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Association of Social Characteristics and Laparotomy Findings in The Diagnosis of Acute Appendicitis

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Abstract
Introduction: *Acute appendicitis is a common serious surgical emergency. Due to the rapid progression of the disease, surgery is frequently the most prudent method of treatment. However, any procedure has some level of risk. If the disease's diagnosis can be improved before surgery, the risk of negative appendectomy can be considerably lowered. In addition, societal or demographic factors may influence the incidence rate of acute appendicitis.*
Aim of the study: *The aim of the study was to observe any possible association of social characteristics and laparoscopic findings among patients diagnosed with acute appendicitis.*
Methods: *This prospective cross-sectional study was conducted at the Department of Surgery, Faridpur Medical College Hospital, Faridpur, Bangladesh. The study duration was 6 months, from November 2013 to April 2014. A total of 100 cases were selected from those admitted to the emergency department of the study hospital with pain in the right lower quadrant of the abdomen for the purpose of this study.*
Result: *Among the 100 participants of the study, histopathological diagnosis showed that 86% were acute appendicitis cases and 14% had normal appendicitis. Gender or age had no significant association with histopathological diagnosis, but male prevalence was observed in the study, with a high prevalence of young adults. The original site of pain was periumbilical pain shifted to the right iliac fossa for half the participants. Pain duration was between 18-24 hours for 36% of the cases. All participants presented with pain, fever, anorexia, and nausea had a high prevalence among participants.*
Conclusion: *The study observed that appendicitis has a slightly higher prevalence among the younger and male population, but this difference was not statistically significant. Laparotomy findings had a high correlation with histopathological findings, and the total study had a diagnosis error rate of 14%.*
Keywords: *Appendix, Burst, Laparoscopy, Histopathology*

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I. Introduction

One of the most common surgical emergencies is acute appendicitis.[1] This disease's diagnosis is mostly clinical in nature.[2] A typical patient reports right lower abdomen discomfort, nausea, and vomiting, as well as tenderness and guarding in the right iliac fosse on examination. However, these signs and symptoms might be mistaken for a variety of other acute abdominal illnesses.[3]The fluctuating location of the appendix further complicates matters.[4] Despite significant progress in diagnostic techniques, the diagnosis remains uncertain in 30-40% of instances.[5] Furthermore, the definitive diagnosis of acute appendicitis remains a clinical choice supported by suitable diagnostics. To lower the occurrence of negative appendectomies, which remains as high as 20%, a high level of diagnostic accuracy is essential.[6] According to recent research, the incidence of appendicitis among women of reproductive age is over 50%.[7] According to several research, appendicitis is a condition that affects young adults.[8] It was often thought to be a disease of wealthy countries with a high protein consumption, but its prevalence is growing in underdeveloped countries as well. Aside from a thorough history and clinical examination, total and differential leukocyte count, ESR, and CRP can avoid half of needless procedures and reduce negative appendectomy (to 15.2%) and appendix rupture.[9],[10] If the WBC, ECR, and CRP levels are normal before the surgery, the diagnosis of acute appendicitis is doubtful, and the surgeon should seek other means of diagnosis.[11] The most relevant test is the leukocyte count, which increases slightly in non-perforated appendicitis.[12] An elevated leukocyte count can aid in the diagnosis of acute appendicitis in individuals.[13]Alongside leukocyte tests, laparotomy findings have also been used to diagnose

the presence of appendicitis in patients, and to determine whether surgery is necessary. Appendectomy has a complication rate of 4-15%, in addition to the expenditures and inconvenience of hospitalization and operation. As a result, the surgeon's objective is to establish a precise diagnosis as soon as feasible. Laparoscopies are important tools for the identification and management of stomach discomfort in such cases, even if the appendix seems normal on inspection. When there is inflammation or rupture at the base of the appendix, and the bowel is discovered to be adherent to an appendiceal abscess, an open procedure should be performed.[14]The present study was conducted to observe the laparoscopic diagnosis of acute appendicitis cases, as well as the social characteristics of such patients.

II. Objective

General Objective

- To observe the social characteristics of acute appendicitis patients among the study population.

Specific Objectives

- To observe the laparotomy findings of acute appendicitis patients among the study population.

