Addis Ababa University College of Health Sciences

School Of Medicine

Department of Emergency and Critical Care Medicine

CLINICAL PROFILE & MORTALITY OF LOUSE-BORNE RELAPSING FEVER AMONG PATIENTS SEEN AT ZEWDITU MEMORIAL HOSPITAL AND TIKUR ANBESSA SPECIALIZED HOSPITAL FROM JULY 2022 TO JULY 2023 -ADDIS ABABA, ETHIOPIA

RETROSPECTIVE CHART REVIEW

A proposal to be submitted to Tikur Anbessa Specialized Hospital, ECCM Department as a Partial fulfillment of the requirement for a post-graduate program of ECCM

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January 2024

Addis Ababa, Ethiopia

Clinical profile & Mortality of Louse-borne relapsing fever among patients seen at Zewditu Memorial Hospital and Tikur Anbessa Specialized Hospital from July 2022 to July 2023 -Addis Ababa, Ethiopia

Retrospective chart review

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Declaration

I**,** Kalkidan, declare that this is my original work and that all sources of materials used for this thesis are properly acknowledged.
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Acknowledgment

I would like to express my deepest gratitude to TASH Department of Emergency Medicine & Critical Care for giving me this opportunity to research an issue that I am curious about.

I would also like to express my heartfelt gratitude to my advisers', Dr. Demelash Gezahagn and Dr. Lemlem(Ph.D.) for their continuous effort, close follow-up, constructive advice, and contribution in facilitating the completion of this proposal.

I would like to thank my family & colleagues for their continuous support.

Table of Contents

List Of Figures

List Of Tables

Abbreviations

AAU – Addis Ababa University

ICU- Intensive care unit

JHR- Jarisch Herxheimer reaction

LOS – Length of stay

LOC – Loss of consciousness

LBRF- Louse-borne Relapsing fever

MV- Mechanical ventilation

MOH- Ministry of Health

RRT- Renal replacement therapy

TASH- Tikur Anbessa Specialized Hospital

ZMW-Zewditu Memorial Hospital

Abstract

Background: Relapsing fever is a vector-born acute recurrent febrile illness caused by Borrelia recurrentis. LBRF is an important re-emerging disease that remains a significant public health concern globally but is currently prevalent in developing countries like the highlands of Ethiopia, Kenya, and Sudan, however, there is limited research on relapsing fever, therefore, it is to assess the clinical profile, and mortality rate in patients with relapsing fever in Addis Ababa.

Objective: The primary goal is to evaluate the clinical characteristics and fatality rate of patients with relapsing fever Patients in ZMH & TASH Addis Ababa Ethiopia.

Methods: An institution-based, multicentered retrospective chart review was conducted at Zewditu Memorial Hospital and TASH, among 172 patients who were kept with LBRF from July 2022- July 2023. The frequency table was used to describe the data and the Association between each variable with mortality was examined using univariate binary logistic regression. variables with P-value <0.25 were candidates for multivariable logistic regression. A multivariable Binary logistic regression model was used to assess the presence of a statistically significant association between mortality and independent variable, to test the statistical significance and interpret the results, adjusted odds ratios p-value and 95% CI were utilized.

Results: Among the study population (172) males were predominant (82.6%), half (49.4%) of patients belonged to the age group between 14-20 years of age, the majority (70.3%) of patients were living on the street. Fever and headache were the most common clinical presentation. Binary logistic regression analysis revealed that sepsis and hematologic complications were highly correlated with mortality, mortality rate was 4.1%.

Conclusion: The most affected ones are the younger age group. Having hematologic complications and sepsis increases the risk of mortality. The mortality rate was 4.1%. Therefore, patients with these risk factors should be followed and treated early.

Keywords: Louse-borne relapsing fever, Mortality, TASH, Addis Ababa, ZMH

1. Introduction

1.1. Background

Relapsing fever is one of the most common causes of acute febrile illness caused by borrelia species transmitted either via body lice in case of louse-borne relapsing fever (LBRF)) and soft ticks in case of tick-borne relapsing fever (TBRF), which manifests as recurrent days-long feverish spells that alternate with afebrile phases. The predominant symptom is a persistent fever that is accompanied by high blood bacterial counts. Its intensity can be fatal or asymptomatic. (1)

Relapsing fever was the name given to the clinical condition that developed after an infection outbreak in Edinburgh in 1843–1848; however, the cause of this infection remained unknown until Otto Obermeier's meticulous research in 1873, while he was employed at the Berlin Charite Hospital (Birkhaug 1942). (2)

LBRF has been there for ages since the 15th century with evidence of outbreak. As a result of their frequent living in cramped and unhygienic conditions, troops during World Wars I and II were particularly susceptible to the disease. In these settings, lice were a significant issue and LBRF outbreaks were frequent. (3) Fifteen of the twenty-seven borrelia species are known to be connected to RF (4). The sole known etiologic agent of LBRF is Borrelia recurrentis, and the only known reservoir is humans (4).

LBRF is characterized by the sudden onset of fever, headache, muscle aches, and chills all at once. The fever may last for many days, diminish for a few days, and then come back. (3) This fever recurrence is the hallmark symptom of LBRF and may occur up to four times. (5)

Meningitis, renal failure, pulmonary difficulties, liver failure, and heart problems are just a few of the serious complications that can result from LBRF if it is not addressed.

