



Risk factors for development of acute appendicitis

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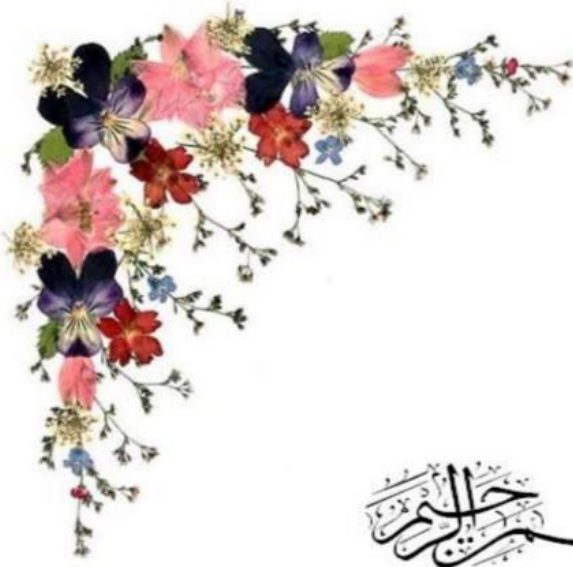
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

{ يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ }

صدق الله العظيم

" سورة المجادلة آية 11 "



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Abstract

Background

Appendicitis is the inflammation of the vermiform appendix. It typically presents acutely, within 24 hours of onset, but can also present as a more chronic condition. Classically, appendicitis initially presents with generalized or periumbilical abdominal pain that later localizes to the right lower quadrant. The cause of acute appendicitis is unknown but is probably multifactorial; luminal obstruction and dietary and familial factors have all been suggested. Abdominal pain is the primary presenting complaint in patients with acute appendicitis. Nausea, vomiting, and anorexia occur in varying degrees. The clinical diagnosis of acute appendicitis is based on history and physical examination, laboratory evaluation, and imaging techniques. Abdominal examination reveals localized tenderness and muscular rigidity after localization of the pain to the right iliac fossa.

Objective

To highlight the risk factors that are associated with the development of acute appendicitis among people and to determine its causes.

Materials and Methods

A descriptive cross-sectional study was conducted in AL-Kindy Teaching Hospital. The data was collected during the period from October 2022 to January 2023. The sample size was 119.

Results

The number of patients in our sample was 119 among them 61 were males (51.3%) and 58 were females (48.7%).

Children (1-12 years old) formed (8.4%) Adolescents (13-17 years old) formed (18.5%) and Adults (18-64 years old) formed (73.1%).

Regarding community status, patients living in urban areas formed three quarters (74.5%) and patients living in rural areas formed one quarter (25.2%).

Patients who have a positive family history formed (44.5%) who were first degree relatives.

Conclusion

Through the research presented and cooperation with the previous researches , we conclude that most of the risk factors has an effect on the incidence of acute appendicitis in different range of effects .

Keywords

Risk factors, acute appendicitis, abdominal pain .

Introduction

Appendicitis is the inflammation of the vermiform appendix. The exact cause of it is unknown but is probably multifactorial; luminal obstruction and dietary and familial factors have all been suggested. It typically presents acutely, within 24 hours of onset, but can also present as a more chronic condition. Classically, appendicitis initially presents with generalized or periumbilical abdominal pain that later localizes to the right lower quadrant ⁽¹⁾⁽⁸⁾. Patients with abdominal pain represent between 5% and 10% of all emergency department visits, of these patients, only 4.3% will ultimately be diagnosed as having acute appendicitis ⁽⁴⁾. Acute appendicitis is one of the common conditions observed in the surgery department, which requires an appendectomy as soon as possible ⁽²⁾. Approximately 7 percent of the population will have appendicitis in their lifetime ⁽³⁾. Although 90% of cases of acute appendicitis occur in children and young adults it can affect people of any age but is most common between the ages of 10 and 20 years. It is more common in males, although females are twice as likely to undergo an appendectomy ⁽⁵⁾. The lifetime risk of acute appendicitis is 8.6% in males and 6.9% in females ⁽⁶⁾. The rate of perforation varies from 16% to 40%, with a higher frequency occurring in younger age groups (40–57%) and in patients older than 50 years (55–70%) and it is associated with increased morbidity and mortality compared with non-perforating acute appendicitis, acute appendicitis is burdened by rates of mortality of up to 8% among patients older than 65 years, compared to a rate ranging between 0 and 1% among young patients ⁽⁷⁾. Moreover, complicated acute appendicitis with abscess, gangrene, or diffuse peritonitis is usually reported as high as 20% of cases in the overall population ⁽⁵⁾. Cause of perforated appendix has been linked with time of onset of the symptoms to the admission to hospital as well as the disease progression. The risk factors for perforation have been however attributed to diabetes mellitus, symptoms and their duration before surgery, age, various laboratory markers, intra-abdominal pressure, underlying pathology of the inflamed appendix ⁽²⁾. Abdominal pain is the primary presenting complaint of patients with acute appendicitis. Nausea, vomiting, and anorexia occur in varying degrees. Abdominal examination reveals localized tenderness and muscular rigidity after localization of the pain to the right iliac fossa ⁽⁹⁾. Typical presentations are only encountered in about 60% of patients, accurate preoperative diagnosis has long been a great challenge, even to experienced surgeons ⁽¹²⁾. The diagnosis of acute appendicitis is predominantly a clinical one; many patients present with a typical history and examination findings ⁽¹⁰⁾. The clinical diagnosis of acute appendicitis is based on history and physical, laboratory evaluation, and imaging techniques ⁽¹¹⁾. Imaging before surgery plays an important role in confirming or ruling out the diagnosis, with ultrasonography (US), computed tomography (CT), and magnetic resonance imaging (MRI) being common diagnostic modalities ⁽¹³⁾. Both laparoscopic and open appendectomy are viable surgical options, with most recent studies suggesting more favorable outcomes with a laparoscopic approach. In practice, the choice for either is usually based on the expertise of the surgeon along with the availability of hospital resources ⁽¹⁴⁾. The disease has been attributed to a variety of possible causes which include mechanical obstruction, inadequate dietary fiber intake, smoking, air pollution and familial susceptibility. Acute appendicitis presents

