commonest in the 20-29 age group with more males (10) than females (5). This explains the occurrence of acute abdomen most commonly in the same age group.

At surgery, of the 37 respondents with appendicitis, 24(64.9%) had acute appendicitis, which were histopathologically confirmed, 10(27.0%) had ruptured appendix while 3(8.1%) had gangrenous appendix. (Table 8). More females (M: F 11:13) had acute appendicitis, (Table 9) while gangrenous appendicitis (table 10) and ruptured appendicitis (Table 11) were commoner in men with M:F ratio 2:1 and 8:2 respectively. Rate of rupture of 27% was significantly lower than was reported in Ilorin<sup>6</sup> (40.4%) but higher than in Benin<sup>8</sup> (5.37%) but in all, it was commoner in males than females. The reason could be the higher endurance and better tolerance to pain on the part of the males leading to delayed presentation and more ruptures.

The diagnosis of appendicitis is basically clinical. It has become more accurate with the use of Alvorado score, thereby reducing the occurrence of negative appendectomies. However, despite the merits associated with its use, its applicability in black South African population with the disease was queried by Kong *et al*, having missed a “significant proportion of patients”<sup>11</sup>.

It is noteworthy that no case of appendicitis was recorded in the above 60 age group. This is due to the relative rarity of appendicitis in the extremes of age, with only 5-10%<sup>12-14</sup> occurring in the elderly population, but with higher rates<sup>15</sup> of perforation, longer hospital stay and higher death rates than younger age groups. Risk for mortality and high morbidity was found to be 70% as against 1% in the general population<sup>15</sup>

The next commonest cause of acute abdomen is Intestinal obstruction, representing 14(12.4%), out of which 9(64.3%) had adhesions/bands (Table 7). Of this, 3(21.4%) were managed conservatively while 6(42.9%) had surgical intervention. Four (28.5%) had obstructed hernias, while 1(7.14%) had intestinal obstruction secondary to Caecal tumour. Therefore, in this series, adhesion is a commoner cause of intestinal obstruction than hernias. This is due to previous abdominal surgeries. This differs from the findings of Ibrahim<sup>7</sup> *et al* who found that obstructed hernia was the commonest cause of intestinal obstruction but completely tallies with Nwashishi's<sup>8</sup> finding of adhesion and bands being the commonest. Lyon<sup>16</sup> reported that bowel obstruction in older patients was caused by adhesions (50-70%) and hernias (15-30%).

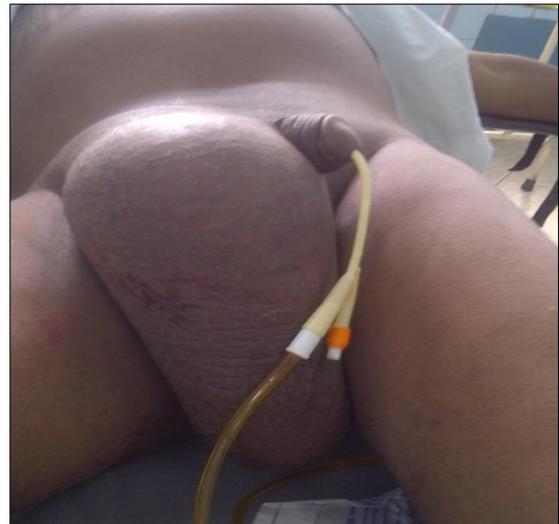


**Figure 7** Strangulated Right Inguinoscrotal Hernia

Malignancy is the commonest cause of large bowel obstruction in older patients. In this series, we found 1(7.14%) case of caecal obstruction. No case of sigmoid volvulus was found.



