



**INSTITUTE OF HEALTH SCIENCES SCHOOL
OF PUBLIC HEALTH DEPARTMENT OF
EPIDEMIOLOGY AND BIOSTATISTICS**

INTEGRATED DISEASE SURVEILLANCE RESPONSE PRACTICE AND
ASSOCIATED FACTORS AMONG HEALTH PROFESSIONALS WORKING
IN PUBLIC HEALTH FACILITIES OF EAST WALLAGA ZONE, WESTERN
OROMIA, ETHIOPIA (CROSS-SECTIONAL STUDY DESIGN)

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As members of the examining the final MPH thesis open defense, we certify that we have read and evaluated the thesis prepared by Teklu Bedassa Ofgea under the title of Integrated Disease Surveillance Response Practice and Associated Factors Among Health Professionals Working in Public Health Facilities of East Wallaga Zone, Western Oromia, Ethiopia, 2025, and recommend that the thesis be accepted as fulfilling the requirement of the degree of Master of Public Health in Epidemiology.

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LIST OF ACRONYMS AND ABBREVIATIONS

AOR	:	Adjusted Odds Ratio
CI	:	Confidence Interval
COR	:	Crude Odds Ratio
EPD	:	Epidemic Prone Disease
ETB	:	Ethiopian Birr
HC	:	Health Center
HCW	:	Health Care Worker
HFs	:	Health Facilities
IDSR	:	Integrated Disease Surveillance and Response
IHR	:	International Health Regulation
MCH	:	Maternal and child health
PHCU	:	Primary Health Care Unit
PHEM	:	Public Health Emergency Management
NDSS	:	National Disease Surveillance System
ND	:	Notifiable Disease
SCD	:	Standard Case Definition
SRS	:	Simple Random Sampling
WDSS	:	Weekly Disease Surveillance System
WHO	:	World Health Organization

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ABSTRACT

Background: The Integrated Disease Surveillance Response (IDSR) system is renowned for transforming data into actionable information within the larger national health system through the continuous, methodical gathering, analysis, interpretation, and distribution of health data. However, there is limited study and low coverage on the integrated disease surveillance response practice among health professionals in Ethiopia. Hence, this study examined the reasons behind the low coverage of notifiable disease reporting practices so far.

Objective: To assess integrated disease surveillance response practice and associated factors among health professionals working in public health facilities of East Wallaga Zone, Western Oromia, Ethiopia, 2025

Methods: A facility-based cross-sectional study was used. A total of 633 sample sizes were selected using a multistage sampling method in the public health facilities of East Wallaga Zone, Western Oromia, Ethiopia, from February to April 2025. Data were collected using structured self-administered questionnaires. After checking its completeness, the data was coded, entered into EpiData 4.6 version, and exported to SPSS version 27 for analysis. Multicollinearity was checked by the variation inflation factor, and also model fitness was checked by the Hosmer-Lemeshew test. Bivariate and multivariable logistic regression analyses were carried out, and variables with a p-value < 0.25 in the bivariate analyses were candidates for the multivariable analysis to identify a variable that has a significant association at a $P < 0.05$. Finally, the study's findings were presented in texts, tables, and figures.

Result: This study revealed that 61.9% (95% CI: 57.9-65.7) of health professionals had good IDSR practice. Training on IDSR (AOR=2.68, 95% CI: 1.64, 4.38), work experience (AOR=0.35, 95% CI: 0.14, 0.91), and work department (AOR=0.20, 95% CI: 0.09, 0.46) were significantly associated with good IDSR practice among health professionals.

Conclusion and recommendation: This study revealed that more than half of the health professionals in the East Wallaga zone had good IDSR practice. Training, working department, and work experience were factors associated with the practice. Thus, it's recommended that the East Wallaga and Woreda health office provide training and facilitate capacity building to strengthen IDSR practice.