throughout the year but incidence is increased in summer⁽¹⁵⁾⁽¹⁸⁾. A positive family history increases the relative risk of being acute appendicitis nearly 3 times⁽¹⁶⁾. Knowing that appendicitis has a non-negligible genetic background is remarkably important towards understanding its etiology, orientate its diagnosis and enable an early surgery⁽¹⁷⁾. Socioeconomic status and distance from hospital have been shown to be associated with poor surgical outcomes related to acute appendicitis⁽¹⁹⁾.

Methods

A descriptive cross-sectional study was conducted in AL-Kindy Teaching Hospital. The data was collected during the period from October 2022 to January 2023. The sample size was 119 among them 61 were males and 58 were females. The data collected was organized in Excel program and then it was analyzed by using the program IBM SPSS Statistics version (29). Tables and figures were used to display the results. The questionnaire contains questions regarding risk factors for the development of acute appendicitis among patients infected or were infected in the past with acute appendicitis including; Age of the patient when get infected with acute appendicitis, Sex of the patient, If he living in rural or urban area, If he has an occupation at the mean time, Date of taking information, Family history of acute appendicitis (first degree relatives only), If he has a medical disease, Systemic steroid use, Social and economic status (good, moderate, bad), Marital status, Weight, Height, Body Mass Index. BMI is calculated by taking a person's weight, in kilograms, divided by their height, in meters squared and we have been divide our patients BMI into groups according to WHO and as follows :-

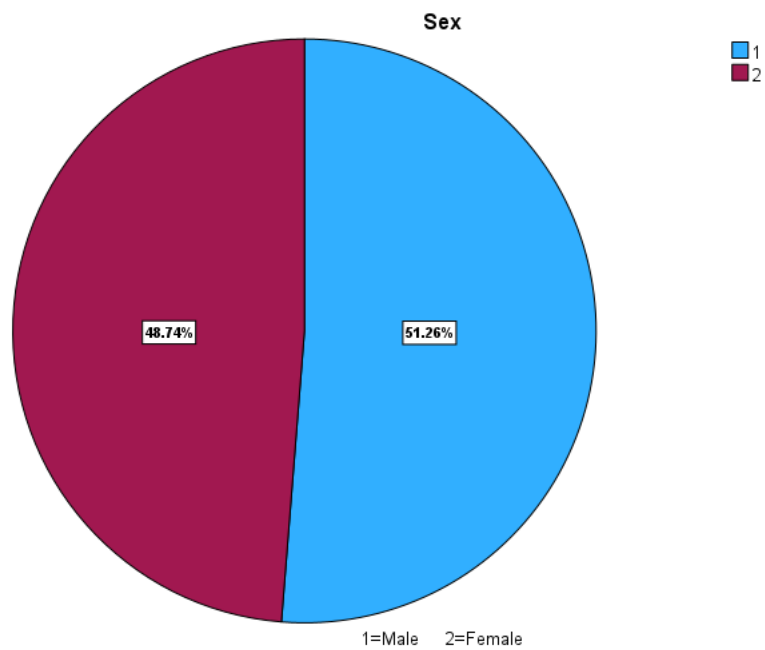
- Severely underweight - BMI less than 16.5 kg/m^2
- Underweight - BMI under 18.5 kg/m^2
- Normal weight - BMI greater than or equal to 18.5 to 24.9 kg/m^2
- Overweight – BMI greater than or equal to 25 to 29.9 kg/m^2
- Obesity – BMI greater than or equal to 30 kg/m^2

