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Analysis of factors affe cting the post-appendectomy wound healing process at RSU Haji Medan in 2021-2023

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ABSTRACT

Appendicitis is an inflammation of the appendix or appendix that can occur in anyone, causing abdominal pain. Risk factors for appendicitis include age, gender, diet, and family history. This is due to poor diet at that age. Treatment for appendicitis can be done by surgery. Appendectomy surgery is performed by appendectomy, which is a surgical procedure to remove the inflamed appendix. Normal surgical wound healing is influenced by various factors, namely coagulation, immune system disorders, nutrition, chronic diseases, medications, and suturing techniques. This study was conducted to determine what factors play a role in the wound healing process in post-appendectomy patients. To determine the factors that play a role in the healing of post-appendectomy patients at the Haji General Hospital in Medan in 2021-2023. Descriptive research with a retrospective design that takes data through medical records from 2021-2023. It was found that post-appendectomy patients were more in early adolescence (12-16 years) and late adulthood (36-45 years), with male gender who had a normoweight nutritional status with dry wound conditions with a high number of leukocytes (leukocytosis) and often occurred in the acute appendicitis type. Post-appendectomy patients at the Haji Medan General Hospital in 2021-2023 were mostly found in early adolescence (12-16 years) and late adulthood (36-45 years), male gender, nutritional status with the normoweight category, had dry wound conditions, with a high number of leukocytes (leukocytosis), and patients suffering from acute appendicitis.

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INTRODUCTION

Appendicitis is an inflammation of the appendix or appendix that can happen to anyone, causing abdominal pain. Appendicitis requires immediate surgery to prevent complications. Appendicitis can occur at any age, but most often occurs at the age of 20-30 years. This is due to poor diet at that age. Risk factors for appendicitis include age, gender, diet, and family history. Men are more likely to get appendicitis than women, because the proportion of lymphoid tissue in men is greater than in women.

Consumption of foods that are low in fiber can cause blockage in the lumen of the appendix due to the presence of a hard feces mass and is characterized by pain when pressed on the abdomen in the lower right quadrant, causing inflammation of the appendix or called appendicitis. The habit of consuming less fiber can cause blockage in the lumen, increase the growth of germs and inflammation of the appendix.

The incidence of appendicitis according to the World Health Organization (WHO) in 2017 stated that the death rate due to appendicitis reached 0.2% -0.8% globally. The incidence of appendicitis in Europe is quite high at around 16%, in America as much as 7%, in Asia 4.8% and Africa 2.6% of the total population. Appendicitis in Europe and America has a high rate, because it is influenced by a low-fiber diet, while in Asia and Africa the incidence is lower but increases because it follows the western diet. In Southeast Asia, the highest incidence of acute appendicitis occurs in Indonesia and is ranked first with a prevalence of 0.05%. The incidence of appendicitis in Indonesia in 2016 reached 65,755 cases, increasing until 2017 to 75,601 cases. This increase continued until 2018 (Zebua et al., 2022) (Wibawa MNJ, 2023).

According to data from the Ministry of Health of the Republic of Indonesia in 2009-2010, it increased from 596,132 people (3.36%) to 621,435 people (3.53%). Based on the Indonesian Ministry of Health, the incidence of appendicitis in North Sumatra is 27% of the total population. The Haji Adam Malik Medan General Hospital (RSUP) recorded 101 cases of appendicitis in 2014, and the Putri Hijau Medan Hospital recorded 104 cases of appendicitis in 2018 (Zebua et al., 2022) Complaints of appendicitis usually start with pain in the umbilicus area accompanied by vomiting. Pain within 2-12 hours will usually spread to the lower right quadrant which will persist and worsen when walking.

In addition, there are other complaints, such as anorexia, malaise, fever, constipation, pain when walking and pain when the patient coughs. Physical examination is performed in the lower right quadrant at the McBurney point, Rovsing sign, which is pain in the lower right quadrant when palpating the lower left quadrant, Blumberg sign, which is pain in the lower right quadrant when pressure on the lower left abdomen is released, Psoas sign, which is pain when rotating or extending the patient's right thigh, and obturator sign, which is pain in the lower right quadrant when rotating or moving to the internal part of the folded right thigh (Safitri, 2020).

Appendicitis treatment can be done by surgery. Appendectomy surgery is performed by appendectomy, which is a surgical procedure to remove the inflamed appendix. This procedure is carried out as soon as possible to avoid the risk of perforation. Management of appendicitis can be given second-generation cephalosporin antibiotics and surgery is performed. Appendectomy is performed after a diagnosis of appendicitis has been confirmed. Establishing a diagnosis of appendicitis requires anamnesis, physical examination and supporting examinations. On physical examination, tenderness was found at the Mc. Burney point. Initial supporting examinations for appendicitis can be done complete blood which usually shows an increase in leukocytes or leukocytosis, ultrasound examination and can be continued with CT-Scan examination. This procedure must be carried out as soon as possible to avoid the risk of perforation or abscess (Sayuti et al., 2022).