**Figure 8** Strangulated Small Bowel due to intestinal obstruction



**Figure 9** Strangulated Right Inguinoscrotal Hernia

Other causes of Acute Abdomen are as outlined in Table 3. Generalized peritonitis occurred in perforated viscus, including Perforated Typhoid, and perforated Duodenal Ulcer, which were surgically managed. There was one case of Primary peritonitis, for which no obvious cause was found, in a 34-year-old woman, recently treated for acute PID. Primary peritonitis comprises of 2% of all abdominal emergencies<sup>17</sup> in children, but rarer in adults. It is very rare in healthy individuals (2%)<sup>18</sup>. Other conditions include gangrenous and perforated gall bladder, vaso-occlusive crisis in HBSS patients, bladder injury following blunt abdominal injury secondary to trauma.

A total of 60/113(53.1%) respondents had surgery consisting of 41 females and 19 males, out of which 5 had repeat surgery (Table 12). The remaining 53/113(46.9%) were managed conservatively. This confirms the fact that acute abdominal conditions can resolve spontaneously or with conservative management. Bains SN *et al*<sup>19</sup> reported a case of a 54-year-old woman with severe acute onset generalized abdominal pain, which was associated with bloating, nausea, and vomiting. However, it resolved spontaneously in 24 hours following administration of morphine. Prompt investigation is necessary to avoid unnecessary surgeries and to identify cases of acute abdomen due to vaso-occlusive crisis and other medical conditions.

Clinical assessments including history and physical examination are vital in the initial evaluation of a patient with acute abdomen. However, these assessments alone are inadequate, only accurate in 47-76%<sup>20</sup> of patients with acute abdomen. Therefore, investigations are necessary. These investigations, after a combination of good history and physical examination, include imaging where available, and laboratory blood tests. Abdomino-pelvic CT<sup>21</sup> scans and ultrasound scans are necessary to correctly identify the pathology in the abdomen, for early surgeries to be performed in those with need for surgery. Imaging also helps to identify unsuspected pathology, prevent unnecessary surgeries, and reduce length of hospital stay and mortality. Full blood counts, including white blood cells give an indication to possibility of sepsis in cases or peritonitis from perforated viscus. C-reactive protein is an acute-phase protein that increases when there is inflammation. It is invaluable as an aid in the diagnosis of acute abdomen<sup>22</sup>.

Overall, 108/113(95.6%) were treated and discharged. No death was recorded in the series (Table 14). Good history, physical examination, and prompt surgical intervention for those who require surgery, reduce morbidity and mortality.

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## 5. Conclusion

Patients presenting in the emergency with acute abdomen need urgent help. It is necessary to take proper history and examine them carefully and institute adequate management. The spectrum is wide, so prompt diagnosis must be made. In making prompt diagnosis, care must be taken to make correct diagnosis so as not to subject patients to unnecessary surgeries and not to delay required surgeries unnecessarily. Imaging modalities like CT and USS need to be easily available and accessible in the Emergency Room for prompt evaluation.

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## Compliance with ethical standards

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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## References

- [1] Patterson BW, Venkatesh AK, AlKhawam L, Pang PS. Abdominal Computed Tomography Utilization and 30-day Revisitation in Emergency Department Patients Presenting with Abdominal Pain. *Acad. Emerg. Med.* 2015; 22: 803–810.
- [2] Bingisser R, Dietrich M, Nieves Ortega R, Malinowska A, Bosia T, Nickel CH. Systematically assessed symptoms as outcome predictors in emergency patients. *Eur. J. Intern. Med.* 2017; 45: 8–12.
- [3] Agbo SP, Oboirien M, Ismail S. Pattern of surgical abdominal emergencies in Sokoto, Nigeria. *Jos J Med.* 2012; 6: 22-5.
- [4] Naaeder SB, Archampong EO. Clinical spectrum of acute abdominal pain in Accra, Ghana. *West Afr. J. Med.* 1999; 18.
- [5] Hagos M. Acute abdomen in adults: A two year experience in Mekelle, Ethiopia. *Ethiop Med J.* Jan 2015; 53(1): 19-24.
- [6] Agboola JO, Olatoke SA, Rahman GA. Pattern and presentation of acute abdomen in a Nigerian teaching hospital. *Niger Med J.* 2014; 55: 266-70.
- [7] Ibrahim NA, Oludara MA, Omodele FO, Oyedele OO. Surgical and Gynaecological Abdominal Emergencies in Adults: The Experience of Lagos State University Teaching Hospital, Ikeja, Lagos State, Nigeria. *Nigerian Hospital Practice.* 2010; 5: 3-4.