III. Methods

This prospective cross-sectional study was conducted at the Department of Surgery,Faridpur Medical College Hospital, Faridpur,Bangladesh. The study duration was 6 months, from November 2013 to April 2014. A total of 100 cases were selected from those admitted to the emergency department of the study hospital with pain in the right lower quadrant of the abdomen for the purpose of this study. Informed written consent was obtained from either the patient or their legal guardian before admission to the study. Ethical review for the study was obtained from the ethical review committee of the study hospital. For all participants, data were obtained on admission by using a questionnaire designed for the study. Routine investigations like hemoglobin, total leukocyte count, differential leukocyte count, ESR, and urine R/M/E were done in all cases. X-ray of KUB, CRP, and high-resolution ultra-sonogram of the whole abdomen was also done.Emergency appendectomy was performed in all cases by maintaining a standard operating procedure. Condition of the peritoneal cavity and appendix was recorded after opening the abdomen.After collection, data were processed and analyzed with the help of SPSS version 16.0. Statistical analysis was done, and a p-value of 0.05 or less was recognizedas statistically significant.

Inclusion Criteria

- Patients aged ≥15 years (Both genders)
- Patients presenting with pain in the right lower quadrant of the abdomen.
- Patients who had given consent to participate in the study.

Exclusion Criteria

- Patients aged <15 years
- Patients with a presentation of urological, gynecological, or surgical problems other than appendicitis
- Patients with mass in the right iliac fossa.
- Unable to answer the criteria question.

IV. Results

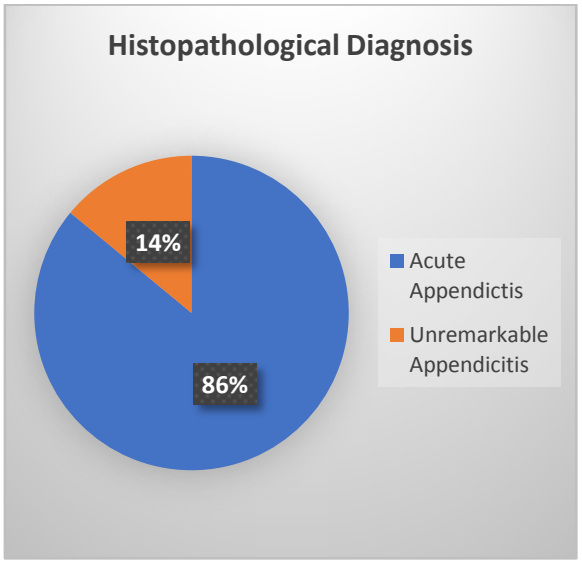

Figure 1: Histopathological diagnosis of the study participants (n=100)

The figure shows the distribution of the patients on the basis of histopathological diagnosis. According to the diagnosis, acute appendicitis was observed in 86% of the patients, while the remaining 14% had unremarkable or normal appendicitis.

Table 1: Association between the age group of the patients and histopathological diagnosis (n=100)

Age	Histopathological diagnosis		P-Value*
	Acute appendicitis n (%)	Unremarkable Appendix n (%)	
15-20	40(46.51)	03(21.43)	0.093
21-30	28(32.56)	05(35.71)	
32-40	10(11.63)	03(21.43)	
41-50	05(5.81)	02(14.29)	
51-60	03(3.49)	01(7.14)	
Mean Age	28.571±1.202		
Total	86(100.00)	14(100)	

*Fisher's Exact test was employed to analyze the data

It was observed that among the 86 acute appendicitis cases, a majority (46.51%) were from the youngest age group of 15-20 years, while another 32.56% were from the age group of 21-30 years. Similarly, among the 14 unremarkable appendix cases, the majority belonged to the earlier age groups. There was no statistical association between the age group of the patients and the histopathological diagnosis of acute appendicitis (p=0.093)

Table 2: Association between gender of the patients and histopathological diagnosis (n=100)

Gender	Histopathological Diagnosis		P* Value
	Acute appendicitis n (%)	Unremarkable Appendix n (%)	
Male	51(59.3)	07 (50.0)	0.163 (NS)
Female	35(40.7)	07(50.0)	
Total	86(100.0)	14(100.0)	

Among the participants, a total of 58 were male and 42 were female. Among the acute appendicitis cases, 59.3% were male and 40.7% were female. The gender distribution was 1:1 among the normal appendix cases. There was no statistical association between the gender of the patients and the histopathological diagnosis of acute appendicitis (p=0.163)