Wound healing after surgery will proceed normally without leaving scars from surgery if accompanied by normal healing. Normal wound healing is influenced by various factors, namely coagulation, immune system disorders, nutrition, chronic diseases, drugs, and suturing techniques. In the elderly, the wound healing process takes longer than in young people, this factor is due to the generation process, poor nutrition, and decreased immune system (Masraini Daulay N & Angraini Simamora F, 2019).

Pain management in patients suspected of having appendicitis in the form of acetaminophen and nonsteroidal anti-inflammatory drugs should be considered, especially in patients who have contraindications to opioids. Management of uncomplicated appendicitis can be

given with antibiotics. The antibiotic regimen that can be given is amoxicillin/clavulanate 1.2-2.2 grams 6 hours or ceftriaxone 2 grams 24 hours plus metronidazole mg 6 hours or cefotaxime 2 grams 8 hours plus metronidazole 500 mg 6 hours (Cruz & Mayasari, 2022) The response that occurs after an appendectomy is tissue damage and damage to nerve endings and can be at risk of infection if not treated properly.

Handling of wound care after the procedure must be done properly and correctly. Bandage changes at the hospital are carried out on the third day after the appendectomy. Then to change the next bandage can be done at home or during a check-up at the surgical polyclinic. Wound care is an action to treat wounds to prevent infection, inhibit bacterial growth on the skin or other body tissues. The care in question, such as changing bandages, aims to keep surgical wounds dry and prevent surgical stitches from tearing due to certain activities (Mustaruddin, 2021). The wet wound stage is the first days (0-3 days) where the wound condition is generally still wet and may be accompanied by fluids such as blood, serum, or pus from the surgical wound. This is a normal phase of the early healing process. The semi-wound stage is often the 4th day to the 2nd week, the wound condition begins to dry out and new tissue formation occurs. The fluid may decrease, and the wound begins to show signs of drying. The dry wound stage is the 2nd to 6th week, the wound condition should be almost completely dry and new skin tissue has formed. The wound becomes drier and scabs may appear. The complete healing stage is the 6th week to several months, namely the wound will continue to heal and improve. Scars may still be visible, but the skin will continue to repair itself and approach its normal appearance over time (Junker et al., 2013).

Therefore, in this article the author will discuss the factors that influence the wound healing process after appendectomy at the Haji General Hospital in Medan in 2021-2023.

RESEARCH METHOD

This type of research is descriptive with a retrospective design. Retrospective is a method of data collection related to the past that takes data through medical records. This study took medical record data from 2021-2023. This research was conducted from September 2023 to November 2023 and the location of the research was carried out at the Haji Medan General Hospital located at Jalan Rumah Sakit H. No. 47, Kenanga Baru, Percut Sei Tuain District, Deli Serdang Regency, North Sumatra. The population in this study were all post-aippendectomy patients at the Haji Medan General Hospital from August 2021 to August 2023, both male and female with criteria from various age groups. This research was conducted using a total sampling technique, namely all populations that would be used as research samples. Inclusion Criteria: All post appendectomy patients at Haji General Hospital Medan from August 2021 to August 2023. Exclusion Criteria: Incomplete medical record data based on age, gender, type of appendicitis, nutritional status, wound condition and leukocyte count, There are comorbidities in patients in the medical record data, Patients who have perforated wounds in the medical record data Data collection was carried out using post appendectomy patient data taken from patient medical record data at Haji General Hospital Medan for the period 2021-2023. The data was analyzed using the Univariate Analysis test to see the description of each variable.

RESULTS AND DISCUSSIONS

Research Results

This study involved a sample of 35 people, the research data was analyzed from January 13, 2024 to April 29, 2024. This research was carried out after obtaining approval from the Ethics Commission with Number: 1068/KEPK/FKUMSU/2023.

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Univariate analysis was performed on each research variable. The analysis of this research is the frequency distribution category of each variable of age, gender, nutritional status, wound condition and leukocyte count in percentage.

Table 1. Distribution of Respondent Characteristics Based on Age (n=35)

Respondent Characteristics	Frequency (n)	Percentage (%)
Age		
Toddlers	1	2,9
Children	3	8,6
Early Adolescence	8	22,9
Late Adolescence	7	20
Early Adulthood	4	11,4
Late Adulthood	8	22,9
Early Elderly	2	5,7
Late Elderly	0	0
Older People	2	5,7
Total	**35**	**100**

Based on table 1, it shows that from the largest age distribution in the Early Adolescent (12-16 Years) and Late Adult (36-45 Years) categories, there are 8 subjects (22.9%), 7 subjects (20%) Late Adolescent (17-25 Years), 4 subjects (11.4%) Early Adult (26-35 Years), 3 subjects (8.6%) Children (6-11 Years), 2 subjects (5.7%) Early Elderly (46-55 Years) and Elderly (>65 Years), Bailitai (<5 years) 1 subject (2.9%) and there are no subjects in the Late Elderly age category (56-65 Years).

