

# Assessment of Incidence and Management Outcome of Acute Appendicitis at Saint Luke Catholic Hospital, Oromia Region, Southwest Shoa, Woliso, Ethiopia

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## Abstract

**Background:** Appendicitis is a condition characterized by inflammation of the vermiform appendix. Untreated, mortality is high, mainly because of rupture leading to peritonitis and shock. **Objective:** The aim of the study was to determine the incidence and management outcome of acute appendicitis in Saint Luke catholic hospital wolliso, Oromia region south west shewa Ethiopia. **Methods:** A retrospective cross sectional analysis was undertaken with complete survey on all cases of acute appendicitis surgically managed at Saint Luke Catholic Hospital from January 1, 2013 up to December 31, 2015 G.C. Descriptive analysis was conducted to determine incidence and management outcome of acute appendicitis and logistic regression was carried out to analyze the association between the independent and dependent variables. **Results:** About 382 patients, 81.1% males, were operated for acute appendicitis. Majority of the patients were in the second decades of life. Abdominal pain was invariably the main presenting complaint in 382 (100%). Intraoperative findings included inflamed appendix 181 (47.4%), perforated appendix 56 (14.7%), gangrenous appendix 49 (12.8%), appendiceal abscess 39 (10.2%), and normal appendix 33 (8.6%). The predominant postoperative complication was postoperative wound infection in 19 of 39 (48.7%). Death of patients due to appendicitis was not recorded during the study period. Male patients had 63% less risk of developing unfavorable outcome (AOR = 0.37, 95% CI [0.56, 0.88]). Those patients with WBC >10,000 cells/mm<sup>3</sup> were 3.6 times more likely have unfavorable outcome (AOR = 3.6, 95% CI [1.55, 8.47]) **Conclusion:** Acute appendicitis mainly affects the young population group in the second decades of life and males are more vulnerable. Therefore, working up on patients with abdominal pain for acute appendicitis and validating this subjective complaint of the patient with proper history taking and physical examination, with relevant laboratory investigations, and thorough postoperative care will improve the management outcome of the patient.

**Keywords:** Acute appendicitis, Appendectomy, Saint Luke Catholic Hospital

## Introduction

Appendicitis is a condition characterized by an inflammation of the vermiform appendix, it is one of the most common causes of the acute abdomen and one of the most frequent indications for an emergent abdominal surgical procedure worldwide (1). The vermiform appendix is located at the base of the cecum, near the ileocecal valve where the Tania coli converge on the cecum.

The appendix is a true diverticulum of the cecum (2). Appendix has various positions such as retrocecal which is most common (74%), next pelvic (21%), paracecal, subcecal, perileal (rarest), postileal and sub hepatic (3,4). Appendicitis occurs most frequently in the second and third decades of life. The incidence is approximately 233/100,000 population and is highest in the 10 to 19 year-old age group, It is also higher among men (male to female ratio of 1.4:1), who have a lifetime incidence of 8.6% compared to 6.7% for women (6) 5.

The etiology and pathogenesis of appendicitis are not completely understood. Obstruction of the lumen due to fecaliths or hypertrophy of lymphoid tissue is proposed as the main etiologic factor in acute appendicitis. The frequency of obstruction rises with the severity of inflammatory process. Fecaliths and calculi are found in 40% of cases of simple acute appendicitis, in 65% of cases gangrenous appendicitis without rupture, and in nearly 90% of cases of gangrenous appendicitis with rupture (1).

Acute appendicitis is the commonest cause of surgical acute abdomen and it is estimated that 10% of the population will have appendicitis during their lifetime. For instance, in Europe, America, and Australasia up to 16% of the population underwent appendectomy for appendicitis (7) 6. Acute appendicitis suggested intense challenge to the mucosa associated lymphoid tissue from allergens in the dust, during the sand storm of the spring months, the Arabian Peninsula (8–10) 7-9.

Acute appendicitis was extremely rare in rural African populations fifty to sixty years ago, and is now thought to have increased in incidence. This is postulated to be due to the adoption of more western patterns of life (6,10,11,12). In some parts of the African continents, it has become one of the commonest surgical emergencies difference in incidences, sex, age, and seasonal variations have been reported widely, with information from Nigeria (13).

Appendicitis is the most common surgical cause of abdominal pain worldwide (14,15). Difference incidences

sex, age and seasonal variations have been reported widely(2,6). In Ethiopia, a total of 277 cases of acute appendicitis admitted from January 1st to December 31st 1998 at Zewditu Memorial hospital (ZMH) were reviewed. And from this case 16(5.8%) had presented with a RLQ mass, which was managed conservatively while 261 (94.2%) had emergency surgery. At Operation, it was found that 184 (70.6%) had simple appendicitis, 45 (17.4%) had perforated, and 25(9.5%) gangrenous appendices. Seven (2.5%) had appendiceal abscess with amputated stump left. In ZMH, appendectomy was found to be the most commonest emergency operations, Accounting for 46.7% of cases and carried a post-operative mortality rate of 1.2 %(16). And also a Study at Yirgalem hospital showed that from January 1997 to December 1999 the disease accounted 27.9 % of the operations for acute abdominal emergencies and 1.1% of the total admissions. The aim of this study was to assess the incidence and magnitude of acute appendicitis at Saint Luke catholic Hospital.

