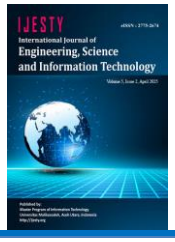
International Journal of Engineering, Science and Information Technology
Volume 5 No. 2 (2025) pp. 204-208
ISSN 2775-2674 (online)
Website: http://ijesty.org/index.php/ijesty
DOI: https://doi.org/10.52088/ijesty.v5i2.814
Research Paper, Short Communication, Review, Technical Paper



Clinical Features of Acute Appendicitis Patients Surgery at Tarakan Regional Hospital in the 2023 Period

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The manuscript was received on 21 June 2024, revised on 20 October 2024, and accepted on 22 February 2025, date of publication 6 April 2025

Abstract

Appendix inflammation, a tube-like structure at the end of the large intestine is acute appendicitis. Right lower quadrant abdomen pain is the most frequent clinical symptom of this condition and, hence, the most common abdominal emergency. Acute appendicitis is notoriously complicated to diagnose since the patient's pain is the sole definite sign. Appendectomy is the sole option when diagnosing or treating acute appendicitis. The purpose of this research is to identify the symptoms and signs of acute appendicitis in patients who have undergone appendectomy operations at Tarakan Regional Hospital. The most common occurrence of acute appendicitis was in patients aged 12–16 years, as identified by this research. Acute appendicitis is more common in this age bracket compared to adults and children. Another unexpected finding of this study is that females make up the majority of people who experience acute appendicitis. While men would theoretically be more at risk, this study found otherwise in Tarakan Regional Hospital. The findings shed light on the age and gender incidence of acute appendicitis, something that medical professionals need to know. To make a prompt and correct diagnosis, medical professionals must be able to detect this pattern of symptoms. Medical intervention can be more effective with an accurate early diagnosis, which speeds up the recovery process and reduces the likelihood of more severe sequelae.

Keywords: *Acute Appendicitis, Appendectomy, Clinical Manifestations, Diagnosis.*

1. Introduction

Appendix inflammation, known as the appendix, is also medically known as appendicitis. The appendix is at the end of the cecum, an empty organ whose size ranges from five to thirty-five centimeters [1]. The tip of this tubular organ is closed, while the other is connected to the cecum itself. Despite ongoing controversy regarding the role of the appendix, numerous research studies have shown that it assists the immune system, particularly by managing the intestinal microbiota content. The most common cause of appendicitis is blockage of the appendix due to factors like infected tissue, foreign bodies, inflamed lymphoid tissues, or hardened stools. The resulting inflammation due to this obstruction can lead to appendiceal perforation, peritonitis, and appendiceal abscess, all of which require urgent medical attention [2]. Intestinal fluid leakage into the peritoneal cavity due to a perforated appendix can be highly harmful to the patient's life. Thus, early diagnosis and prompt treatment are necessary to reduce the chances of more serious effects and speed up the patient's recovery. Various diseases are included under the broad umbrella of “Acute Abdominal Emergency,” and among these is appendicitis [3]. Spontaneously cured appendicitis will have very real complications of fatal possibilities, such as perforation of the appendix, peritonitis, or appendicular abscess, unless it receives a timely intervention. Therefore, rapid and prompt diagnosis is invaluable so that it may be known how to approach it best in treatment. Surgical removal of the inflamed appendix (appendectomy) is considered the cornerstone of treatment for appendicitis and the gold standard of medicine. Appendixes may be incorrectly diagnosed during appendectomy even though the operation is routine and generally safe. US researchers have reported that appendixes removed for appendectomy were normal in about 10% of cases [4]. To minimize the unwanted rate of unnecessary appendectomy, a stricter clinical assessment is necessary. Better diagnostic techniques have allowed surgeons to restrict the number of patients who need to be operated on because of advancements in technology in the medical field. Open and laparoscopic appendectomy surgeries are both widely used in the medical field. Uncomplicated appendicitis patients, pregnant women, the elderly, and obese patients tend to opt for laparoscopic appendectomy as it is less invasive and requires less recovery time. Nevertheless, the procedure takes longer in the operating room