Table 2. Distribution of respondent characteristics based on gender (n=35)

Respondent Characteristics	Frequency (n)	Percentage (%)
Gender		
Male	21	60
Female	14	40
Total	**35**	**100**

Based on table 2, the gender in this study was mostly male, with 21 subjects (60%) and female, with 14 subjects (40%).

Table 3. Distribution of respondent characteristics based on nutritional status (n=35)

Karakteristik Responden	Frekuensi (n)	Presentase (%
Status Gizi		
Underweight	7	20
Normoweight	15	42,9
Overweight	7	20
Obesitas I	5	14,3
Obesitas II	1	2,9
Total	35	100

Based on table 3, the most nutritional status is normoweight (BMI 18.5-22.9), namely 15 subjects (42.9%), 7 subjects (20%) with the categories Underweight (BMI <18.5) and Overweight (BMI 23-24.9), 5 subjects (14.3%) obesity I (BMI 25-29.9), and 1 subject (2.9%) Obesity II (BMI >30).

Table 4. Distribution of respondent characteristics based on wound condition (n=35)

Respondent Characteristics	Frequency (n)	Percentage (%)
Wound Condition		
Wet Wound	13	37,1
Dry Wound	22	62,9
Total	**35**	**100**

Based on table 4. The wound condition of the subjects was mostly dry, namely 22 subjects (62.9%) and 13 subjects (37.1%) had wet wounds.

Table 5. Distribution of respondent characteristics based on Leukocyte Count (n=35)

Respondent Characteristics	Frequency (n)	Percentage (%)
Leukocyte Count		
Leukopenia	0	0
Normal	4	11,4
Leukocytosis	31	88,6
Total	**35**	**100**

Based on table 5, the number of leukocytes in the results of this study was the highest with an increased number of leukocytes or leukocytosis (> 10,000 cells/mm^3) of 31 subjects (88.6%), Normal (5,000-10,000 cells/mm^3) 4 subjects (11.4%), and no subjects had laboratory results of leukocytes with low conditions or leukopenia (<5,000-10,000 cells/mm^3).

Table 6. Distribution of respondent characteristics based on Appendicitis Type (n=35)

Respondent Characteristics	Frequency (n)	Percentage (%)
Type of appendicitis		
Acute	22	62,9
Acute with Localized Peritonitis	13	37,1
Total	**35**	**100**

Berdasarkan tabel 6. hasil penelitian terbanyak dengan tipe apendisitis akut sebanyak 20 subjek (62,9%) dan 13 subjek (37,1%) yang memiliki apendisitis dengan tipe akut with *localized* peritonitis.

Discussion of Research Results

Characteristics of Appendicitis Patients Based on Age

In this study, the most common age group experiencing appendicitis was early adolescence (12-16 years) and late adulthood (36-45 years). According to Nasution, appendicitis can be found at all ages, but the most common is in the age range of 20 to 30 years, this is influenced by poor eating patterns at that age where this age can be categorized as a productive age, where people at that age do a lot of activities. Research conducted at the Batara Guru Belopa Regional Hospital, Luwu Regency, divides the age of <35 years as the majority and> 35 years as the minority. This is also related to the results of the interviews conducted and most patients said that they lack knowledge about this disease so they do not maintain a healthy lifestyle and diet (Awaluddin, 2020).

The results of the study found a minimal number in toddlers to children and also in the elderly. Appendicitis is rare in children but the risk of perforated appendicitis increases in children because the omentum has not developed properly and the diagnosis of appendicitis in children is a little difficult and takes longer because children are less communicative and find it difficult to determine whether or not there is pain in the abdomen and the symptoms they feel. In the elderly, the high incidence of appendiceal perforation is due to vague symptoms, late treatment, narrowing of the appendiceal lumen, and atherosclerosis. The degenerative process in the elderly plays a significant role as a risk factor for appendiceal perforation (Bima Johar I et al., 2021).

Different from the research conducted at Abdul Wahab Sjahranie Hospital Samarinda which conducted research on patients with acute perforated appendicitis. Based on statistical tests, the results showed that age has a significant relationship with the incidence of acute perforated appendicitis with a p value of 0.015 (p value <0.05). The PR (Prevalance Ratio) value obtained was 1.871 which stated that acute appendicitis patients aged <10 years were at 1.871 times greater risk of perforation compared to those aged 10-49 years. Children under 5 years of age have a risk of

perforation and it increases in younger patients, namely perforation at the age of less than 3 years, and almost children under 1 year. Anatomically, the appendicular wall in children is thinner than in adult patients, the cecum cannot dilate, and the omentum is smaller so that it is not sufficient to prevent the spread of infection, are factors that increase the incidence of perforation in children. This difference in anatomical structure is what causes the increased incidence of perforation. In this case, the lymphoid tissue in the vermiform appendix plays an important role. GALT (Gut Associated Lymphoid Tissue) is found throughout the digestive tract, including Peyer's patches, a lymphoid follicle found in the vermiform appendix that plays a role in initiating the immune response. In children and the elderly, there are differences in the structure of lymphoid tissue where in children it is not yet perfect and in the elderly it has experienced atrophy. In general, the vermiform appendix of elderly patients can experience vascular sclerosis, narrowing of the lumen due to fibrosis and the presence of fatty infiltration in the muscular layer so that the structure of the vermiform appendix becomes weak and encourages perforation. Meanwhile, in the elderly, they may have conditions or diseases of the heart, lungs, or kidneys, which result in significant morbidity and mortality due to perforation, for example diabetes mellitus. Diabetes mellitus is associated with complications in various gastrointestinal diseases (Mirantika N et al., 2021).