Keywords: IDSR, health professionals, practice, public health facility, Ethiopia

1. INTRODUCTION

1.1 Background

Integrated Disease Surveillance Response (IDSR) is a kind of indicator-based surveillance system that, as part of the larger national health system, combines several surveillance operations into a single system (1). Additionally, IDSR denotes a strategy and a tool designed to encourage the efficient use of resources by merging and simplifying surveillance efforts for IDSR-priority diseases, which include epidemic-prone diseases (EPDs). The purpose was to report disease conditions that require immediate and preventive action (2).

In order to support and guide effective and efficient public health action for infectious illnesses, surveillance is an initiative for the ongoing, systematic collection, analysis, interpretation, and dissemination of health data (1). Reporting notifiable diseases is part of the surveillance system health professionals use to monitor and report diseases in time to ensure early identification (3).

The World Health Organization (WHO) launched the Integrated Disease Surveillance and Response approach in African countries in 1998. Monitoring disease trends and public health events is the main goal of IDSR implementation in order to quickly identify, look into, and tackle abnormal trends like outbreaks (2,4).

Prior to this period, the majority of African nations established surveillance systems through vertical programs focused on certain diseases of national and/or global importance. These included diseases that may be prevented by vaccination, TB, and malaria. Epidemiological data were mostly gathered in outreach health service settings and at the level of healthcare facilities (4,5).

Viral hemorrhagic diseases, cholera, measles, malaria, meningococcal meningitis, yellow fever, and diphtheria, which are prone to epidemics, still present significant health threats to people in developing countries. In many low and middle-income countries, robust disease surveillance is essential for the successful control of communicable diseases (6).

In sub-Saharan Africa, evaluations of IDSR systems have found certain achievements in their implementation, such as enhanced utilization of surveillance data at the national level, better

communication and cooperation between districts and other sectors, and the accessibility of IDSR reports through district health information systems (DHIS) (7).

The development of the disease surveillance system aimed at improving the coordination of surveillance efforts in Ethiopia started in 1998, based on historical records. After the resolution passed at the 48th Assembly in 1998, the World Health Organization Regional Office for Africa (WHO/AFRO) began promoting Integrated Disease Surveillance and Response as the main approach to enhance the National Disease Surveillance System (NDSS) that all member states were encouraged to implement (8). In Ethiopia, the routine surveillance system includes 36 diseases, with 22 reported immediately and 14 reported weekly. Reporting is done every week and also immediately, within 30 minutes of identification. The Ethiopian Public Health Institute implemented the Public Health Emergency Management (PHEM) system in order to successfully handle the growing challenges posed by public health emergencies (1).

This system is fully integrated, adaptable, and takes an all-hazards approach, incorporating the obligations of the International Health Regulation (IHR 2005) (9). Reporting and responding promptly requires efficient connections to individuals authorized to control diseases, which places extra demands on health information systems. Poor execution of the IDSR system has been associated with delays at every stage of reporting epidemic outbreaks and other diseases that are of public health importance (10).

1.2 Statement of the Problem

Globally, the threat posed by epidemics to health security is growing and constitutes a significant disaster for people's livelihoods (10). The African region faces significant risks to its health security. The emergence and resurgence of infectious diseases with the potential for pandemics continue to pose challenges to the continents' already vulnerable health systems. In sub-Saharan Africa, as the prevalence of infectious diseases continues to rise, it becomes crucial to have reliable methods for anticipating outbreaks and preparing for appropriate responses. This required an effective IDSR system, which depends on healthcare professionals working in healthcare settings and involves continuous disease monitoring at the individual, local, national, and international levels (10,11).

Meanwhile, communicable diseases continue to have a detrimental impact, primarily in low- and middle-income nations. Additionally, healthcare-associated infections (HAIs) are a major cause of death worldwide and a substantial source of disease burden, especially in low- and middle-income nations. (LMICs) (12–14).