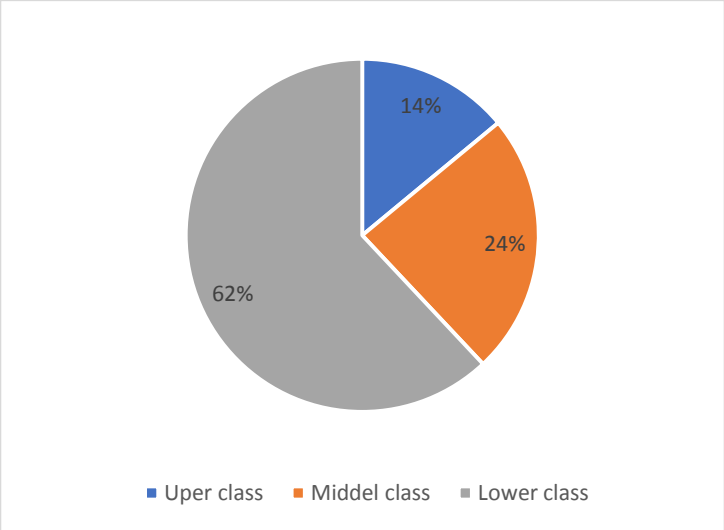

Figure 1: Distribution of participants by monthly income (n=100)

The majority(62%) of patients were from lower-class families, followed by 24% of patients who were from middle-class families, and 14% of patients who were from upper-class families by socioeconomic status.

Table 3: Distribution of patients according to site of pain (n=100)

The original site of pain	Frequency	Percentage
Peri-umbilical pain shifts of RIF	50	50.0
Right iliac fossa	30	30.0
Epigastric pain shifted to RIF	13	13.0
Whole abdomen	07	07.0
Total	100	100.0

Half of the participants had presented with periumbilical pain shifted to the right iliac fossa (RIF), 30% had pain in the right iliac fossa, and 13% had epigastric pain to the right iliac fossa 7% had pain in the whole abdomen.

Table 4: Distribution of patients according tothe duration of pain (n=100)

Duration of the pain	Frequency	Percentage
<6 hours	05	5.0
6-12 hours	09	9.0
12-18 hours	11	11.0
18-24 hours	36	36.0
24-48 hours	27	27.0
>48 hours	12	12.0
Total	100	100

For 36% of the participants, the duration of pain was between 18 to 24 hours, followed by 24 to 48 hours in 27%, less than 6 hours in 0.5%, between 6 to 12hours in 09%, between 12 to 18 hours in 11%,and in 12% of the participants the pain was more than 48 hours.

Table 5: Distribution of patients according to clinical presentation (n=100)

Clinical presentation	Frequency	Percentage
Pain	**100**	**100.0**
Fever	**66**	**66.0**
Anorexia	**85**	**85.0**
Nausea	**65**	**65.0**
Vomiting	**53**	**53.0**
Diarrhea	**13**	**13.0**
Constipation	**25**	**25.0**

Multiple clinical features were present among all the participants. All the patients had pain in the abdomen; fever was present in 66% of patients, anorexia in 85%, nausea in 65%, vomiting in 53%, constipation in 25%, and diarrhea in 13% of the patients as features

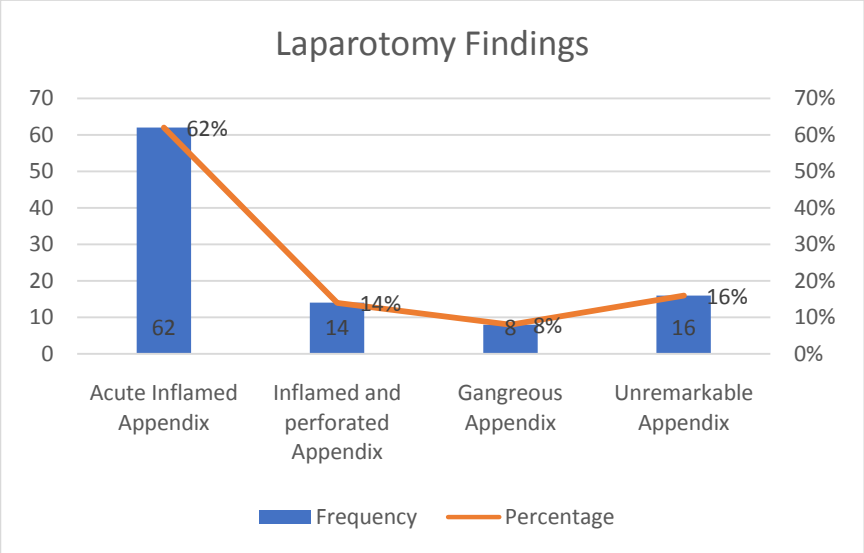

Figure 2: Distribution of patients according to Laparotomy findings (n=100)

According to laparotomy findings, acute inflamed appendix was found in 62% of patients, inflamed and perforated appendix was found in 14% gangrenous appendix in 8%, and normal looking appendix in 16% of patients.