compared to open appendectomy. The operation of choice is typically determined by the patient's health and the surgeon's preference, as no definitive decision has been made regarding the relative merits of the various procedures [5][6].
With 8.6% of men and 6.7% of women affected, acute appendicitis is the most prevalent acute abdominal illness globally. While anyone can develop this disease, individuals in their tens to twenty-first have the most significant prevalence [7]. Approximately 321 million individuals develop acute appendicitis each year, or roughly 233 per 100,000 individuals in the population of the world. The risk of developing acute appendicitis may be enhanced in an individual by causes such as a low-fiber diet, bacterial infection, or blockage in the appendiceal lumen. Lethal consequences such as perforation of the appendix, peritonitis, and abscesses may be caused by this disease if not treated in the early stages. Acute appendicitis is one of the diseases that mainly occur at Indonesian health centers. The World Health Organization reports that appendicitis is the fourth most common cause of death in Indonesia. Appendicitis has been reported to have over 64,000 cases annually, or 134 cases per 100,000 people [8][9]. This means that there is still a big problem with delayed diagnosis and treatment despite the general accessibility of treatment procedures like appendectomy. Hence, to limit the occurrence and death rate of acute appendicitis, individuals should be aware of the initial signs of the disease. They should have access to early and appropriate medical care. Acute appendicitis struck 596,132 people in Indonesia in the year 2009, which was 3.36 percent of the population, according to statistics released by the country's Ministry of Health. The cases rose to 621,435 people, or about 3.53% of the population 2010. Acute appendicitis is a serious public health issue in Indonesia, as shown by the rising patient population. One of the reasons for the high number of acute appendicitis cases is the high percentage of risk factors such as low-fiber diet, delayed diagnosis, and poor access to healthcare. Therefore, better health education and medical facilities are required to control this disease more efficiently [10][11].

2. Research Method

To better explain the clinical presentation of acute appendicitis in patients who received open appendectomy at Tarakan Regional Hospital, the present descriptive and retrospective study sought to find out the answer to that question. Through the application of the explanatory method, researchers can detail patient characteristics; through the application of the retrospective method, researchers can look back at patients' medical records after surgery. This approach allows the study to identify frequent patterns, potential risk factors, and clinical profiles of patients with acute appendicitis who had undergone operations at the hospital. A portion of this study's population included all patients from January 2023 through December 2023 who had open appendectomy at Tarakan Regional Hospital. When researchers can reach the entire population and a list of all the target population members, they apply a categorical descriptive formula to the sample. To ensure that every member of the population had an equal opportunity to be sampled as part of the research sample, the sampling was done randomly. This approach aims to achieve more representative results and fewer subject selection biases. Researchers will initiate the data collection by drafting a formal application letter to the Tarakan Regional Hospital management seeking permission. Once permitted, we used the purposive sampling procedure, randomly picking individuals according to predetermined criteria. Following the sample selection process, the researcher will have rightful access to the patient's medical record data based on the hospital's policy. Research ethics and maintaining patient confidentiality and privacy will guide all sampling processes, as will any relevant medical research law.