Due to the symptoms' resemblance to those of many other contagious illnesses including typhoid and malaria, diagnosing LBRF can be difficult. The diagnosis must be confirmed by blood tests.

Antibiotics like doxycycline, penicillin, and chloramphenicol can be used to treat LBRF. The length of the disease can be shortened and complications can be avoided with prompt and suitable treatment. (3)

1.2. Statement of the problem

Borrelia relapsing fever was once a major worldwide epidemic disease that made a significant impact on the world around 15 million cases of louse-borne relapsing fever (LBRF) and more than 5 million fatalities in Africa, Eastern Europe, and Russia in the past (5). Currently, the disease is primarily found in North-Eastern Africa, particularly the highlands of Ethiopia, where it affects largely homeless people living close to one another in extremely unclean and crowded conditions, especially during rainy seasons (6). Previously LBRF was one of the top ten reasons for hospital admissions in Ethiopia and is associated with high morbidity and death [2].

Numerous cases of RF were seen at Zewditu Memorial Hospital. The majority of these patients are referred from a health center after experiencing difficulties either before or after beginning Relapsing fever therapy. Some of these patients pass away because of disease-related complications like myocarditis, pulmonary, renal, and hematology complications.

Though some studies were done on the prevalence and overview of relapsing fever in Ethiopia, none explored the associated factors and mortality of relapsing fever patients in Addis Ababa. This study aims to understand the clinical profile of the relapsing fever in different age groups, sex, and factors that contribute to the mortality, and mortality rate of the disease. It is the first study in Addis Ababa.

1.3. Significance of the study

LBRF is considered a neglected disease, which means that it receives little attention from public health authorities and funding agencies. This lack of resources hampers the control and prevention of the outbreak, so this study will provide information for the Health Bureau & MOH for appropriate management to prevent outbreaks and reduce the burden of illness in the affected population. It will contribute to future literature.

2. Literature Review

Globally

Relapsing fever has been documented in the USA since 1844 when immigrants from Liverpool were said to have experienced an outbreak of louse-borne relapsing fever in Philadelphia (Moursund 1942) (2). According to the League of Nations Report, which Wynn's 1942, an alarming estimated 1570, 604 instances were thought to have happened in the erstwhile "European Russia" during 1920 alone. (2)
It is reported that around 15 million cases of LBRF and more than 5 million people died in Russia, Eastern Europe, and Africa in the past. It is now an important disease only in North-Eastern African, Ethiopian highlands, where 10,000 cases are thought to occur annually (2).

According to reports, mortality from LBRF-related complications can reach 40% in people who are left untreated and 2-5% in those who receive treatment. JHR is a frequent potentially lethal LBRF consequence that occurs before or after initiation of treatment. The observed incidence rate of JHR reported in research ranges from 0% to 100%, and the lack of standardization in the diagnosis of JHR may be the cause of this discrepancy (3).

There was no discernible difference between tetracycline and penicillin in terms of mortality rate, according to a comprehensive analysis of the literature that included 6 randomized controlled trials (RCT) comparing antibiotics in LBRF that single-dose regimen using either antibiotic. Three of the five trials evaluating the rate of JHRs demonstrated a significant benefit for penicillin, despite a significant heterogeneity in the category. Tetracycline decreased the possibility of relapse. The use of tetracycline was linked to a shorter mean time for fever to resolve. Although tetracycline seems as the most effective treatment, it also seems to be linked to a greater JHR rate. It is important to look at alternative treatment plans for LBRF.(7)

In Africa study

Fever (94%), headache (85%), jaundice (46%), epistaxis (40%), and hepatosplenomegaly were the most prevalent clinical findings in a Sudanese investigation that included 363 patients. In 93% of cases, thrombocytopenia was also found. (8) Seventy-eight percent of cases had elevated blood urea, whereas 68% exhibited hepatocellular derangement. In five of the instances, the

autopsy revealed bronchopneumonia, interstitial edema with focal cardiac fibrosis, hepatic necrosis, splenic infarcts, a rise in the size and cellularity of the glomeruli, brain edema, and congestion, among other things. Three of the occasions with autopsies revealed intracranial bleeding. (8)

In a Sudanese study, the mortality rate with therapy was 5-5%. Six cases underwent post-mortem examination. The liver, spleen, brain, and lungs were the most commonly implicated organs. Severe liver damage, lobar pneumonia, subarachnoid hemorrhage, and splenic rupture were the most common reasons for death. One hundred and sixty patients with LBRF fever cases were treated with a combination therapy of procaine penicillin and tetracycline. With the advantages of tetracycline (severe reaction) and penicillin (relapses) when taken separately, the combination therapy has been proven to be safe and effective (9).

In Ethiopia study

Its occurrence in Ethiopia has two patterns one is as an epidemic problem, with outbreaks associated with war, military personnel, and refugee camps, and the second is as an endemic problem, with a relatively small but steady stream of cases presenting for treatment(10). The prevalence of louse-borne relapsing fever done in females North-West of Addis Ababa (Bahir dar Hospital) was 2.5%, with yekolotemaries having the highest LBRF positive rate, followed by street youngsters respectively and socio-demographic characteristics revealed that the positive rate was higher in men than females in Bahir dar Hospital (10).

