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Prevalence and Seasonality of Acute Appendicitis Among Patients Registered at Ibn- Sina General Hospital in Al-Mukalla, Yemen

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Prevalence and Seasonality of Acute Appendicitis Among Patients Registered at Ibn- Sina General Hospital in Al-Mukalla, Yemen

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Abstract

Appendicitis is the most common acute surgical condition of the abdomen. Age, sex and seasonal variations have been observed in many studies. The aim of the study is to determine the prevalence and seasonality of acute appendicitis among patients registered in Ibn-Sina general hospital (ISGH) in Al-Mukalla. In this retrospective study. The data was collected from admission records in surgical department of ISGH during the period January 2011 - December 2017. Out of 12580 patients attending surgical ward, 2565 patients with acute appendicitis were collected from records of the hospital. The prevalence of acute appendicitis during the study years was 20.39%. The prevalence of acute appendicitis in males was found to be twice that of females (66.6% and 33.4% respectively). Acute appendicitis was significantly higher among males in the 11-20 age group (70.0%). While in females it was higher in the age group ≤ 10 years (51.1%) (p value = 0.000).and decreased with age increase in both males and females. A significant seasonal effect was also observed, with the prevalence of acute appendicitis higher in the winter and autumn (p value = 0.000). In this study obvious differences were observed in the prevalence of acute appendicitis for different seasons, age groups and genders with higher rate in teen age group, male gender and winter and autumn season.

Keywords: Acute appendicitis, prevalence, seasonality, Ibn-Sina hospital, Al-Mukalla

Introduction:

Acute appendicitis is the most common cause of 'acute abdomen. It is defined as a sudden, severe inflammation of the vermiform appendix. It is characterized by abdominal pain, usually localized in the lower right quadrant, with nausea, vomiting and constipation [14]. The etiology of the appendicitis still remains unclear and multifactorial.

The disease has been attributed to a variety of possible causes, including mechanical obstruction [9] inadequate dietary fiber [1] smoking [19], air pollution [10] and familial susceptibility [6,21].

The incidence of appendicitis seems to have risen greatly in the first half of this century, particularly in Europe, America and Australasia, with up to 16% of the population undergoing appendectomy [14]. The rate of acute appendicitis varies among countries. Declining rates of acute appendicitis have been reported in the United States and Europe. In the past 30 years, the incidence has fallen dramatically in these countries, such that the individual lifetime risk of appendicectomy is 8.6% and 6.7% among males and females respectively [14]. However, the frequency appears to be increasing in the developing countries [20,16].

Age, sex and seasonal variations of acute appendicitis have been observed in many studies, but the reasons for these variations are not clear. Acute appendicitis is relatively rare in infants, and is common in childhood and early adult life, reaching the peak of infection in teens and early twenties.. After middle age, the risk of developing appendicitis is quite small. The incidence of appendicitis is equal among males and females before puberty. In teenagers and young adults, the male–female ratio increases to3:2 at age 25; thereafter, the greater incidence in males declines [14].

Population-based epidemiological studies about the impact of seasonal variables on appendicitis have been published, but so far there is no clear consensus about the connection between the seasonal variations and acute appendicitis [4,15,17,18].

Although acute appendicitis is a common surgical condition, little is known about its epidemiology in Yemen. Therefore, this study was conducted to explore the prevalence, demographic characteristics, and seasonal variation and trends of acute appendicitis among patients attended Ibn Sina general hospital in AL-Mukalla district during the period 1st January 2011 to 31st December 2017.

Materials and method:

The study was a retrospective descriptive study, relied on data that had been collected through medical records. All patients with Appendicitis

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who registered for treatment at Ibn Sina General Hospital (ISGH) in AL-Mukalla district from 1st January 2011 to 31st December 2017 were included in this study. The study was carried out at Ibn Sina General Hospital in Al- Mukalla District. ISGH is the main referral hospital that provides health services to the population from the following geographical areas [Hadhramout, Shabwa and Mahara governorates)

Data Analysis:
To ensure the accuracy of data processing, the data were analyzed by using (statistical package for social software SPSS version (19.0), frequencies and percentages for categorical data. Comparisons were done with the Chi-square test and p-value level <0.05 was considered, significant throughout the study.