The result of the study would also help the local Health institutions, Regional Hospitals, Health Centers, Zonal Health Departments and Regional Health Bureaus so that proper planning, implementation and evaluation of perspective health service activities would be conducted in the area.

## Methods and Materials

### The study area and period

This study conducted at Saint Luke catholic Hospital from January1, 2016 up to Sep 2016 G.C in Wolliso town, Oromia region, Capital of Southwest shewa, Ethiopia, which is about 116 kilometers from Addis Ababa. The Zone has 54 Health Centers and several private clinics. Which are government owned, and 2 hospitals, St. Luke catholic hospital and college of Nursing and Midwifery. The other hospital near Woliso Tulu Bolo district hospital35 km away owned and run by the government. The Zone is one of the eighteen zones of Oromia Region and has eleven districts in habited by a total is 1,173, 363 of which 591,633 are males and 581,730 are females (17) (CSA, 2012).

### Study design:

Facility based retrospective cross sectional study employed. On the records in all patients who had appendectomy at Saint Luke Catholic Hospital.

### Source of population:

The source population was records of all patients who have had surgical acute abdomen at Saint Luke Catholic Hospital from January 1, 2013 up to December 31, 2015 G.C.

### Study population:

The study populations were the selected records of patients who have had appendectomy at Saint Luke Catholic Hospital from January 1, 2013 up to December 31, 2015 G.C. and fulfill the eligibility criteria.

### Eligibility criteria

#### Inclusion criteria

Patients, who had gotten operative management for acute appendicitis at Saint Luke Catholic Hospital from January 1, 2013 up to December 31, 2015G.C included in the study.

#### Exclusion criteria

Patients with acute appendicitis, who had incomplete records to fill all variables, were excluded from the study.

### Sampling technique and Sample size

Simple random sampling technique was used in order to achieve the objective of the study. The sample size was calculated by the single population proportion formulae considering the following assumptions:-P = 0.47(16), because there is study done in Ethiopia on prevalence of appendicitis at ZMH Q or (1-P) =proportion of appendicitis

$Z_{\alpha/2}$ =statistic for the level of confidence at 95%, which is 1.96, 5% margin of error (e). I used the following formula for calculating the sample size  $n = \left( Z_{\alpha/2} \right)^2 \times \frac{p(q)}{E^2}$   
 $n = (1.96)^2 \times 0.47 \times 0.53 / (0.05)^2 = 382$

### Study Variables

Independent Variables:

Patient related: Age, Sex, Address, chronic disease, knowledge and skill

Disease related: duration of illness, clinical signs and symptoms, intraoperative findings

Treatment related: Medication(s) taken prior to hospitalization, Types of abdominal incision, Procedure done,

Length of hospital stay.

Dependent variables:

Outcome of appendicitis, Favorable outcome: improvement and discharged.

Unfavorable outcome: developed post op complications (e.g. wound infection, intestinal obstruction) or died in the intra- or post-operative period.

#### Data collection tool and procedure

Data was collected from patient record cards, registration books and anesthesia charts available in the hospital by check list questionnaires using trained data collectors. First card number of patients in the study period was identified from registration books (logbooks), and then their charts were retrieved from card office. Data collectors and supervisor were recruited from the health facilities of the study area. The training was given for about five data collectors and one holder supervisors for two day on data quality, data collection procedure, in ethical issue and confidentiality of information.

#### Data processing and analysis:

Data was cleaned and edited before entering into SPSS for analysis. The data was analyzed by SPSS version 20 using both descriptive and inferential statistics. Descriptive statistics such as frequencies and percentages Calculated for categorical variables. From inferential statistics Chi-square test performed for categorical variables to check adequacy of cells before performing logistic regression. Binary logistic regression was employee in order to identify factors affect the management outcome of acute appendicitis using backward selection method. The overall model fitness for the variables was assessed by Hosmer-Lemeshow goodness of fit test.

#### Data quality assurance:

The checklists were pretested before the actual data collection period of the study and some correction was made on the checklist. Regular daily supervision was done for checking the consistency and completeness of the filled out checklists, by the principal investigator. Also, before starting data analysis completeness was checked.

#### Ethical clearance:

The ethical issue of this study was approved by the ethical committee of the Jimma University, College of Public Health and Medical Sciences and Saint Luke catholic Hospital and official permission to undertake the study was obtained from the Saint Luke Catholic hospital. The supportive staffs (i.e. Card room workers and surgical staffs) were informed about the purpose of the study and verbal consent obtained. Confidentiality of patient's information assured and information recorded.