Ethiopian research carried out at Assela, The most typical clinical characteristics of the disease were fever, headache, hepatosplenomegaly, myalgia, arthralgia, petechial rash, epistaxis, and jaundice. The issues reported included pneumonia, pulmonary edema, myocarditis, and six abortions out of fifteen pregnancies (10)

Additional studies at Jimma Hospital Ethiopia The two main causes of medical visits were fever, which was reported by every patient, and acute onset epistaxis, which affected 30 patients. Nine patients (25%) had severe types of thrombocytopenia (platelet count 50,000/L), which affected 22 patients (61.1%) with thrombocytopenia. (11)

LBRF is one of the top ten reasons for hospital admissions in Ethiopia and is linked to high rates of morbidity and death (10). For example, LBRF admissions made up 27% of all admissions in

Southern Ethiopia (Hosanna Hospital) and 6% of the death rate in South Western Ethiopia (Jimma Hospital). Furthermore, the Ethiopian Health Department data indicates that it is more widespread in urban than rural areas, ranking fifth in terms of causes of mortality and seventh in terms of hospital admissions in Ethiopia. [2, 4].

One study carried out in Arsi with 63 patients had a case fatality rate of 13%, which was a significant percentage, and 7.4% of patients had JHR after therapy began. In another study conducted in Jimma Hospital over five years with 617 cases of RF, the mortality rate range was between 1-6%. (9) Patients with stupor or coma upon admission, diffuse bleeding, abnormal liver function tests, myocarditis, bronchopneumonia, and when associated with concurrent infections like malaria, typhoid, or typhus, as well as pregnancy, are traits linked to a poor prognosis in individuals with relapsing fever (LBRF and TBRF) (11).

Since no global consensus has been reached, it is still difficult to evaluate the choice of antibiotic therapy. Tetracycline, penicillin, ceftriaxone, erythromycin, and chloramphenicol were all medicines that worked in Ethiopia. The results of a meta-analysis of six randomized controlled trials on antibiotic treatment of LBRF conducted in Ethiopia revealed that tetracycline therapy was much better than penicillin. This was true for both the reduction of relapse rates and the clearing of fever. The incidence of JHR was, however, significantly lower in patients receiving penicillin treatment, and a clinical trial conducted in Ethiopia using three different doses of penicillin and 250 mg of tetracycline PO came to the same conclusion. In addition, they discovered that the incidence of JHR increased with increasing doses of penicillin used. (6), (12), (13)

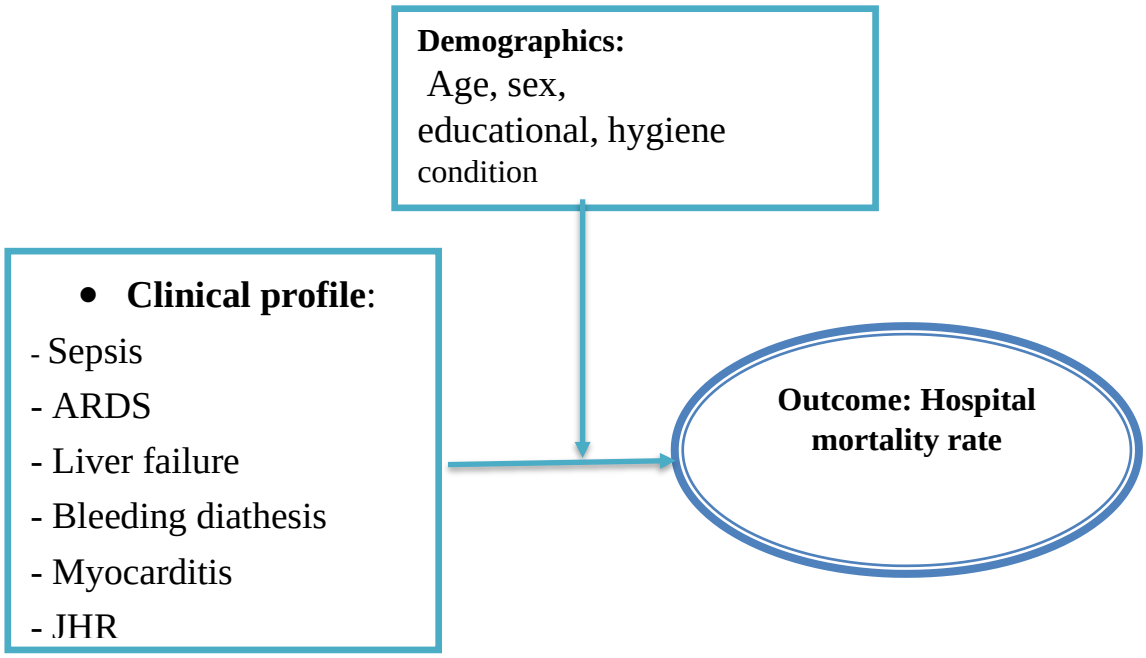

Figure 1: Conceptual Framework showing factors that affect the outcome of relapsing fever (1).

