

# Acute Appendicitis among Saudi and Non-Saudi Patients: A Cross-Sectional Based Study

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## Abstract

**Objective:** We conduct this study to discuss the differences between Saudi and non- Saudi patients with acute appendicitis. **Background:** Acute appendicitis is one of emergency surgeries in developing and developed countries. Its symptoms are vomiting, lower abdominal pain and decreased appetite. Appendicitis needs urgent surgical prouder to avoid its perforation and associated complications which may lead to death. **Method:** We conduct cross-sectional based study in one of khamis Mushayt, Saudi Araba. 136 patients diagnosed with acute appendicitis were included and their medical records were reviewed after getting their informed consent. **Results:** We included 136 patients, 90 were non-Saudi and 46 were Saudi. There were no statistically differences in their diagnosis but the distribution of the diagnosis was different. **Conclusion:** Acute appendicitis was more prevalent among non-Saudi patients, the diagnosis between both was with no significant differences. **Keywords:** acute appendicitis, Saudi, non-Saudi, diagnosis, cross-sectional, Saudi Arabia and khamis Mushayt .

## 1. Introduction

Acute appendicitis is the most preventable differential diagnosis at any hospital dealing with acute abdominal surgical conditions. It is one of the most common abdominal emergency in both developed and developing countries (1,2). Reginald Fitz is credited with being the first person to describe the condition in 1886. Around six to seven percent of all population suffers from acute appendicitis during their life (1,3).

Its symptoms vary from vomiting to sever abdominal pain

It seems to be the end result of a primary intestinal obstruction of the appendix (4,5). Once the obstruction occurs, the appendix will be filled with mucus and swell. The continuous production of mucus increases the pressures within the lumen and the walls of the appendix. this increased pressure leads to thrombosis and occlusion of the small vessels, and of lymphatic flow stasis. At this point, spontaneous recovery less likely to occur (6).

In this case appendectomy is the standard treatment and it significantly lowers the risks of perforation and its complications (7-9). Uncomplicated acute appendicitis, when surgically treated, its rate of complications is lowered (10) and gives the definitive diagnosis, in addition to reduces the risk of perforation, sepsis and death are decreased (11).

In 2015 there were 11.6 million cases of appendicitis that resulted in more than 50,100 deaths (12). In the United States, appendicitis is one of the most preventable cause of sudden abdominal pain which needs urgent operation.

In this study authors aimed to compare between both Saudi and non-Saudi patients diagnosed with acute appendicitis and between their lab and different methods of diagnosis results.

## 2. Method:

### 2.1. Study setting

In this cross-sectional study, 136 patients, who were admitted to the emergency unit of Dr. Ghassan Pharaon hospital in Khamis Mushayt, Saudi Arabia and clinically diagnosed with acute appendicitis.

### 2.2. Selection criteria

All Patients with suspected acute appendicitis that visited the hospital during the period of the study were included with no restrictions to gender, race, color, religion or nationality. Exclusion criteria were: 1) hepatobiliary diseases, 2) hemolytic diseases, 3) alcoholic patients, 4) certain infectious diseases.

### 2.3. Data collection and laboratory methods

we collected the data about lab results, diagnosis and general information from patients' medical records.

### 2.4. Statistical analysis

statistical analyses were performed using SPSS 24 for Windows (SSPS Inc., Chicago, IL, USA). Data were

analyzed by Chi square, and Fisher's exact test. In order to compare the mean of age, gender, the test variables WBC, CRP, TB, and their application when predicting perforated appendicitis, receiver-operating characteristic (ROC) curves were created for each endpoint. Two-sided "p-values" were considered to show statistical significance when it was  $<0.05$  for all statistical tests

### 2.5. Research ethics

All participants gave full informed written consent, which included consent for biomarker analysis prior to inclusion into the study. Participation was voluntary, and participants told that they could exclude themselves at any time. All their personal information and files number will be confidential and the results will be published as a total.

### 3. Results

We included 136 patients, 46 patients, 24 males and 22 females, were from KSA with mean years of age 28.46 (13.08) and 90 patients, 50 males and 40 females, were from other countries, their mean years of age was 32.14 (11.1). Average hours of hospital stay for both Saudi and non-Saudi patients was 30.08 (27.05) and 36.17 (37.86) respectively. The mean of WBCs and neutrophils count in Saudi patients was 10.17 (3.45) and 7.03 (3.4) respectively. On the other hand, WBCs and neutrophils in non-Saudi patients have mean of count 10.9 (4.49) and 7.91 (4.44) respectively (table1).

There was no significant difference between Saudi and non-Saudi in the diagnosis by specialists although the prevalence of diagnosis was different (table 2).