Every year, more than 100 outbreaks of infectious diseases and other public health crises take place in the African region, as recognized by the WHO in 2024. The risks of health emergencies affect every country in the region (12,13). Thus, a strategic approach is constantly required for any public health system, particularly in low-income countries like Africa, where infectious and epidemic-prone diseases are a national priority (10).

The IDSR strategy was being implemented in forty-four (44) African countries by December 2017, with only Algeria, Cabo Verde, and Mauritius having not adopted the second edition of the IDSR technical guidelines. Challenges were identified in terms of reporting timeliness and completeness, with only 32 (68%) of the countries meeting the 80% reporting unit target (13).

Several studies demonstrate that passive health facility-based monitoring systems have generally had low timeliness in reporting notifiable diseases, depending on the sickness or condition recorded. They also didn't have the requisite knowledge of the reporting format. Inadequate IDSR practice is linked to a variety of organizational and human variables. The implementation of the IDSR system was found to be impacted by a number of factors, including perceptions, a lack of regular data analysis and interpretation, a lack of feedback, a lack of manpower, a lack of

training, a lack of organizational support, a lack of knowledge, a lack of time or workload, the complexity of the process, inadequate resources, transportation, and communication problems (4,10,14,15).

In Ethiopia, there are still some issues, like insufficient capacity for lower-level surveillance, inadequate documenting of rumors and a weak verification system, suboptimal laboratory-based surveillance, insufficient emergency funding, and insufficient pandemic preparedness (15).

Even if Ethiopia launched IDSR in 1998, the study conducted in the Oromia region, West Hararge, in 2023 shows that the overall integrated disease surveillance response practice was 50.17%, and also, Ethiopia has demonstrated progress through IDSR, the system's overall implementation state is unsatisfactory (9).

Even though our country launched the implementation of IDSR 26 years ago, until now, the coverage of IDSR practice has been very low. Since all reporting units within a report's catchment region must submit their reports on time for the report to be considered complete, (1) national target IDSR timelines reporting should be greater than 80% (16). Also, there is limited research on the integrated disease surveillance response practice among health professionals in Ethiopia.

Therefore, this study aimed to analyze the reasons behind the low coverage of notifiable disease reporting practice so far. Also, to ascertain the extent of IDSR practice and associated factors among health professionals in the East Wallaga zone, Western Oromia, Ethiopia.

1.3 Significance of the study

This study will help to enhance the reporting system of priority diseases under surveillance and also help to strengthen the existing surveillance systems in the health facilities. The findings from this study will be used to provide information on integrated disease surveillance response practice activities in the East Wallaga zone. Additionally, it will get information for the detection of uncommon disease occurrences, track trends, collaborate with other researchers, and use this information to take relevant action.

Furthermore, the results of this study assist planners and other relevant organizations involved in disease surveillance notification in developing strategies based on the factors identified among health workers, and also researchers and policymakers will get information as a baseline for their decision to scale up disease surveillance response implementation. Additionally, the results of this study can serve as a baseline for future research.

2. LITERATURE REVIEW

2.1 Integrated disease surveillance reporting practice among health professionals

Research carried out in Iraq's Kurdistan Region found that over 82.4% of critical notifications were promptly promoted to the next levels in all health facilities (HFs) (17). A descriptive, cross-sectional study conducted in Baghdad shows that of the 50 primary health care centers (PHCC), 72% achieved epidemic response in health centers (18). Also, according to a study done in Southwest Nigeria, the highest monitoring units reported illness outbreaks (81.48% at the health facility level and 100% at the local government level) (19).

A study conducted in the Northeastern geopolitical zone of Nigeria, Taraba State, shows that three-fifths (60%) of the respondents had ever reported the occurrence of diseases, while two-fifths (40%) had not (2). According to a Johannesburg City study on environmental health practitioners' knowledge, attitudes, and practices regarding notifiable conditions, 92 participants (68%) out of the 135 environmental health practitioners who participated said they collected data from medical facilities once a month. In contrast, 28% (n = 38) stated that they had not gathered any information from medical facilities. The majority of participants (n = 105; 78%) said that they used a standard operating procedure for diseases that needed to be reported (3).