3. Result and Discussions

3.1. Frequency Distribution of Patients with Acute Appendicitis Undergoing Appendectomy Based on Gender

Men are more likely than women to suffer from acute appendicitis, information collected in published studies in Deutsches Ärzteblatt shows. The disease is accompanied by an 8.6% lifetime risk for men and 6.7% for women. Acute appendicitis in men is higher than in women, this study finds. Appendix lumen diameter and hormonal effects, which influence the likelihood of inflammation and obstruction of organs, are only a few instances of the physiological and anatomical effects that may be causing this difference. These findings corroborate the observations by Abdelhalim et al. who also observed higher rates of acute appendicitis among males compared to females. The research confirmed that even though women comprised 38% of the population, men comprised 62%. The research by Avci and Ayengin agreed with this finding; 63% of men and 37% of women had this incidence [12]. Acute appendicitis is more common in men than in women, and the consistent findings of these studies confirm this. Physicians can benefit from previous diagnoses and more effective preventive measures on high-risk groups if they learn more about this epidemiologic trend [13][14].
Men are more likely to develop acute appendicitis, according to the majority of research literature on this topic. However, in a study by Syifa Sukmahayati, the result contradicted this: female patients more frequently had acute appendicitis. Although, in theory, there would be more men, other things might influence the trend of developing appendicitis; there were 152 female doctors and 52% of the samples, which amounted to 293. Possible explanations for the difference between the findings of this study and other studies are hormonal influences, anatomical differences, and differences in reporting illness and medical visits [15][16]. The same findings were reported by Romadhan Achmad Ngutro Fuad et al. Out of 71 samples, 45 patients (63.4%) with acute appendicitis were female. Patterns of occurrence of acute appendicitis can differ across populations, depending on these numbers. Consistent with my clinical experience, this study included 96 patients and consisted of 54 (56.25%) women and 42 (43.75%) men. Increased investigation of specific risk factors part of the epidemiology of acute appendicitis in men and women is justified because there is variation in the proportion of reported cases by gender. While men are more prone to having acute appendicitis, women are more commonly operated on with appendectomies. Women had a lifetime risk of having an appendectomy of 23.1% compared to men [17]. There are many reasons why this discrepancy might be seen. One is that appendicitis has very similar symptoms to gynecologic disease in women, and therefore, surgery must be performed to prevent more severe complications. Another explanation for the higher surgery rates may be that women tend to seek medical assistance earlier than men. The Journal of the Nepal Medical Association also reported that appendectomy surgeries are performed more often in women than in men. Of the 175 patients who were studied in Nepal, 92 (52.6%) were women, and 83 (47.4%) were men [18][19]. According to my observation, 56.25 percent of the total sample were women patients who were subjected to appendectomy. This also supports the information that surgery is more often performed on women compared to men, even though men have a higher incidence of acute appendicitis. The disparity is based on differences in diagnosis and medical indications for operation. It

is believed that the increased proportion of lymphoid tissue in men is responsible for the finding that acute appendicitis is more common in men than in women. While lymphoid tissue plays a vital role in the immune process, it can interfere with the appendiceal lumen if it becomes too large due to infection or inflammation. Acute appendicitis occurs when infection and inflammation cause the appendix to become blocked; this is more probable in men due to the increased concentration of lymphoid tissue. Appendicitis in men and women may be decided by a combination of genetics and environment, including diet, lifestyle, and the delay in seeking medical care. There are also gender differences in the management and diagnosis of acute appendicitis, with the probability of undergoing appendectomy being greater among women even though men are at increased risk [20][21].

3.2. Frequency Distribution of Patients with Acute Appendicitis Undergoing Appendectomy Operation at Tarakan Regional Hospital Based on Age

To be effective in health and epidemiological research, the Ministry of Health of Indonesia categorized age groups in 2009 according to some ranges. From toddlers (0–5 years), children (6–11 years), early adolescence (12–16 years), late adolescence (17–25 years), early adulthood (26–35 years), late adulthood (36–45 years), early elderly (46–55 years), late elderly (56–65 years), and elderly (over 65 years) are part of this group. Certain physical and physiological traits are associated with particular age groups, defining susceptibility to disease, growth patterns, and responsiveness to medical interventions and treatments. This age grouping will enable researchers and health professionals to more easily visualize health trends by age group and shape prevention and treatment programs to meet the specific needs of each age group. As the prevalence and severity of diseases, such as acute appendicitis, can differ according to the age group of the patient, this age classification is also convenient for epidemiological studies of these diseases. Acute appendicitis, for instance, is more common in preteen and teenage individuals compared to any other age group. This is because, among others, the lymphoid system is still developing, and dietary and lifestyle changes raise the risk of appendix inflammation. Whereas in the elderly, appendicitis symptoms are mild or even nonexistent, thus making it more difficult to detect and lead to delays in treatment. To more effectively diagnose patients and adjust their treatment based on their age group, medical professionals in Indonesia would do well to familiarize themselves with the age brackets as stipulated by the Ministry of Health [22][23].

The most frequent incidence of acute appendicitis varies by the population studied, but most studies report that it most frequently occurs among children and young adults. Children and adolescents (6–15 years) are more affected by acute appendicitis, according to a study by Belén Aneiros et al., which found that out of 1,736 patients, 1,453 (83.7%) belonged to this age group. However, other research has indicated otherwise. Acute appendicitis was highest among patients aged 17-30 years, according to a study by Manda R. Happyanto et al. [24]. Among 195 patients in this age group, 85 (43.59%) had the condition. Environmental conditions, eating habits, and availability of healthcare facilities may be the reasons for this population variation. The peak incidence of acute appendicitis varies with age, as other studies also showed. According to Syifa Sukmahayati's research, out of 293 patients examined, 93 (31.7%) were between 17–25 years of age, which was the highest prevalence [25]. According to data in NHIRD, from a total of 294,544 patients, 91,965 (31.22%) were between 15-29 years of age, which was the highest incidence of acute appendicitis [26]. Even though acute appendicitis can appear at any age, the risk age is established based on factors that include physiological adaptations, food practices, and the health facility resources available, reflected by age-related occurrence rates.