3. Objective

3.1. General Objective

1. To assess the Clinical profile, and mortality of LBRF patients in Zewditu Memorial Hospital and TASH Addis Ababa Ethiopia from July 2022-July 2023

3.2. Specific Objectives

1) To explore the socio-demographic feature in patients who present with LBRF in Zewditu Memorial Hospital and TASH Addis Ababa Ethiopia from July 2022 to July 2023.
2) To describe the clinical profile and mortality of patients with LBRF in Zewditu Memorial Hospital and TASH Addis Ababa Ethiopia from July 2022 to July 2023.
3) To identify factors that affect mortality in patients presenting with complicated LBRF in Zewditu Memorial Hospital and TASH Addis Ababa Ethiopia from July 2022-July 2023.

4. Methodology

4.1. Study Setting / Area and Period

The study was conducted in Addis Abeba, the Federal Republic of Ethiopia's capital. In Addis Ababa, there are over 500 healthcare institutions, ranging from publicly funded specialized hospitals to privately run ones. From those the study was done on TASH and ZMH. Tikur Anbesa Specialized Hospital(TASH) is located in the Lideta sub-city in Addis Ababa and is one of the largest and oldest tertiary hospitals in Ethiopia opened in 1972. It serves as the main referral hospital in the country serving more than 110 million people. It is the first hospital to serve as a teaching hospital for medical doctors. Currently, it is the main specialty and sub-specialty teaching hospital. TASH emergency department was established in October 2010. Since then it has increased its capacity to accept patients and the number of staff and residents being trained increased significantly. The other one is Zewditu Memorial Hospital is one of the oldest public hospitals and is found in central Addis Ababa, Ethiopia. It was established back in 1910 by Empress Zewditu in honor of her mother, Empress Taytu Betul, who was a renowned queen and an influential figure in Ethiopian history. The hospital has a mission to provide high-quality medical care at an affordable cost for all patients, regardless of their economic status. It offers various services, including emergency care, inpatient and outpatient care, surgery, diagnostic and laboratory services, and maternal and child health services. ZMH is committed to delivering healthcare services, and it employs 900 administrative staff members and 1204 medical personnel.

The data collection period was from August 1 to Nov 31, 2023.

4.2. Study design

A retrospective chart review study was employed by collecting secondary data from patient/ medical records.

4.3. Population

4.3.1. Source population

All patients who came with acute febrile illness visited the emergency room at Zewditu Memorial Hospital and Tikur Anbesa Specialized Hospital throughout the research period.

4.3.2. Study Population

All Relapsing fever patients who visited the emergency room at Zewditu Memorial Hospital and Tikur Anbesa Specialized Hospital throughout the research period.

4.3.3. Study Unit

Patients diagnosed with relapsing fever

4.3.4. Sampling frame

A convenience sampling method was used. Every patient that fulfills the criteria was taken consecutively during the study period.

4.4. Eligibility criteria:

4.4.1 Inclusion Criteria

- Age >= 14 years old with a presumed or confirmed diagnosis of complicated louse-born relapsing fever at admission.
- Patients in whom relapsing fever was diagnosed after admission.

4.4.2 Exclusion Criteria

- Patients whose initial diagnosis was presumed to be relapsing fever and had a negative blood film for relapsing fever and later diagnosis of relapsing fever was changed.

4.5. Sampling size determination and sampling technique

4.5.1. Sample size determination

Sampling was done through convenience sampling method.

The required sample size for achieving a 95% confidence interval with a 1% margin of error & proportion of prevalence of LBRF was taken as 2.5% as per the study done by Yimer et al 2014 (1) which was accepted for this study, and it is as follows. We used single population proportion to calculate sample size $n= z_{\alpha/2}^2 *P(1-P)/d^2$ n= Sample Size P= Proportion=0.025 d=Margin of error=0.01 $n=1.96^2*0.025(1-0.025)/0.01^2$ n= 936

Since the sampling frame was <10000, i.e., 200, we used the adjustment formula $n_{adj.}= n/((1+(n/N))$ where $n_{adj.}$= Adjusted sample size n= calculated sample size N= Study population $n_{adj.}=$ 936/(1+(936/200))

= 164 ***10% (non-response rate) = 182**

Sample size for specific objective(Relapsing fever in Gondar, Mulat Yimer) (10),(14)

Presence of JHR() – sample size=168

Mortality rate from previous study (4.6%, 6%) = sample size -85 & 54 respectively.

4.5.2. Sampling Technique and Procedures

4.6. Study variables

Dependent variable(s)

- In-hospital mortality

Independent variables

- Age
- Sex
- Socioeconomic status
- Educational status
- Status of hygiene
- Symptoms at presentation

- Duration of hospital stay
- Type of complication
- Type of antibiotics used
- Vasopressor use
- Presence of JHR

4.7. Operational definitions

Treatment outcome: Treatment outcome of patients with complicated relapsing fever is explained by in-hospital mortality. It will be calculated by dividing the total number of patients who died during their hospital stay by the total number of patients who participated in the study.
In-hospital mortality is defined as the percentage of patients who die during their hospital stay.