According to a cross-sectional facility-based study on IDSR strategy for epidemic-prone conditions at the PHC in Oyo State, Nigeria, the majority of health care workers (HCWs), 492 (99.4%), agreed that reporting epidemic-prone diseases (EPDs) is essential. Only 345 respondents, or 69.7%, concurred that the IDSR tools for reporting EPDs are easy to use. Despite the fact that 482 HCWs (97.4%) believed that it is their public health responsibility to report EPDs (5).

A study done among Jordanian physicians showed that among the total participants of 223 physicians, more than two-thirds (68.6%) of physicians said that their role in public health monitoring is to diagnose diseases and report them (10). A Nigerian Plateau State study found that 55 (76.4%) of those surveyed in public health facilities said that IDSR was reporting in their facilities. Of those surveyed in public health facilities, 53 (73.6%) reported utilizing IDSR to report a disease at a time (19). According to a cross-sectional study conducted in Ethiopia's West

Hararghe Zone in Eastern Oromia, 50.17% of the 297 participating health professionals practice IDSR effectively (9).

2.2 Factors associated with integrated disease surveillance reporting practice among health professionals

2.2.1 Socio-demographic Characteristics

According to a study done in Enugu State, Nigeria, people over 40 years were almost five times less likely than people under 40 years to know the IDSR system effectively (20). Similarly, it was discovered that factors including the facility's years of activity, job experience, and greatest degree of education were predictors of having a solid understanding of the IDSR system (20). One hundred and forty-five respondents (46.8%) were nurses, whereas 76 (24.5%), 60 (19.4%), and 29 (9.4%) were doctors, ward assistants, and medical record staff, respectively, according to a study conducted in Edo State, South-South Nigeria (14,21).

Similarly, research on private health providers' compliance with illness surveillance and notification in Southwest Nigeria reveals that 49% of private health facilities have professionals to manage health data (22). A study in Riyadh, Saudi Arabia, showed that among 81 nurses, 39 physicians, and one epidemiologist, knowledge of the notification system was the most frequent obstacle to notification (23). Also, a study conducted in South Africa found that health workers who had worked in a pediatric ward were less likely to notify a notifiable disease correctly (24).

According to a study conducted in Oyo State, Nigeria, 233 HCWs (72.1%) with more than ten years of post-academic training had a somewhat greater percentage of good knowledge of EPDs than those with fewer than ten years of post-basic training (5). A study in Ghana's Eastern Region found that among the 347 participants, those who had been in their current position for more than three years were about three times more likely to have an efficient surveillance system in place than those who had been there for less than a year (25). Similarly, according to research done in Edo State, South-South Nigeria, the majority of respondents (63.5%) had practiced for less than ten years, while 25.2% and 11.3% had practiced for ten to twenty years and more than twenty years, respectively (21).

2.2.2 Organizational factor

According to a study conducted in Oyo State, Nigeria, the percentage of HCWs with good knowledge was somewhat higher among those who had received formal training on core IDSR activities, 120 (75.0%), compared to those who had not received any formal training, 221 (66.0%) (5,14). Additionally, research results from North Kivu, the Democratic Republic of the Congo, showed that 65% of health institutions surveyed had a surveillance focal point trained in IDSR (13,26).

A cross-sectional study conducted in Zimbabwe's Chegutu District showed that the reason for the poor performance of the notifiable disease surveillance system (NDSS) identified by the participants was a lack of training in NDSS 42 (91%) (27). Likewise, a study of Jordanian physicians revealed that just 27.4% of them had received surveillance education or training (10).

