



Original Research Paper

Description of Appendicitis Patients Post-Appendectomy at Prof. Dr. H. Aloe Saboe Hospital Gorontalo in 2023

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Abstract

Background: Appendicitis is an acute or chronic inflammation of the appendix caused by obstruction of the lumen. According to the World Health Organization (WHO), appendicitis ranked eighth as a global cause of death in 2014. **Objective:** To describe the characteristics of post-appendectomy appendicitis patients at Aloe Saboe Hospital, Gorontalo, in 2023. **Methods:** A retrospective descriptive study was conducted in June–August 2024 at Aloe Saboe Hospital, Gorontalo. The population included appendicitis patients who underwent appendectomy between January–December 2023. Using purposive sampling, 98 patient medical records were analyzed. Data were described based on gender, age, and surgical procedure. **Results:** Most patients were female (64.3%). The highest age distribution was late adolescence (17–25 years) at 39.8%. The most frequent surgical technique performed was open appendectomy (53.1%), followed by other procedures. **Conclusion:** At Aloe Saboe Hospital, the majority of post-appendectomy appendicitis patients were female, predominantly in late adolescence, with open appendectomy being the most common surgical method. These findings are expected to provide useful information and education for individuals with high-risk factors for appendicitis.

Keywords: Appendektomy, apendiks, apendicitis, Gorontalo

Introduction

Appendicitis is an acute or chronic inflammatory process occurring in the vermiform appendix due to obstruction of the appendiceal lumen¹. The World Health Organization (WHO) reported that the incidence of appendicitis in Asia and Africa in 2014 was 4.8% and 2.6% of the total population, respectively. In the United States, approximately 250,000 people undergo appendectomy surgery each year².

Research in Southeast Asia shows that Indonesia ranks first with the highest incidence of acute appendicitis at a prevalence of 0.05%, followed by the Philippines with a prevalence

of 0.022% and Vietnam with a prevalence of 0.02%. The incidence of appendicitis in Indonesia, according to data released by the Indonesian Ministry of Health in 2009, was 596,132 people with a percentage of 3.36%, increasing in 2010 to 621,435 people with a percentage of 3.53%³.

Males have a higher risk factor for acute appendicitis than females, with lifetime incidences of 8.6% and 6.7% for males and females, respectively⁴. Appendicitis can occur at all ages but is more prevalent in adolescents and adults. Ages 20–30 years are productive years, during which individuals often neglect healthy eating habits due to daily busyness. The consumption of fast food among adolescents

has increased over the last four decades. Salty snacks, desserts, candies, and sweet drinks have become major calorie sources. Meanwhile, consumption of high-fiber foods like fruits and vegetables has decreased, while calories obtained from unhealthy snacks have increased⁵. Consequently, insufficient fiber intake can cause constipation and increased pressure in the intestinal cavity, ultimately leading to obstruction of the appendiceal lumen⁶.

Prompt diagnosis and management are required for acute appendicitis cases. Some patients exhibit atypical symptoms and signs of appendicitis, which can lead to misdiagnosis and delayed treatment. Complications such as gangrene, perforation, or even generalized peritonitis can occur if diagnosis is not immediate. The more complications found, the higher the morbidity and mortality⁷.

Appendectomy is the surgical removal of the appendix, or the removal of an infected appendix⁸. There are three types of appendectomy procedures: open appendectomy, laparoscopic appendectomy, and laparotomy appendectomy. However, laparoscopic surgery for acute appendicitis is more preferred. Patients choose this method over open appendectomy due to less postoperative pain, smaller incisions, and shorter hospital stays. Nevertheless, due to lower costs, some appendicitis patients still opt for laparotomy appendectomy⁹.

Based on a preliminary study conducted at Prof. DR. H. Aloe Saboe Regional Hospital, Gorontalo City, data from the Medical Records Subdivision showed that in 2011, out of approximately 1,606 general surgery patients, 35.87% underwent appendectomy surgery, or about 576 patients. In 2012, out of 1,431 general surgery patients, 455 underwent appendectomy surgery, or about 31.79%. Meanwhile, in 2013 for the period January to March, out of 318 general surgery patients, 83

people underwent appendectomy surgery with an average length of stay of 3-5 days¹⁰.

Previous studies show differences in the distribution of appendicitis patients in terms of gender, age, and preferred surgical method. This research is expected to provide a description of post-appendectomy appendicitis patients in Gorontalo, facilitating easier identification and providing valuable information to healthcare personnel regarding risk factors and appropriate surgical selection.