From this research, the most common age group for acute appendicitis was early teens (12–16 years), and 22.92% of the total 96 cases studied fell into this category. This concurs with other research and shows that adolescent gut function is disturbed by conditions like active lymphoid tissue development and poor diet, which increase the risk of acute appendicitis. It was also found that adolescents (15.63%) and late adolescents (16.67%) had the second-highest incidence rates, showing that the condition is common among adolescents. Early adolescents had the highest rate of incidence. On the other hand, acute appendicitis is mainly in the youngest age group (1.04%), followed by the oldest age group (2.04%). Physiological changes, including impaired immune response, reduced lymphoid tissue function, and unusual presentation that tends to make diagnosis harder, may cause low prevalence among older people. Overlapping risk or symptoms of appendicitis may be worsened in older patients due to the occurrence of other comorbidities. While the results of this study suggest that acute appendicitis occurs more frequently among younger age groups, they also indicate that older age groups have lower rates of the condition but increased risks of complications from delay in diagnosis and treatment.

Patients between the ages of 12 and 25, encompassing early and late adolescence, are at most significant risk for developing acute appendicitis. Ample lymphoid tissue is still active and responsible for the high prevalence in this age group, particularly in men [27][28]. Lymphoid tissue aids in the battle against infection by regulating the immune system and generating a more robust immune response. On the other hand, lymphoid tissue hyperplasia, the excessive and sometimes fatal hyperactivity of the immune system, can occur in certain situations and result in lumen narrowing or appendix blockage [29]. Because it can impede mucus movement and elevate appendix pressure, this appendix lumen blockage is an essential factor in the pathophysiology of acute appendicitis. This leads to compromised blood supply, bacterial proliferation, and later inflammation, resulting in acute appendicitis. Greater disease prevalence is thus evident among the adolescent and young adult groups. These kinds of medical doctors must, therefore, clearly understand the processes above to facilitate early diagnosis and prevent complications, particularly in those most prone age groups. Physiological and behavioral factors increase the risk of acute appendicitis. A poor diet, particularly a low-fiber diet, is an essential factor. The digestive system, regular bowel function, and prevention of constipation are all enhanced by fiber. Lack of fiber in the diet raises the risk of constipation, where waste builds up in the large intestine. This accumulation can generate appendix lumen occlusion, creating bacterial growth and infection. Acute appendicitis, if it progresses from this infection and is not promptly treated, is an emergent condition that necessitates prompt treatment, such as appendectomy, to prevent further complications [30]. Therefore, the most effective way to avoid acute appendicitis is through a good and healthy diet full of fiber.

The age groups of toddlers, late elderly, and elderly have the lowest rate of acute appendicitis. Toddlers have a moderate risk because of the small appendix lumen and lymphoid tissue of toddlers compared to adolescents. Appendix lumen obstruction is thus less likely [31]. Also, in contrast to teenagers and young adults, toddlers' immune systems are developing and, therefore, do not have excessively inflammatory reactions. Conversely, the natural involution of lymphoid tissue because of thymus organ degeneration and reduced efficiency of bone marrow accounts for low rates of acute appendicitis in the late old and elderly. Moreover, as compared to other younger age groups, the diagnosis of acute appendicitis in this group is more complicated. This is because symptoms of appendicitis, which are characterized by pain in the right lower abdomen, are not always readily discernible. On the other hand, signs of peritonitis or nonspecific infection are common in older patients, making it difficult to make a correct diagnosis. Destruction of afferent nerves in the

spinal cord reduces the sense of pain, thus encouraging complications and delaying the diagnosis of acute appendicitis in the elderly [32]. Therefore, to diagnose acute appendicitis at this age, a more detailed examination with greater caution is required.