Results

Table 1 Classification of sex in those with acute appendicitis

| | | Sex | | | |
|-------|--------|-----------|---------|---------------|--------------------|
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Female | 58 | 48.7 | 48.7 | 48.7 |
| | Male | 61 | 51.3 | 51.3 | 100.0 |
| | Total | 119 | 100.0 | 100.0 | |

Figure 1 Classification of sex in those with acute appendicitis



As shown in (Table1) and (Figure1) the number of the participants was (119) among them (58) were females (48.7%) and (61) were males (51.3%).

Table 2 Descriptive statistics about age of the patient when he get acute appendicitis.

| Age | | | | | | | |
|-----|-----|-------|---------|---------|-------|--------------------|----------|
| | N | Range | Minimum | Maximum | Mean | Standard Deviation | Variance |
| Age | 119 | 46 | 3 | 49 | 23.81 | 9.571 | 91.598 |

Figure 2 Descriptive statistics about age of the patient when he get acute appendicitis.

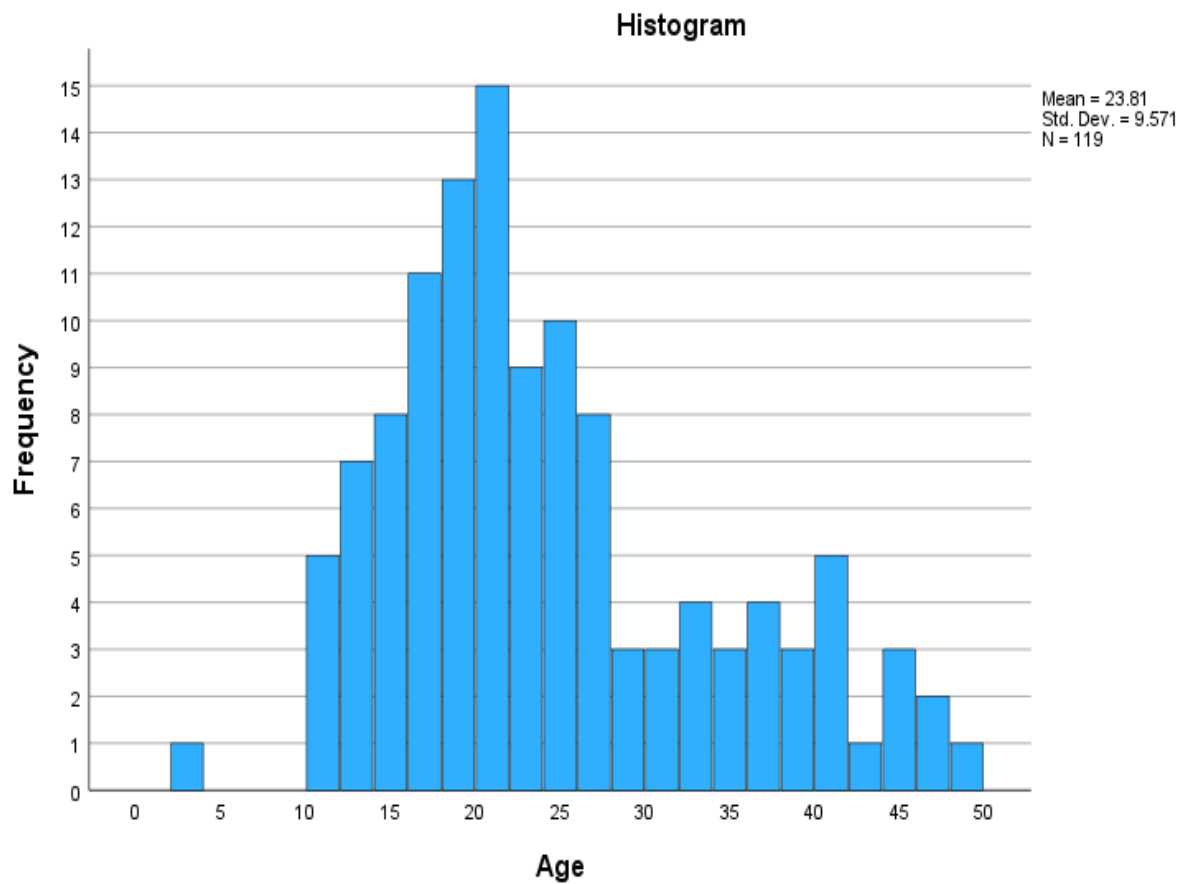
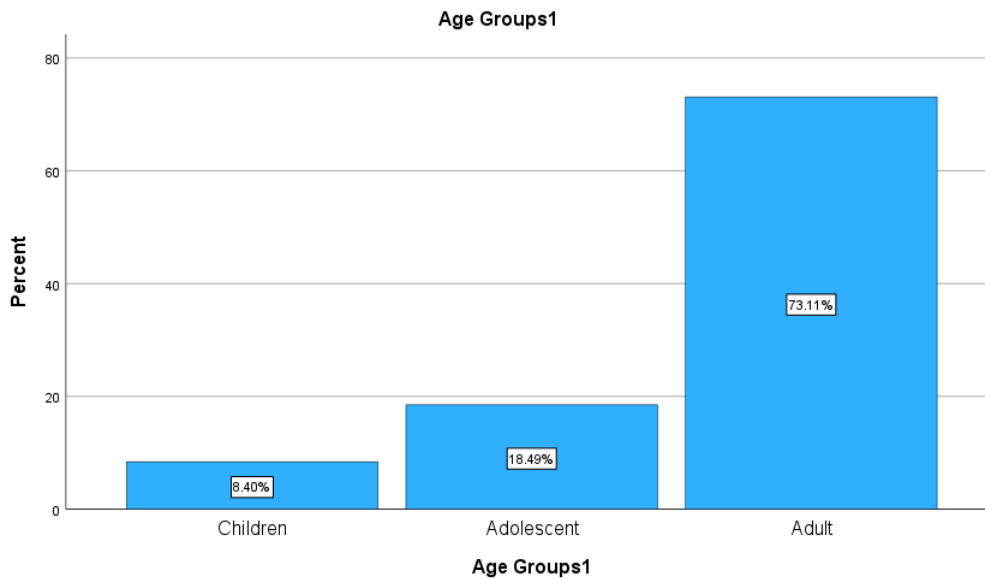
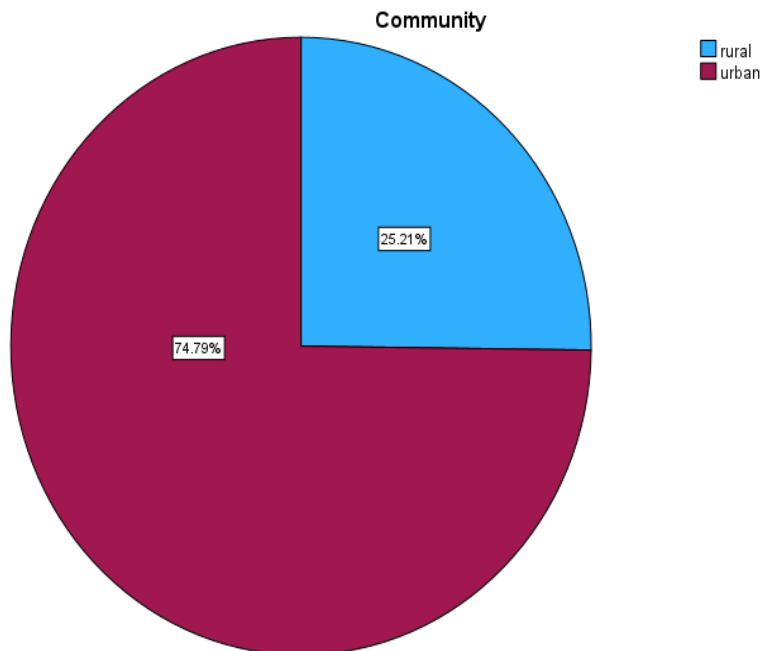