Age > = 14 yrs: will be considered adult

Complicated LBRF: is defined as patients who are diagnosed with relapsing fever and come with one of the complications of relapsing fever-like hypotension, jaundice(acute liver failure), bleeding diathesis, ARDS, renal failure, and encephalopathy.

4.8. Data collection tool, method, and procedures

Data was extracted from patient's medical records using a structured, pre-tested data collection checklist. It will be filled by the principal investigator from Each patient's medical record using the prepared questionnaire.

4.9. Data quality control

A checklist was filled by an experienced or trained data collector whose background is a health professional. Before data collection, the health professionals were given training on the data collection method and the importance of confidentiality. Close supervision was maintained during data collection and filled checklists were double-checked daily for consistency and completeness by data collectors and principal investigator before proceeding into analysis. The checklist was pretested in 5 % of the sample size outside the study unit for validity, and it was further modified according to the outcome.

4.10. Data processing and analysis

The completed questionnaires were coded, manually checked, entered into Microsoft Excel, and exported to SPSS version 26 for cleaning and analysis by the principal investigator. Descriptive statistics were presented with frequency tables to characterize the study population using socio-demographic and background characteristics

A binary logistic regression model was used to assess the association between the independent variable and disease (relapsing fever))-related death. The univariate analysis was used to performed to calculate an unadjusted odds ratio (OR) and screen out potentially significant independent variables at a 0.25 level of significance to be included in the multivariable binary logistic regression model. Adjusted Odds ratio, P-value, and 95% CI for odds ratio used for testing the significance and interpretation of the result. Variables with P- value < 0.05 were considered statically associated with the outcome variable. Descriptive analysis, binary logistic regression, and Fisher's exact test will be used to produce a summary of statistics.

4.11. Ethical consideration

After submission of this research proposal and getting a written paper from the Emergency Department and ZMH Medical director for informed consent, it was given to the hospitals` heads, heads of the emergency medicine department, and other responsible bodies. After permission was granted, the data collection process started. Since the card includes the name of the patients; confidentiality was maintained by excluding any identification found on the card. Privacy was also maintained during the interview and recording. The researchers didn't share and expose sensitive information by talking to others.

4.12. Dissemination of result

The study result was submitted to the Emergency and Critical Care Medicine Department of Addis Ababa University (AAU), Zewditu Memorial Hospital Emergency Department, and, FMOH, in hard and soft copy. It will also be presented at meetings and conferences and also be submitted to journals for possible publication.

5. Result

5.1 Sociodemographic characteristic

A total of one hundred seventy-two patients were included in the study that were found during the study period. The majority 85(49.4%) of the patients belong to the age group that ranged from 14 years to 20 years. Males constituted 82.6% (n=172) of the total study population, with a male-to-female ratio of 4.7:1. most 97(56.4%) of the patients who had no formal education. About two-thirds 121(70.3%) of the patients were living on the street, 19(11%) patients were living in small homes with a lot of people (crowded) and 27(15.7%) patients were living in prison. (Table 1).

Table 1 Sociodemographic of participants, July 2022 – July 2023, Addis Ababa, Ethiopia.

Variables	**Frequency (n=172)**	**Percent (%)**
Sex		
Female	30	17.4
Male	142	82.6
Age		
14-20yrs	85	49.4
21-30yrs	60	34.9
31-40yrs	20	11.6
>41yrs	7	4.1
Educational status		
No formal education	97	56.4
1-8th grade	18	10.5
9-12th grade	-	-
Diploma	-	-
Not documented	57	33.1
Living condition		

Living in Street	121	70.3
Living in small homes with a lot of people	19	11
Prison	27	15.7
Not documented	5	2.9

5.2 Clinical characteristics

As described in Table 2, Fever was the most common presenting complaint as it was documented in 145 (84.3%) patients, and the next most frequent symptoms were headache and bleeding, which were mentioned in 44 (25.6%) and 7 (4.1%) of the patients respectively. In contrast, jaundice was the least frequent symptom documented (Table 2).

Eighty-five (85.5%) participants had hematologic complications (Thrombocytopenia), followed by hypotension 92(53.5%) and sepsis 30(17.4%), and the list complication encountered was myocarditis 1(0,6%). From one hundred -seventy-two patients around one hundred twelve 112(65.1%) were treated with procaine penicillin,47(27.3%) patient took ceftriaxone and the rest took doxycycline. The case fatality rate among the analyzed LBRF cases was 4.1%. (Table 2)**.**

Table 2 Clinical characteristics of the patients July 2022 – July 2023, Addis Ababa, Ethiopia.