### Results

#### Socio-Demographic characteristics of clinical diagnosis of acute appendicitis at SLCH

Out of all 382 patients have undergone operative management for a clinical diagnosis of acute appendicitis are 313 (81.9%) of the patients were males and 69 (18.1%) were females (Figure 1). The age category included  $\leq 20$  years 155 (40.6%) patients, 21-30 years 137 (35.9%) patients, 31-40 years 61 (16.0%) patients, 41-50 years 19 (5%) patients,  $>50$  years 10 (2.6%) patients (Figure 2).

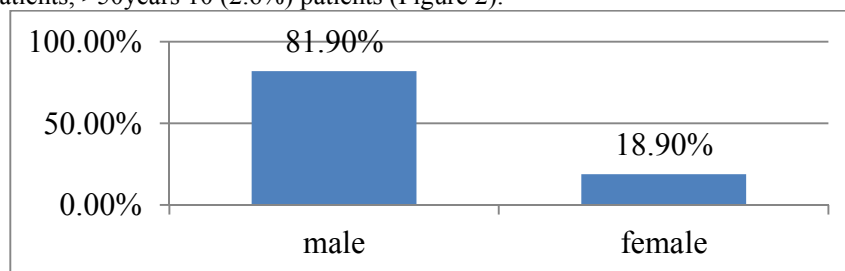


Figure 1: Sex distribution of patients operated for a clinical diagnosis of acute appendicitis at SLCH from January 1, 2013 to December 31, 2015(n=382)

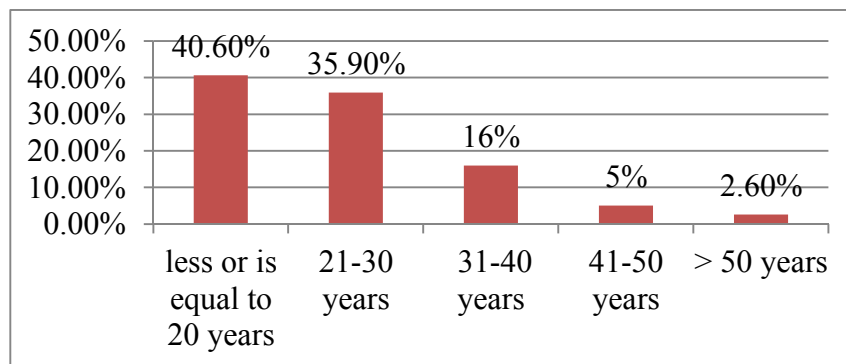


Figure 2: Age distribution of patients operated for a clinical diagnosis of acute appendicitis at SLCH from January 1, 2013 up to December 31, 2015(n=382)

### Pattern of Clinical Profile:

Clinical Symptoms:- Abdominal pain was invariably the main presenting complaint of the patients. An initial per umbilical pain which latter shifted to the RLQ of the abdomen was observed in 259(67.8%) patients. The remaining patients presented with abdominal pain in unspecified sites 44(11.5%), RLQ pain 71(18.6%), and generalized abdominal pain 8(2.1%). 356 (93.2%) patients presented with vomiting. Loss of appetite was noticed in 172 (45%) patients. Fever and nausea were also the other presenting complaints of the patients, 207(54.2%) and 272 (71.2%) respectively (Table 2).

Clinical Signs: - During the physical examination, Roving's sign in 161 (42.1%), obturator sign in 104 (27.2%) and psoas sign in 146 (38.2%) patients were found. Abdominal tenderness was consistently one of the major findings in these patients. 292 (76.4%) of them had tenderness over the RLQ of the abdomen. The rest 68(17.8%) and twenty two (5.8%) of the patients had generalized abdominal tenderness and tenderness of the abdomen in unspecified site respectively. 32(8.4%) patients presented with RLQ mass. WBC Count: Total WBC count was determined for patients out of which a raised WBC count (>10,000 cells/mm<sup>3</sup>) was noted in 200 (52.4%) patients (Table 2).

Table 2: Clinical findings of patients operated for a clinical diagnosis of acute appendicitis at SLCH from January 1, 2013 to December 31, 2015 (n=382).

variables	label	Frequency	Percent
<b>Clinical Symptoms</b>			
<b>vomiting</b>	yes	356	93.2
	no	26	6.8
<b>fever</b>	yes	207	54.2
	no	175	45.8
<b>Abdominal pain</b>	Per umbilical abdominal pain shifting to the RLQ	262	68.6
	RLQ abdominal pain	74	19.4
	in unspecified site	46	12
<b>Loss of appetite</b>	yes	172	45
	no	210	55
<b>nausea</b>	yes	272	71.2
	no	110	28.8
<b>Clinical signs</b>			
<b>abdominal tenderness location</b>	RLQ abdominal tenderness	292	76.4
	generalized abdominal tenderness	68	17.8
	unspecified tenderness	22	5.8
<b>Roving's sign</b>	yes	161	42.1
	no	221	57.9
<b>obturator sign</b>	yes	104	27.2
	no	278	72.8
<b>psoas sign</b>	yes	146	38.2
	no	236	61.8
<b>RLQ abdominal mass</b>	yes	32	8.4
	no	350	91.6
<b>Raised WBC (&gt;10,000cells/mm<sup>3</sup>)</b>	yes	200	52.4
	no	182	47.6

