

Prevalence of Appendicitis at Surgery Inpatient Department of a Secondary Care Hospital: A Descriptive Study

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ABSTRACT

Background: Appendicitis is an acute inflammation that occurs in the vermiform appendix. The incidence of appendicitis in Indonesia was reported at 5 per 1000 population with the number of cases reaching 10 million annually and was the highest incidence in ASEAN. The present study was conducted to assess the prevalence of Appendicitis in RST Tk.III Wijayakusuma Purwokerto.

Method: This was a descriptive cross-sectional study that determine the prevalence of appendicitis at RST Tk.III Wijayakusuma Purwokerto during January 2020 – December 2020. Descriptive analysis was performed for age, sex, chief complaints, complications, laboratory tests of blood leucocytes, patient conditions on hospital discharge, and patient length of hospital stays (LOS).

Result: The highest incidence in persons aged 10 – 19 (29.03%), that females had higher rates (51.61%), the most common presenting complain was pain in right lower abdomen with 93.54% , that 61.29% were developed the complications, the highest proportion were in the group of blood leucocytes $\geq 10.000/mm^3$ about 83.87%, patients were planned for continuing in outpatient care with 87.09%, and the highest proportion were belonged to the LOS group of 4 – 5 days that 35.48%.

Conclusion: Our Study concluded that female were affected more by appendicitis, most common age for appendicitis was 10-19 years, the most presenting complain was pain in right lower abdomen that more developed in to complications with highest propotion were blood leucocytes $\geq 10.000/mm^3$ with patients were planned for continuing in outpatient care and the most LOS was 4-5 days.

KEYWORDS: Appendicitis, Prevalences, Descriptive study

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BACKGROUND

Acute abdomen is the sudden onset of an abdominal disease that requires surgical intervention, and is common in both developed and developing countries. Acute appendicitis is the most common cause of abdominal surgery, it is estimated that 10% of the population will have appendicitis during their lifetime. Up to 16% of the population in Europe, America, and Australia undergo appendectomy surgery [1]. Appendicitis is an acute inflammation that occurs in the vermiform appendix and is often associated with obstruction and can cause bacterial infection complication. The most common cause of appendicitis is infection of gram-negative bacteria, *Escherichia coli* (76%), *Enterococcus* (30%), *Bacteroides* (24%), and *Pseudomonas* (20%) [2].

Appendicitis cases in the United States cover 11 each 10,000 population per year, and this incidence is not so different in developing countries. Men are more at risk of developing appendicitis than women [3]. Appendicitis most commonly occurs between the ages of 5 and 45 years with a median age of 28 years. The incidence of appendicitis ranges from 233/100,000 people [1].

The incidence of appendicitis in Indonesia was reported at 5 per 1000 population with the number of cases reaching 10 million annually and was the highest incidence in ASEAN [4]. The number of appendicitis cases in Central Java in 2018 was reported 5,980 cases and 177 of them died. The highest number of patients with appendicitis was in the city

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of Semarang, which is 970 people. This may be related to the lack of dietary fiber in modern society [5].

There are several conditions that cause appendicitis such as obstruction of the appendix lumen by lymphoid follicular hyperplasia, kecalid, foreign bodies, parasites, strictures due to fibrosis of previous inflammation, or neoplasms [6].

The main symptoms of appendicitis is an abdominal pain, a history of unspecified peri-umbilical pain that move to the right iliac fossa in the first 12-24 hours. Pain aggravated by coughing and movement may indicate some degree of peritonitis. Patients often experience anorexia, nausea, vomiting and constipation or diarrhea. Symptoms with fever (37.5 - 38.5 C) are common, but high fever (>39 C) or stiffness is rare [7].

Tenderness in the right iliac fossa and the presence of local signs of peritonitis such as involuntary resistance, rebound tenderness and pain to percussion are indications of appendicitis. In thin patients, the appendix or appendix mass can be palpated. There are a number of eponymous tests such as the rovsing sign, psoas sign, obturator sign, and dunpy sign [7].

In order to make the clinical diagnosis of appendicitis easier, scientist have succeeded in developing various diagnostic methods, one of which is using the Alvarado score. Alvarado score is a simple scoring system for the diagnosis of acute appendicitis in adults. This scoring system is based on three symptoms, three signs, and two simple laboratory findings that are often seen in acute appendicitis [8].