Variables	Frequency (n=172)	Percent (%)
Symptoms at presentation		
Headache	44	25
Fever	145	84.3
Bleeding	7	4.1
Altered mental status	4	2.3
Jaundice	2	1.2
ICU admission		
Yes	7	4.1
No	165	95.9
Type of antibiotic used		
Procaine penicillin	112	65.1
Ceftriaxone	47	27.3
Doxycycline	13	7.6
Length of stay		
<7 days	153	89
≥ 7days	19	11

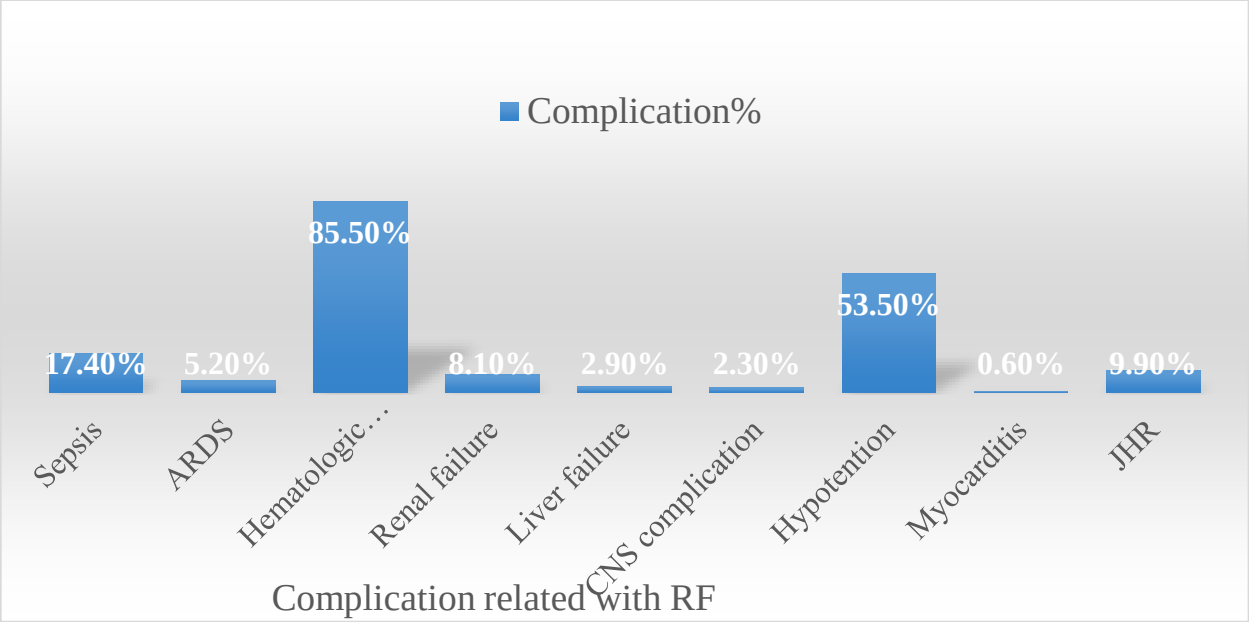

Figure 2. Complication related to RF, TASH, July 2022 – July 2023, Addis Ababa, Ethiopia.

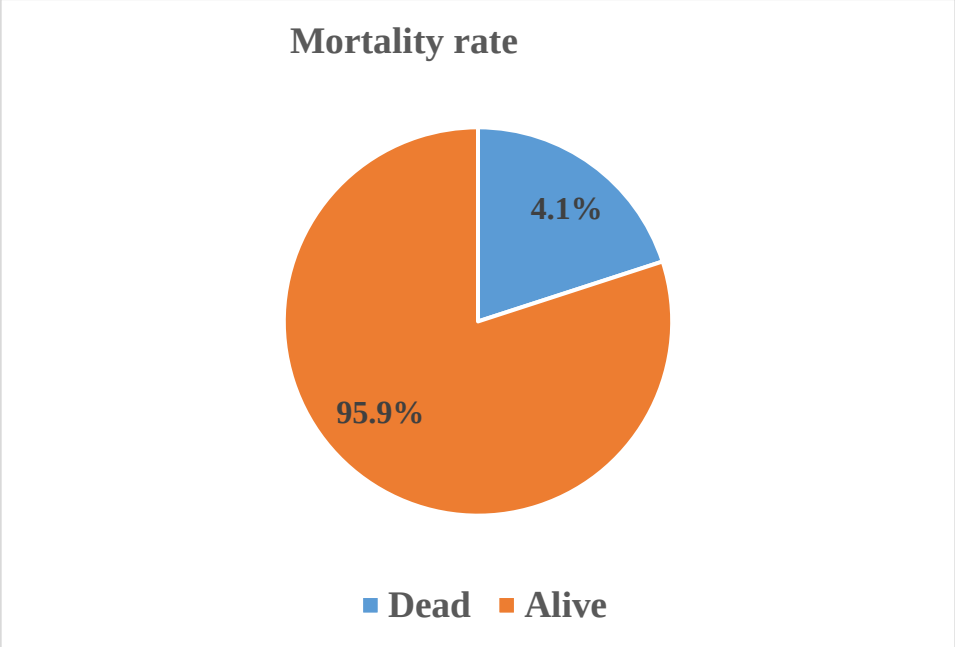

Figure 3. Mortality rate of RF, TASH, July 2022 – July 2023, Addis Ababa, Ethiopia.

5.3 Factor associated with outcome

A crude analysis of each independent variable with mortality was run at a 25 % level of significance. from univariate analysis age group, ARDS, Liver failure, CNS complication, and presence of sepsis were significantly associated with higher mortality among patients with louse-borne relapsing patient. The adequacy of the final model was assessed using the Hosmer and Lemeshow goodness of fit test and the final model fitted the data well (p-value = 1).