### 5.3: Management Profile

The intraoperative findings of these patients included an inflamed appendix in 181(47.4%) patients followed by

perforated appendix 56 (14.7%), gangrenous appendix 49 (12.8%), appendicular abscess 39 (10.2%), and appendicular mass six (1.6%). The appendix was found normal in 33 (8.6%) patients. In 18 (4.7%) patients, inflammatory peritoneal fluid and non-appendicular pus was found (figure 4).

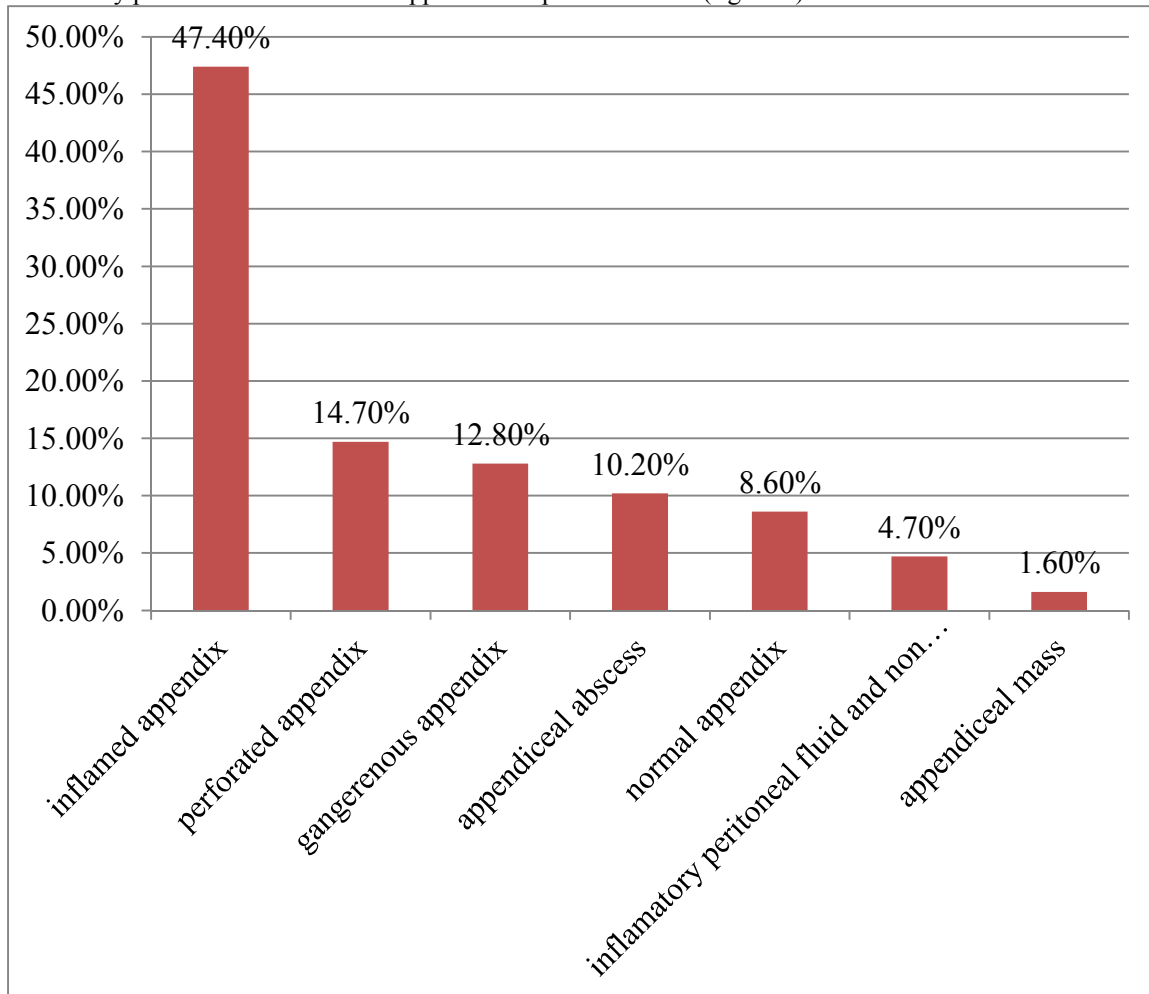


Figure 4: Intraoperative findings patients operated for a clinical diagnosis of acute appendicitis at SLCH from January 1, 2013 up to December 31, 2015 (n=382)

The position of the appendix was reviewed, the commonest position was retrocecal 230 (60.2%) followed by pelvic 77(20.2%) and other positions (pre & post-ileal and paracecal) in three75 (19.6%) patients each (Figure 5)