Characteristics of Appendicitis Patients by Gender

Men were the most subjects obtained in this study. When compared to women, appendicitis occurs more often in men, because women often consume high-fiber foods than men. Low-fiber consumption habits can cause functional obstruction of the appendix and increased growth of normal flora in the colon. This condition facilitates inflammation of the appendix. These results are in line with a literature review that collected 10 literatures discussing gender variables, 7 literatures obtained results that men are more likely to suffer from acute appendicitis than women. Men tend to experience appendiceal inflammation due to anatomical changes. The wall of the appendix contains a lot of lymphoid tissue and in men the proportion of lymphoid tissue is found to be higher than in women. This can explain why the incidence of appendicitis is higher in men than in women (Cristie JO et al., 2021). Salah satu perbedaan jenis kelamin yang paling diketahui dalam apendisitis adalah fakta bahwa pria secara signifikan lebih mungkin mengalami apendisitis dibandingkan dengan wanita.

Over the years, various aspects of appendicitis have been analyzed, such as the origin of the condition, symptoms associated with the condition, risk factors associated with the condition, treatment of the condition, and complications after treatment. The incidence of appendicitis has been increasing, and the need for further evaluation has been revealed because previous studies have mentioned some differences between the sexes related to appendicitis. It is well known that males have a higher incidence of appendicitis, and it has been suggested that males may be more likely to experience perforated appendicitis. This review suggests that the incidence and complications differ at all stages of appendicitis, from diagnosis to treatment outcome. Common risk factors for acute appendicitis are increasing age, three or more comorbid conditions, and, according to one study, increased gene expression. In appendicitis male sex is considered a significant risk factor, along with age, duration of symptoms, race, laparoscopic approach, race, increased leukocyte count, low-income individuals, use of medical centers, use of regional hospitals, diarrhea, and fever. However, in the pediatric population, it is known that female gender is associated with perforation and not male. Contrary to most studies, Akbulut et al. reported no clear correlation between gender and the risk of appendicitis (Kollias et al., 2024).

The results also showed that appendicitis was more common in males and the rate of appendicitis was higher in summer months than in winter months. The incidence of appendicitis, acute appendicitis, and primary appendectomy decreased each year, while the incidence of perforated appendicitis did not show a clear increase. The above patterns are consistent with the results of several previous studies. However, the highest incidence of appendicitis was found in people aged 15 to 29 years, which is different from the highest incidence in the 10 to 19 age group

obtained in previous studies. The crucial finding was that the overall incidence of appendicitis for LIP (Low-income population) patients was 34.99% higher than the overall incidence of appendicitis for NP (Normal population) patients and the incidence of perforated appendicitis was 40.40% higher in LIP (Low-income population) patients than in NP (Normal population) patients, indicating a significant negative effect of lower SES (Socioeconomic status) on the incidence and management of appendicitis and appendectomy (Lin et al., 2015).

Another study conducted at RSAL dr. R. Oetojo Sorong in the period January 2021-14 June 2022 showed different results, namely from a total of 71 subjects, 25 subjects (36.6%) were found in men and 45 subjects (63.4%) in women and showed significant results with p = 0.007. Many studies have obtained different results from the study conducted in Sorong because other studies say that men are one of the risk factors for appendicitis related to lymphoid tissue in men. However, in women as they age they will experience menopause, when a woman is in the pre-menopause stage, cases of appendicitis increase due to hormonal changes (Fuad Ran et al., 2022).

Research conducted at Anutara General Hospital Palu showed that out of 71 male respondents. There were 20 respondents (37.0%) who suffered from appendicitis. Based on the facts in the field, this is because men spend more time outside the home to work and are more likely to consume fast food compared to rice and so on, because fast food is easier for them to get in restaurants or from street vendors. Fast food is a type of food that is not processed properly, so this can cause several complications or obstruction in the intestines which can cause problems with the digestive system, one of which is appendicitis. In the male gender according to field data, they have a poor fiber intake pattern, this is due to the lack of consumption of vegetables and fruits every day (Ariffudin A et al., 2017).

In 91 female respondents, it showed that 34 respondents (63.6%) suffered from appendicitis at Anutara General Hospital, Palu. This is because in the current era of globalization with the existence of gender emancipation or equality. Men and women have the same rights to get the widest and highest education. This study, the level of employment of the people who were respondents was mostly male and female students. Students and students spend a lot of time at school/on campus so that for intake every break time only in the canteen. The canteen at school/on campus sells more instant or fast food, this is what causes a lack of consumption of fibrous foods that are at risk of appendicitis. Based on this, it can be concluded that gender is not a risk for the occurrence of appendicitis (Ariffudin A et al., 2017).