Table 6: Concordance of Laparotomy findings and clinical diagnosis (n=100)

Laparotomy Findings	Histopathological Diagnosis		Total
	Acute Appendicitis	Unremarkable appendix	
Acute Appendicitis	62(62.0)	0(0.0)	62
Inflamed & Perforated	14(14.0)	0(0.0)	14
Gangrenous	8 (8.0)	0(0.0)	8
Unremarkable	02(02.0)	14(14.0)	16
Appendix total	86(86.0)	14(14.0)	100

The table shows that among the 86 histopathological diagnosis of acute appendicitis, 2 cases were diagnosed as unremarkable or normal looking through laparotomy, and among the remaining 84, 62 were diagnosed as acute appendicitis, 14% as inflamed and perforated, and 8% as gangrenous appendix via laparotomy. All 14 histopathological diagnoses of the unremarkable appendix were also diagnosed as unremarkable via laparotomy diagnosis.

V. Discussion

The most frequent abdominal emergency is appendicitis. The lifetime chance of having appendicitis is roughly 7%, and surgical treatment is typically required. This disorder affects roughly 11 people per 10,000 people each year. Acute appendicitis can affect persons of any age or gender. Among the present study participants, the age limit of the patients varied from 15 years to 60 years with a mean age of 28.571±1.202 years (mean ±SD). Overall incidences were more in the 2nd and 3rd decades 43% and 33% respectively. 13% of the patients were between the age group of 31-40 years, 7% of the patients were between the age group 41-50 years, and 4% of the patients were between the age group 51-60 years. This was in line with the findings of various other studies, that recognize appendicitis as a disease of the young, but can occur in patients of all ages and genders.[15],[16]In the present study, the male: female ratio was 1.4:1, and there was no significant association between gender and histopathological diagnosis of appendicitis. The slightly higher male prevalence was similar to the findings of various other studies.[16]-[19] However, Craig et al. reported an incidence of equal appendectomy cases among participants from both genders.[20]According to the monthly income of the patients, the majority were from lower-class families, while 24% were from middle-income families and 14% had been

from low-income families. This was primarily due to the better lifestyle and healthcare available to the patients belonging to high-income families compared to others. These findings were also supported by the findings of Azad et al.[21]In this study, 50% of patients presented with periumbilical pain shifted to the right iliac fossa (RIF), 30% had pain in the right iliac fossa, and 13% had epigastric pain shifted to the right iliac fossa 7% had pain in the whole abdomen. Migration of pain from the periumbilical area to the right lower quadrant was the most discriminating feature of the patient's history. According to the studies by Craig et al. and Kazarian et al., it was observed that the most common constant symptom was abdominal pain localized to right lower quadrant.[20],[22]In the current study, all the patients had pain in the abdomen, fever was present in 66% of patients, anorexia in 85%, nausea in 65%, vomiting in 53%, constipation in 25%, and diarrhea in 13% of the patients as presenting features.The duration of the abdominal pain differed from patient to patient, and the majority (36%) had pain for 18-24 hours. Only 5 patients had abdominal pain for less than 6 hours, while 12 of the patients had continuous abdominal pain for over 2 days (48 hours).Histopathological acute appendicitis was found in 86% of patients, and the remaining 14% were found unremarkable appendix. So diagnosis accuracy was 86% and diagnosis error or negative appendectomy was performed in 14% of patients.An error rate of <15% is quite common in cases of appendectomy, as seen in various other studies.[16],[23],[24]Histopathological findings revealed 14 cases of the normal or unremarkable appendix. According to laparotomy findings, Acute inflamed appendix was found in 62% of patients, inflamed and perforated appendix in 14%, gangrenous appendix in 8%, and normal-looking appendix in 16% of patients. Concordance of laparotomy findings and histopathological diagnosis revealed that among the 86 cases of acute appendicitis, 62 cases were acute appendicitis cases by both diagnoses, and 14 were inflamed and perforated appendix according to laparotomy findings, 8 were gangrenous appendicitis, and 2 were unremarkable appendicitis cases.

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

VI. Conclusion

The study observed that appendicitis has a slightly higher prevalence among the younger and male population, but this difference was not statistically significant.A high prevalence of acute appendicitis cases was found among patients from low socio-economical families. Laparotomy findings had a high correlation with histopathological findings, and the total study had a diagnosis error rate of 14%.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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