- [8] Nwashilli NJ, Okobia NM, Osime OC, Abugui OJ. The pattern and outcome of surgical acute abdomen at a Nigerian tertiary hospital. *Niger J Surg Sci* 2017; 27: 51-6.
- [9] Agbo P, Oboirien M, Ismail S. Pattern Of Surgicalabdominal Emergencies In Sokoto, Nigeria. *Jos Journal of Medicine*. 2012; 6(1): 22-25.
- [10] Alagoa PJ, Jebbin NJ. The changing pattern of acute abdomen in Port Harcourt, Nigeria. *Port Harcourt Medical Journal*. 2009; 4(2).
- [11] Kong VY, Van Der Linde S, Aldous C, Handley JJ, Clarke DL. The accuracy of the Alvarado score in predicting acute appendicitis in the black South African population needs to be validated. *Can J Surg*. Aug 2014; 57(4): E121–E125.
- [12] Lunca S, Bouras G, Romedea NS. Acute appendicitis in the elderly: diagnostic problems, prognostic factors and outcomes. *Rom J Gastroenterol*. 2004; 13: 299-303.
- [13] Storm-Dickerson TL, Horattas MC. What we have learned over the past 20 years about appendicitis in the elderly. *Am J Surg*. 2003; 185: 198-201.
- [14] Gurleyik G, Gurleyik E. Age-related clinical features in older patients with acute appendicitis. *Eur J Emerg Med*. Sep 2003; 10(3): 200-3.
- [15] Abdelkarim HO, Muhammad RK, Ghazi RQ, Ahmad KS, Mohammad KBY, Sahel KH. Acute appendicitis in the elderly: risk factors for perforation. *World J Emerg Surg*. 2014; 9: 6.
- [16] Lyon C, Clarke DC. Diagnosis of Acute Abdominal Pain in Older Patients. *SA Fam Pract*. 2007; 49(4): 35-40.
- [17] Armitage TG, Williamson RCN. Primary Peritonitis in Children and Adults. *Postgraduate Medical Journal*. 1983; 59: 21-24.
- [18] Cortese F, Fransvea P, Saputelli A. Streptococcus pneumoniae primary peritonitis mimicking acute appendicitis in an immunocompetent patient: a case report and review of the literature. *J Med Case Reports*. 2019; 13: 126.
- [19] Bains SN, Anis M, Mohr LC, Bains SS, Strange C. Rude Awakening: Acute Abdominal Pain with Spontaneous resolution. *Images in Radiology*. 2012; 125(10): 971-973.
- [20] Rosen MP, Sands DZ, Longmaid HE, Reynolds KF, Wagner M, Raptopoulos V. Impact of Abdominal CT on th Management of Patients Presenting to the Emergency Department with Acute Abdominal Pain. *American Journal of Roentgenology*. 2000; 174(5): 1391-1396.
- [21] Ng CS, Watson CJE, Palmer CR, See TC, Beharry NA, Housden BA, Bradley JA, Dixon AK. Evaluation of early abdominopelvic computed tomography in patients with acute abdominal pain of unknown cause: prospective randomized study. *BMJ*. 2002; 325(7377): 1387-1389.
- [22] Salem TA, Molloy RG, O'Dwyer PJ. Prospective Study on the Role of C-Reactive Protein (CRP) in Patients with an Acute Abdomen. *Ann R Coll Surg Engl*. 2007; 89(3): 233-237.