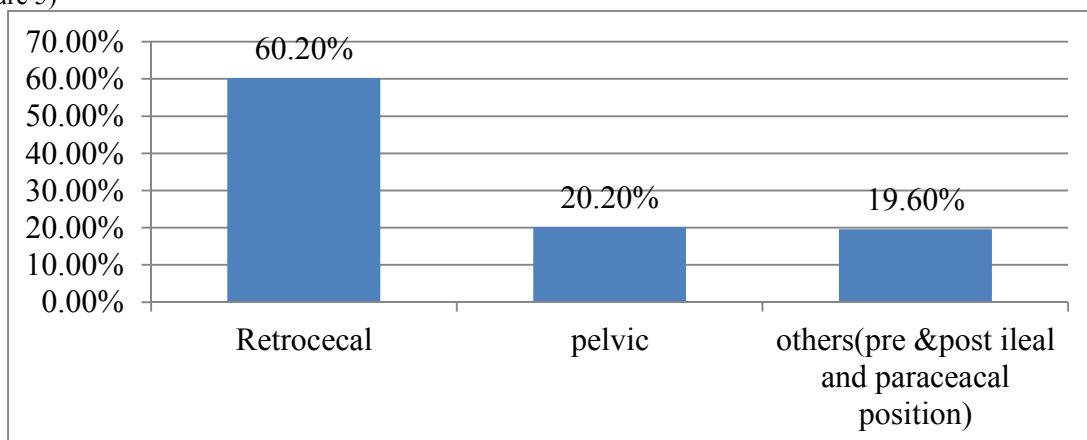


Figure 5: Intra-operative position of the appendix of patients operated for a clinical diagnosis of acute appendicitis at SLCH from January 1, 2013 to December 31, 2015(n=382).

Three hundred two (79.1%) patients have undergone appendectomy for acute appendicitis whereas 31(8.1%) of them have undergone a negative or prophylactic appendectomy.

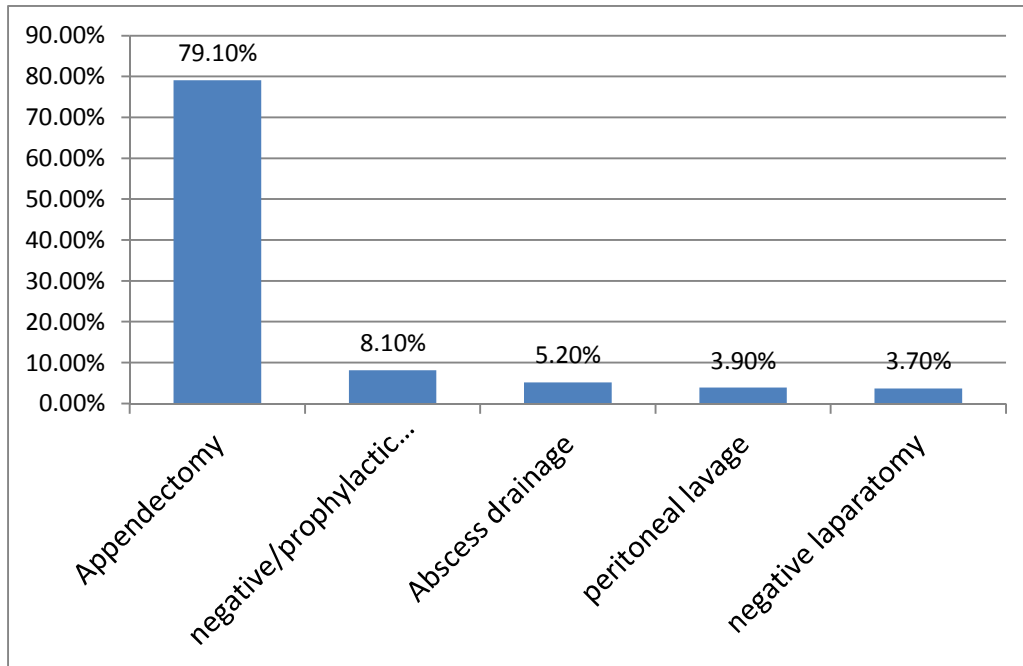


Figure 6: Operative procedures performed for patients with a clinical diagnosis of acute appendicitis at SLCH from January 1, 2013 to December 31, 2015 (n=382).

Management Outcome of Acute Appendicitis: Postoperative Complication: Three hundred and forty three (89.8%) of the patients had favorable outcome where they have improved and discharged from the hospital and developed no postoperative complication, but 39 (10.2%) of them had unfavorable outcome where they have improved but developed one or more postoperative complication(s) excluding death (Figure 7). Postoperative wound infection was the predominant postoperative complication in 19/39 (48.7%) patients and bowel adhesion was found in 10/39 (26%) patients. Five patients (13%) developed fecal fistula and incisional hernia both at once. Among patients who had favorable outcome majority 283 (74.3%) were males and the rest 59(15.4%) were females (Table 3).