Acute appendicitis is one of the most common emergency surgical cases requiring immediate intervention to prevent serious complications. Amid the rising prevalence of appendicitis in Indonesia, particularly in Gorontalo, further studies are needed to understand patient characteristics, risk factors, and preferences for surgical methods. This information is crucial for improving healthcare quality through faster diagnosis, appropriate surgical method selection, and optimal postoperative management. Therefore, this study aims to answer the main research question: "What are the characteristics of post-appendectomy appendicitis patients at Prof. DR. H. Aloe Saboe Regional Hospital, Gorontalo City, and how is the distribution of surgical method preferences and risk factors influencing these choices?"

Materials and Methods

Study Design

This study used a retrospective descriptive design to analyze medical record data of appendicitis patients who had undergone appendectomy. The research was conducted at Prof. Dr. H. Aloe Saboe Regional Hospital, Gorontalo City, Gorontalo Province, from June to August 2024.

Sample

The research population consisted of all appendicitis patients who underwent appendectomy at Prof. Dr. H. Aloe Saboe

Regional Hospital during the period January to December 2023, with a total population of 113 people. The research sample was taken using purposive sampling technique, totaling 98 people who met the inclusion and exclusion criteria. Inclusion criteria included patients who were hospitalized, diagnosed with appendicitis, and underwent appendectomy during that period. Exclusion criteria were incomplete medical records, patients diagnosed with appendicitis without appendectomy, and patients who underwent appendectomy without an appendicitis diagnosis.

Data Collection Techniques

Data were collected from patient medical records with research variables including risk factors such as age and gender, as well as clinical pictures like the type of appendectomy performed.

Data Analysis Techniques

Data were analyzed univariately using frequencies, mean, median, and mode. Analysis results were processed using Statistical Package for The Social Sciences (SPSS) application and presented in tables for easier interpretation.

Ethical Consideration

This research has received ethical approval from the Health Research Ethics Commission (KEPK) of Universitas Negeri Gorontalo with letter number 054/UN47.B7/KE/2024 dated June 4, 2024.

Result

Based on the results obtained in Table 1, from a total of 113 patients, the gender distribution of post-appendectomy appendicitis patients among 98 patients was most commonly found in females with 63 patients (64.3%). The age distribution of appendicitis patients who successfully underwent appendectomy among 98 patients was most commonly found in late adolescence aged 17–25 years with 39 patients

(39.8%), with the lowest percentage (1.0%) in the toddler age category 0–5 years.

Table 1. Distribution of patients based on age, gender, and type of appendectomy procedure for appendicitis patients at Prof. Dr. H. Aloe Saboe Regional Hospital, Gorontalo in 2023

Variable	Frequency (n = 98)	Percentage (%)
Gender		
Male	35	35.7
Female	63	54.3
Age (Years)		
0-5	1	1.0
6-11	6	6.1
12-16	18	18.4
17-25	39	39.8
26-35	17	17.3
36-45	7	7.1
46-55	7	7.1
56-65	3	3.1
Type of Appendectomy		
Open Appendectomy	52	53.1
Laparoscopic Appendectomy	14	14.3
Laparotomy Appendectomy	32	32.7

Source: Secondary Data 2023

Table 1 also shows the types of appendectomy procedures for appendicitis patients among 98 patients found in medical records; the most commonly performed surgical procedure was open appendectomy with 52 patients (53.1%), and the least preferred surgical type was laparoscopic appendectomy with 14 patients (14.3%).

Discussion

Based on Table 1, the research results show that the highest gender distribution among appendicitis patients is female, higher than males. This result aligns with research conducted by Antu et al., which found more respondents with appendicitis were female, namely 15 people (55.6%) compared to males with 12 people (44.4%)¹¹. Similar research by Sukmahayati et al. showed the same results, finding appendicitis patients at Dr. Adjidarmo Regional Hospital, Lebak Regency were predominantly female with an incidence of 152 patients (52%) while males had an incidence of 141 patients (48%)¹². The high incidence of appendicitis in females is often associated with

false positives. The intended false positive is when patient complaints indicate appendicitis but anatomical pathology examinations do not show appendicitis due to gynecological conditions.¹³ According to previous research, there is an explanation that acute appendicitis is often found in females due to false positives of 20%, especially in women aged 20-40 years¹³.

However, there is a difference in the results of research by Hartawan et al., where the incidence of appendicitis showed the highest results in males, namely 64 people (58.2%) and 46 people (41.8%) were female¹⁴. Other research by Thomas et al. also obtained similar results, where based on the data obtained, out of 650 cases, males suffering from appendicitis numbered 363 patients (56%), while females numbered 287 patients (44%)¹⁵. Supporting this research, there is a theory that argues that lymphoid tissue in females is less than in males. Lymphoid tissue can undergo hyperplasia at any time related to bacterial or viral infections¹⁶.