A total Alvarado score >7 indicates acute appendicitis and a score <7 indicates a normal appendix. Alvarado recommended surgery for all patients with a score of 7 and observation for patients with a score of 5 or 6 [9].

Appendectomy can be performed by open surgery or microscopically laparoscopic. Laparoscopic appendectomy for advanced uncomplicated appendicitis should be performed during the first 24 hours after diagnosis. Several treatment protocols included initial intravenous antibiotics for 1-3 days, followed by oral antibiotics for 7 days [10].

More serious complications of acute appendicitis include localized and generalized peritonitis, appendicular or periappendicular mass or abscess, pylephlebitis, liver abscess [11]. Patients with complicated peritonitis usually experience of severe generalized abdominal pain, with nausea and vomiting. The stomach becomes distended, tense and stiff. There is tenderness throughout, although it remains more pronounced in the right lower quadrant. The temperature is much higher (39-40°C) than uncomplicated acute appendicitis, and the pulse is elevated [12].

Mortality of appendicitis in the United States have continued to decline from 9.9 per 100,000 in 1939 to 0.2 per 100,000 today. Responsible factors include advances in anesthesia, antibiotics, IV fluids, and blood products [13].

Based on this problems above and the lack of research data located at RST tk.III Wijayakusuma, we are interested in raising the topic of "Characteristics of Appendicitis Patients at RST tk.III Wijayakusuma Purwokerto in 2020". The present study was conducted to assess the prevalence of Appendicitis in RST Tk.III Wijayakusuma Purwokerto, so it can evaluate the characteristics of appendicitis cases in RST tk.III Wijayakusuma Purwokerto.

METHODS

This was a descriptive cross-sectional study that determine the prevalence of appendicitis at RST Tk.III Wijayakusuma Purwokerto during January 2020 – December 2020. This study involved 34 participants obtained with total sampling method, where the entire study population was included as the research sample. Data were obtained from medical record of the patients, which diagnosed with appendicitis.

The eligibility criterion for this study were the complete data of medical records (include age and sex, chief complaints, complications, laboratory tests of blood leucocytes, patient conditions on hospital discharge, and patient length of hospital stays (LOS)) obtained from patients that diagnosed with appendicitis at RST Tk.III Wijayakusuma Purwokerto (during January 2020 – December 2020). The exclusion criteria in this study was that, in the medical records, there were no complete data of the patients. Descriptive analysis was performed for the demographic data include age and sex, chief complaints, complications, laboratory tests of blood leucocytes, patient conditions on hospital discharge, and patient length of hospital stays (LOS). This study was approved by the ethical committee of RST Tk.III Wijayakusuma Purwokerto.

RESULT

1. Prevalences of Appendicitis at RST tk.III Wijayakusuma Purwokerto

From the data that we gathered throughout January 1, 2020 – December 31, 2020, we found a total 34 medical records of patients diagnosed with appendicitis, and a total of 31 that fulfilled the inclusion criteria, and 3 were excluded due to incomplete data.

2. Distribution of ages of the study population

Table.1 Distribution of ages of the study population

Age Range	Frequency (n)	Percentage (%)
0-9	2	6.45%
10 – 19	9	29.03%
20 – 29	4	12.90%
30 -39	4	12.90%
40 – 49	5	16.12%
50 – 59	7	22.58%

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Out of 31 patients, the highest incidence of appendicitis was found in persons aged 10 – 19 (29.03%). The lowest incidence were 6.45%, belonged to the age group of 0 – 9 (Table 1).

3. Distribution of sex of the study population

Table.2 Distribution of sex of the study population

Gender/sex	Frequency (n)	Percentage (%)
Male	15	48.38%
Female	16	51.61%

Out of 31 patients, 48.38% (15 patients) were male and 51.61% (16 patients) are female (Table 2). We found that females had higher rates of appendicitis than males in this study.

