Jurnal edu Healt
Volume 15 , Number 02, 2024, DOI 10.54209/eduhealth.v15i02
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

Literature Review: Analysis of Risk Factors Associated With the Incident of Acute Appendicitis

Ali Akbar[1], Azis Beru Gani[2], Ilham Arif[3]
[1]Mahasiswa Program Studi Dokter Fakultas Kedokteran Universitas Muslim Indonesia, [2]Dokter Pendidik Klinik Spesialis Bedah RSP Ibnu Sina Makassar, [3]Dokter Pendidik Klinik Spesialis Bedah RSUD La Palaloi Maros

Article Info
Keywords:
Risk factors,
appendicitis,
gender,
age,
diet

ABSTRACT
Acute Appendicitis is acute abdominal pain caused by obstruction of the lumen of the appendix causing the vermiform appendix to experience acute inflammation. Appendicitis cases based on the World Health Organization (WHO) report in 2020 reached 8% worldwide. The highest incidence is in the 20-30 year age group with the majority of patients being men. This research method was carried out using a literature review by collecting various research journals and obtaining 9 samples of related research literature. The research results showed 6 articles which stated that the incidence of appendicitis occurred more frequently in men. Meanwhile, the age variable in 5 research articles states that the age group is most often 15 years - 30 years and has a significant relationship with the incidence of appendicitis. In dietary pattern variables, there are 6 research articles and all state that dietary patterns are related to the risk of acute appendicitis. Based on the results of the literature review, it can be concluded that age, gender, diet are related and act as risk factors for acute appendicitis.

Corresponding Author:
Ali Akbar
Mahasiswa Program Studi Dokter Fakultas Kedokteran Universitas Muslim Indonesia
aliakbar027424@gmail.com

INTRODUCTION

Acute appendicitis is a general factor that causes acute abdominal pain because there is obstruction of the lumen of the appendix so that the vermiform appendix experiences acute inflammation. Appendicitis is one of the most common abdominal surgical emergencies.

The incidence of appendicitis based on the WHO report in 2010 reached 80% of the total world population. Appendicitis can affect any age group, but it is rarely reported in children under 1 year. The highest number of cases affects the age range of 20-30 years and the number decreases after that age. Cases suffered by women and men are generally quite comparable with the exception of those aged 20-30 years where the majority of sufferers are male. The incidence of appendicitis is much lower in less developed countries, particularly in parts of Africa and in lower socioeconomic groups.

There are various risk factors that cause appendicitis, including: stool consistency, diet, age and gender. Men make up the majority of acute abdominal sufferers with a ratio of 2.5:1 to women. 1 The incidence of appendicitis which occurs more frequently in men

Jurnal edu Healt
Volume 15 , Number 02, 2024, DOI 10.54209/eduhealth.v15i02
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

may be caused by low fiber consumption compared to women who more often consume foods high in fiber.

Epidemiological studies show that consuming foods that are low in fiber and also using constipation influence the emergence of appendicitis. Constipation causes intracecal pressure to increase, giving rise to a functional blockage of the appendix which in turn causes normal colony flora bacteria to experience increased growth. These factors have a big risk of causing acute appendicitis. It is hoped that this literature review can provide useful information regarding risk factors associated with the incidence of acute appendicitis

METHOD

Researchers choose a literature review or literature review method. Literature was obtained through scientific journals or articles downloaded from the PubMed-MEDLINE and Google Scholar databases. The next researcher screened the articles by referring to the specified criteria, namely the year of publication between 2016-2024 and having relevance to the risk factors that cause acute appendicitis. Researchers used several keywords to search for articles, namely "risk factors, acute appendicitis, gender, age, diet". The data that has been collected will be analyzed narratively in the results and data analysis section in order to find out the relationship between risk factors and cases of acute appendicitis.

RESULTS

There were 9 articles sampled, with details of 7 articles that examined gender variables and 6 research articles that stated that the majority of cases of appendicitis were suffered by men rather than women. Then, there are 7 research articles that examine the age variable and 5 research articles that state that ages 15 - 30 years are most often affected by appendicitis. This is also influenced by the anatomy of the adult appendix and diet. There are 6 research articles that examine dietary patterns on the incidence of appendicitis and all state that dietary patterns are related to the risk of acute appendicitis.