Results:
During the seven years the total patients attending the surgical wards were 12580; out of them 2565 patients with acute appendicitis were collected from records of the hospital. The prevalence of acute appendicitis during the 7 years was 20.39%. Out of 2565 there were 2055 (80.1%) patients operated with acute appendicitis and 510 (19.9%) were treated conservatively as appear in Table 1.

Table No (1): Frequency of patients registered at ISGH with acute appendicitis during the years 2011-2017

Treatment		Frequency	Percent
Operated	Appendectomy	2013	78.5
	Perforation	42	1.6
Conservative	Mass	108	4.2
	Observation	402	15.7
Total		**2565**	**100.0**

As shown in Table 2 the distribution of acute appendicitis with respect to gender. Males were found to be twice as high as females (66.6% and 33.4% respectively) of the total number of patients during the seven years of study period. It was seen also that the number of patients with acute appendicitis is increasing yearly starting from 157 at the year 2011 to 743 at the year 2017.

Table No (2): Distribution of acute appendicitis related to gender during the study years 2011-2017

Year	Gender		Total
	Male No (%)	Female No (%)	No (%)
2011	116 (73.9)	41 (26.1)	157 (100.0)
2012	101 (62.7)	60 (37.3)	161 (100.0)
2013	152 (65.5)	80 (34.5)	232 (100.0)
2014	278 (71.1)	113 (28.9)	391 (100.0)
2015	259 (65.7)	135 (34.3)	394 (100.0)
2016	318 (65.3)	169 (34.7)	487 (100.0)
2017	484 (65.1)	259 (34.9)	743 (100.0)
Total	1708 (66.6)	857 (33.4)	2565 (100.0)

Table 3 demonstrates the distribution of acute appendicitis regarding age groups. More than half of recorded patients were at the age group of 11-20 years and the number was decreased when the patients were older. The lowest number was 109 (4.2%) in older than >40 years.

Table 3: Distribution of acute appendicitis according to age group

Age group	Frequency	Percent
≤10	223	8.7
11-20	1332	51.9
21-30	729	28.4
31-40	172	6.7
>40	109	4.3
Total	2565	100.0

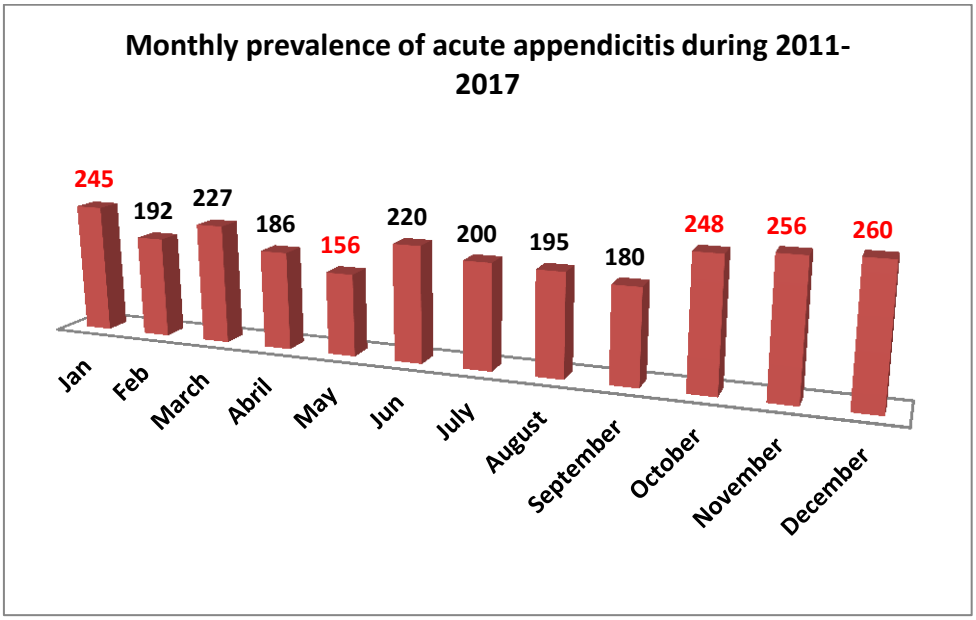
Using Chi square test, it was found that, there was significant association between patients' age groups and gender in the occurrence of acute appendicitis. The prevalence of acute appendicitis was significantly higher among males in age group 11-20 years 932(70.0%). The prevalence of acute appendicitis was significantly higher among females in age group ≤ 10 years 114(51.1%). On the other hand the prevalence of acute appendicitis has decreased with increasing of age in both males and females (Table 4).