Figure 3 Age groups



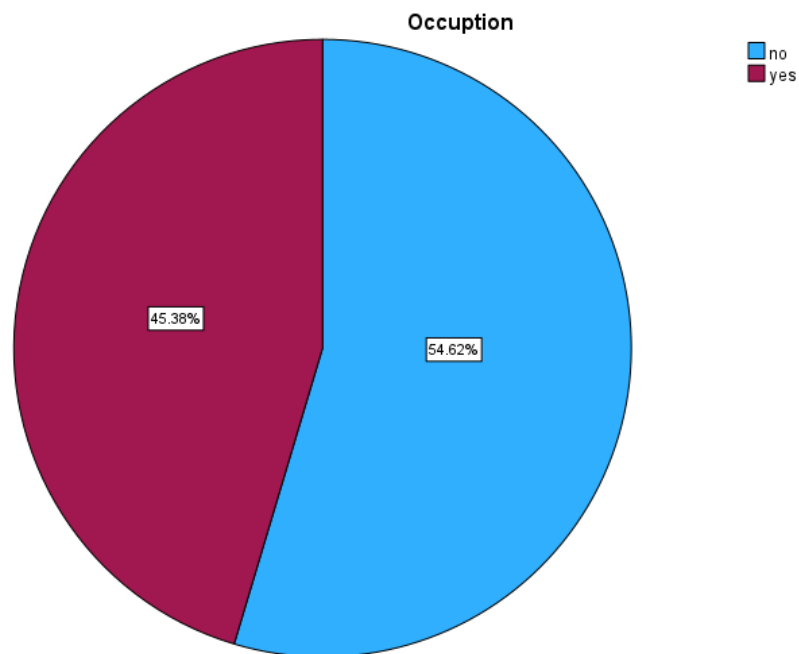
As shown in (Figure3) Children (1-12 years old) formed (8.4%) Adolescents (13-17 years old) formed (18.5%) and Adults (18-64 years old) formed (73.1%).

Figure 4 community status



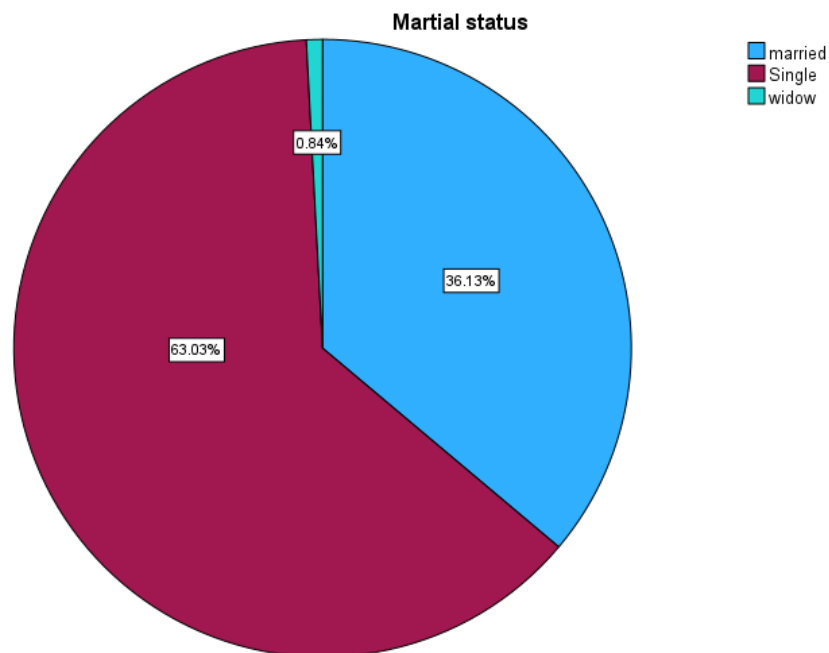
As shown in (Figure4) patients living in urban area (74.5%) and patients living in rural area (25.2%).

Figure 5 Occupation



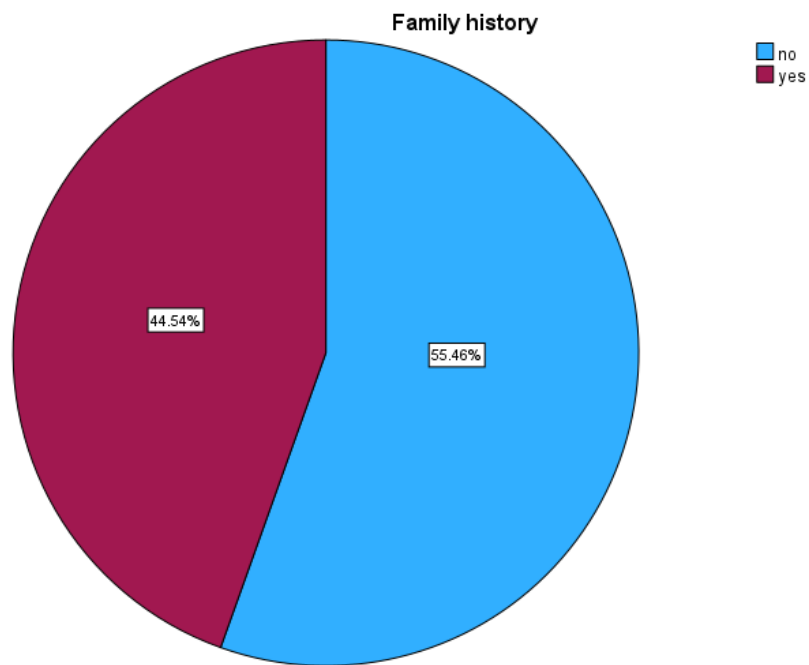
As shown in (Figure5) patients who have job (45.4%) while patients who do not have job (54.6%).