Table 1. Characteristics of literature review articles

No	Researcher	Research title	Year of publication	Research methods	Number of samples	Research location
1.	Zebua RF., *et al.*[10]	The Relationship Between Age and Gender on the Incidence Rate of Appendicitis at Dr. Pirngadi, Medan City	2022	*Cross-sectional*	57	Medan, indonesia
2.	Thomas GA., *et al.*[16]	The incidence of appendicitis at RSUP Prof. Dr. R. D. Kandou Manado for	2016	*Retrospective study*	650	Manado, inonesia

Jurnal edu Healt
Volume 15 , Number 02, 2024, DOI 10.54209/eduhealth.v15i02
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

		the period October 2012 – September 2015				
3.	Adhar A., *et al.*[8]	Risk Factors for Appendicitis in the Inpatient Department of Anutapura General Hospital, Palu	2017	*case control*	54 (108 non appendicitis)	Palu, Indonesia
4.	Ferdian H., *et al.*[17]	Risks of Diet on the Incident of Appendicitis at RSUD DR.H Chasan Boesirie Ternate	2022	*case control*	35 (35 non appendicitis)	Ternate, Indonesia
5.	Awaluddin.[6]	Risk factors for appendicitis in appendicitis sufferers at Batara Guru Belopa Hospital, Luwu Regency in 2020	2022	*Cross-sectional*	121	Kab.Luwu, indonesia
6.	Peeters T., *et al.*[18]	An observational study on lifestyle and environmental risk factors in patients with acute appendicitis	2023	*Retrospective study*	254	Belgia
7.	Siraj F., *et al.*[13]	Relationship Between Fiber in	2020	*case control*	200	Pakistan
8.	Alzahrani I., *et al.*[14]	Diet and Acute Appendicitis	2017	*Cross-sectional*	923	Saudi Arabia
9.	Abdullah A., *et al.*[19]	Relationship Between Appendicitis and Lifestyle; Dietary and Hygiene in Saudi Arabia	2022	*case control*	115 (230 non appendicitis)	Saudi Arabia

Table 2. Results of literature review

Researcher	Research title	Results
Zebua RF., *et al.* (2022)[10]	The Relationship Between Age and Gender on the Incidence Rate of Appendicitis at Dr. Pirngadi, Medan City	• 15-30 years old, namely 61.4%
Thomas GA.,	The incidence of appendicitis at	• The majority are male with

Jurnal edu Healt
Volume 15 , Number 02, 2024, DOI 10.54209/eduhealth.v15i02
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

et al. (2016)[16]	RSUP Prof. Dr. R. D. Kandou Manado for the period October 2012 – September 2015	68.4%
Adhar A., *et al.* (2017)[8]	Risk Factors for Appendicitis in the Inpatient Department of Anutapura General Hospital, Palu	• There is a significant correlation between the age variable and cases of appendicitis (p=0.018 <0.05).
Ferdian H., *et al.* (2022)[17]	Risks of Diet on the Incident of Appendicitis at RSUD DR.H Chasan Boesirie Ternate	• There is a significant correlation between the gender variable and cases of appendicitis (p=0.013 <0.05).
Awaluddin (2022)[6]	Risk factors for appendicitis in appendicitis sufferers at Batara Guru Belopa Hospital, Luwu Regency in 2020	• The most common age group is 20-29 years
Peeters T., *et al.* (2023)[18]	*An observational study on lifestyle and environmental risk factors in patients with acute appendicitis*	• The male gender dominates over the female gender.
Siraj F., *et al.* (2020)[13]	*Relationship Between Fiber in Diet and Acute Appendicitis*	• 15-25 year olds are 57.4%, the risk of 15-25 year olds suffering from appendicitis is up to 4,717 times
Alzahrani I., *et al.* (2017)[14]	*Relation Between Appendisitis and Lifestyle; Dietary and Hygine in Saudi Arabia*	• the incidence in men is 37.0% while in women it is 63%. The majority are men compared to women (OR 0.657)
Abdullah A., *et al.* (2022)[19]	*Case-control: A low-fiber diet increases the risk of appendicitis in main Qassim, Saudi Arabia hospitals 2020- 2021*	• incidence of appendicitis (70.4%) with poor diet. Appendicitis attacks more individuals with poor diet patterns (OR 3.455)

Discussion

The incidence of acute appendicitis varies greatly according to gender, age and diet. Based on the results of 9 pieces of literature as research samples, there were 7 studies that used the gender variable and 6 studies showed that the incidence of acute appendicitis occurred more often in men.