3.3. Distribution of Clinical Manifestations of Patients with Acute Appendicitis Undergoing Appendectomy Operation at Tarakan Regional Hospital

Patients who underwent appendectomy surgery most commonly complained of right lower abdomen pain (64.58%), nausea (58.33%), McBurney tenderness (46.88%), vomiting (42.71%), and fever (42.71%), according to medical record data. Patients most commonly seek treatment in the hospital for acute appendicitis, as evidenced by these symptoms. Pain complaints in the back, thighs, and waist are 2.04 percent more common than others, whereas pain complaints of bloating and diarrhea are 3.13 percent less common. Also described to be fewer frequent symptoms were the traditional signs of acute appendicitis, i.e., the psoas sign (8.33%), obturator sign (6.25%), and the roving sign (4.17%). The most common presenting symptom is, as usual, abdominal pain, with 95 out of 96 patients (98.96%) having presented with this symptom. The most significant clinical symptom for the diagnosis of acute appendicitis and the need for an appendectomy is abdominal pain, notably right lower quadrant pain.

The majority of patients with acute appendicitis will have right iliac fossa pain located in the lower right abdomen (95 percent of presentations), as per the International Journal of Emergency Medicine. This is typically the patient's presenting complaint. The majority of patients with acute appendicitis also have vomiting (73%), nausea (80%), and abdominal pain (80%) [59]. The results support what is recorded on medical records, where right lower abdominal pain (64.58%), nausea (58.33%), and vomiting (42.71%) are most commonly recorded among the most frequent side effects on patients who are undergoing an appendectomy. The difference in the incidence rate may be influenced by factors such as the severity of the disease, the time of arrival at the health facility, and the application of a method of diagnosis. Acute appendicitis is most commonly diagnosed by the presence of abdominal pain, particularly in the right iliac fossa. Since the first manifestation of appendicular inflammation, right iliac fossa pain is the most prominent symptom in patients with acute appendicitis. Generalized periumbilical colic abdominal pain results from stimulating the T8-T10 afferent nerve fibers. The pain starts to radiate from the belly button area since the stimulation is still visceral. The somatically innervated parietal peritoneum is attracted to the inflammation as it evolves. A characteristic finding of acute appendicitis is that irritation of this nerve induces right iliac fossa pain, which is more severe, constant, and localized. The first symptom in 50-60% of appendicitis patients is periumbilical pain. Within 24 hours, this pain localizes to the right lower quadrant [33]. Pain migration aids diagnosis as the clinical presentation of appendicitis progresses. Pain is referred to the right iliac fossa as the inflammation worsens and involves more sensitive peritoneal structures. For this reason, the early diagnosis of acute appendicitis and the prevention of more severe complications depends on an appreciation of the distribution of pain.

Depending on where the inflamed appendix is located in the body, other symptoms may occur along with right iliac fossa pain. If the appendix is inflamed, it can irritate the distal ileum and rectum, leading to increased intestinal peristalsis and diarrhea-like symptoms. Suppose the appendix is positioned behind the cecum and further towards the back muscle structures, a condition known as a retrocecal position. The patient may also have back and lower back pain in that case. Consequently, inflammation may bring about pain in locations other than the usual locations participating in acute appendicitis. The other symptom that might present in patients with appendicitis is vomiting; the symptom presents more so in situations where the infection has progressed to diffuse peritonitis. When the peritoneum is inflamed everywhere, it upsets digestion and deranges you. Vomiting is, however, no standard or ominous feature of plain appendicitis. Consequently, the anatomical location of the appendix and the extent of inflammation significantly affect the variability of these symptoms [32]. The majority of the patients with acute appendicitis present with lower right abdominal pain or right iliac fossa pain, which is therefore explainable. Inflammation within the appendix first presents as visceral pain but shifts to local somatic pain upon involvement of the parietal peritoneum. Most people who feel this type of pain say it starts in the periumbilical region and eventually radiates to the right lower quadrant of the abdomen. Also, the pain's severity generally worsens over time, particularly with perforation or inflammation extending to nearby tissues. Thus, right iliac fossa pain is a significant symptom of acute appendicitis, and doctors need to be able to identify this pattern of pain so that they can act promptly and effectively.