Characteristics of Appendicitis Patients Based on Nutritional Status

The nutritional status of the research subjects was predominantly normoweight. This study is also in line with a study conducted at Al-Islam Hospital Bandung from 82 cases, the highest frequency of Appendicitis was found in the normal weight BMI category (18.5-22.9) as many as 26 cases (32%) and the lowest frequency occurred in the obese BMI category (≥30) as many as 6 cases (7%). There is no relationship between obesity and the number of white blood cells and neutrophils in adults. There was no difference in the level of WBC and Neutrophil counts between normoweight and obesity in appendicitis patients. White blood cells and neutrophils themselves play a role in the inflammatory process as an immune defense. So in this case it proves that there is no difference in the number of white blood cells and people who have normoweight and obesity (Kurniadi M & Nur IM, 2019).

Another study that collected several journals also did not find significant results between excess weight and the incidence of appendicitis, but with overweight and obesity nutritional status at risk of postoperative complications and also affects the duration of surgery which becomes longer, relatively the risk of surgical wound infection is twice as high when compared to patients with normal weight (Fuad Ran et al., 2022). However, this is different from a retrospective review study of pediatric patients conducted in Texas in 2023. Among 23,152 patients, the likelihood of appendicitis complications was 66% higher in underweight patients [odds ratio (OR) = 1.66; 95% CI: 1.06–2.59] and 28% lower in overweight patients (OR = 0.72; 95% CI: 0.54–0.95) compared to

patients with normal weight. This is related to depersonalization and parental education regarding their child's nutritional status which can be prevented so as to minimize post-operative complications (Miguel-Delgado C et al., 2020).

Nutritional status is also related to good and bad eating patterns in patients diagnosed with appendicitis. Research in Palu showed that out of 82 respondents with bad eating patterns. There were 38 respondents (70.4%) who suffered from appendicitis. This is because eating patterns are a risk factor for appendicitis. Eating patterns of fiber foods are information about the types and amounts of fiber foods consumed by a person or group of people at a certain time, so that the assessment of fiber food consumption can be based on the amount and type of fiber foods consumed. Fiber foods are very much needed by the body in the digestive process. Lack of fiber intake can cause constipation. Constipation is very high risk of causing blockage in the appendix, which can cause appendicitis. In addition, out of 80 respondents with good eating patterns. There were 16 respondents (47.2%) who suffered from appendicitis. This is due to the lack of drinking water for daily needs. So even though the daily fiber requirement has been met, constipation will still occur. This is because drinking water in the colon functions to increase the mass of the feces and also changes the shape of the feces to be softer so that it will be easier in the metabolism process (Ariffudin A et al., 2017).

Characteristics of Appendicitis Patients Based on Wound Conditions

The condition of wounds in post-appendicitis surgery patients is mostly found in dry wounds. According to research conducted at the Medan City Hospital, post-appendectomy wound healing is related to nutrition that has nutritional content, especially protein, which can help grow damaged tissue or surgical wounds. Foods or nutrients that are easily found with protein content are egg whites. Egg whites are rich in protein that can grow new tissue on damaged tissue. Surgery will cause physiological stress due to hypermetabolism. Nutritional management is intended to reduce nutritional loss during the hypermetabolism period and to promote repair during healing. The need for vitamins and minerals such as Zn and Vitamin C is also very important to support tissue repair in the wound healing phase (Nutan H et al., 2023).

Another study conducted in Depok Jaya that examined nutritional stress and stress as factors related to appendectomy wound healing found that there was a relationship between stress levels and appendectomy wound healing with $p = 0.003$. Stressed patients will slow down the wound healing process, psychological stress is a cause of slow wound healing in patients with acute wounds or those known to have a major relationship. Psychological stress can be measured as an immunological key to the wound side. Patients with higher stress produce two low proinflammatory cytokines. Proinflammatory cytokines are important for the early phase of wound healing to produce Interleukin 1 (IL-1α) and IL-8. Stress inhibits the emergence of proinflammatory cytokines in the early phase of wound healing, namely the inflammatory phase. Stress induces increased glucocorticoids and changes the dynamic system that controls the development of the inflammatory response (Taufik M & Hasibuan D, 2018).

A case study that examines the application of early mobilization to wound healing in patients with post-appendectomy surgery in Metro City, Lampung Province, was obtained before the mobilization was carried out, the wound had blood, stitches and soft tissue. The wound is in the inflammatory phase. In this phase, the wound has not closed because there has been no growth of new connective tissue (granulation) to close the wound. So it still takes time for the wound to heal. Early mobilization is a policy to guide the patient out of bed and walk as soon as possible. Early mobilization is very important in accelerating the day of treatment and reducing the risks due to long bed rest such as stiffness/tension of muscles throughout the body and impaired blood circulation. Early mobilization has an effect on improving and facilitating blood circulation, with smooth blood circulation it is hoped that the supply of nutrients to the wound tissue can be sufficient so that the healing process will be faster. The wound healing process that occurred in this case after early mobilization was carried out on post-operative days from day 0-3, namely where

the characteristics of the wound were tight, epithelialization appeared, there was no bleeding, there were no signs of infection and redness because the blood vessels would widen to drain blood to the wound area. Based on the results of the application of early mobilization, it can be concluded that this application is one way to accelerate the healing of post-appendectomy surgical wounds (Hidayat R et al., 2022).

