ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES

SCHOOL OF MEDICINE DEPARTMENT OF EMERGENCY AND CRITICAL CARE MEDICINE

A SINGLE CENTERED CROSS SECTIONAL STUDY ON ASSESSMENT OF KNOWLEDGE AND ATTITUDE OF EMERGENCY DEPARTMENT STAFF TOWARDS FUTURE INFECTIOUS DISEASE OUTBREAK PREPAREDNESS: A STUDY AT TIKUR ANBESA SPECIALIZED HOSPITAL, ADDIS ABABA, ETHIOPIA.

A RESEARCH THESISSUBMITTED TO DEPARTMENT OF EMERGENCY AND CRITICAL CARE MEDICINE, COLLAGE OF HEALTH SCIENCE FOR THE PARTIALFULFILMENT OF THE REQUIREMENTS FOR SPECIALTY CERTIFICATE IN EMERGENCY AND CRITICAL CARE.

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Declaration

I, the undersigned principal investigator, declare that this thesis is my original work. All sources of information and materials used in the preparation of this thesis have been appropriately acknowledged.

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Acronyms

AAU ---------- Addis Ababa University

ECCM ---------- Emergency and Critical Care Medicine

ED ---------- Emergency Department

ETB ---------- Ethiopian Birr

TASH ----------Tikur Anbesa Specialized Hospital

Abstract

Background: Infectious disease outbreaks pose ongoing challenges to global public health, particularly in low- and middle-income countries with limited resources. Emergency Departments (EDs) are critical frontline units for early detection and management of outbreaks. The knowledge and attitudes of ED staff are essential for effective preparedness. At Tikur Anbessa Specialized Hospital (TASH) in Addis Ababa, the recently restructured ED has not yet been evaluated for outbreak readiness.

Objective: This study assessed the knowledge and attitudes of ED staff at TASH regarding preparedness for future infectious disease outbreaks.

Methods: A descriptive cross-sectional study was conducted from July to September 2025 among clinical staff. Stratified random sampling was used to include all staff categories. Data were collected using a structured, self-administered questionnaire adapted from WHO and CDC guidelines and analyzed using descriptive statistics in SPSS.

Result: out of 100 participants, only 44 of them (44%) demonstrated good knowledge (≥80%). 56 participants out of 100 (56%) scored below 80%. This indicates poor knowledge. High knowledge was observed in isolation practices (93%), outbreak leadership (86%), and infection prevention (87%). while gaps were identified in recognition of airborne transmission (54%), correct use of personal protective equipment (57–77%), triage prioritization (64%), team coordination, and certain isolation practices (43–72%). Attitudes toward outbreak preparedness were generally positive, with (73%–78%) expressing confidence in managing infectious diseases and supporting preventive strategies. However, notable concerns were reported regarding PPE feasibility (24%), institutional support (64%), triage and isolation readiness (47%), and team coordination (36%).

Conclusion: Although ED staffs at TASH have positive attitudes and good knowledge in some areas, there are critical gaps in outbreak management skills. Focused training and stronger institutional support are recommended to improve preparedness and ensure effective responses to future infectious disease outbreaks.

Key Words

- Emergency Department Staff
- Infectious Disease Outbreak Preparedness

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1. Introduction

Infectious disease outbreaks continue to pose significant threats to global public health systems. Events such as the COVID-19 pandemic, the Ebola outbreaks in West Africa, and recurrent epidemics of cholera, measles, and influenza in sub-Saharan Africa have demonstrated the urgent need for effective health emergency preparedness. Healthcare workers, particularly those stationed in Emergency Departments (EDs), are often the first point of contact for patients during such outbreaks, placing them at the frontline of response efforts.

Ethiopia is affected by multiple disease outbreaks. Including water born disease like cholera, vaccine preventable disease, measles, vector born disease like malaria and relapsing fever according to Ethiopian health cluster strategy 2024-2025 report. The current prevailing drought, ongoing conflict, and huge population movement pose a substantial risk of TB transmission in the country and require serious attention and support in addressing this key and vulnerable population for tuberculosis.

Addis Ababa, Capital of Ethiopia, has a population of 5.9 million. The population density is 5,165 per square kilometer, and the annual population growth rate is 3.8%. The city also has about 70,000 refugees from outside the country. According to the government, there are 150,000 homeless people. The conflict in the country has also led to people migrating to Addis Ababa in search of a safe haven. All these factors make the city prone to infectious diseases.

The Emergency Departments are of prime importance in the early diagnosis, sorting, isolating, and controlling cases of infectious diseases. The readiness of the Emergency Departments to respond promptly and effectively is directly affected by the knowledge and attitude of the health personnel. These two factors, knowledge about the symptoms and modes of disease transmission, and attitude towards risks and responsibilities, not only help determine the preparedness of the health personnel but also their ability to safeguard themselves and their patients against high-risk situations.

Notwithstanding their pivotal position, the Emergency Departments in many low- and middle-income countries are faced with challenges such as underfunding, overcrowding, and a lack of access to personal protective equipment (PPE), training, and protocols. This is especially the case in newly formed or restructured Emergency Departments, where the systems of preparedness may still be in the process of development.

Tikur Anbessa Specialized Hospital, found in Addis Ababa, is Ethiopia’s biggest referral and teaching hospital. The Emergency Department at this hospital has recently been reorganized and has been functional in its new structure for only about four months. Therefore, there is not much information on the preparedness of the current ED staffs for potential future infectious disease outbreaks. In fact, most of the ED staffs were not involved in previous outbreaks such as the

COVID-19 pandemic, and therefore, there is a concern about their preparedness and resilience for future challenges.

In light of the above, it is essential to determine the current level of knowledge and attitudes of the Emergency Department staff at TASH regarding preparedness for future infectious disease outbreaks. This will help provide evidence for training and resource development, hence improving the efficiency and safety of the hospital in responding to future public health emergencies.

2. Statement of the Problem

The Emergency Departments (EDs) are a core and critical component of the healthcare system as the first line of defense in the event of infectious disease outbreaks and other acute health emergencies. The preparedness of healthcare workers, especially their knowledge and attitudes towards infection prevention and outbreak management, is crucial to the success of EDs during an outbreak. This preparedness is particularly important for large tertiary hospitals like Tikur Anbessa Specialized Hospital (TASH), which is a national referral hospital and receives a large number of emergency cases.

In Ethiopia, and in TASH in particular, the organizational capacity and functionality of emergency care services are still faced with challenges. Recently, a national review has shown that there is a lack of comprehensive emergency preparedness plans in many hospitals, including tertiary ones, and that emergency care infrastructure, equipment, and staff capacity are inadequate to deal with emergencies, including outbreaks.

In TASH, previous studies have shown that there are serious problems in the ED: overcrowding with an average of 50 patients per day according to the daily triage report, and long stays in the ED due to the unavailability of inpatient beds or delays in investigations. These problems are even more serious when new infectious disease outbreaks occur.

Moreover, although efforts have been made to strengthen emergency medicine at TASH notably through past trainings and international collaborations aimed at improving emergency care capacity it remains unclear to what extent current ED staff are prepared for outbreak management, triage, isolation, and infection control under the current restructured ED setup.

Importantly, on a national level, recent evaluations highlight systemic challenges in Ethiopia's health system that further undermine emergency and outbreak response capacity: insufficient financial resources, suboptimal allocation and management of funds, shortages of essential medical supplies (such as PPE), inadequate infection control systems, and weak disaster/preparedness planning in many hospitals. The fragility of the health system is especially concerning in light of recurrent and emerging infectious disease threats, including cholera, acute respiratory infections, measles, meningitis, and more recently; novel threats such as viral hemorrhagic fevers.