4. Conclusion

The study revealed that, overall, more female patients than male patients developed acute appendicitis. Indeed, theoretically, this disease is more common in men than in women. Acute appendicitis is also most common in children and adolescents (12–16 years), whereas it is least common in adults (65 and older). People in their twilight years require more attention and caution when checking them because they become less sensitive to pain as age advances. More problems can occur because of the longer duration between the onset of symptoms and diagnosis and subsequent treatment. This age group, therefore, requires special attention when diagnosing and treating illness. Right lower quadrant abdominal pain is the most common complaint of patients at Tarakan Regional Hospital who come in with acute appendicitis. The pain is the primary motivation for individuals to come to the hospital most of the time. Nausea, vomiting, fever, and abdominal pain are some accompanying symptoms that aggravate the patient's condition. To make a prompt and correct diagnosis, medical professionals must be able to detect this pattern of symptoms. Medical intervention can be more effective with an accurate early diagnosis, which speeds up the recovery process and reduces the likelihood of more severe sequelae.

References

[1] Nshuti R, Kruger D, Luvhengo TE. (2014). Clinical presentation of acute appendicitis in adults at the Chris Hani Baragwanath Academic Hospital. *Int J Emerg Med, 7*, 1-6.

[2] Guan L, Liu Z, Pan G, Zhang B, Wu Y, Gan T, et al. (2023). The global, regional, and national burden of appendicitis in 204 countries and territories, 1990–2019: a systematic analysis from the Global Burden of Disease Study 2019. *BMC Gastroenterol, 3*(1).

[3] Salim J, Agustina F. (2022). Maker JJR. Pre-Coronavirus Disease 2019 Pediatric Acute Appendicitis: Risk Factors Model and Diagnosis Modality in a Developing Low-Income Country. *Pediatr Gastroenterol Hepatol Nutr, 25*(1), 30-40.