Figure 6 Marital status



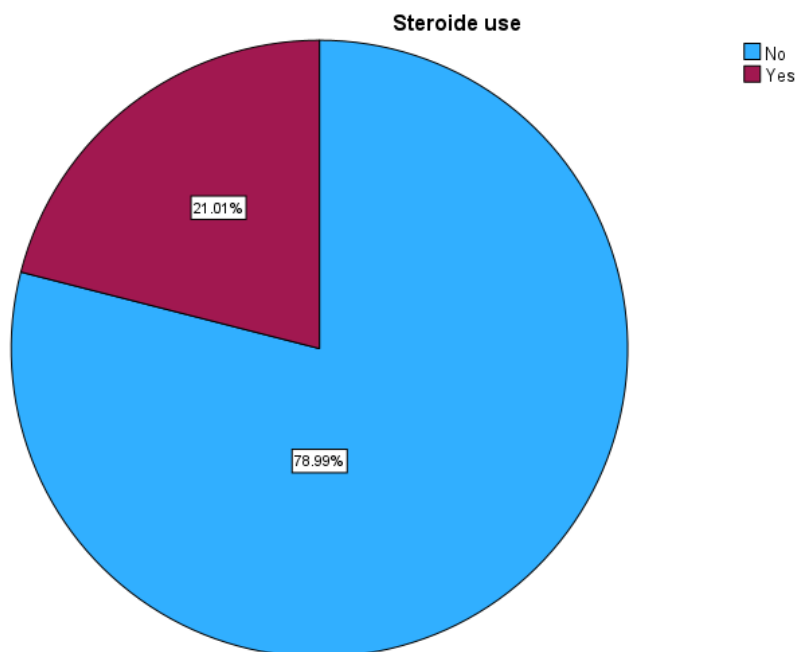
As shown in (Figure6) patients who are single (63%) patients who are married (36.1%) and patients who are widowed (0.84%)

Figure 7 Family history of acute appendicitis



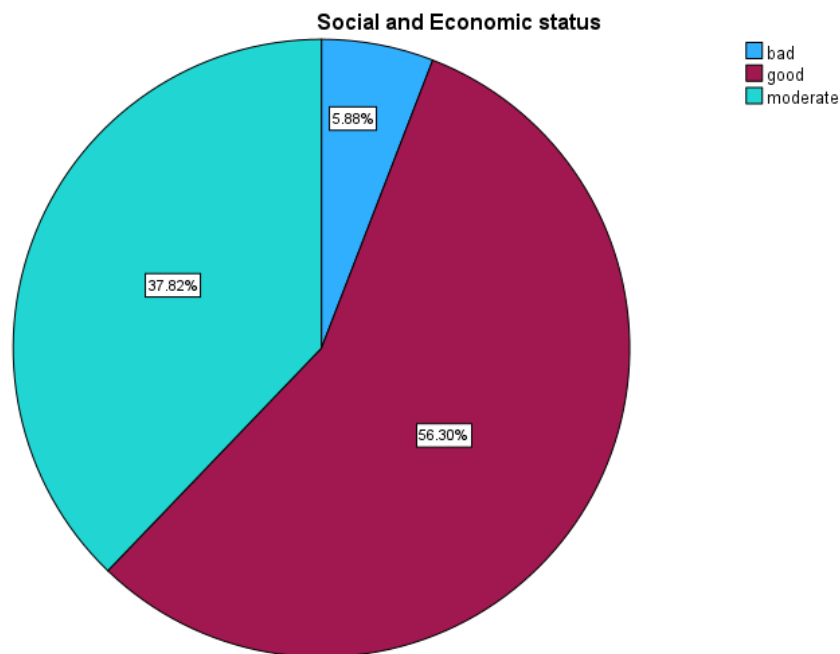
As shown in (figure8) patients who have family history (44.5%) while patients who do not have family history (55.5%)

Figure 8 systematic steroid use



As shown in (Figure9) patients who used steroid containing drugs (21%) while those who do not used them (79%).

Figure 9 Social and Economic status



As shown in (figure10) patients who have good social and economic status (56.3%) patients who have moderate social and economic status (37.2%) and those with bad social and economic status (5.9

Figure 10 Medical diseases other than acute appendicitis.