A research study in Nigeria's Rivers State found that respondents who had never been trained in disease surveillance and notification systems (DSNS) were 23 times less likely to report a disease that needed to be reported (28). A study conducted in Zambia indicated that factors that affected the implementation of the IDSR were insufficient knowledge levels among health workers regarding IDSR, as only 36.3% of them received training in IDSR (29). In Nairobi County, Kenya, a cross-sectional study design revealed that 268 (85%) of the 315 participants were not trained to use disease surveillance data (30).

According to a descriptive, cross-sectional study carried out in Baghdad, 65% of the 50 primary health care centers (PHCC) had surveillance system supervision (18). Similarly, out of 131 respondents, the majority (74.1%) of a cross-sectional survey conducted at rural healthcare facilities in Kenya revealed that they had at least one support supervision visit on surveillance-related matters within the previous six months (31).

Also, 225 participants (46.7%) in research in Southern Ethiopia's Hadiya Zone received supportive supervision for routine health information systems (32). A research study among Jordanian physicians reveals that, out of 223 participants, 49.8% reported a heavy workload as the reason they did not report required diseases (10).

According to a cross-sectional study conducted in South Africa on healthcare practitioners' adherence to the illness surveillance system, individuals with a load were 16% less likely than those without to report disease surveillance (24).

Of the 347 healthcare workers in the Eastern Region of Ghana who participated in the study, those who did not receive feedback from the next higher level were 52% less likely to have an effective IDSR system than those who did (25). Additionally, the South Province, Zimbabwe study reveals that 28 (56%) of the participants reported receiving feedback from the province, and 18 (64%) of them said they used the feedback reports (33).

According to a descriptive, cross-sectional study carried out in Baghdad, only 66% of the 50 Primary Health Care Centers (PHCC) received feedback that met or exceeded expectations (18). According to research done in Zanzibar, Tanzania, just eight out of forty (20%) basic health facilities have received a written bulletin or feedback report from higher levels (6).

2.2.3 Behavioral factors

The results of a study conducted in Oyo State, Nigeria, indicate that 93.2% of the 495 HCWs were aware of the IDSR method for diseases that are prone to epidemics. In contrast to other healthcare workers, laboratory scientists, medical record officers, and pharmacist technicians (79.4%) had the lowest awareness levels. Additionally, a substantial percentage of HCWs, 341 (68.9%), knew the selected EPDs (5). Similarly, a study conducted in Zimbabwe reveals that, out of 46 participants, 36 (79%) were aware that notifiable diseases need to be reported, 72 percent (33 participants) were aware of notification forms, and 61 percent were aware of what a notifiable disease is (27).

According to a survey done in Southwest Nigeria, nearly half (93, 48.9%) had inadequate awareness of the IDSR criteria throughout the nation, while over half (97, 51.1%) had high knowledge (34). Similarly, research conducted in Enugu State, Nigeria, reveals that 71 people (71.0%) knew a lot about the IDSR system (20). A survey carried out in Zimbabwe's South Province reveals that 45 (90%) of the respondents thought the WDSS to be useful (33).

According to a Zambian study of health professionals' negative attitudes, 9.0% of them believed that the IDSR system wasted a lot of their time and was a contributing factor in the gaps in the implementation of IDSR (29). Similarly, a research study carried out in Kenya's Meru County found that there was a 70.7% attitude disparity (30).

2.2.4 Technical factors

According to a Tanzanian study, Zanzibar found that 23 out of 40 (57%) primary health facilities, including 21 out of 29 (72%) public and 2 out of 11 (18%) private, have standard case definitions (SCDs) for the priority diseases. SCDs were not installed in any of the hospitals. Nonetheless, 35 out of 45 (80%) health facility employees who were interviewed were able to accurately detect at least one SCD priority disease (6).