Despite this challenging backdrop, there is currently no empirical data assessingthe knowledge, attitudes, and readiness of ED staff at TASH toward infectious disease outbreaks, infection prevention, triage, isolation, and coordinated outbreak response. Many current emergency department staff may not have participated in managing past outbreaks, and the recent restructuring of the ED raises questions about whether existing staff are trained, experienced, and confident to respond effectively under outbreak conditions.

This lack of data is a major gap. Without a clear understanding of staff preparedness, their baseline knowledge, attitudes towards outbreak response, perceptions of institutional support,

and confidence in practical measures such as PPE and isolation hospital management, the hospital administration and public health authorities cannot tailor training needs and design interventions. This may lead to delays, ineffectiveness, and potential nosocomial transmission and spread of outbreaks in the hospital, potentially threatening patient and public safety.

With the high burden of disease, the regular occurrence of outbreaks in Ethiopia, and the large patient flow to TASH's ED, there is a pressing need for an empirical evaluation of staff knowledge and attitudes in this setting. This will help identify major gaps and design targeted capacity-building interventions to improve outbreak preparedness, emergency response capacity, and ultimately control morbidity and mortality in future outbreaks.

3. Significance of the Study

This research aims to offer necessary baseline data on the current state of knowledge and attitudes of emergency department healthcare workers towards preparedness for future infectious disease outbreaks in Tikur Anbessa Specialized Hospital (TASH), the largest tertiary care referral hospital in Ethiopia. In view of the pivotal role played by emergency department workers in responding to outbreaks, knowledge of their preparedness status assumes paramount importance in improving both hospital and countrywide capacities for handling infectious disease outbreaks.

First, the results will help hospital administrators and emergency department managers gain a clear understanding of the status of existing knowledge and attitude gaps among healthcare workers.

Second, the findings will help to develop and enhance standardized preparedness guidelines for emergency departments in Ethiopia. By understanding the strengths and weaknesses of a major referral hospital, the study can be used as a template for other facilities and help to standardize outbreak preparedness guidelines across the country.

Third, enhancing ED-level preparedness will directly benefit the hospital's capacity to respond to future infectious disease outbreaks. Enhanced ED-level preparedness will help to improve case detection, patient safety, infection prevention and control practices, and occupational safety for healthcare workers, ultimately protecting both staff and patients.

Finally, this study is also in line with the health system strengthening and epidemic preparedness plan for Ethiopia. By informing strategic planning and resource development, this study will help to strengthen the country's emergency care systems to be better prepared to respond to emerging infectious diseases.

4. Literature Review

The Emergency Departments (EDs) are the key entry points in the event of infectious disease outbreaks, where rapid triage, isolation, and treatment are carried out to limit the spread of disease and protect both healthcare workers and patients. Well-organized preparedness in EDs can minimize the risk of transmission and prevent the healthcare system from being overwhelmed during pandemics.

Research studies conducted in developed nations have shown that well-organized emergency plans, well-defined leadership, and isolation facilities can greatly improve the preparedness of hospitals and emergency departments (EDs) in dealing with infectious disease outbreaks like influenza, Ebola, and COVID-19. Al Haliq et al. found that despite the availability of well-organized preparedness plans and infrastructure in tertiary care hospitals in countries such as Saudi Arabia, there were still some critical gaps in the training of junior personnel, unit-level pandemic safety plans, and implementation in emergency situations(1).

In addition to material and infrastructure preparedness, biological outbreak preparedness also needs to be resilient, coordinated, and communicative. Welby-Everard et al. In a study conducted in the UK, argued that the best possible disaster response is achieved through periodic simulation drills, inter-professional coordination, and communication infrastructure that facilitate decision-making for frontline workers under extreme pressure. The study illustrates that preparedness in terms of technical capacity is not sufficient without simultaneous efforts in building organizational resilience and worker preparedness(2).

Knowledge and attitudes of healthcare personnel have also been extensively explored in the context of high-income and upper-middle-income countries. Zhang et al. In a study conducted in China, found that although healthcare workers had a strong overall understanding of COVID-19, there was a lack of accurate understanding and misconceptions regarding transmission and prevention, which adversely affected confidence in infection control practices. This study suggests that awareness does not always translate to complete knowledge and preparedness (3).

Psychological and organizational issues also affect the response to outbreaks. Taylor et al., in a qualitative study conducted in the United States, showed that the willingness and capacity of healthcare staff to respond to infectious disease emergencies were greatly affected by the fear of infection, personal risk, trust in institutional support, and leadership confidence. These issues had a significant effect on staff attitudes and response preparedness during infectious disease outbreaks (4).

Adding to the above, the crucial importance of emergency medicine staff in the national preparedness of high consequence infectious diseases was emphasized by Sánchez et al., who pointed out that EDs are a critical link between public health surveillance and healthcare delivery, which demands both high knowledge and positive attitudes to be effective(5).

Even in countries with highly developed healthcare systems, challenges in preparedness remain. Fifolt et al., in a study conducted in the United States during the 2019 measles outbreak, emphasized the communication deficits, lack of surge capacity, and resource constraints that impeded effective hospital response(6).

Likewise, Post-COVID-19 assessments have offered important lessons on the existing gaps in hospital and health system preparedness for infectious disease outbreaks. In their extensive review, Williams et al. reviewed the lessons learned from the recent pandemics and emphasized that “many healthcare systems began the COVID-19 pandemic with weak foundations of preparedness, including inadequate surge capacity, insufficient critical resources, poor communication infrastructure, and a lack of integration between healthcare services and public health agencies.They emphasize that “preparedness for pandemics needs to be maintained through investments in resilient surveillance infrastructure that can detect threats early, support research in the early stages, and share data quickly, as well as maintain capacity in vaccine development and manufacturing even after the crisis is over.” Notably, the study makes it clear that “preparedness needs to be considered a process rather than a reaction, and the hospitals have a crucial role in implementing the strategy of national preparedness into operational preparedness, especially in the emergency department where early recognition, communication, and containment are key(7).”

Earlier foundational studies by Rebmann et al. undertook one of the earlier comprehensive assessments of hospital preparedness for infectious disease emergencies through a survey of infection control professionals in healthcare facilities. The study found that while many hospitals had documented emergency preparedness and response plans in place, there were still many weaknesses in the operational preparedness. Inconsistencies in staff training, varying levels of understanding of outbreak response plans, and varying perceptions of risk among healthcare staff were found to be major factors hindering preparedness. Notably, the authors pointed out that the mere presence of an emergency preparedness plan did not necessarily mean that the healthcare facility was prepared for emergencies, since many healthcare staff members had inadequate levels of familiarity, comfort, and hands-on experience with the response plans in actual outbreak scenarios. The study also emphasized that attitudes towards emergency preparedness, including perceptions of the feasibility of personal protective equipment use, institutional support, and leadership and communication, were important factors in determining the ability and willingness of staff to respond effectively in infectious disease emergencies(8).

Based on these experiences, Kamalrathne ET al. reiterated the importance of a multi-hazard approach that is flexible and adaptable to a broad spectrum of emerging infectious diseases, rather than a single disease strategy. As a point of comparison to the COVID-19 pandemic, the authors pointed out those inflexible and disease-specific strategies for preparedness are often ineffective when faced with new and multiple hazards in the health system, and therefore the need for integrated planning, continuous training, and flexible response strategies. This is also a systems-level approach (9).