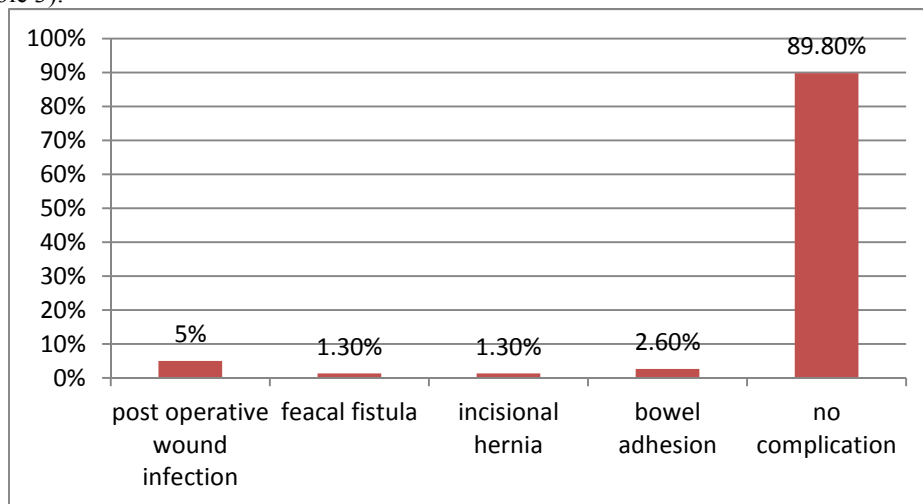


Figure 7: Postoperative complications found in patients operated for a clinical diagnosis of acute appendicitis at SLCH from January 1, 2013 to December 31, 2015(n=382)

Table 3: Sex by outcome of patients operated for a clinical diagnosis of acute appendicitis at SLCH from January 1, 2013 to December 31, 2015(n=382).

Sex	Management outcome of patients				
	Favorable outcome		Unfavorable outcome		Total
	Number	percent	Number	percent	
male	283	74.3	30	7.6	313
female	59	15.4	10	2.6	69
total	343	89.7	39	10.2	382

Length of Hospital Stay: - most of the patients (59.4%) stayed 4-7 days, 8.6% of them stayed =<3days.

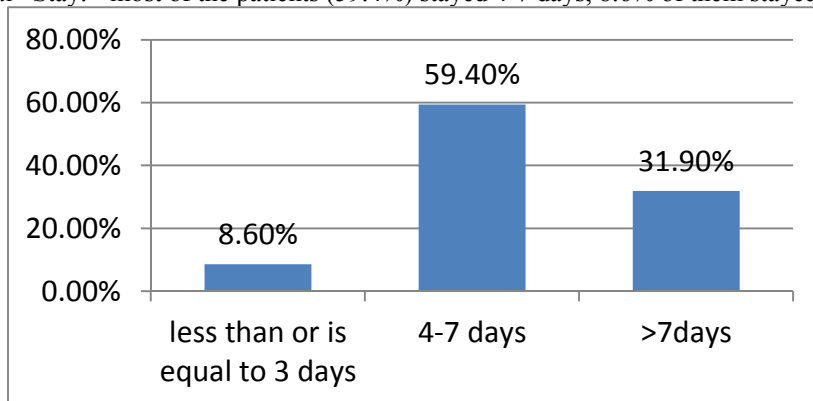


Figure 8: Length of hospital stay of patients operated for a clinical diagnosis of acute appendicitis at SLCH from January 1, 2013 to December 31, 2015 (n=382).

#### 5.4: Factors Affecting Management Outcome of Acute Appendicitis:

Measures of association were performed to test the association between each independent variable with the dependent variable, management outcome of acute appendicitis. The following independent variables were found to have no association with the dependent variable namely, age, address, duration of illness, medication(s) taken prior to hospitalization, clinical symptoms, clinical signs, and types of abdominal incision, intraoperative findings, procedure done, and length of hospital stay. However, sex and Raised WBC (WBC>10000cells/mm<sup>3</sup>) was found to significantly predict whether someone with a clinical diagnosis of acute appendicitis would have favorable or unfavorable management outcome.

Thus, male patients with a clinical diagnosis of acute appendicitis were 63% less likely, risk of developing unfavorable outcome as compared to their female counterpart with AOR of 0.37 and 95% CI of [0.56,0.88]), at P-value of 0.02 and those patients with WBC>10,000 cells/mm<sup>3</sup> with clinical diagnosis of acute appendicitis were 3.6 times more likely have unfavorable outcome as compared to their counterpart,(AOR =3.6, 95% CI[1.55,8.47]), at p-value of 0.003.