Some literature explains that appendicitis affects adult humans at a rate of up to 1.4 times higher than that of women. This is because the appendix wall contains a lot of lymphoid tissue and the proportion of lymphoid tissue in men is greater than in women. Studies by Peeters et al (2023), Alkhamiss et al (2022), Ahmed et al (2017) show that

Jurnal edu Healt
Volume 15 , Number 02, 2024, DOI 10.54209/eduhealth.v15i02
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

men experience appendicitis more often which is in line with the variable pattern of low fiber consumption in men. Habituation of eating fibrous foods can increase the risk of experiencing blockage in the appendix which can lead to inflammation. In general, most men suffer from appendicitis inflammation, which is also due to anatomical transformation.

This is in line with Awaluddin's (2020) research. Based on the bivariate test in this study, it was explained that there was a correlation between gender and cases of appendicitis with a sig-p score = 0.003 < @ = 0.05.6 Only in the research of Arifuddin et al (2017) which obtained gender results. More women suffer from appendicitis. However, judging from the statistical test results, Yani's odds ratio (OR) was 0.657, where the OR score was < 1, so gender was not considered to be the main risk factor for cases of appendicitis.

The incidence of acute appendicitis varies greatly based on age. Several studies state that appendicitis tends to be suffered in late adolescence (aged 17 years - 25 years). Of the 7 literatures, there are 4 literatures, namely Rebekah et al (2022), Arifuddin et al (2017), Ahmed et al (2017), and Alkhasim et al (2022) which state that the most common age is 15 years - 25 years. In the research of Rebekah et al (2022), the results of a multivariate test using logistic regression analysis of each risk factor variable studied showed that the age variable was the most dominant (p=0.022; OR=6.955), or age was at risk up to 6.9 times as a factor. risk of appendicitis.10 In line with the study from Arifudin (2017) that the risk of those aged 15-25 years and experiencing appendicitis is 4,717 times that of the age group under 15 years and over 25 years and has a significant impact.

The background to the causes of obstruction in the appendix is different in each age group. 11 In adolescence there is maximum development of lymphoid tissue so this can cause an increase in obstruction of the appendix. 7 The shape of the appendix in adults is also different in children. The appendix in adult humans is wide proximally while the distal part is narrow. This causes proximal obstruction resulting in an increase in intraluminal pressure. As a result, there can be an increase in the number of bacteria in the lumen of the appendix. Germs in the lumen of the appendix can cause mucosal ulceration resulting in appendicitis.

The predominant incidence of appendicitis experienced by teenagers to adults is also related to diet. Low fiber consumption can cause constipation. Constipation is a risk factor for blockage in the appendix canal which ultimately causes appendicitis. There are 6 pieces of literature sampled, namely Arifuddin et al (2017), Hidayat et al (2022), Peeters et al (2023), Siraj et al (2020), Ahmed et al (2017), and Alkhamiss et al (2022) state that eating patterns, namely fiber consumption , diet sugar, drinking water and fast food play a role in the incidence of appendicitis and have a significant relationship. In research by Arifuddin et al (2017), based on the results of statistical tests, patients with poor diets were 3.455 times more likely to suffer from appendicitis than patients with good diets. The score is >1, so diet is considered a risk factor for cases of appendicitis.

Research by Siraj et al (2022) states that a high fiber diet is a protective factor against acute appendicitis because the healthy population sample without appendicitis has a much higher fiber intake than the acute appendicitis population sample (p-value

Jurnal edu Healt
Volume 15 , Number 02, 2024, DOI 10.54209/eduhealth.v15i02
ESSN 2808-4608 (Online)
https://ejournal.seaninstitute.or.id/index.php/healt

<0.01). In research by Ahmed et al (2017), apart from consuming fibrous foods such as vegetables and fruit, frequent eating at fast food restaurants also plays a role.

WHO recommends that adult women need 2.2L of water/day and men 2.5L/day or the equivalent of 8-8.5 glasses of water every day. In research by Ahmed et al (2017), half of appendicitis patients consumed less than 6 glasses of water every day. This is in accordance with the theory that low water consumption contributes to slow bowel movements followed by constipation. Even though fiber consumption meets daily needs, it is still possible for constipation to occur because drinking water in the colon has the function of increasing mass and changing the shape of the stool to make it softer. Overall, appendicitis is associated with an unhealthy diet. A diet low in fruit and vegetables, low water consumption and frequent consumption of fast food are associated with the risk of acute appendicitis.

CONCLUSION

Based on the data from the research literature review, it can be concluded that gender, age, diet have a relationship and act as risk factors for acute appendicitis.