Table 4: Association between prevalence of acute appendicitis and age group and gender among study populations

Age groups (years)	Sex				Total		p-value
	Male		Female				
	No	(%)	No	(%)	No	(%)	
≤ 10	109	(48.9)	114	(51.1)	223	(100.0)	0.000
11-20	932	(70.0)	400	(30.0)	1332	(100.0)	
21-30	483	(66.3)	246	(33.7)	729	(100.0)	
31-40	113	(65.7)	59	(34.3)	172	(100.0)	
> 40	71	(65.1)	38	(34.9)	109	(100.0)	
Total	1708	(66.6)	857	(33.4)	2565	(100.0)	

*Chi square *p<0.05 is considered statistically significant*

Figure (2) shows the prevalence of acute appendicitis in every month during the study period 2011-2017. It was found that the highest prevalence of registered patients with acute appendicitis was in cold months; December, November, October and January (260, 256, 248 and 245 cases respectively). The lowest prevalence was in May 156 patients.



As shown in Table 5, there was a significant association between season and prevalence of acute appendicitis. It was clear that the prevalence of acute appendicitis throughout the most study years was significantly higher in winter and autumn and decreased during spring and summer.

Table 5: Association between seasons and the prevalence of acute appendicitis

Year	Season								Total		P. value*
	Winter		Spring		Summer		Autumn				
	No	%	No	%	No	%	No	%	No	%	
211	39	(24.8)	33	(21.0)	40	(25.5)	45	(28.7)	157	(100.0)	0.000
2012	33	(20.5)	34	(21.1)	54	(33.5)	40	(24.8)	161	(100.0)	
2013	82	(35.3)	48	(20.7)	30	(12.9)	72	(31.0)	232	(100.0)	
2014	97	(24.8)	96	(24.6)	96	(24.6)	102	(26.1)	391	(100.0	
2015	140	(35.5)	69	(17.5)	100	(25.4)	85	(21.6)	394	(100.0)	
2016	125	(25.7)	110	(22.6)	112	(23.0)	140	(28.7)	487	(100.0)	
2017	176	(23.7)	184	(24.8)	183	(24.6)	200	(26.9)	743	(100.0)	
Total	692	(27.0)	574	(22.4)	615	(24.0)	684(26.7)		2565	(100.0)	

** p <0.05 is considered statistically significant*

Discussion

Despite diagnostic and therapeutic advancement in medicine, appendicitis remains a clinical emergency. In fact, this illness is one of the most common causes of acute abdominal pain. The prevalence of acute appendicitis found in this study (20.39%) is much higher than that found in the study done among the population in the United States and European countries 7%. [5,12]. On the other hand the prevalence of acute appendicitis among the Yemeni population in the present study is much lower than that in the other developing countries such as India where the prevalence was 30.7% [11]

One of the most striking epidemiological features of appendicitis is the marked variation in

prevalence by age and sex. In this study, the highest prevalence of acute appendicitis was observed among males than females (with a male to female ratio of 2.2: 1), which was consistent with other studies in Canada, Tehran, Nigeria and Ghana where males had higher prevalence of appendicitis more than females [4,15,17,18].