According to research done in North Kivu, the Democratic Republic of the Congo, no case definitions for any reportable diseases were provided in more than one-third (36%) of the facilities assessed (26). A study carried out in Ghana's Eastern Region found that respondents who can use case definitions are twice as likely to help create an IDSR system that works as opposed to healthcare professionals who are unable to do so. Additionally, 97.1% of healthcare professionals have standard case definitions at their hospitals (337/347) (25). Similarly, a cross-sectional survey in rural health facilities in Kenya shows that of 131 respondents regarding the surveillance interventions, almost two-thirds (68.7%) had IDSR case definition posters displayed (31).

A research study conducted in North Kivu, Democratic Republic of the Congo, found that 53% of the health institutions assessed lacked blank case notification forms for any reportable diseases, indicating a deficiency of disease case reporting forms (26). According to another study carried out in Ghana's Eastern Region, the majority of healthcare workers (95.7%, 332/347) reported having immediate reporting forms for priority diseases, while 90.8% (315/347) of the respondents had IDSR weekly reporting forms available at their facilities, and 93.7% (325/347) of the participants had monthly IDSR reporting forms available (25).

The study was conducted in Southwest Nigeria with a total of 190 participants; only 9.5% had ever seen a disease notification form (34). Similarly, research conducted in Enugu State, Nigeria,

found that the most frequent issue was the lack of forms (48.0%) (20). According to a study done in Zimbabwe's South Province, 32 (64%) of the 50 study participants were aware of the deadlines for submitting data to the next level (33).

The study carried out in Zimbabwe found that the lack of IDSR guidelines 38 (83%), as well as the lack of notification forms 8 (18%), were the main causes of the poor reporting of diseases that need to be reported (27). Similarly, a study in Ethiopia and Tigray shows that access to technical guidelines for the health institution and health information technology enrollment in the quick reaction team were predictive factors for facilitating overall service quality (35).

2.3 Conceptual Frame work

This conceptual framework was adapted after reviewing different related literature. The figures below show the factors associated with integrated disease surveillance response practice among health workers at government health facilities. These independent variables have a direct and indirect contribution to integrated disease surveillance response practice (figure below).