REFERENCES

1. Sjamsuhidajat R, De jong. Buku ajar ilmu bedah. Edisi ke-3. Jakarta: EGC; 2010.
2. Dixon F, Singh A. Acute appendicitis. Surg (United Kingdom). 2020;38(6):310–7.
3. Anggraini W, Beta Wiraningtias N, et al. Evealuasi Penggunaan Antibiotik pada Pascabedah Apendisitis Akut di RSUD Kabupaten Pasuruan Tahun 2018 (Penelitian dilakukan di Instalasi Rawat Inap RSUD Kabupaten Pasuruan). Pharm J Indones. 2020;6(1):15–20.
4. Longo, D. L.,and Fauci, A. S. Harrison Gastroenterologi & Hepatologi. Jakarta: EGC; 2014.
5. Damanik B, Fikri E, Nasution IP. Relation between Fiber Diet and Appendicitis Incidence in Children at H. Adam Malik Central Hospital, Medan, North Sumatra-Indonesia. Bali Med J. 2016;5(2):84.
6. Awaluddin. Faktor Resiko Terjadinya Appendisitis pada Penderita Apendisitis di RSUD Batara Guru Belopa Kabupaten Luwu Tahun 2020 Awaluddin. J Kesehat Luwu Raya. 2020;7(1):67–72.
7. Lee J. The Influence of Sex and Age on Appendicitis in Children and Young Adults. [Thesis]. London: Social Medicine Research Unit London Hospital, 2009.
8. Adhar Arifuddin, Lusia Salmawati, Andi Prasetyo. Faktor Risiko Kejadian Apendisitis Di Bagian Rawat Inap Rumah Sakit Umum Anutapura Palu. J Prev. 2019;8(1):1–58.
9. Hartawan, dkk. Karakteristik Kasus Apendisitis di Rumah Sakit Umum Pusat Sanglah Denpasar Bali Tahun 2018. Jurnal Medika Udayana. 2018. 9(10), 60-67.
10. Zebua RF, Butar HB, Sihombing YP. Hubungan Antara Usia dan Jenis Kelamin Terhadap Angka Kejadian Apendisitis di RSUD Dr. Pirngadi Kota Medan. Jkm. 2022;15(2):148–53.

11. Mark W. Jones, dkk. StatPearls. [Internet]. Update 2023 April 24 Available from: https://www.ncbi.nlm.nih.gov/books/NBK493193/
12. Hidayatullah, R. M. R. efektivitas antibiotik yang digunakan pada pasca operasi apendisitis di RUMKITAL dr. Mintohardjo Jakarta Pusat [skripsi]. [Jakarta]: Fakultas Kedokteran dan Ilmu Kesehatan, UIN Syarif Hidayatullah Jakarta; 2014.
13. Siraj F, Qureshi MA, Ahmad M, Siddiqi O, Hassan B. Relationship between fiber in diet and acute appendicitis. Vol. 31, Medical Forum Monthly. 2020. 181–184 p.
14. Alzahrani I, Sehli S, Alsharif A, Alqurayyan R, Alshenaifi R, et al. Relationship Between Appendicitis and Lifestyle; Dietary and Hygiene in Saudi Arabia. Int J Adv Res. 2017;5(2):263–9.
15. Nelson, M., D. J. Barker, and P. D. Winter. "Dietary fibre and acute appendicitis: a case-control study." Human nutrition. Applied nutrition 38.2 (1984): 126-131
16. Thomas GA, Lahunduitan I, Tangkilisan A. Angka Kejadian Apendisitis Di Rsup Prof. Dr. R. D. Kandou Manado Periode Oktober 2012 – September 2015. e-CliniC. 2016;4(1).
17. Ferdian Hidayat AH. Resiko Pola Makan Terhadap Kejadian Apendisitis di RSUD DR. H Chasan Boesirie Ternate. :5–10.
18. Peeters T, Houben B, Cools P, Thys Y, D'Onofrio V, Martens S, et al. An observational study on lifestyle and environmental risk factors in patients with acute appendicitis. Heliyon [Internet]. 2023;9(4):e15131. Available from: https://doi.org/10.1016/j.heliyon.2023.e15131
19. Abdullah Alkhamiss, Osamah Almosallam W, Al Abdulmonem, Ajlan Alajlan BA, Sulaiman Alodhaylah, Abdulhakeem Aloqla F, Alzaaqi AA. Case-control: A low-fiber diet increases the risk of appendicitis in main Qassim, Saudi Arabia hospitals 2020-2021. 2022;2033(5(5)).