Other studies have found that stress causes a 25-40% delay in wound healing. Stressed patients have high levels of many hormones in their blood, including cortisol, aldosterone, and epinephrine. These hormones can help initiate the wound healing process by slowing the migration of cytokine components to the wound site. Wounds will take longer to heal if the healing process is disrupted. The stress response associated with surgery can cause disruption in wound healing. Stress from surgery is known to stimulate the sympathetic nervous system, mediating vasoconstriction. Vasoconstriction in blood vessels will reduce peripheral blood supply, resulting in a lack of oxygen and nutrients to the wound area, and ultimately combined with susceptibility to infection in the wound area (Ananda AR et al., 2021).

Characteristics of Appendicitis Patients Based on Leukocyte Count

The majority of appendicitis patients in this study had laboratory results of high leukocyte counts (leukocytosis). Leukocytes are sensitive markers of the inflammatory process and increase when experiencing inflammation such as appendicitis. This study is in line with a study conducted at the Muhammadiyah Hospital in Palembang in 2022, where 31 people (70.5%) experienced leukocytosis. In patients who had a leukocyte count that shifted to the left (shift to the left) indicated acute inflammation. If the leukocyte count is more than 18,000/mm3 or there is an extreme shift to the left in the differential count, perforated appendicitis is likely to have occurred (Mindasari Y, 2017).

This study is also in line with research conducted at RSUD DR.H. Abdul Moeloek Lampung showing results from 110 respondents, 64 respondents (74.36%) had leukocyte levels> 18,000/mm3. Anamnesis and physical examination are the basis for diagnosing appendicitis with an accuracy rate of 76-80%. The number of leukocytes generally increases in acute appendicitis, which is around 10,000-18,000/mm3. The number of leukocytes less than 18,000/mm3 indicates perforation. Patients with appendicitis generally experience leukocytosis, which is an increase in the number of leukocytes above 10,000/mm3. Leukocyte levels are significantly higher in cases of perforation than without perforation. In cases of perforation, the appendix ruptures, breaks or has a hole and then the pus in the lumen of the appendix will come out, spread to other organs or in the fossa of the vermiform appendix so that it can cause peritonitis, and allow bacteria to grow and cause more infections. This condition will stimulate the body's immune response to be reluctant to produce more leukocytes which function as a defense against infectious agents. The number of leukocytes within normal limits which are often found in acute appendicitis can be influenced by the use of antibiotics freely by patients before being admitted to the hospital (Maulana E & Salsabila AS, 2022).

Research conducted in Pekanbaru showed results from 21 patients with uncomplicated appendicitis, 12 (55%) patients experienced leukocytosis and 9 (45%) patients were normal. While from 47 patients with complicated appendicitis, 40 (85.1%) patients experienced leukocytosis and 7 (14.9%) patients were normal. The results of the study can be concluded that the higher the severity of appendicitis, the more patients will experience leukocytosis and the higher the average leukocytes. The highest number of leukocytes in uncomplicated appendicitis in this study was 22,870 cells/mm3 in children aged 18 years, which is quite high with a diagnosis of uncomplicated appendicitis. Leukocyte counts cannot yet determine the severity of appendicitis. This is because leukocytosis is a reaction to a non-specific infection that only occurs in the appendix, so that the presence of infection elsewhere can affect the patient's leukocyte count. The results of this study obtained p = 0.00 (p = 0.00) which means that there is a significant difference in the average number of leukocytes between uncomplicated appendicitis and complicated appendicitis with the

average leukocytes in uncomplicated appendicitis being lower than complicated appendicitis. A confidence level of 95% (IK95% = 4,015.7-6,683.1), means that if measurements are taken in the population, the difference in the average number of leukocytes between uncomplicated and complicated appendicitis is between 4,015.7-6,683.1 cells/mm3 (Erianto M et al., 2020).

Characteristics of Appendicitis Patients Based on Appendicitis Type

The results of this study mostly found results of acute appendicitis type as many as 20 subjects (62.9%) and 13 subjects (37.1%) who had appendicitis with acute type with localized peritonitis. This study is in line with previous research conducted at the Muhammadiyah Hospital Palembang which found results of 30 subjects (68.2%) in the acute appendicitis type and perforated appendicitis as many as 14 subjects (31.8%). Many people already know the symptoms of acute appendicitis and immediately seek treatment quickly so that it is very helpful for clinicians to diagnose earlier. Perforated appendicitis is a complication of acute appendicitis that is not treated quickly (Mindasari Y, 2017).