In our study we found a significant association between the prevalence of acute appendicitis and the patients' age. Acute appendicitis was found significantly higher among males in those aged 11-20 years of age group whereas in females the highest occurrence was observed in ≤ 10 years of age group. In most of the studies, it is observed that appendicitis is common in the youngest age group which we also observed in our study. These studies such as India (1-20 years age group) United States (10–19 years age group) and Ontario, Canada (10–19 years age group) [11,5,4].

Study conducted by Noudeh et al in Tehran showed that appendicitis is more common in males, in those aged 21-30 years whereas in females the highest occurrence was observed in (11-20 years of age group) [15].

A study conducted by Thomas in Saudi Arabia showed that acute appendicitis was found to be most common between ages 10 to 29 years [23]. While a study conducted by Mungadi et al in Nigeria showed that acute appendicitis is more common in age group 20-29 years [13].

Regarding seasonality our study found a significant association between the occurrence of acute appendicitis and temperature. Seven years period of study (2011-2017) showed seasonal variation of appendicitis with peak in Winter and Autumn and decreased during Spring and Summer. This observation is consistent with the study that was carried out in India which revealed that the highest in Summer and Spring and the lowest in Autumn and Winter [11]

In contrast a seasonal pattern of incidence for acute appendicitis which has been reported by other many studies, which revealed that the highest incidence of acute appendicitis was found in Summer and Spring and the lowest in Autumn and Winter [7,13,23]. The influence of seasonal variables on the incidence of acute appendicitis has been discussed in many studies but yet there is no definite explaination for it [2,3,8,22].

Conclusion

The prevalence of acute appendicitis during the 7 years was (20.39%). Acute appendicitis was significantly higher among males, in those aged 11-20 years compared to females, in those aged ≤ 10 years and has decreased with increasing of age in both males and females. Occurrence of appendicitis was significantly higher during the Winter and Autumn season.

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انتشار وموسمية التهاب الزائدة الدودية الحاد بين المرضى المسجلين في مستشفى ابن سينا العام بالمكلا، اليمن

عبدالله صالح اليماني فوزية فرج بامطرف

الملخص

لتهاب الزائدة الدودية هو أكثر الحالات الجراحية الحادة شيوعا في البطن. وفي العديد من الدراسات تم ملاحظة العمر والجنس والتغيرات الموسمية . الهدف من الدراسة هو تحديد مدى انتشار وموسمية التهاب الزائدة الدودية الحاد بين المرضى المسجلين في مستشفى ابن سينا العام في المكلا. في هذه الدراسة الاسترجاعية ، تم جمع البيانات من سجلات القبول في قسم الجراحة في مستشفى ابن سينا العام بالمكلا خلال الفترة يناير 2011 – ديسمبر 2017. من بين 12580 مريض الذين حضروا جناح الجراحة ، تم فرز 2565 مريض من سجلات المرضى والذين يعانون من التهاب الزائدة الدودية الحاد. كانت نسبة التهاب الزائدة الدودية الحاد خلال السبع سنوات 20.39 %. ووجد أن انتشار التهاب الزائدة الدودية الحاد في الذكور ضعف الإناث (66.6 %) والإناث 33.4 %. وكانت التهاب الزائدة الدودية الحاد أعلى بشكل ملحوظ بين الذكور في المجموعة العمرية 11–20 سنة (70.0%). بينما في الإناث كانت أعلى في الفئة العمرية ≥ 10 سنوات (51.1%) (P=0.000) ، وانخفضت مع زيادة العمر في كل من الذكور والإناث. ولوحظ أيضا تأثير موسمي كبير ، مع انتشار التهاب الزائدة الدودية الحاد أعلى في فصل الشتاء والخريف (p = 0.000). ي هذه الدراسة لوحظ اختلافات واضحة في التهاب الزائدة الدودية الحاد لمواسم مختلفة ، وللفئات العمرية وفي الجنسين مع انتشار أعلى في مجموعة سن المراهقة ، وبين الذكور وموسم الشتاء والخريف.

الكلمات المفتاحية: التهاب الزائدة الدودية الحاد ، موسمية الإصابة ، مستشفى ابن سينا ، المكلا