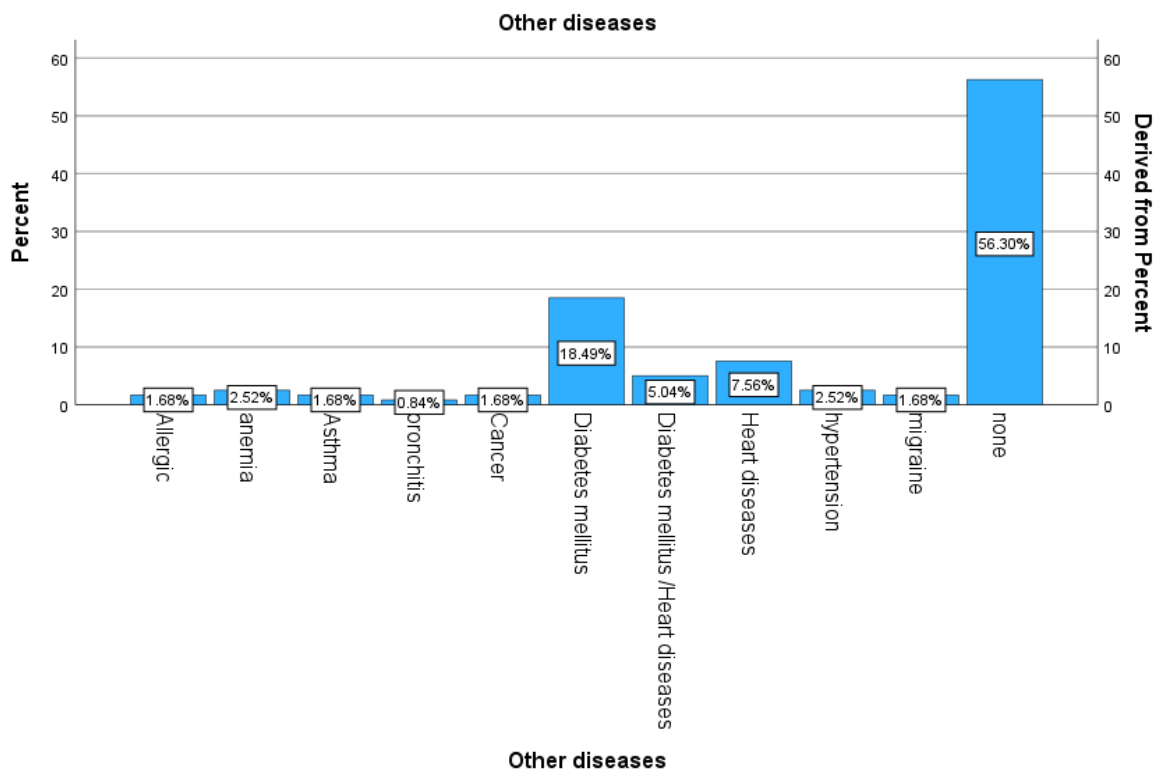
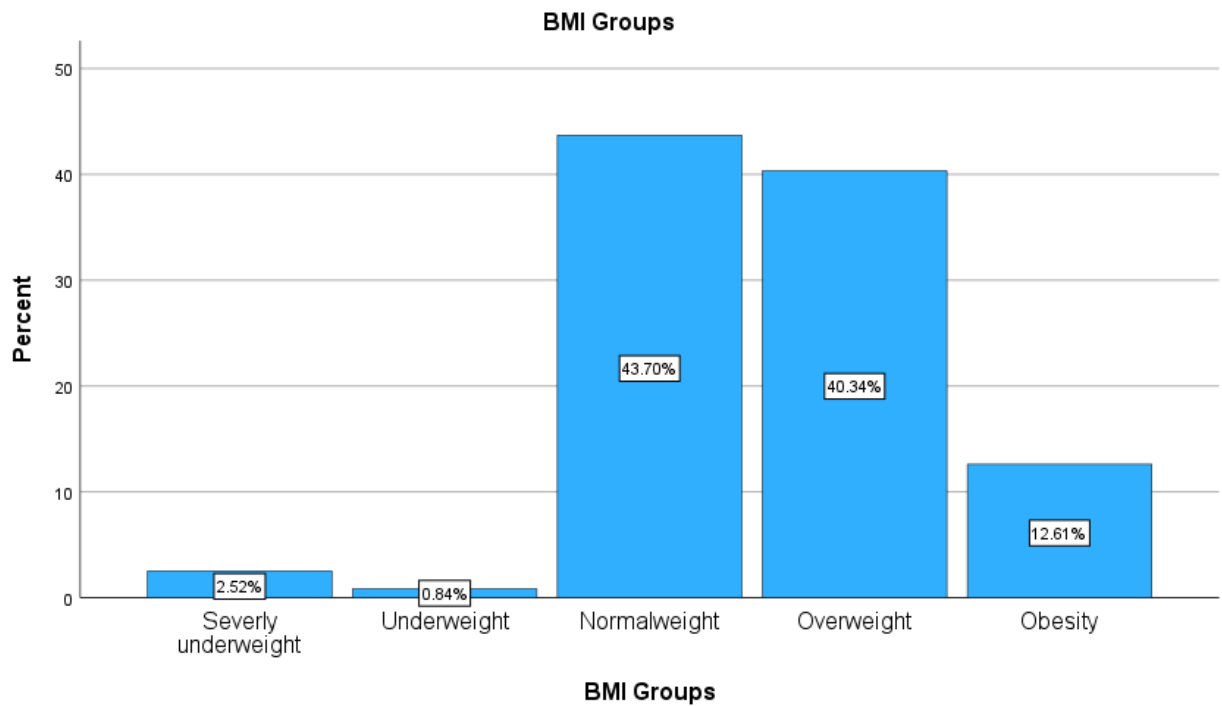