4. The characteristics of appendicitis patients based on chief complaints

Table.3 The characteristics of appendicitis patients based on chief complaints

Chief complaints	Frequency (n)	Percentage (%)
Pain in right lower abdomen	29	93.54%
Fever	2	6.45%
Nausea and vomiting	0	0%
Loss of appetite	0	0%
Diarrhea	0	0%

From Table 3, we found that the highest proportion of inpatients chief complaint were pain in right lower abdomen with the percentage of 93.54% (29 patients), whereas the lowest symptoms include nausea, vomiting, loss of appetite, and diarrhea (0%)

5. The characteristics of appendicitis based on complications

Table.4 The characteristics of appendicitis based on complications

Complications	Frequency (n)	Percentage (%)
With complications	19	61.29%
No complications	12	38.70%

From Table 4, we found that 61.29% (19 patients) of the study population were developed the complications, and 38.70 % (12 patients) were not developed the complications.

6. The characteristic of study populations based on laboratory test of blood leucocytes

Table.5 The characteristic of study populations based on laboratory test of blood leucocytes

Blood leucocyte count	Frequency (n)	Percentage (%)
< 10.000	5	16.12%
≥ 10.000	26	83.87%

About 83.87% (26 patients) of the study populations based on the laboratory test of blood leucocytes, the highest proportion were in the group of ≥10.000/mm³. The lowest proportion were in <10.000/mm³ group, with the percentage of 16.12% (5 patients) (Table 5).

7. The characteristics of study populations based on patients conditions on hospital discharge

Table.6 The characteristics of study populations based on patients conditions on hospital discharge

Patients condition on hospital discharge	Frequency (n)	Percentage (%)
Continuing for outpatient care	27	87.09%
Died before discharged	12	12.90%

The highest proportion of appendicitis patients based on their conditions on hospital discharge were planned for continuing in outpatient care, with the percentages of 87.09% (27 patients), and the proportion of patients who died before discharge were 12.90% (4 patients) (Table 6).

8. The characteristics of appendicitis patients based on patient length of hospital stays (LOS)

Table.7 The characteristics of appendicitis patients based on patient length of hospital stays (LOS)

Length of stay (days)	Frequency (n)	Percentage (%)
≤ 3	5	16.12%
4 – 5	11	35.48%
6 – 7	8	25.80%
8 – 14	2	6.45%
≥ 15	2	16.12%

From Table 7, we divided the patient length of hospital stay into 5 groups. The highest proportion were belonged to the LOS group of 4 – 5 days, with the percentage of 35.48% (11 patients), and the lowest proportion were in

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LOS group of 8 – 14 days, with the percentage of 6.45% (2 patients).

DISCUSSION

This study has found out that most of the sufferer were in the age group of 10 – 19 years, with the percentages of 29.03% (9 patients), which is supported by a study conducted by Berlian in Medan (2019). In Berlian's research, it is showed that the highest incidence of acute appendicitis were in the age group of < 20 (79.2%), and 20.8% suffer chronic appendicitis. Marisa et al (2011) also reported that the highest incidence of acute and chronic appendicitis were in age group of 15 – 24. This incidence is also in accordance with the study of Syifa (2016) conducted at RSUD dr.Adjidarmo Kabupaten Lebak, appendicitis mostly occurs in the age range of 17 – 25 [14].

According to what we found in this study, it is suggested that the high incidence of appendicitis in adolescents is caused by the peak in the development of lymphoid tissue with occurs during adolescence leads to an increased liability of the appendix to obstruct, and so accounts for the high incidence of the disease. Anatomically, adults have greater mean length or diameter or lumen size of appendix distally [15].

The present descriptive analysis of this study observed that female were more in number (51.61%) than male (48.38%) shows that female predominance in appendicitis is one of the notable factor which is similar to 61.9% in female in a study conducted by Wahyuning Hapsari at RSU Kota Tangerang Selatan, in 2016 – 2017. This might well be an important observation, but again there is no confirmation. Why appendicitis be higher in female than in male is particularly intriguing [6].