In African settings, there have also been experiences of similar challenges in preparedness. These have often been exacerbated by; resource constraints in the health system, human resource shortages, and irregular training patterns. Musa et al. found that in the context of the COVID-19 pandemic in Kenya, health care providers who had prior training in infection prevention and control (IPC) had significantly improved knowledge and attitude towards pandemic response, and that training had a protective effect on preparedness. However, there was also a lack of consistent implementation of preventive measures, which indicated that training coverage and reinforcement are not even (10).

Similarly, Juttla et al. observed that despite healthcare workers in Kenya displaying overall positive attitudes towards COVID-19 prevention, there existed areas of knowledge deficit and inconsistencies in practices, thereby emphasizing the need for organized and continuous training and education(11).

Similar observations were made in Uganda, where Kamacooko et al. showed that despite healthcare workers having moderate awareness of COVID-19, there existed areas of knowledge deficit and inconsistencies in attitudes that affected their compliance with preventive practices. These observations, therefore, suggest that in the African continent, healthcare worker preparedness is highly dependent on training and operational support(12).

These African studies, therefore, suggest that healthcare worker preparedness is highly dependent on training and operational support. They also emphasize the importance of continuous capacity building among healthcare workers to ensure that general awareness is converted into effective practices in the event of an outbreak.

In Ethiopia, challenges in emergency preparedness are more apparent and have been more enduring, reflecting underlying systemic weaknesses in the healthcare system. Borie et al. found that only 42% of government employees in the Sidama region had good knowledge of COVID-19 transmission and prevention, indicating a large knowledge gap in outbreak knowledge at the front line level. This data points to a concern about the preparedness of healthcare workers and support staff, who are critical to disease control at the community level.(13) At the system level, Deressa et al. indicated that underfunding, overcrowding, lack of surge capacity, and unavailability of key supplies have been major drivers of health facility preparedness for COVID-19 response(14).

In a similar study, Bedilu Woldemichael et al. established that there was a lack of preparedness in Ethiopian hospitals in relation to personal protective equipment, isolation rooms, and outbreak preparedness plans. This lack of preparedness was first identified during the 2014 Ebola outbreak and was even more evident during the COVID-19 outbreak, thus establishing that there are underlying issues in emergency preparedness (15).

From a human resource perspective, Mohammed et al. further established that less than half of the medical staff in the Amhara region were able to identify the appropriate protocols for

outbreak preparedness, thus establishing underlying weaknesses in knowledge dissemination and training systems(16).

Specifically targeting emergency departments, Kebede et al. found that overcrowding, insufficient isolation facilities, a lack of PPE, and variable training were still affecting the efficiency of triage and infection control in Ethiopian emergency departments(17).

A study conducted at Tikur Anbesa hospital, Adis Ababa, Ethiopia by Azazh et al. showed that physical infrastructure and emergency department design are also essential elements of preparedness. Their assessment of the newly designed emergency medicine building at Tikur Anbessa Specialized Hospital found that well-organized space, patient flow, and isolation and resuscitation areas could greatly improve emergency preparedness. However, it also suggested that infrastructure development alone is not enough without simultaneous development of trained personnel and operational systems (18).

These studies, collectively, underscore the importance of having both adaptive and multi-hazard planning structures and designs for emergency departments, along with qualified personnel and institutional coordination in hospital preparedness.

These worldwide perspectives underscore the paramount importance of continued investment in knowledge improvement and attitude change among emergency personnel to develop resilient health systems that can respond quickly and effectively to infectious outbreaks.

In light of the recent reorganization of the emergency department at TASH and the fact that many of its employees did not work during the COVID-19 pandemic, there is a pressing need to evaluate the current status of knowledge and attitudes regarding infectious outbreaks among emergency personnel. This is crucial to understand these aspects to identify training gaps and improve the preparedness of the department to respond effectively to future infectious outbreaks.

This study will help address the important knowledge gap by shedding light on the preparedness status of emergency personnel at Ethiopia’s primary referral hospital. The results will help policymakers and hospital administrators to design interventions that can improve knowledge, attitudes, and overall ED resilience in infectious disease emergencies.

5. Objectives of the Study

5.1. General Objective

To evaluate the knowledge and attitudes of clinical staff in the adult Emergency Department; at TikurAnbessa Specialized Hospital regarding their preparedness for future infectious disease outbreaks.

5.2. Specific Objectives

To assess the level of knowledge among emergency department (ED) clinical staff regarding preparedness for infectious disease outbreaks.

To evaluate the attitudes of ED clinical staff towards the importance of infectious disease outbreak preparedness.

6. Methodology

6.1. Study Setting

TikurAnbessa Specialized Hospital, also known as Black Lion Hospital, which is located In Addis Ababa, Lideta sub city. It is Ethiopia's largest and oldest tertiary referral hospital, founded in 1964.It serves roughly half a million patients annually. Offering 24-hour emergency services, comprehensive medical, surgical and pediatric care. The ED operates around the clock, handling a high volume of critically ill and injured patients from across Ethiopia.
A newly designed emergency medicine building has recently been implemented to alleviate overcrowding and improve patient flow and care delivery(18).

The clinical audit report indicates that the monthly patient volume in the Emergency Department ranges from 800 to 1,200 cases.

6.2. Study Design

Single center cross-sectional descriptive study to assess the knowledge and attitude regarding future infectious diseases outbreak preparedness among clinical staff members at adult Emergency Department (ED), Tikur Anbessa Specialized Hospital.

6.3. Study Period

The study was conducted from July 1, 2025 to December 30, 2025**.**

6.4. Source Population

All clinical staff members currently working in the Emergency Department of TikurAnbessa Specialized Hospital, Addis Ababa, Ethiopia

6.5. Study Population

All clinical staff working in the adult Emergency Department; including physicians (resident consultant and GP) and nurses.

6.6. Sample Size Determination

The sample size formula for cross-sectional study design is given by the single population proportion formula denoted by:

$$n = (Z\alpha/2)^2(1 - p)/d^2$$

Here n is the minimum required sample size, Zα/2 is the value under the standard normal table for a given confidence interval (1.96 for 95% CI), p is the best estimate of prevalence since we have a previously done study in Sidama Ethiopia (13) , which shows 42 % of population have knowledge about COVID-19 . We use p= 0.42 and d is the margin of error (0.05).

n= $(1.96)^2$ $0.42(1 - 0.42)/0.05^2$= 374

However,we do not have that much amount of sample size; we will use correction for small population,

$n = n_0/1+^{no\ -1}/N$

n_o=sample size(if population was infinite)

N =actual size of study population =118

Sample size became 90

Final value became 100 including 10 percept non-respondents (90/0.9).

Formula –final sample= n/(1-0.1)

6.6.1. Inclusion and exclusion criteria

6.6.1.1. Inclusion criteria

All clinical staff currently working for at least one month in adult ER of TASH including

Emergency and Critical Care consultants actively practicing in the Emergency Department

Residents assigned to the Emergency Department for one month or longer

General practitioner working at ER

Nurses currently working in the adult Emergency Department

Staffs who are willing to participate and provide informed consent

6.6.1.2. Exclusion criteria

Interns rotating through the ER (since they stayed at ER for only 2 weeks)

Staff on leave during data collection period

Staffs who decline participate

Staff from other hospital unit (pharmacy, laboratory,radiology, administrative workers and supportive workers)

Variables

Dependent variables

Knowledge level

Attitude level

Independent variables

Age, sex

Profession, years of ED experience

Outbreak training and outbreak response experience

Routine triage role

Resuscitation role

Operational definition

Knowledge: Participants scoring 80% or above were classified as having good knowledge, while those scoring below 80% were classified as having poor knowledge**,** based on the Bloom's cut-off point of 80%(11 ,12,19).