Table 3 Descriptive statistics regarding BMI

| | N | Minimum | Maximum | Mean | Std. Deviation | Variance |
|-----|-----|---------|---------|---------|----------------|----------|
| BMI | 119 | 2.42 | 62.50 | 25.2647 | 5.99023 | 35.883 |

Figure 11 BMI groups



Discussion

Acute appendicitis continues to be the commonest cause of surgical abdominal emergency⁽⁴⁾. Although 90% of cases of acute appendicitis occur in children and young adults it can affect people of any age but is most common between the ages of 10 and 20 years⁽⁵⁾. In our study the age dispersion was similar to other studies^(20,21). Most common age was between 10-20 years old⁽⁶⁾. The mean age of our study was (23.81) while the mean age of other study was (35.7 ± 15.5) ⁽²³⁾.

Male constituted (51.26%) and female (48.74%) of our sample group. In other research females constituted a minority of their sample group; one explanation might be that women with acute abdomen are usually directed to other medical facilities by emergency medical services, given the obstetric and gynecological pathologies leading to abdominal pain in women⁽²³⁾.

The community status was three quarters (74.5%) live in urban area and one quarter (25.2%) live in rural area. One explanation is most patients in Al-kindy hospital in general come from urban areas because the location of Al-kindy hospital is in the center of the city.

The occupation have received attention in health studies both in past and present. Other research findings, suggested that those with complicated acute appendicitis had no job so they probably don't have the best knowledge about the risk of their symptoms, and that they sought professional help after a longer interval probably because they favored self-treatment⁽²³⁾.

This study and other studies has confirmed the familial risk of appendicitis in a nationwide population. We found an overall of 44.54% individuals with first-degree relative compared with 55.46% who have not first degree relative with acute appendicitis. In other study Also Genetic factors have been implicated in the etiology of acute appendicitis. In other words, the chance of appendicitis was 10 times greater in a child with at least one relative with reported appendectomy, compared with that in a child with no affected relatives. They also found that the proportion of relatives with appendicitis varied directly with the degree of relationship: 21% in first degree relatives, 12% in second degree relatives, and 7% in third degree relatives⁽²⁴⁾. Assuming a total heritability of 56%, relative risk increases by three when family history is present⁽¹⁷⁾. The familial tendency to acute appendicitis may perhaps be explained by environmental factors such as a specific bacterial infection, certain food habits, or a genetic difference in resistance to bacterial infection or other causes⁽¹⁶⁾.

According to the socioeconomic status areas with low incidence of acute appendicitis are more thriving and more educated compared to areas with high incidence⁽²⁰⁾

The mean BMI in our study was 25.26 and it is close to other study 25.2 ± 4.9 ⁽²³⁾.

The reason for the significantly longer admission time for adult patients with comorbidities is unclear⁽²³⁾.

Conclusion

Through the research presented and cooperation with the previous researches , we conclude large percentage of patient have family history from first degree relatives for acute appendicitis (44.45%) ,there was slightly more males(51.3%) than females(48.7%) ,most of them was single (63%) , according to the community status nearly $\frac{3}{4}$ were living in the urban area , most of the patients were in age range between 10-20 years old , these were the risk factors that we noticed more in the cases .

Recommendation

People who have relatives from first degree who had acute appendicitis in the past should take caution from any pain in the right abdominal quadrant which is an indicator of acute appendicitis, for future researches hoping to investigate further in this subject and to know how the different factors leads to the complications of acute appendicitis .

limitations

The study population was restricted to Al-kindy teaching hospital and the time was not enough to take a large sample, if we have a large sample in this study the results would be more precise and we did not have much access to the data from recent studies , in addition to the limited number of previous studies on this subject .

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Eric Lorio, David H. Ballard, Elizabeth Guarisco, James Hughes, Forrest D. Griffen and Navdeep S. Samra.