The chief complaints or main symptoms was also observed in this study and found out that 93.54% (29 patients) of the cases experienced the right lower abdominal quadrant pain, and the lowest proportion of symptoms were nausea, vomiting, loss of appetite and diarrhea (0%). This result is comparable to the findings of previous research conducted by Sarah (2018) at RS Putri Hijau Medan, found out that the highest incidence of appendicitis main symptoms were right lower quadrant pain (37.5%). Right lower quadrant pain is caused by the inflamed appendix, specifically because of the appendix distention and spasm, causes the increased lumen pressure and decreased blood flow to appendix, and the release of inflammation mediators [18]. Pain with pressure over McBurney point, or two-thirds the distance between the umbilicus and anterior superior iliac spine, is the physical exam finding in the vast majority of patients with appendicitis [17].

There are about 19 patients (61.29%) who developed complications, and 12 patients (38.07%) were not developed any complications. This result is supported by study conducted by Octavia (2017) in Medan, 62.8% of the study populations were developed the complications such as

generalized peritonitis. A total number developed the complications such as localized peritonitis were about 1%, 30.3% diagnosed with unspecified acute appendicitis, and 6.9% diagnosed with other appendicitis [16].

The incidence of perforated appendicitis in elderly patients (> 70) was higher in males and those who had certain clinical features such as fever and anorexia. Duration of pain in the preadmission period was also an important factor in appendiceal rupture. Patients with perforated appendix are also seem atypical, thus prolonged the diagnostic time [5].

Based on laboratory test of blood leucocytes, the highest proportion of appendicitis patients were $\geq 10.000/\text{mm}^3$, with the percentages of 83.87% (26 patients), and the lowest proportion were $< 10.000/\text{mm}^3$, with the percentages of 16.12% (5 patients). This incidence is also in accordance with the study conducted by Sarah (2018) at RS Putri Hijau Medan, it is stated that the highest proportion of appendicitis patients based on their leucocyte counts were $\geq 10.000/\text{mm}^3$, with the percentages of 81,7% (85 patients), and the lowest proportion were $< 10.000/\text{mm}^3$, about 5,8% (6 patients) [18].

Nepal medical College Journal and American Family Physician stated that the leucocyte count in patients with perforated appendicitis were higher than on acute appendicitis, caused by the severe inflammation of perforated appendicitis. On perforation phase, appendix has ruptured, then the pus inside appendix lumen spread into surrounding organs. This process were also in accordance to the progressivity of bacterial invasion, facilitated by the cytotoxin. If perforation of the necrotic wall occurs, appendicitis becomes complicated by perforative peritonitis. Usually, peritonitis is localized, being confined to the ileocecal region. Because of this severe inflammation, the body produces more leucocytes and neutrophils [19].

This study has found out that the length of stay of patients with appendicitis were higher in the group range of 4 -5 days, with the percentages 35.48% (11 patients), and the lowest incidence were in the group range of 8 – 14 days, with the percentages of 6.45% (2 patients). On the other study conducted by Octavia in Medan, it was found that the study population with acute appendicitis were 17.2% (11 patients), with the length of stay ≤ 3 days, 4 – 7 days, >14 days were 54.7%, 14% and 12.5% respectively [16].

Early diagnosis, an intensive supportive management and administrations of antimicrobial medications on the right time, early decisions for operating procedure to control infection sources has played an important role to determine patients prognosis [16].

The highest proportion based on patients condition on hospital discharge were planned for continuing outpatient care (87.09%), and the lowest proportion were died before discharged (12.90%). This incidence is also in accordance with the other study that stated if patients condition on hospital discharge were planned for continuing outpatient care (88.5%) [18].

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The proportion of appendicitis patients who continuing for outpatient care were higher because they already underwent the inpatient care with administrations of proper medications and accurate inpatient care, so that possible for being taken them home, based on doctor's decisions. Patients who suffered appendicitis can actually died in some cases if they were left untreated, so the complications such as peritonitis can quickly spread, resulting in septicemia, or bacteria in the blood, so it will cause a condition named sepsis [18].

CONCLUSION

The number of appendicitis incidence in this study In this study, it is found out that the incidence of appendicitis has a total number of 31 cases, with the highest proportion of the study populations were in the group age of 10-19, higher in female, with the main symptoms of chief complaints of right lower abdomen quadrant pain, length of hospital stay in the group of 4-5 days, blood leucocytes count of $\geq 10.000/\text{mm}^3$, with the highest proportion of patients who developed the complications, and the conditions on hospital discharge were planned for continuing outpatient care by the doctors.

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