Attitude: Participants scoring 80% or above were classified as having appositive attitude, while those scoring below 80% were classified as having a negative attitude, in accordance with the Bloom's cut-off point of 80%(12).

6.7. Sampling Technique

A stratified random sampling method was employed to ensure that all relevant staff categories in the Emergency Department (ED), including physicians and nurses, were adequately represented.

By dividing the population into strata and sampling proportionally, estimates that are more precise were obtained, minimizing the risk of under- or over-representation of each subgroup. Two strata were identified based on professional category: Physicians and nurses

In order to Determine the population size in each stratum

Physicians (N_1) = 62

Nurses (N_2) = 56

Total population (N) = 118

The proportion of each stratum relative to the total population was calculated as:

Proportion of stratum h=Nh/N
Physicians: 62 / 118 ≈ 0.52

Nurses: 56 / 118 ≈ 0.47

Allocate the sample size to each stratum

Total sample size of n=100, the sample size for each stratum was determined using proportional allocation:

nh=n×Nh/N
Physicians: 100 × 0.52 ≈ 53
Nurses: 100 × 0.47 ≈ 47

This ensures that the sample accurately reflects the composition of the ED staff.

Then random selection within each stratum

Within each stratum, participants were selected randomly to minimize selection bias, preserving the representativeness of each professional group while maintaining the overall randomization required for valid statistical inference.

Table 1:Sample size from each cluster

Stratum	Population -N_h	Proportion-N_h/N	Sample Allocation-$n_h=n\times N_h/N$_
Physicians	62	0.52	53
Nurses	56	0.47	47

Stratum	Population -N_h	Proportion-N_h/N	Sample Allocation-$n_h=n\times N_h/N$_
Total	**118**	**1.00**	100

N-total population =118

N_h-number of individuals in stratum h

n-total sample size

n_h-sample size allocated to stratum

6.8. Data Collection Tool

A structured, self-administered questionnaire was developed from CDC cholera and respiratory infection checklist. Modified to include team formation and triaging practice at local level. It was pre-tested before actual data collection.

The questionnaire contains three main parts, partone-socio demography 8 questions. Part two knowledge 35questions, which include knowledge on triaging, isolation, team formation, cholera from water born infection, air born infection and relapsing fever (from vector born infection).and finally 10 questions on attitude part.

Data were collected using an online survey questionnaire developed on Google Forms. Study participants were invited to complete the survey via email SMS and telegram. The questionnaire consists of three sections: the first page provides the study's objectives, an information sheet for participants, and a consent form, the second one is questions on socio demography and the last one knowledge and attitude questions.

6.9. Data quality control and processing

Prior to data collection, a pretest was conducted on 5% of the study population at TikurAnbessa Specialized Hospital to validate the data collection instruments and procedures. The pretest confirmed that the questionnaire was clear, understandable, and free of ambiguities. Following this, data were collected from the study participants. After collection, all completed questionnaires were thoroughly reviewed to ensure completeness and accuracy before entering the data into SPSS for analysis.

The outcome variables included participants' knowledge and attitude.

Knowledge: was measured using 35 items: the first 10 questions addressed airborne infections, five questions focused on cholera, five on relapsing fever, five on infectious disease triaging, five on isolation practices, and the final five on team formation during an infectious disease outbreak. All questions were multiple-choice with four options each, with correct answers scored as 1

point and incorrect answers as 0. The total score of 35 points was converted to a scale of 100% for reporting purposes.

Attitude:was measured using 10 items that assess participants' confidence, perceptions, and preparedness regarding infectious disease management. The questions covered confidence in identifying and managing cholera, relapsing fever, and respiratory infections. Feasibility of consistent PPE use during busy emergency department hours; adequacy of hospital outbreak preparedness resources; the necessity of regular outbreak preparedness training for ED staff; perception of the likelihood of future infectious disease outbreaks in Ethiopia; enforcement of healthcare worker vaccination during outbreaks; preparedness to follow triage and isolation protocols; and effectiveness of team coordination and communication during outbreaks. Responses were measured using a 5-point Likert scale, scored from 5 (Strongly Agree) to 1 (Strongly Disagree), with higher scores indicating a more positive attitude toward infectious disease management.

7. Data Analysis

Data analysis was performed through a set of systematic procedures. First, the completed questionnaires were coded to ensure uniformity and enable precise data entry. The coded questionnaires were then carefully examined manually to check for completeness and correct any discrepancies. Later, the data was transferred to Microsoft Excel for data organization and initial data management. To enable further statistical analysis, the data was exported to SPSS version 26. Descriptive statistical analysis, such as frequency, proportion, mean, standard deviation, and median, was employed to describe the socio-demographic and background variables of the study participants.

The level of knowledge was measured using 35 questions. Each correct response was given 1 mark, while incorrect responses received zero marks. The total knowledge score was measured using a scale of (0-35) and transformed to a percentage scale (0-100%).

Attitude was measured using 10 questions on a five-point Likert scale ranging from strongly agree to strongly disagree. Each response was given a numerical value from 1 to 5, with higher scores indicating a positive attitude. The total attitude score for each participant was calculated by summing the scores and transforming the sum to a percentage scale (0-100%).

Inferential statistical tests were employed to determine the factors associated with knowledge and attitude towards infectious disease outbreak preparedness. Bivariate logistic regression analysis was first employed to explore the relationship between each independent variable and the outcome variables (knowledge and attitude). Variables with a p-value of less than 0.25 in the bivariate analysis were selected as candidates for the multivariate logistic regression analysis to account for potential confounding variables. Multivariate logistic regression analysis was then employed to determine the independent predictors of knowledge and attitude, and the adjusted

odds ratios with 95% confidence intervals were calculated to measure the associations. Statistical significance was set at a p-value of less than 0.05

8. Ethical Considerations

Following approval from the ethical Review committee of the department of emergency and Critical Care medicine at TASH, Addis Ababa University, data collection was initiated.

The objective of the study was communicated to participants via an online written form. After providing consent through the online consent form, participants were enrolled in the study and allowed to proceed with completing the online questionnaire. To ensure confidentiality, no personal identifiers were collected in the form.

9. Result

9.1. Background characteristics

Out of the 100 participants, (62%) were male and 38% were female. Professionally, the majority were residents (55%), followed by nurses (40%), while 4% were consultants and 1% was a general practitioner. The minimum and maximum age of participants are 24 and 45 years respectively with the mean age being 31 years. In terms of emergency experience, 44% had 1–3 years, 21% had less than one year, 27% reported 4–6 years, and the remaining 8% had more than seven years of emergency experience.

Table 2:Years of ED experience

		Frequency	Percent	Valid Percent	Cumulative Percent
	less than a year	21	21.0	21.0	21.0
	1-3 years	44	44.0	44.0	65.0
	4-6 years	27	27.0	27.0	92.0
	7-10 years	5	5.0	5.0	97.0
	more than 10 years	3	3.0	3.0	100.0
	Total	100	100.0	100.0	

9.2. Knowledge of the Study Participants

The participants in the study have shown a varied level of knowledge with regard to several domains such as airborne and respiratory infections, cholera, relapsing fever, triage, team formation, and isolation practices in the emergency department. With regard to airborne and respiratory infections, the participants have shown good knowledge (≥80%) in some key areas such as identifying the recommended practices to prevent hospital-acquired infections (87.0%) and appreciating the significance of isolating patients immediately if they have symptoms indicative of tuberculosis (93.0%). In addition, management of the outbreak by leaders (86.0%) and appreciating the primary reason for isolation in the ED (80.0%) are some areas where the knowledge is good.