Table 4: Crude and Adjusted odds ratio for factors affecting management outcome of acute appendicitis acute appendicitis at SLCH from January 1, 2013 to December 31, 2015(n=382)

Variables	Labels	Management outcome		COR [95% CI]	P-value	AOR[95% CI]	p-value
		Favorable	Unfavorable				
Raised WBC (WBC>10,000 cells/mm <sup>3</sup> )	Yes	173	9	3.52[1.63,7.62]	0.001	3.63[1.55,8.47]	0.03
	No	169	31				
Sex	Male	283	30	0.63[0.28,1.30]	0.198	0.37[0.56, 0.88]	0.02
	Female	59	10				
Loss of appetite	Yes	145	27	0.33[0.16,0.66]	0.02	1.59[0.62,4.06]	0.34
	No	197	13				
nausea	Yes	253	19	3.33[1.70,6.54]	0.000	0.50[0.21,1.15]	0.10
	No	89	21				
fever	Yes	179	28	0.43[0.21,0.89]	0.23	1.16[0.48,2.82]	0.75
	No	163	12				
Obturator sign	Yes	97	7	2.20[0.90,5.42]	0.09	0.44[0.17,1.16]	0.98
	No	245	33				

#### Discussion

This retrospective analysis of 382 hospital records of patients operated for a clinical diagnosis of acute

appendicitis showed the prevalence, management outcome, and factors that affect management Outcome of acute appendicitis at Saint Luke Catholic Hospital, Oromia Regional State, South West shoa. The analysis has shown that majority of patients with a clinical diagnosis of acute appendicitis were found to be in the second decades of life. This age pattern is in line with both histological nature of the vermiform appendix and different studies. Histologically, the mucosa of the vermiform appendix has aggregations of lymphoid tissue, proliferation of which may block the lumen of the appendix.

The peak incidence of appendicitis in childhood, adolescent and early adulthood coincides with the period of maximal lymphoid development the time in which an acute appendicitis supervene. This finding is in consistent with different literatures (1, 3, 11-13, 16, 18- 22). Although in a certain study an almost even sex distribution of acute appendicitis was reported (19), the male predominance observed in this study was in agreement with many studies (6,7).

The greater frequency of appendicitis in males was explained by Van Cot as due to the circumstance that the appendix of the male has a less abundant blood supply than that of the female; for in the latter there is a collateral circulation derived from the sexual apparatus (23). In contrary, in a different study it was concluded that the male predominance was a coincidental finding whereas another study pointed out as no apparent explanation could be given for this finding (7, 24). Therefore, it is highly recommended to have tie-breaking studies to reach at a scientific conclusion of why males are more affected than females.

The pattern of residency of the patients with acute appendicitis has shown a similar trend as that of previous study at Kijabe hospital, Kenya, where majority (95%) of them was from rural districts (10).

However, in the study at Zewditu Memorial Hospital, Addis Ababa, Ethiopia, more than half of the patients were from Addis Ababa (16). The finding on late presentation of the patients concurs with reports from A. Bekele, MD *et al*, Deneke A. MD *et al*, and W. S. Willmore (3, 16).

The patients presented lately probably because most of these patients were residents of out of Woliso town, which is similar finding as that of earlier studies where most of the patients were rural dwellers (7, 22). Deficient basic infrastructural set up in line with difficult access to health care service, poor health-seeking behavior of the community and poverty could also explain the delay in timely presentation to the hospital. In late presentation of appendicitis, features of unfavorable outcome are usually evident some of which are wound infection, intra-abdominal abscess formation, adhesion, intestinal obstruction and death (1, 16).

The clinical symptoms of the patients showed a similar pattern as previous reports. As has been mentioned in many studies, abdominal pain was the most common symptom. Typical feature of per umbilical pain shifting to the right lower quadrant of the abdomen was in agreement with the very path physiologic nature of the disease. In addition, studies conducted by A. Bekele, MD *et al*, A. E. Kunle, *et al*, and Deneke A. MD *et al* showed similar results, Vomiting was the next most common clinical presentation of patients followed by fever and loss of appetite. This finding has also been reported previously (1, 11, 12, and 16). The clinical presentation of acute appendicitis was described as a constellation of “classic symptoms”: right lower quadrant abdominal pain, anorexia, nausea and vomiting. This classical presentation is not commonly found in all patients (25). The physical findings of this study were comparably similar with previous works. Tenderness over the right lower quadrant of the abdomen was the dominant physical finding as that of the findings of S. T. Edino *et al*, Kunle *et al*, and others (11, 24, and 26).

Determination of the total WBC counts together with a through history and proper physical examination helps to reach at a more accurate diagnosis of acute appendicitis. In this study about 52.4% patients had a raised WBC count ( $>10,000/\text{mm}^3$ ) which was comparable with the results of different studies where 50% and 69.5% of the patients had a raised WBC count. Similarly, A. Bekele, MD *et al* have reported a raised WBC count on over two thirds of their study subjects. Though the role of a raised WBC count in the diagnosis of acute appendicitis had remained controversial, it helped in suspecting appendicitis in about 10% of cases (7).