In table 3, the finding of both CT and ultrasonography were different from each other as well as from the diagnosis by specialists (table 2) and the actual intraoperative findings (table4) but with no significant differences between them.

Histopathological findings differ from Normal appendix without any gross pathologic changed, Early acute appendicitis with intraluminal and mucosal inflammation, Acute suppurative appendicitis, Gangrenous appendicitis and perforated appendicitis with no significant difference between Saudi and non-Saudi (table 4).

### 4. Discussion

In table 1, acute appendicitis was preventable among non-Saudi patients than Saudi. The mean age of Saudi patients was  $28.46 \pm 13.08$  while Zuhour K Al-gaith has reported the mean age of Saudi patients diagnosed with acute appendicitis is  $23.25 \pm 9.80$ .

Male patients were more than females in both groups as reported in other studies (13-16). The length of hospital stay was elevated in non-Saudi and this may be due to increased post-operative complications (17).

WBCs and neutrophils play a significant role in the diagnosis of acute appendicitis (18) and there were no differences between both groups in their counts. Ishizuka M, et al, showed that neutrophils count is an indication for the type of appendicitis and help to give the definitive diagnosis (18).

Appendicitis diagnosis is mainly clinically, Diagnosis is based on a signs and symptoms as well as physical examination which can be supported by neutrophils and the whole white blood cells diagnosis(19).

table 2 reported the results of specialists' diagnosis, acute appendicitis was more common in both groups followed by acute abdomen, appendicular mass and then appendicitis associated with other diseases.

In table 3, we summarize the findings of both CT and USG, Appendicitis was most preventable in both techniques. However, negative/normal come in the second place when USG performed and the third in case of CT scan. There were no statistically differences between Saudi and non-Saudi when diagnosed by those technique.

USG is a widely used in acute appendicitis diagnosis, however its use still remains controversial (19) as well as CT scan but CT usually used when diagnosis is not clear based on history and physical examination. Concerns about radiation head for limitation of the use of CT in both pregnant women and children, with the increasingly widespread usage of MRI (20).

Intraoperative and histopathological findings were listed in table 4.

Histopathology is the best method for diagnosis as it allows physicians to identify malignancies and give the certain diagnosis(21).

There were some limitations of this study such as the short period of time, applying to one hospital, number of patients was small and lack of fund.

On the other hand, there are a lot of strength points, it's the first study to compare between Saudi and non-Saudi patients with acute appendicitis, all data about their diagnosis were analyzed and all patients were recruited.

### 5. Conclusion

Acute appendicitis is more preventable among non-Saudi patients than Saudi patients, males in both groups was

the most.

WBCs and neutrophils count was statistically not significant as well as

## 6. References

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Table 1: participants' characteristics:

Variables	Saudi	Non-Saudi
Total	46 (33.8%)	90 (66.2%)
Gender (males/females)	22/24	50/40
Age: mean (SD)	28.46 (13.08)	32.14 (11.1)
Hospital stay in hours: mean (SD)	30.08 (27.05)	36.17 (37.86)
WBCs count: mean (SD)	10.17 (3.45)	10.9 (4.49)
Neutrophils count: mean (SD)	7.03 (3.4)	7.91 (4.44)

Table 2: diagnosis by specialists:

Variables	Saudi	Non-Saudi
Acute abdomen	12	30
Acute appendicitis	25	53
Appendicular Mass	3	5
acute appendicitis with Right renal colic	1	0
AGE with acute appendicitis	1	0
Complicated appendicitis	1	0
p-value 0.224		

Table 3: CT and USG findings:

Variables	Saudi	Non-Saudi
<b>USG findings</b>		
Normal/negative	7	10
Appendicitis	17	39
Other diagnosis	3	7
Advised other investigations	7	15
Not performed	12	19
p-value 0.89		
<b>CT findings</b>		
Normal/negative	2	3
Appendicitis	11	32
Other diagnosis	3	9
Not performed	30	46
p-value 0.4		

Table 4: intraoperative and histopathological findings:

Variables	Saudi	Non-Saudi
<b>intraoperative finding</b>		
Appendicitis	20	46
Complicated appendicitis	7	23
Appendicitis with other finding	11	14
Notes not available	3	7
p-value 0.42		
<b>histopathological finding</b>		
Normal appendix without any gross pathologic changed.	1	1
Early acute appendicitis with intraluminal and mucosal inflammation.	7	15
Acute suppurative appendicitis.	21	43
Gangrenous appendicitis.	4	4
Perforated appendicitis.	0	1
Not Performed	13	26
p-value 0.88		