However, despite these strengths, there existed important knowledge gaps (<80%) in a number of key areas. Less than two-thirds of the participants were able to correctly identify the routes of airborne transmission (54.0%), the type of masks not indicated for preventing airborne infection (57.0%), and the procedures that increase the risk of airborne transmission (72.0%). Knowledge of cholera management was moderate. While 77.0% of participants were able to correctly identify the cornerstone of management, only 67.0% to 78.0% had a satisfactory level of knowledge regarding important clinical features, initial management, and isolation practices. Knowledge of relapsing fever was also mixed. While 66.0% of participants were able to correctly identify the organism causing tick-borne relapsing fever, the level of knowledge regarding identification of vectors, common complications, and management was moderate, with correct response rates ranging from 60.0% to 74.0%.

In outbreak triage, the audience was well-informed about the initial steps of triage (77.0%), immediate isolation of suspected patients (87.0%), and the overall goals of triage (83.0%). Nevertheless, there were some gaps in recognizing the essential factors for triage prioritization (64.0%) and appropriate PPE use (77.0%). Knowledge about team formation was also inconsistent, with high recognition of leadership positions (86.0%) but some gaps in recognizing optimal team composition and coordination roles. Regarding isolation practices, the audience demonstrated good recognition of the purpose of isolation (80.0%) and procedures in the absence of isolation rooms (72.0%), but some gaps in recognizing diseases that do not require airborne isolation (43.0%) and appropriate PPE removal procedures (59.0%).

In general, more than half of the participants (56%) showed poor knowledge, with scores below 80%, while only 44% showed good knowledge with scores of 80% or higher. The results of this study indicate that despite the participants' good knowledge of leadership, TB isolation, and infection prevention practices, there are still knowledge gaps in the recognition of airborne infections, the use of PPE, the prioritization of outbreak triage, team coordination, and some isolation procedures.

Table 3: knowledge assessment

	Incorrect		Correct	
	Count	Row %	Count	Row N %
1. Which one is airborne transmission?	46	46.0%	54	54.0%

2. The recommended PPE for aerosol generating procedures	25	25.0%	75	75.0%
3. The best measure to prevent hospital-acquired respiratory infection is	13	13.0%	87	87.0%
4. Which sign requires immediate isolation for suspected TB patient?	7	7.0%	93	93.0%
5. Appropriate waste disposal after managing an airborne case includes	18	18.0%	82	82.0%
6. Which procedure increases risk of airborne transmission?	28	28.0%	72	72.0%
7. Which infection requires both droplet and contact precautions	33	33.0%	67	67.0%
8. Which factor reduces airborne pathogen spread?	16	16.0%	84	84.0%
9. Which mask type is unsuitable for airborne infection?	43	43.0%	57	57.0%
10. Staff vaccination against influenza helps to:	17	17.0%	83	83.0%
11.The hallmark clinical feature of severe cholera is	22	22.0%	78	78.0%
12. The mainstay of cholera management is:	23	23.0%	77	77.0%
13. The first step in managing suspected cholera in ED	31	31.0%	69	69.0%
14. In cholera, appropriate isolation measure is	33	33.0%	67	67.0%
15. Prevention of hospital transmission requires?	16	16.0%	84	84.0%
16. The vector for louse-borne relapsing fever is	26	26.0%	74	74.0%

17. The common complication after antibiotic initiation for RF is?	40	40.0%	60	60.0%
18. The causative organism of tick-borne relapsing fever is	66	66.0%	34	34.0%
19. The best diagnostic method for relapsing fever is	24	24.0%	76	76.0%
20. The appropriate management includes	29	29.0%	71	71.0%
21. The first step in triage during an outbreak is:	23	23.0%	77	77.0%
22. Which factor is most critical for outbreak triage prioritization	36	36.0%	64	64.0%
23. What should be used by triage staff during outbreak triage?	23	23.0%	77	77.0%
24. Which patients should be triaged to isolation immediately?	13	13.0%	87	87.0%
25. The main objective of triage during outbreak is:	17	17.0%	83	83.0%
26. The ideal ED outbreak team includes:	9	9.0%	91	91.0%
27. Effective outbreak team communication involves:	27	27.0%	73	73.0%
28. Which of the following prevents staff fatigue during outbreak response?	25	25.0%	75	75.0%
29. Leadership in outbreak response should be:	86	86.0%	14	14.0%
30. The key function of team coordination is to	11	11.0%	89	89.0%
31.The main purpose of isolation in ED is	20	20.0%	80	80.0%
32. Disease that doesn’t require airborne isolation	57	57.0%	43	43.0%

33. Isolation rooms should have: a) Negative pressure ventilation	46	46.0%	54	54.0%
34.When isolation rooms are unavailable, the next best measure is:	28	28.0%	72	72.0%
35.. Correct PPE removal sequence is	41	41.0%	59	59.0%

9.3. Attitude

The overall attitude of the emergency department personnel towards outbreak preparedness was generally poor, with only 22 participants (22%) scoring above the 80% cut-off level for a good attitude, while 78 participants (78%) showed a poor attitude. The item-level responses also bring out the difference in attitude. Though a large number of participants felt confident about the management of specific diseases like, 74 percent agreeing or strongly agreeing that they can manage cholera cases, 74 percent for relapsing fever, and 73 percent for respiratory infections, system readiness and feasibility of implementation were major issues. Only 24 percent agreed that the use of personal protective equipment is possible during busy hours in the emergency department, while 54 percent disagreed. Similarly, only 18 percent felt that the hospital provides adequate resources for outbreak preparedness, while 64 percent disagreed. Preparedness to follow triage and isolation procedures was also low, with only 47 percent feeling confident, while 24 percent disagreed and 29 percent were undecided. Communication and coordination among team members during outbreak situations were also found to be inadequate, with only 36 percent agreeing that communication is clear and effective, while 32 percent disagreed. However, the staff members' motivation to improve was high, with 78 percent agreeing that regular outbreak preparedness training should be mandatory, and 75 percent agreeing that future outbreaks are likely to occur in Ethiopia. The implications of low system readiness and high staff motivation for training are that there is a need for systematic preparedness programs to enhance staff attitude and preparedness.

Table 4: attitude assessment

	strongly agree	agree	neutral	Disagree	strongly disagree

1. I am confident in identifying and managing cholera cases.	34.0%	40.0%	17.0%	9.0%	0.0%
2. I am confident in identifying and managing relapsing fever cases.	29%	45%	20%	5%	1%
3. I am confident in identifying and managing respiratory infection cases.	28.0%	45.0%	19.0%	5.0%	3.0%
4. Using PPE consistently is feasible during busy ED hours.	11.0%	13.0%	22.0%	33.0%	21.0%
5. The hospital provides adequate outbreak preparedness resources.	7.0%	11.0%	18.0%	36.0%	28.0%
6. Regular outbreak preparedness training should be mandatory for all ED staff.	53.0%	25.0%	13.0%	4.0%	5.0%
7. Future infectious disease outbreaks are likely to occur in Ethiopia.	37.0%	38.0%	17.0%	7.0%	1.0%
8. Healthcare worker vaccination should be enforced during outbreaks.	36.0%	40.0%	12.0%	10.0%	2.0%
9. I feel adequately prepared to follow triage and isolation protocols during an outbreak.	12.0%	35.0%	29.0%	21.0%	3.0%
10.. Team coordination and communication during outbreaks are clear and effective.	20.0%	16.0%	32.0%	26.0%	6.0%

9.4.Factors affecting knowledge and Attitude

In the bivariate analysis, all variables with a p-value less than 0.25 were considered eligible and subsequently entered into the multivariate logistic regression model. After adjusting for these

factors, only a limited number of variables remained significantly associated with knowledge in the final multivariate model.