Another study conducted at RSPAD Gatot Soebroto, the majority of appendicitis types were non-complicated with 98 subjects (70.5%) and complicated 41 subjects (29.5%). Appendicitis is the most common cause of intra-abdominal infection which in a short time can be an emergency because the appendix wall can rupture, resulting in complications that result in inflammation of the serous membrane layer of the abdominal cavity and the organs inside it and it is known that one of the most common causes is gastrointestinal leakage with mortality always above 10%. There are differences in surgical procedures for the type of appendicitis where in non-complicated appendicitis, laparoscopic appendectomy is usually performed, while in complicated appendicitis, laparotomy to exploration is required (WJ Wibowo et al., 2020).

The results of the study at RSU Haji Medan from January 2017 to December 2019 found that there were 161 (72.9%) cases of acute appendicitis, 35 (15.8%) cases of perforated appendicitis and 25 (11.3%) cases of chronic appendicitis. Specific manifestations make doctors diagnose acute appendicitis incidents earlier. Meanwhile, the incidence of perforated appendicitis is based on the number of cases of acute appendicitis because perforated appendicitis is a complication of acute appendicitis, especially if it is not treated properly. Perforated acute appendicitis is a complication of acute appendicitis that is not treated within 24-36 hours. In general, the longer the delay in diagnosis and surgery, the greater the possibility of perforation. The risk of perforation after 36 hours after the onset of symptoms is at least 15% (Kurniadi H et al., 2023).

Not in line with Fransisca C's research in 2010 with a sample of 723 people, it was found that there were more patients with chronic appendicitis, namely 55 people, than with acute appendicitis, as many as 41 people. Appendicitis can occur in the form of acute or chronic appendicitis. Chronic appendicitis is rare. The existence of chronic appendicitis as a group of diseases that really exist has been questioned for several years. Although the latest clinical data proves the existence of this rare disease. In chronic appendicitis, some patients experience persistent abdominal pain. Patients do not experience typical symptoms of acute appendicitis. Instead, patients experience right lower abdominal pain for weeks to years and may have received various treatments. Diagnosis can be difficult because laboratory and radiological examinations are typically normal. Because the preoperative diagnosis is often unclear, laparoscopy can be a useful tool to allow abdominal exploration.

CONCLUSION

The majority (22.9%) of post-appendectomy patients at the Haji General Hospital, Medan in 2021-2023 were in early adolescence (12-16 years) and late adulthood (36-45 years), The majority (60.0%) of post-appendectomy patients at the Haji General Hospital, Medan in 2021-2023 were male, The majority (42.9%) of post-appendectomy patients at the Haji General Hospital, Medan in 2021-2023 had a nutritional status that was included in the normoweight category, The majority (62.9%) of

post-appendectomy patients at the Haji General Hospital, Medan in 2021-2023 had dry wound conditions, The majority (88.6%) of post-appendectomy patients at the Haji General Hospital, Medan in 2021-2023 had laboratory results of high leukocyte counts (leukocytosis), The majority (62.9%) of patients suffered from Acute Appendicitis.

References

Ananda AR, Inayati A, & Ludiana. (2021). Penerapan Mobilisasi Dini Terhadap Proses Penyembuhan Luka Pada Pasien Dengan Post Operasi Appendiktomi di Kota Metro. *Jurnal Cendikia Muda*, *1*, 436–444.

Ariffudin A, Salmawati L, & Prasetyo A. (2017). Faktor Risiko Kejadian Apendisitis di Bagian Rawat Inap Rumah Sakit Umum Anutara Pali. *Jurnal Preventif*, *8*(1), 1–58.

Awaluddin. (2020). Faktor Risiko Terjadinya Apendisitis Pada Penderita Apendisitis Di RSUD Batara Guru Belopa Kabupaten Luwu Tahun 2020. *Jurnal Kesehatan Luwu Raya*, *7*(1), 67–72.

Bima Johar I, Syamsu FR, & Pramono SD. (2021). Hubungan Jenis Kelamin, Usia dan Jumlah Leukosit Pada Pasien Appendisitis Perforasi dan Apendisitis Non Perorasi. *Wal' Afiat Hospital Journal*, *11*(1), 36–41.

Cristie JO, Wibowo AA, Noor MS, Tedjowitono B, & Aflanie I. (2021). Analisis Faktor Risiko Yang Berhubungan Dengan Kejadian Apendisitis Akut. *Homeostasis Jurnal Mahasiswa Pendidikan Dokter*, 59–68.

Cruz, H. H. Dela, & Mayasari, D. (2022). Aspek Klinis dan Tatalaksana Apendisitis Akut . *JK Unila*, *6*(2).

Erianto M, Fitriyani N, & Siswandi A. (2020). Perforasi Pada Penderita Apendisitis di RSUD Dr. H. Abdul Moeloek Lampung. *Jurnal Ilmiah Kesehatan Sandi Husada*, 490–496.