[4] Arifuddin A, Salmawati L, Prasetyo A. (2017). Risk factors for appendicitis in the inpatient department of Anutapura General Hospital, Palu. *Preventif: Jurnal Kesehatan Masyarakat, 8*(1).
[5] Deshmukh S, Verde F, Johnson PT, Fishman EK, Macura KJ. (2014). Anatomical variants and pathologies of the vermix. *Emerg Radiol, 21*(5), 543-52.
[6] Kaya B, Eris C. (2011). Different clinical presentation of appendicolith IASIS. The report of three cases and review of the literature. *Clin Med Insights Pathol*, (4), 1-4.
[7] Gu Y, Wang N, Xu H. 92015). Carcinoid tumor of the appendix: A case report. *Oncol Lett, 9*(5), 2401-3.
[8] Shaib WL, Assi R, Shamseddine A, Alese OB, Staley C, Memis B, et al. (2017). Appendiceal Mucinous Neoplasms: Diagnosis and Management. *Oncologist, 22*(9), 1107-16.
[9] Dixit A, Robertson JH, Mudan SS, Akle C. (2007). Appendiceal mucoceles and pseudomyxoma peritonei CASE REPORT. *World J Gastroenterol*, *13*(16), 2381-4.
[10] Swischuk LE, Chung DH, Hawkins HK, Jadhav SP, Radhakrishnan R. (2015). Non-fecalith-induced appendicitis: etiology, imaging, and pathology. *Emerg Radiol*, *22*, 643-9.
[11] Di Saverio S, Podda M, De Simone B, Ceresoli M, Augustin G, Gori A, et al. (2020). Diagnosis and treatment of acute appendicitis: 2020 update of the WSES Jerusalem guidelines. *World Journal of Emergency Surgery, 15*.
[12] Petroianu A. (2012). Diagnosis of acute appendicitis. *International Journal of Surgery, 10*, 115-9.
[13] Gomes CA, Sartelli M, Di Saverio S, Ansaloni L, Catena F, Coccolini F, et al. (2024). Acute appendicitis proposes a new comprehensive grading system based on clinical, imaging, and laparoscopic findings. *World J Emerg Surg, 10*(1), 60.
[14] Pratama Y. (2022). Clinical Aspects and Management of Acute Appendicitis in Children. *Jurnal Kedokteran Nanggroe Medika, 5*(2), 33-42.
[15] Guibentif L, Ris F, Scheffler M, Reny JL, Prendki V. (2016). Acute Appendicitis in Elderly Adults: A Difficult Diagnosis. J Am Geriatr Soc. 64(6), 1377-9.
[16] Pedram A, Asadian F, Roshan N. (2019). Diagnostic Accuracy of Abdominal Ultrasonography in Pediatric Acute Appendicitis. *Bull Emerg Trauma, 7*(3), 278.
[17] Bahrami M, Mirgaloyebayat H, Mohajeri Z, Mohammadi H, Afshari SA, Fazeli P, et al. (2023). The diagnostic value of the computed tomography scan and ultrasonography in acute appendicitis. *Am J Nucl Med Mol Imaging, 13*(1), 11.
[18] Aneiros B, Cano I, García A, Yuste P, Ferrero E, Gómez A. (20190. PEDIATRIC APPENDICITIS: AGE DOES MAKE A DIFFERENCE. *Revista Paulista de Pediatria, 37*(3), 318.
[19] A. Albahadili M. (2016). Study the effect of age, gender, and seasonal variation on appendicitis in Azizyah-Iraq. *Al-Kufa University Journal for Biology, 8*(2), 55-62.
[20] Chinn IK, Blackburn CC, Manley NR, Sempowski GD. (2012). Changes in Primary Lymphoid Organs with Aging. *Semin Immunol, 24*(5), 309.
[21] Balogun O, Osinowo A, Afolayan M, Olajide T, Lawal A, Adesanya A. (2019). Acute Perforated Appendicitis in Adults: Management and Complications in Lagos, Nigeria. *Ann Afr Med, 18*(1), 36.
[22] Zewdu D, Wondwosen M, Tantu T, Tilahun T, Teshome T, Hamu A. (2022). Predictors and management outcomes of perforated appendicitis in sub-Saharan African countries: A retrospective cohort study. Annals of Medicine and Surgery, 80, 104194.
[23] Ahmed A, Feroz SH, Dominic JL, Muralidharan A, Thirunavukarasu P. (2020). Is Emergency Appendicectomy Better Than Elective Appendicectomy for the Treatment of Appendiceal Phlegmon? A Review. *Cureus, 12*(12).
[24] Vanover M, Saadai P. (2023). Appendectomy. Operative Dictations in Pediatric Surgery, 115–9.
[25] Zani A, Hall NJ, Rahman A, Morini F, Pini Prato A, Friedmacher F, et al. (2019). European Paediatric Surgeons' Association Survey on the Management of Pediatric Appendicitis. *Eur J Pediatr Surg, 29*(1), 53-61.
[26] Antonacci N, Ricci C, Taffurelli G, Monari F, Del Governatore M, Caira A, et al. (2015). Laparoscopic appendectomy: Which factors are predictors of conversion? A high-volume prospective cohort study. *International Journal of Surgery, 21*, 103-7.
[27] Ranganathan P, Aggarwal R. (2018). Study designs: Part 1 – An overview and classification. *Perspect Clin Res*, *9*(4), 184.
[28] Elfil M, Negida A. (2017). Sampling methods in Clinical Research; an Educational Review. *Emergency, 5*(1), 52.
[29] Téoule P, de Laffolie J, Rolle U, Reißfelder C. (2020). Acute Appendicitis in Childhood and Adulthood: An Everyday Clinical Challenge. *Dtsch Arztebl Int, 117*(45), 764.
[30] Deo K, Yogi P, Niroula A, Maharjan S. (2023). Appendicitis among Patients Admitted to the Department of Surgery of a Tertiary Care Centre: A Descriptive Cross-sectional Study. *JNMA J Nepal Med Assoc, 61*(257), 10.
[31] Happyanto MR, Adhika OA, Pranoto D. (2022). Overview of Appendicitis Patients and Post-Appendectomy Surgical Wound Infections at Bethesda Hospital, Yogyakarta City, 2019-2020 Period. *Journal of Medicine and Health, 4*(2), 154-64.
[32] Lin KB, Lai KR, Yang NP, Chan CL, Liu YH, Pan RH, et al. (2015). Epidemiology and socioeconomic features of appendicitis in Taiwan: a 12-year population-based study. *World J Emerg Surg, 10*(1), 42.
[33] Nshuti R, Kruger D, Luvhengo TE. (2014). Clinical presentation of acute appendicitis in adults at the Chris Hani Baragwanath Academic Hospital. *Int J Emerg Med, 7*(1), 1-6.