Based on Table 1, the research results show that the highest age distribution among post-appendectomy appendicitis patients is in the late adolescence category aged 17–25 years. Consistent with the results obtained by the researcher at Sanglah General Hospital, Denpasar, Bali in 2018, based on age characteristics, the highest rank was the age range 17-25 years (late adolescence) with 38 people (34.5%). Meanwhile, the lowest rank of appendicitis cases at Sanglah General Hospital, Denpasar, Bali in 2018 was occupied by the 0-5 year age group (toddlers)¹⁴. Similar research was also conducted by Muchti et al., showing that the largest age group in acute non-perforated appendicitis was 15-20 years (25%) and 21-25 years (25%), while in acute perforated appendicitis, the age was 15-20 years (33.33%)¹⁷. These results are supported by the theory that the high incidence of appendicitis in adolescents is due to the maximal development of lymphoid tissue

during adolescence, becoming a factor for increased appendix incidence where even slight obstruction can cause high intraluminal pressure¹⁸. The high incidence of appendicitis is often associated with unhealthy eating patterns; there is research explaining that during adolescence, individuals experience an independence phase where they freely choose food according to their desires, and food selection is no longer based on nutritional content but for social enjoyment¹⁹. Epidemiological studies show that insufficient fiber intake during adolescence can affect the occurrence of constipation, thus becoming one of the risk factors for appendicitis³.

There is an explanation that lymphatic tissue within the appendiceal lumen develops during the two weeks after birth, supporting the frequency of appendicitis cases reported by researchers in toddlers and the elderly. Lymphatic tissue grows with age and reaches maximal growth at ages 12–20 years. Lymphatic tissue will reach maximal growth with 200 follicles during adolescence. At age 30, lymphatic tissue gradually decreases and disappears at age 60. In individuals over 60 years, the appendiceal lumen is often closed due to fibrosis or atrophy¹⁷.

According to another theory, appendiceal lymphoid tissue no longer exists in people over 60 years old. However, changes occur in the serosal layer, which is less elastic than the mucosal layer. Consequently, the response to intraluminal pressure differs from younger patients, resulting in poorer accumulation of intraluminal secretions, which can cause early-stage ischemia and gangrene¹⁸.

Based on Table 2, it was found that the majority of appendicitis patients underwent open appendectomy, namely 52 patients with a percentage of 53.1%. The second most common surgical type was laparotomy appendectomy with 32 people (32.7%), followed by laparoscopic appendectomy with 14 people (14.3%), making it one of the least

chosen surgeries for appendicitis management at this hospital.

Consistent with research conducted by Biondi et al. at Garibaldi Catania Hospital in Italy, which stated that out of 593 patients with appendicitis, open appendectomy was the most common choice for surgical intervention with 310 procedures. Meanwhile, laparoscopic appendectomy was the second choice with 283 procedures in appendicitis patients. However, the difference in surgical method selection is based on the operator and patient condition, as each type of appendectomy has its own advantages²⁰.

According to research by Shiihara et al. conducted in Japan, there were differences in surgical method selection. Out of 159 appendicitis patients planned for laparoscopic appendectomy, 6 patients were indicated to convert to open appendectomy due to patient condition and complication risks. Of the remaining 153 patients for laparoscopic appendectomy, 8 patients were transitioned to laparotomy appendectomy²¹.

There is research explaining the advantages of appendectomy surgery. However, among all methods, laparoscopic appendectomy is the best in terms of prognosis and complication risks. According to Kumar et al., infection complications were significantly higher in the open appendectomy group compared to the laparoscopic appendectomy group, with an infection rate of 3.8% in the laparoscopic appendectomy group and 14.15% in the open appendectomy group.²² Meanwhile, according to Cui et al., patients who underwent laparoscopic appendectomy experienced a much lower incidence of postoperative complications than patients who underwent laparotomy appendectomy. After 3 months, the total complication incidence in the laparoscopy group was 3.9%, compared to 16% in the laparotomy group²³.

The selection of surgical type is not only based on its advantages but must also consider

several disadvantages so that the patient's autonomy right can be exercised. There are several disadvantages explained by previous research, namely according to Biondi et al., the cost of laparoscopic instruments is higher than the open appendectomy technique²⁰. This becomes one consideration in selecting the surgical type. According to research by Farizal et al., some patients prefer to undergo laparotomy appendectomy over laparoscopic appendectomy because the cost with the laparotomy appendectomy method is more affordable than laparoscopic appendectomy⁹.

Limitations in this study include one risk factor (dietary pattern) that could not be included in the variables due to the retrospective descriptive research design and some patient data being unavailable during the search.

Conclusion

Based on the research results, it is concluded that risk factors for post-appendectomy appendicitis patients at Prof. Dr. H. Aloei Saboe Regional Hospital in 2023 most commonly occur in females in the late adolescence age group of 17–25 years. Clinically, the most frequently performed surgical type is open appendectomy. It is hoped that this research can serve as a reference for epidemiological studies, particularly in appendicitis cases, and can be used as additional information for the community with risk factors.

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