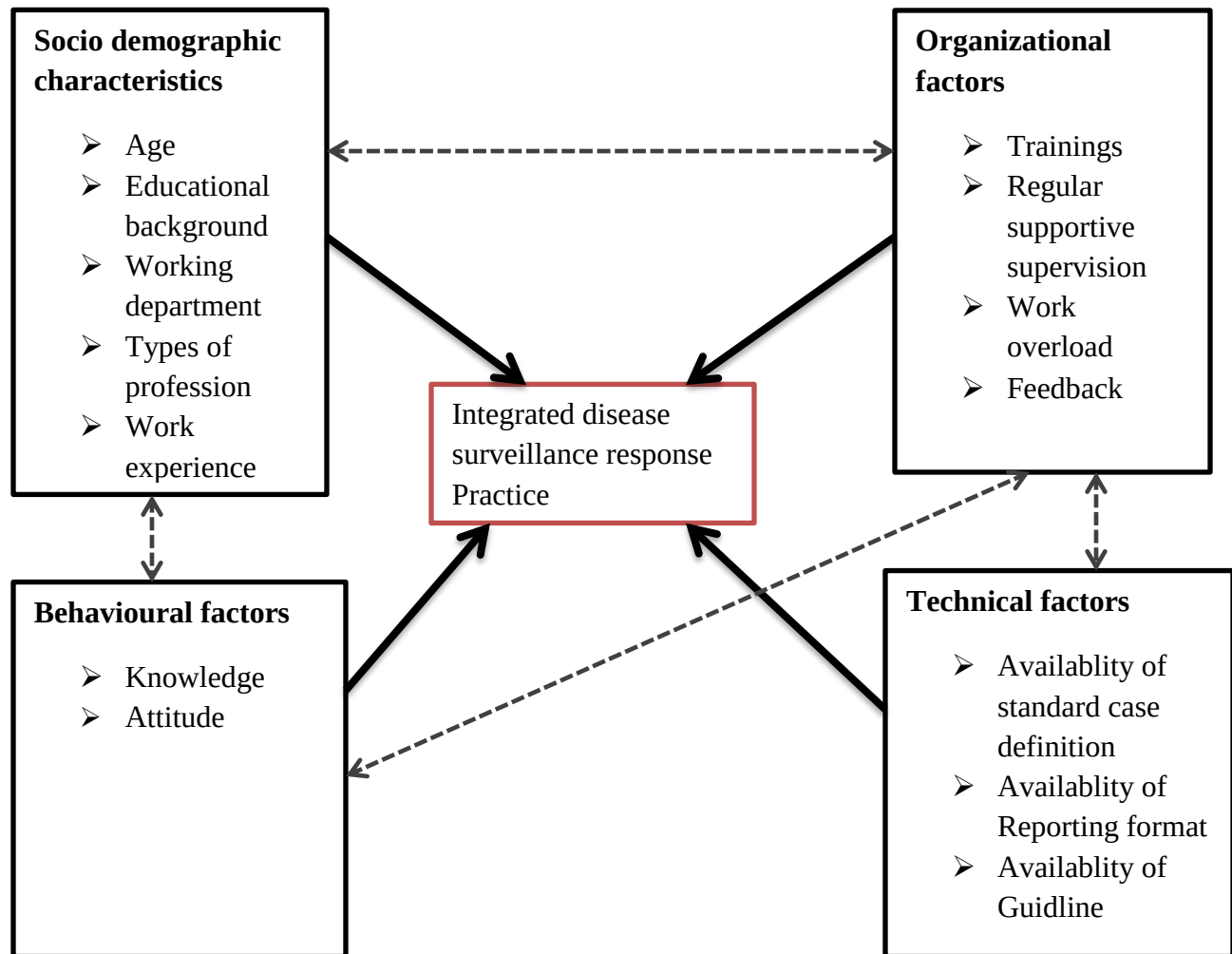


Figure 1: Conceptual framework of integrated disease surveillance response practice and associated factors among health professionals working in public health facilities in East Wallaga zone, Western Oromia, Ethiopia 2025 (4,5,20,25,27,29,33)

3. OBJECTIVES

3.1 General Objective

- ❖ To assess integrated disease surveillance response practice and associated factors among health professionals working in public health facilities of East Wallaga Zone, Western Oromia, Ethiopia, 2025

3.2 Specific Objectives

- To determine the integrated disease surveillance response practice among health professionals working in public health facilities of East Wallaga Zone, Western Oromia, Ethiopia, 2025
- To identify factors associated with integrated disease surveillance response practice among health professionals working in public health facilities of East Wallaga Zone, western Oromia, Ethiopia, 2025

4. METHODS AND MATERIALS

4.1 Study Area and period

This study was conducted in the East Wallaga Zone, Oromia regional state, from February 14 to April 20, 2025. East Wallaga Zone is located in the western part of Ethiopia, which is 331 km away from Addis Ababa. Administratively, the zone is divided into 17 rural woredas and one town administrative unit. The zone has boundaries with the northeast by Horo Guduru Wallaga, the east by West Shoa, the southwest by Illubabor, the west by West Wallaga, and the northwest and north by the Benishangul Gumuz Region. The total population of the East Wallaga Zone in 2024 is estimated to be 1,772,618. Currently, the zone has 66 primary healthcare units, 1 general hospital, and 2 primary hospitals, with a total of 2381 governmental health workers (36).