Fuad Ran, Papendang HA, & Hartanto APS. (2022). The Relationship Between Age, Gender and The Incidence of Acute Appendicitis in Naval Hospital dr. Oejo Sorong Period January 2021-June 14. *Eduhealth*, *23*(2).

Hidayat R, Sukamti N, & Hidayah AA. (2022). Status Nutrisi dan Stress Sebagai Faktor Yang Berhubungan Dengan Penyembuhan Luka Apendiktomi. *Jurnal Penelitian Kesehatan Suara Forikes*, *13*(2), 549–552.

Junker, J. P., Kamel, R. A., Caterson, E. J., & Eriksson, E. (2013). Clinical Impact Upon Wound Healing and Inflammation in Moist, Wet and Dry Environments. *Advances in Wound Care*, *2*(7), 348–356. https://doi.org/10.1089/wound.2012.0412

Kollias, T. F., Gallagher, C. P., Albaashiki, A., Burle, V. S., & Slouha, E. (2024). Sex Differences in Appendicitis . *A Systematic Review*, *16*(5).

Kurniadi H, Sumarny R, & Simorangkir TPH. (2023). Faktor-Faktor Yang Berhubungan Dengan Komplikasi Apendisitis Dan Efektivitas Penggunaan Antibiotik Profilaksis Pada Pasien Apendektomi di RSPAD Gatot Soebroto. *Jurnal Sains Dan Kesehatan*, *5*(6).

Kurniadi M, & Nur IM. (2019). The Characteristic of Apendicitis Based on Histopatological Features in Al-Islam Bandung Hospital. *Universitas Islam Bandung*, *5*(1).

Lin, K., Lai, K. R., & Yang, N. (2015). Epidemiology and Socioeconomic Features of Appendicitis In Taiwan : a 12-year Population-based study. *World J Emerg Surg*, *10*(42).

Masraini Daulay N, & Angraini Simamora F. (2019). Efektivitas Mobilisasi Dini Terhadap Penyembuhan Luka Paska Operasi Apendiktomi. *J Educ Dev*, *7*(4).

Maulana E, & Salsabila AS. (2022). Hubungan Diagnosa Apendisitis Akut Dengan Jumlah Leukosit Di Rumah Sakit Muhammadiyah Palembang. *Syifa ' Med J Kedokteran Dan Kesehatan*, *12*(2).

Miguel-Delgado C, Serrano M, & Delfa S. (2020). Influence of Overweight and Obesity on Acute Appendicitis in Children a Cohort Study. *Cirugia Pediatrica*, *33*(1), 20–34.

Mindasari Y. (2017). Hubungan Stress Ibu Preoperasi Seksio Sesarea Terhadap Penyembuhan Luka Operasi Sesarea di Ruang Nifas Rumah Sakit Ben Mari Malang. *Nursing News*, *2*(2), 150–162.

Mirantika N, Danial, & Suprapto B. (2021). Hubungan Antara Usia, Lama Keluhan Nyeri Abdomen, Nilai Leukosit dan Rasio Neutrofil Limfosit Dengan Kejadian Apendisitis Akut Perforasi di RSUD Abdul Wahab Sjahranie Samarinda. *Jurnal Sains Dan Kesehatan*, *3*(4).

Mustaruddin. (2021). Global Health Science. *Global Health Science*, *7*(1), 1–6.

Nutan H, Stacia D, & Eric B. (2023). Body Mass Index is Associated with Pediatric Complicated Appendicitis and Postoperative Complications. *Ann Surg*, *278*(3), 337–346.

Safitri, N. A. (2020). Tinjauan Pustaka Tinjauan Pustaka. *Convention CenterDi KotaTegal*, 6–37.

Sayuti, M., Maulina, N., & Damanik, R. (2022). Gambaran Tingkat Kecemasan Pasien Pre Apendektomi Menggunakan Hamilton Anxiety Rating Scale (HAR-S) di Rumah Sakit Swasta Kota Lhokseumawe. *Jurnal Bidang Ilmu Kesehatan*, *12*(2), 178–182.

Taufik M, & Hasibuan D. (2018). Hubungan Status Nutrisi Dengan Waktu Penyembuhan Luka Pada Pasien. *Jurnal Ilmu Keperawatan Imelda*, *4*(1), 1–4.

Wibawa MNJ. (2023). Hubungan Kejadian Apendisitis Akut Dengan Peningkatan Mean Platelet Volume (Mpv) di RSUD Kabupaten Klungkung. *J Ners Community*, *13*(2).

WJ Wibowo, TOR Wahid, & H Masdar. (2020). Hubungan Onset Keluhan Nyeri Perut dan Jumlah Leukosit Dengan Tingkat Keparahan Apendisitis Akut Pada Anak. *Health & Medical Journal*, *2*(2), 27–36.

Zebua, R. F., Butar-Butar, H., & Sihombing, Y. P. (2022). Hubungan Antara Usia dan Jenis Kelamin Terhadap Angka Kejadian Apendisitis di RSUD Dr. Pirngadi Kota Medan. *Jurna Kedokteran Methodist*, *15*(2), 148–153.