Profession showed a strong independent association with knowledge, with consultants being significantly more likely to have good knowledge compared with other professional categories (AOR = 4.7, 95% CI: 2.1–65.2, p = 0.048). Years of experience in the emergency department were also an important predictor; particularly, those with four to seven years of experience had significantly higher

Odds of demonstrating good knowledge (AOR = 4.2, 95% CI: 2.7–39.1, p = 0.046). Additionally, participants who had taken part in previous outbreak responses were more knowledgeable than those without such experience were (AOR = 3.512, 95% CI: 1.066–11.56, p = 0.039).

A number of other variables were found to be significant at the crude level but did not retain their significance after adjustment, which may indicate that their initial associations were masked by more important predictors like profession and experience. Notably, however, none of the variables used in the analysis of knowledge, whether significant or not, demonstrated any statistical association with attitude scores in bivariate or multivariate analysis. This suggests that, whereas knowledge is affected by professional exposure and experience, attitude may be influenced by other factors like organizational culture, perceived support, individual motivation, and systemic issues.

Table 5 factor affecting knowledge and attitude

			COR (95%CI	P value	AOR (95% CI	P value
	Sex	male	1.03(0.43-2.1)	0.907	2.2(0.77-6.1)	0.139
	Profession	Consultant	13(7.8-36.6)	0.08	4.7(2.1-65.2)	0.048
		Resident	1.4(0.8-4.4	0.68	1.08(0.98-12.7)	1.000
		Nurse	1.01(0.67-1.89)	0.87	.89(0.58-3.21)	1.000
		Other	47.7(12.7-167)	0.67	12.5(8.5-123)	1.000
	Years of ED experience:	Less than a year	1.88(1.08.11.3)	0.99	13.12(11-84)	0.855
		1-3 years	17.4(2.5-58.1)	0.74	51.0(29.2-249.4)	0.999
		4-7 years	1.56(1.04-15.88)	0.24	4.2(2.7-39.1)	0.046
		7-10 years	0.79(0.34-2.39)	0.66	0.81(0.65-17.7)	0.878
		More than 10 years	8.23(6.2-93)	0.84	32.2(13.55-167.7)	0.956
	Have you received formal outbreak preparedness training in the last 3 years? (1)	Yes	0.625(0.266-0.877)	0.282	2.4(0,78-7.3)	0.125
	Have you participated in any outbreak response before? (1)	Yes	2.1(1.35-476)	0.072	3.512(1.066-11.56)	0.039
	Do you routinely manage triage or resuscitation?	Yes	2.31(089-6.43)	0.115	1.7(0.48-607	0.403
	Constant				1.322	1.000

10. Discussion

This paper offers a thorough evaluation of emergency department staff knowledge and attitude towards infectious disease outbreaks and highlights important areas of knowledge and attitude deficit. The level of knowledge was poor, with the majority of participants (56%) scoring below the 80% level. Areas of knowledge deficit included airborne infection control, cholera and relapsing fever, outbreak triage, and team coordination. Areas of knowledge deficit included incorrect identification of personal protective equipment for aerosol-generating procedures, poor understanding of airborne transmission and TB isolation, and poor understanding of important clinical features and initial management of cholera and relapsing fever. While some participants showed moderate knowledge in specific areas, such as naming diseases not requiring airborne isolation or identifying causative organisms, there is evidence that many staff members may not have the comprehensive knowledge necessary for effective outbreak management.

Attitudes towards outbreak preparedness were also predominantly negative, with 78% of the participants being categorized as having poor attitude scores. Although the majority of the participants were confident in their ability to handle particular infectious diseases, there were considerable concerns about operational practicability and readiness. Few participants thought that wearing personal protective equipment was possible during busy hours in the emergency department or that sufficient resources for outbreak preparedness were available. Confidence in following triage and isolation procedures and in good team communication was also low. Despite these difficulties, there was considerable motivation for improvement, as evidenced by the support for making outbreak preparedness training mandatory and the recognition of the probability of future outbreaks in Ethiopia. Taken together, these results indicate that attitudes are primarily driven by systemic and institutional barriers and not by lack of motivation, emphasizing the need for organizational support and training to improve outbreak preparedness.

Analysis of factors associated with knowledge, three factors were independently associated with higher knowledge scores among emergency department staff: being a consultant (AOR 4.7; 95% CI, 2.1–65.2; $p = 0.048$), having four to seven years of ED experience (AOR 4.2; 95% CI, 2.7–39.1; $p = 0.046$), and previous involvement in outbreak response (AOR 3.51; 95% CI, 1.07–11.56; $p = 0.039$). These results are in line with studies carried out in Ethiopian hospital settings, where professional seniority and actual involvement in outbreaks were found to be important predictors of preparedness knowledge. For example, in a study carried out in East Gojjam Zone, it was observed that healthcare workers with more than five years of service experience had significantly higher familiarity and preparedness scores than their less experienced colleagues ($\beta = 15.5$; 95% CI, 7.8–23.2) (20). Similarly, in South Gondar Zone public hospitals, consultants and mid- to senior-level healthcare workers showed significantly better knowledge and preparedness for disaster and emergency management than their junior counterparts (21). Internationally, a study conducted in Qatar among ED physicians and nurses revealed that physicians rated higher in the preparedness for communicable diseases than nurses (85.1% vs 73.9%; $p = 0.003$)[3], validating the link between role and knowledge. Also, in our

study, previous experience in outbreak response was a predictor, emphasizing the value of experiential learning, which was reflected in the Ethiopian studies where direct involvement in emergencies/outbreaks was linked to greater preparedness and knowledge (20,21).

However, none of the individual factors, such as gender, nursing/residency status, recent formal training, or regular triage/resuscitation tasks, were significantly associated with attitude on outbreak preparedness. This is consistent with previous Ethiopian and regional studies, which showed that attitudes are less affected by individual factors.Moreover, influenced by systemic and institutional factors.Such as, resource availability, organizational support, and workload. These results suggest that although role, experience, and previous exposure are linked to knowledge, system-level interventions are needed to improve attitudes and that institutional support, preparedness, and training programs are essential to convert knowledge into effective preparedness and confident practice.

11. Generalizability and Interpretability

The results of this study should be considered in the context of the study environment and population. The study results are largely representative of the emergency department staff working in the hospital that was included in the study and may not be generalizable to other healthcare settings. However, the study offers important insights into the knowledge, attitudes, and factors that are likely to be similar in other low and middle-income healthcare settings, where resource limitations are common. The study results are easier to interpret because of the use of standardized tools to measure knowledge and attitudes, as well as the use of statistical analysis to determine the independent predictors of knowledge. The study offers an important starting point for understanding the gaps in outbreak preparedness and can inform interventions in other emergency care settings..