However, only hematologic complications and the presence of sepsis were found to be significantly associated with mortality in multivariable binary logistic regression.

On multivariable binary logistic regression, after for covariates, the presence of sepsis and the presence of hematologic complication were found to be significantly associated with higher mortality at a 5% level of significance. (Table 3)

Having hematologic complications was associated with 89% higher odds of having higher mortality compared to those who had no hematologic complication (AOR=0.11,95% CI= 0.018-0.739, p-0.023).(Table4)

Having sepsis was associated with 86% higher odds of having higher mortality compared to those who had no sepsis (AOR= 0.14, 95%CI=0.02-0.993 P-0.0049). (Table4)

Binary logistic regression

Table 3. Socio-demography, clinical characteristics, and outcome of study participants(n=172)

Variables	Categories	Outcome /Mortality		P value
		Dead	Alive	
Age	14- 20yrs	0	85	
	21-30yrs	4	56	
	31-40yrs	1	19	**0.004***
	>41yrs	2	5	
Gender	Male	7	135	
	Female	0	30	0.998
Living condition	Living in street	5	116	
	Living in small homes with a lot of people	0	19	0.851

	Prison	2	25	
	ARDS	**3**	**6**	**0.001***
	Hypotension	7	85	0.997
	Hematology	2	145	**0.05***
Complication	Change in mentation	4	0	0.999
	Sepsis	5	25	**0.171***
	Liver failure	1	4	**0.112***
	Vasopressor use	7	11	0.995
	Cardiac complication	0	1	1
	Renal failure	0	14	0.998
	CNS	1	1	**0.025***
Presence of JHR	JHR	0	17	0.999
Treatment	Procaine penicillin	1	111	0.525
	Ceftriaxone	6	41	
	Doxycycline	0	13	

Table 4. Result for final Multivariable binary logistic regression model among patients with louse-borne relapsing fever(n=172)

Variable	**Mortality**		**COR (95% CI)**	**AOR (95% CI)**	**P-value**
	dead	alive			
Age					
14- 20yrs	0	85	0.308(0.139-		0.802
21-30yrs	4	56	0.68)	4.4(0.213-94)	0.995
31-40yrs	1	19		22(0.691-707	0.334
>41yrs	2	5		1	0.802
ARDS	3	6	0.050(0.009-0.27)		0.084
Hematologic complication	2	145	18(3.29-99)	0.114(0.018-0.739	**0.023***
Sepsis	5	25	14(2.57-76.18)	0.14(0.02-0.993	**0.0049***
Liver failure	1	4	0.149(0.0014-1,54	2.4(0.146-39)	0.539
CNS complication	1	1	0.017(0.006-0.055)	7.1(0.327-156.7)	0.211

6. Discussion

This study was conducted to see the clinical profile and mortality of patients with louse-born relapsing fever who were kept at Zewditu Memorial Hospital and Tikur Anbessa Specialized Hospital from -July 2022 to July 2023 Addis Ababa, Ethiopia. There isn't any research in Addis Ababa that explains the clinical profile and contributing variables. Comprehending these risk variables will direct policymakers in their approach to resolving the matter.

In this study, the majority of 85 (49.4%) patients are in the range from 14 years to 20 years and The male-to-female ratio of the study is 4.7:1 which is significant, and the male gets the lead by 142 (82.6%) of the total participants. Regarding educational status, 97(56.4%) had no formal education. Most of the participants were living on the street. In the Bahr Dar study, the highest positive rate was seen in the age group 11-20 years, Gonder study half of the participants were above 15 years, In addition study done in Arsi mean age was 22years and males were predominant. about educational status and living conditions in the Bahrdar study, most of the high-risk patients were yekolotemaries, living in the street(1)(14)(15). However, a statistically significant association was not observed for the age, and sex of patients who were kept with LBRF ($P > 0.05$). overall socio-demography profile was comparable with the previous studies done which might be due to their living condition (living in the street, living in crowds, and prison) as well as internal migration and displacement of males for different reasons from different parts of the country to the capital city, Addis Ababa, as a daily laborer, street boys who have a low level of knowledge about the disease prevention and low level of literacy to seek health care service hence increase the chance of inquiring the disease and its complications. The study didn’t compare yekolotemaries due to the absence of yekolotemaries in the study population.

In this study the most common chief complaint was fever in 84.3% of the participants, followed by headache 25% and bleeding 4.1% of the participants. Study which was done in Sudan, the most common symptom 94% is fever followed by headache 85% (16). In addition, a study was done on Jimma fever was still reported in the majority of the patients followed by headache and joint pain in 97.2% of participants. In this study and studies done in Sudan, Jimma the most common presenting symptoms are fever followed by headache.

Among the study population the most complications were hematology (thrombocytopenia) (85.5%), hypovolemia, and ARDS, even if all are not statically significant, having hematologic complications and the presence of sepsis were statistically significant & are associated with higher mortality. (Table 3) Therefore, in this study as well as studies which were done in Sudan, Hassana, and Gondar hematologic complications were common In contrast to the current study higher mortality was associated with severe liver failure and CNS complications, lobar pneumonia in a study done in Sudan(4)(13).