Treatment of choice, urgent removal of the appendix was achieved via an open method or through a laparoscopy. Rocky Davis/ RLQ transverse incision was the commonest open method employed for appendectomy in this study. Whereas, lower mid line and gridiron incisions were the commonest in other studies. In the current study Rocky Davis / RLQ transverse incision was preferred over the others probably because in this type of incision the exposure was better, extension, when needed, was easier and it was aesthetically more acceptable (1, 11, 15). The commonest intraoperative finding of inflamed appendix (47.4%) was in agreement with findings of previous studies (14, 21). However, few numbers of previous studies reported higher rates of intra-operative findings of inflamed appendix (11, 12). The 14.7% rate of perforated appendix seen in this study correlates with the rates seen in studies done in the United States (19.2% in males and 17.8% in females) (18,20). Susan L. Bratton et al had found out as high as 46% and as low as 19% of perforated appendix in different age groups in their series. The high rate of perforation in this study, as compared to reports of lower rate, could be attributed to delayed presentation, which is a similar finding as the previous studies (19, 21).

Some of the grave complications of untreated appendicitis were the progression to gangrenous appendicitis and the formation of appendiceal abscess following specially a perforated appendix (2, 4, and 10). Ten percent of



the cases in this study had an intra-operative finding of appendiceal abscess, which was a smaller rate (21%) as compared to the paper works of Wilmore W.S. but a higher rate (2.5%) as compared to the works of Deneke A. *et al* (16). In addition, there were 12.8% cases with gangrenous appendicitis, which is the same finding as previous studies (12).

The explanation used for higher rate of perforation could also explain the relatively higher rates of appendiceal abscess and gangrenous appendicitis in this study. Accordingly, there was a direct correlation between these two variables and duration of illness prior to admission to hospital. One of the governing factors for the clinical signs and symptoms of patients with acute appendicitis was the position of the appendix. Knowing the clinical manifestation of acute appendicitis during various positions of the appendix, helps the clinician for a better diagnosis. Awareness of position of the appendix aids one not to confuse acute appendicitis with other differentials. For example the presence of right upper quadrant abdominal pain in case of sub hepatic appendicitis (4). Unfortunately, in this study the interestingly enough, even in this figure, the most common site was found to be retrocecal, which correlates with previous studies (1).

The prevalence of postoperative complications and the length of hospital stay were found to be in line with the findings of other investigators (1, 7, 11). The overall postoperative complication rate (10.2%) was the smallest as compared to 32.5% and 34.9% higher rates in South West Nigeria and Eastern Romania (6, 25, and 27). Of overall postoperative complications, 48.7% postoperative wound infection rate was found to be the highest in comparison to as low as 10.9% (11, 14). This highest postoperative wound infection rate was probably because most of the patients presented lately after they had reached at a more complicated clinical stage of the disease. The other possible explanation for the highest wound infection rate in this study was the duration of illness prior to presentation to the hospital. This study had shown that of those patients who developed postoperative wound infection, 79% sought medical help 24 hours later the onset of their illness.

Postoperative length of hospital stay in most of the patients (59.4%) was 4-7 days, and 8.6% of them stayed  $\leq 3$  days. Which was almost similar as compared to that of the study at Durban, South Africa (6.5 days) (11). The other influencing factor of length of postoperative hospital stay was the degree of postoperative complication. It was found that patients with one or more postoperative complications had longer days of hospital stay as compared to those without postoperative complication (10.4 days with complication vs. 6.6 days without complication,  $P = 0.003$ ). As explained by Wilmore W. S. *et al* (10) particularly in the presence of postoperative wound infection, the length of hospital stay remarkably increased. No mortality was recorded in this study which was different from other studies. This was due probably to the better health care services given to the patients such as improved preoperative routines and postoperative care (15).

In this review, it was observed that there was a great difference in the management outcome of female and male patients where female patients were found to have higher unfavorable outcome rate than their male counterparty. It is in women of childbearing age that pelvic diseases most often mimic acute appendicitis, including pain associated with ovulation; disease of the ovaries, fallopian tubes, and uterus; and urinary tract infections. Therefore, misdiagnosis in female patients is common. Difficulty in diagnosis leads to a high perforation rate due to a delay in timely intervention, which finally results in unfavorable management outcome (2).

## Conclusion

Acute appendicitis mainly affects the young population group in the second decades of life. The male patients with a clinical diagnosis of acute appendicitis were less likely than risk of developing unfavorable outcome as compared to their female patients. Abdominal pain was invariably the main presenting complaint. It was found that patients with one or more postoperative complications had longer days of hospital stay as compared to those without postoperative complication. The patients those with  $WBC > 10,000$  cells/ $mm^3$  with clinical diagnosis of acute appendicitis were more likely have unfavorable outcome as compared to their counterparty. Therefore, working up on patients with abdominal pain for acute appendicitis and validating this subjective complaint of the patient with proper history taking and physical examination, with relevant laboratory investigations, and thorough postoperative care will improve the management outcome of the patient.

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