12. Limitations

There are several limitations to this study that should be taken into consideration when interpreting the results. First, this study was performed in one institution, which may affect the generalizability of the results to other institutions. Second, the assessment of attitudes was performed by self-report, which may be subject to social desirability bias. Finally, although the sample size was sufficient for the analyses that were performed, some of the subgroup analyses may have had reduced statistical power, which may affect the ability to detect associations. Despite these limitations, this study provides valuable information regarding emergency department preparedness for infectious disease outbreaks.

13. Recommendations

In order to fill the identified gaps in knowledge and attitude among emergency department personnel, a comprehensive approach is recommended. Training sessions should be conducted on a regular and mandatory basis, emphasizing outbreak preparedness skills such as the use of

personal protective equipment, triage and isolation procedures, and the management of cholera, relapsing fever, and respiratory infections. Training sessions should incorporate scenario-based learning to enhance skills in applying knowledge during actual outbreak scenarios. Support at the institutional level should be improved by ensuring the availability of personal protective equipment, functional and well-ventilated isolation rooms, sanitation materials, and diagnostic facilities. . Since the deficiencies in attitude seem to be more affected by systemic factors than individual factors, interventions in the organization such as optimizing workflow, communication channels, coordination tools, and support from the leadership are necessary to promote positive attitudes and operational readiness. Outbreak response exercise training and guidance from more senior staff members can also be beneficial in improving knowledge and confidence, particularly in staff members with less experience in the emergency department. Additionally, regular knowledge, skill, and readiness assessments should be carried out to monitor progress and provide continuous improvement. By integrating training, reinforcement, and strengthening of the operational system, emergency departments can improve the knowledge and attitude of staff members, thus improving outbreak preparedness and response readiness.

Bibliography

1. Al Haliq S, Khraisat O, Al-Bashaireh A, Al Jumaan M, Alqudah Z, Williams B. Emergency Department Preparedness toward a Future Pandemic: Safety Management Response Pyramid. Open Nurs J [Internet]. 2023 Jan 30 [cited 2025 July 11];17(1). Available from: https://opennursingjournal.com/VOLUME/17/ELOCATOR/e187443462212140/

2. Welby-Everard P, Quantick O, Green A. Emergency preparedness, resilience and response to a biological outbreak. BMJ Mil Health [Internet]. 2020 Feb [cited 2025 July 11];166(1):37–41. Available from: https://militaryhealth.bmj.com/lookup/doi/10.1136/jramc-2019-001323

3. Zhang M, Zhou M, Tang F, Wang Y, Nie H, Zhang L, et al. Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Henan, China. J Hosp Infect [Internet]. 2020 June [cited 2025 July 11];105(2):183–7. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0195670120301870

4. Taylor HA, Rutkow L, Barnett DJ. Local Preparedness for Infectious Disease Outbreaks: A Qualitative Exploration of Willingness and Ability to Respond. Health Secur [Internet]. 2018 Oct [cited 2025 July 11];16(5):311–9. Available from: https://www.liebertpub.com/doi/10.1089/hs.2018.0046

5. Sánchez SM, Shenoy ES, Biddinger PD. The indispensable role of emergency medicine in national preparedness for high consequence infectious diseases (HCIDs). JACEP Open [Internet]. 2020 Apr [cited 2025 July 11];1(2):78–9. Available from: https://linkinghub.elsevier.com/retrieve/pii/S2688115224004752

6. Fifolt M, Lee RA, Nafziger S, McCormick LC. Infectious Disease Hospital Preparedness: Lessons Learned From the 2019 Measles Outbreak. Disaster Med Public Health Prep [Internet]. 2022 June [cited 2025 July 11];16(3):899–903. Available from: https://www.cambridge.org/core/product/identifier/S1935789321000185/type/journal_article

7. Williams BA, Jones CH, Welch V, True JM. Outlook of pandemic preparedness in a post-COVID-19 world. Npj Vaccines [Internet]. 2023 Nov 20 [cited 2025 July 11];8(1). Available from: https://www.nature.com/articles/s41541-023-00773-0

8. Rebmann T, Carrico R, English JF. Hospital infectious disease emergency preparedness: A survey of infection control professionals. Am J Infect Control [Internet]. 2007 Feb [cited 2025 July 11];35(1):25–32. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0196655306011497

9. Kamalrathne T, Amaratunga D, Haigh R, Kodituwakku L, Rupasinghe C. Epidemic and Pandemic Preparedness and Response in a Multi-Hazard Context: COVID-19 Pandemic as a Point of Reference. Int J Environ Res Public Health [Internet]. 2024 Sept 19 [cited 2025 July 11];21(9):1238. Available from: https://www.mdpi.com/1660-4601/21/9/1238

10. Musa, J. Knowledge, attitude, and practice of infection prevention and control among healthcare workers during COVID-19 in Kenya. Pan Afr Med J. 2021;

11. Juttla PK, Ndiritu M, Milliano F, Odongo AO, Mwancha-Kwasa M. Knowledge, attitudes and practices towards COVID-19 among healthcare workers: A cross-sectional survey from Kiambu County, Kenya. Ghosh PK, editor. PLOS ONE [Internet]. 2024 Mar 12 [cited 2025 Dec 8];19(3):e0297335. Available from: https://dx.plos.org/10.1371/journal.pone.0297335

12. Kamacooko O, Kitonsa J, Bahemuka UM, Kibengo FM, Wajja A, Basajja V, et al. Knowledge, Attitudes, and Practices Regarding COVID-19 among Healthcare Workers in Uganda: A Cross-Sectional Survey. Int J Environ Res Public Health [Internet]. 2021 June 30 [cited 2025 Dec 8];18(13):7004. Available from: https://www.mdpi.com/1660-4601/18/13/7004

13. Borie YA, Yeheyis T, Deribe B, Ayalew M, Reta Y, Hoyiso D, et al. Knowledge, attitude, and practice toward COVID-19 transmission, prevention, and self-quarantine management among public servants in selected locations of the Sidama region, Southern Ethiopia: a multicenter cross-sectional study. Front Public Health [Internet]. 2023 June 27 [cited 2025 July 11];11. Available from: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1170317/full

14. derresa w abebe. Health facility preparedness for COVID-19 response in Ethiopia. 2021;

15. bedilu woldemichael.). Emergency preparedness of hospitals in Ethiopia: An assessment of policies and practices. 2020;

16. mohammed abebe tgebeyehu. Emergency preparedness among healthcare workers in the Amhara region, Ethiopia. 2022;

17. Kebede, S gebremedhe assfaw. Preparedness of Ethiopian emergency departments for infectious disease outbreaks. 2020;

18. Azazh A. The new emergency medicine building design at Tikur Anbessa Specialized Hospital (TASH), Addis Ababa University. Ethiop Med J. 2014 July;Suppl 2:49–52.