In the study that was done in Gonder prevalence of JHR was 28.8% but in the current study, it is 9.9%, even though it is difficult to diagnose JHR, this may be due to most patients being referred early from the Health center, and due to different treatment(14).

In the current study, when we see the case fatality rate among the analyzed LBRF cases was 4.1% whereas study that was done at Arsi the case fatality among the analyzed LBRF cases was 13% but this was done during an outbreak when compared to the previous study done in Arsi where the case fatality rate was 2-4%(15). In the study which was done in Gonder, the overall fatality rate was 4.6% with adults having a higher fatality rate(7.14%) respectively(14) (16). In this study and studies done in Arsi, Gondor, Sudan, the overall case fatality rate is comparable. This may be due to early initiation of treatment and no comorbidities documented.

7. Strength & Limitation

7. 1 Strength

- This study’s findings are important in terms of being the first study done in Addis Ababa on the magnitude, associated factors, and outcome of louse-borne relapsing fever.

7.2 Limitations

- The study was retrospective, with a relatively small number of patients. Much of the patients’ data were obtained from their medical charts, which were occasionally compromised by missing or torn pages, or illegible handwriting.
- Other relevant variables including other behavioral factors and detailed laboratory and complications were not included in the study because these variables were not consistently collected from the participants.
- The study's small sample size doesn't allow it to have power.
- Because of the above-mentioned reasons, the studies' internal and external validity is in question.

8. Conclusion And Recommendation

8.1 conclusion

The mortality rate of the studied population was 4.1%, this is comparable with reports from other studies

Having hematologic complications, the presence of sepsis was associated with higher mortality. In addition, having ARDS, hypotension has an unfavorable outcome.

8.2 Recommendation

In this study, LBRF is a serious public health concern that primarily affects younger population groups. Thus, health education ought to be provided aimed at LBRF prevention in the city particularly for those with a high risk of acquiring the disease as well as measures that must be taken by stakeholders to reduce displacement and migration.

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Consent form

Title of study

Clinical profile & Mortality of Louse-borne relapsing fever among patients seen at Zewditu Memorial Hospital and Tikur Anbessa Specialized Hospital from July 2022 to July 2023 -Addis Ababa, Ethiopia

Principal investigator

Dr. Kalkidan Zenebe, Final year Emergency and Critical care resident

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Purpose of study

You are being asked to take part in a research study. Before you decide to participate in this study, you must understand why the research is being done and what it will involve. Please read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information.

The purpose of this study is to assess the Clinical profile & Mortality of Louse-borne relapsing fever among patients seen at Zewditu Memorial Hospital and Tikur Anbessa Specialized Hospital from July 2022 to July 2023 -Addis Ababa, Ethiopia.

Study procedures

The checklist that is utilized is adopted from the previous studies. The checklist focuses on sociodemography, clinical characteristics, complications, and outcomes.

Risks

There are no risks associated with participating in this study. You may decline to answer any or all questions and you may terminate your involvement at any time if you choose.

Benefits

There will be no direct benefit to you for your participation in this study. However, we hope that the information obtained from this study may help to give input for policymakers like MOH to take appropriate measures.

Confidentiality

This study project's data will remain private. Only the research team will have access to your health center information.

Contact information

If you have questions at any time about this study, or you experience adverse effects as a result of participating in this study, you may contact the researcher whose contact information is provided on the first page. If you have questions regarding your rights as a research participant, or if problems arise that you do not feel you can discuss with the Primary Investigator, please contact the Addis Ababa University ethical board (Tel. - +251115538734).

VOLUNTARY PARTICIPATION

Your participation in this study is voluntary. It is up to you to decide whether or not to take part in this study. If you decide to take part in this study, you will be asked to sign a consent form. After you sign the consent form, you are still free to withdraw at any time and without giving a reason. Withdrawing from this study will not affect the relationship you have, if any, with the researcher. If you withdraw from the study before data collection is completed, your data will be returned to you or destroyed.

CONSENT

I have read and understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

Participant's signature _____ Date _____

Investigator's signature _____ Date _____

ANNEXES

Annex: data collection tool

Questionnaire

Part – I Directions: - Please place a mark on the given spaces, and checkbox choices, and write comments accordingly.

1. Age O. 14-20yrs O. 21-30yrs O. 31-40yrs O. > 40yrs

2. Sex O. Male O. Female

3. Educational status O. no formal O. 1-8th grade O. 9-12th grade O. diploma

4. Hygiene/frequency of washing O. Once in two weeks O. once/week O. twice/week

5. How is living condition O. Street boy O. Living in crowded O. Prisoner

6. Chef compliant O. Fever O. Headache O. Change in mentation O. Bleeding O. Cough O. Other

7. Which antibiotic O. Doxycycline O. Procaine penicillin O. Ceftriaxone

8. Hypovolemia O. Yes O. No

10. Complication O. Cardiac O. Liver failure O. Renal O. Hematology O. CNS O. Respiratory

11. ICU admission O. Yes O. No

12. Vasopressor O. Yes O. No

13. Mechanical ventilation O. Yes O. No

14. length of stay (days) O. < 7 days O. > 7 days

15. Presence of JHR O. yes O. No

16. Need for RRT O. yes O. No

17. Sepsis O. yes O. No

18. Death O. yes O. No