19. Ashebir W, Yimer B, Alle A, Teshome M, Teka Y, Wolde A. Knowledge, attitude, practice, and factors associated with prevention practice towards COVID-19 among healthcare providers in Amhara region, northern Ethiopia: A multicenter cross-sectional study. Musoke D, editor. PLOS Glob Public Health [Internet]. 2022 Apr 11 [cited 2025 Dec 8];2(4):e0000171. Available from: https://dx.plos.org/10.1371/journal.pgph.0000171

20. Ayenew T, Gedfew M, Afenigus AD, Amha H, Mulugeta H, Mengist B, et al. Familiarity with emergency preparedness and its predictors among nurses and physicians working at public hospitals in east Gojjam zone, northwest Ethiopia. SAGE Open Med [Internet]. 2022 Jan [cited 2025 Dec 25];10:20503121221096532. Available from: https://journals.sagepub.com/doi/10.1177/20503121221096532

21. Tassew SF, Chanie ES, Birle TA, Amare AT, Kerebih G, Nega TD, et al. Knowledge, attitude, and practice of health professionals working in emergency units towards disaster and emergency preparedness in South Gondar Zone hospitals, Ethiopia, 2020. Pan Afr Med J [Internet]. 2022 [cited 2025 Dec 25];41. Available from: https://www.panafrican-med-journal.com/content/article/41/314/full

Annex

Dr. Ekram Getahun of the Department of Emergency Medicine, Addis Ababa University, is carrying out this research. The aim of the research is to evaluate the knowledge and attitudes of emergency department health care workers towards outbreak preparedness, with special emphasis on cholera, relapsing fever, and respiratory infections. You are free to participate in this research. You can refuse to participate, refuse to answer any question you do not want to answer, or withdraw from the research at any time without any consequences. No personal details will be collected, and the information you provide will only be used for research. Provide not all the information you provide will be kept confidential, and the results will only in aggregate form, which means that it will be possible to identify your responses. By agreeing to participate in this research, you confirm that you have read and understood the above

information and that you are willing to participate in the research. Are you volunteer to participate?

☐Yes, I consent ☐No, I do not consent

Signature (optional): _____ Date: _____

Section A: Demographics

1. Age: _____ years
2. Sex: ☐Male ☐Female ☐Other
3. Profession: ☐Consultant ☐Resident ☐Nurse ☐Intern ☐Health Officer ☐Other _____
4. Years of ED experience: ☐<1 ☐1–3 ☐4–6 ☐7–10 ☐>10
5. Have you received formal outbreak preparedness training in the last 3 years? ☐Yes ☐No
6. Have you participated in any outbreak response before? ☐Yes (specify disease) _____ ☐No
7. Do you routinely manage triage or resuscitation? ☐Yes ☐No

Section B: Knowledge

Choose the best answer for each question. Select one or more if applicable.

Airborne/Respiratory Infections

1. Which infection primarily spreads through airborne transmission? a) Tuberculosis b) Influenza c) Cholera d) Typhoid

2. What is the recommended PPE during aerosol-generating procedures? a) N95 mask b) Surgical mask c) Cloth mask d) No mask

3. The best measure to prevent hospital-acquired respiratory infection is: a) Proper ventilation b) Shared patient rooms c) Mask reuse d) Poor air flow

4. Which sign requires immediate isolation for suspected TB patient? a) Cough >2 weeks b) Fever only c) Vomiting d) Diarrhea

5. Appropriate waste disposal after managing an airborne case includes: a) Disposing in infectious waste bin b) Flushing into sink c) Open burning d) General waste bin

6. Which procedure increases risk of airborne transmission? a) Intubation b) Wound dressing c) Catheter insertion d) IV line setup

7. Which infection requires both droplet and contact precautions? a) COVID-19 b) Typhoid c) Cholera d) Hepatitis A

8. Which factor reduces airborne pathogen spread? a) Adequate air exchange b) Closed doors c) Overcrowding d) Unclean filters

9. Which mask type is unsuitable for airborne infection? a) Cloth mask b) N95 c) FFP2 d) FFP3

10. Staff vaccination against influenza helps to: a) Reduce staff illness and patient exposure b) Cause fever c) Decrease mask use d) Replace isolation

Cholera

1. The hallmark clinical feature of severe cholera is: a) Profuse watery diarrhea b) Bloody diarrhea c) Constipation d) Productive cough

2. The mainstay of cholera management is: a) Rehydration b) Antibiotics only c) Anti-diarrheal drugs d) Dietary changes

3. The first step in managing suspected cholera in ED is: a) Assess dehydration b) Wait for lab result c) Send home d) Start antibiotics

4. In cholera, appropriate isolation measure is: a) Contact isolation b) Airborne isolation c) Protective isolation d) No isolation

5. Prevention of hospital transmission requires: a) Hand hygiene and safe waste disposal b) Shared utensils c) No disinfection d) Common toilets

Relapsing Fever

1. The vector for louse-borne relapsing fever is: a) Body louse b) Flea c) Mosquito d) Tick

2. The common complication after antibiotic initiation is: a) Jarisch–Herxheimer reaction b) Anaphylaxis c) Pneumonia d) Renal failure

3. The causative organism of tick-borne relapsing fever is: a) Borreliaduttonii b) Borreliarecurrentis c) Salmonella typhi d) None

4. The best diagnostic method for relapsing fever is: a) Peripheral blood smear b) Stool test c) Chest X-ray d) Urine test

5. The appropriate management includes: a) Doxycycline and supportive care b) IV fluids only c) Corticosteroids d) No monitoring

Triage

1. The first step in triage during an outbreak is: a) Identify and isolate suspected infectious cases b) Take full history c) Register patient d) Wait for labs

2. Which factor is most critical foroutbreak triage prioritization? a) Vital signs b) history c) Occupation d) Religion

3. What should be used by triage staff during outbreak triage? a) Full PPE b) Gloves only c) No PPE d) Face shield only

4. Which patients should be triaged to isolation immediately? a) Cough with fever and exposure history b) All trauma cases c) All stable patients d) Headache only

5. The main objective of triage during outbreak is: a) Early detection and separation of cases b) Speed of admission c) Reducing documentation d) Assigning routine beds

Team Formation

1. The ideal ED outbreak team includes: a) Triage officer, IPC focal person, logistics, and clinical team b) Only nurses c) Only doctors d) Security staff

2. Effective outbreak team communication involves: a) Regular briefings and documentation b) Verbal orders only c) No updates d) Random meetings

3. Which of the following prevents staff fatigue during outbreak response? a) Duty rotation b) Continuous shift c) No rest d) Overcrowding

4. Leadership in outbreak response should be: a) Clearly assigned b) Shared without coordination c) Ignored d) Optional

5. The key function of team coordination is to: a) Ensure safety and effective communication b) Delay interventions c) Focus only on supplies d) Avoid reporting

Isolation

1. The main purpose of isolation in ED is: a) Prevent cross-infection b) Reduce workload c) Comfort the patient d) Save space

2. Disease that doesn’t require airborne isolation : a) Tuberculosis b) COVID-19 c) Measles d)cholera

3. Isolation rooms should have: a) Negative pressure ventilation b) Shared air system c) No airflow d) Positive pressure

4. When isolation rooms are unavailable, the next best measure is: a) Cohorting similar cases b) Mixing all patients c) Avoid triage d) No action

5. Correct PPE removal sequence is: a) Gloves → Gown → Eye protection → Mask b) Mask → Gloves → Gown → Eye protection c) Gown first d) Random order

Section C: Attitude

1. I am confident in identifying and managing cholera cases.

2. I am confident in identifying and managing relapsing fever cases.

3. I am confident in identifying and managing respiratory infection cases.

4. Using PPE consistently is feasible during busy ED hours.

5. The hospital provides adequate outbreak preparedness resources.

6. Regular outbreak preparedness training should be mandatory for all ED staff.

7. Future infectious disease outbreaks are likely to occur in Ethiopia.

8. Healthcare worker vaccination should be enforced during outbreaks.

9. I feel adequately prepared to follow triage and isolation protocols during an outbreak.

10. Team coordination and communication during outbreaks are clear and effective.

Scoring Guide
Attitude: Likert scale scored 5→1 (Strongly Agree → Strongly Disagree).