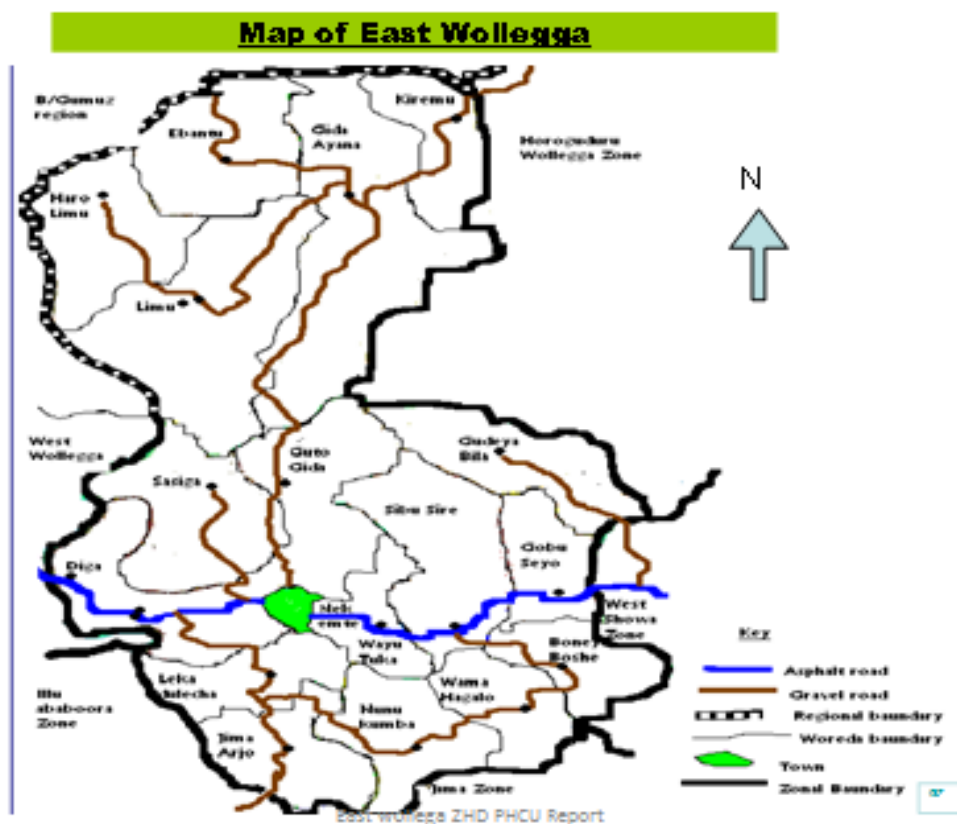


Figure 2: Map of East Wallaga Zone:

4.2 Study Design

A facility-based cross-sectional study was conducted.

4.3 Population

4.3.1 Source Population

All health professionals who were working in public health facilities in the East Wallaga zone were the source population.

4.3.2 Study population

All randomly selected health professionals working in selected public health facilities in the East Wallaga zone during the study period who fulfilled the inclusion criteria were the study population.

4.4 Eligibility criteria

4.4.1 Inclusion criteria

Health professionals at selected public health facilities who had been working for at least six months and who were also willing to participate in the study were included in this study.

4.4.2 Exclusion criteria

Health professionals who were on annual leave and not volunteers during the data collection time were excluded from this study.

4.5 Sample size determination and sampling techniques

4.5.1 Sample size determination

For the first objective, the sample size was determined by using a single population proportion formula with the following assumption:

$$n = \frac{(Z_{\alpha/2})^2 P(1-P)}{d^2}$$

$n = z^2 pq/d^2$ where: n = the required sample size, z = standard normal deviate

At 95% confidence interval = 1.96, p = proportion of respondents, and $q=1-p$ proportion.

d = precision level 5%=0.05. 10% for non-response

Prevalence of IDSR practice: $P= 50.17$ (9).

$$n = z^2 pq/d^2 = \frac{1.96 \times 1.96 \times 0.5017 \times (1-0.5017)}{0.05 \times 0.05} = 384.15$$

When a 10% non-response rate is added, $384 + 38 = 422$. Since the multistage sampling method was used, the probability of all health professionals in the health facilities being included in the sample is not equal. Therefore, to overcome this problem, the sample size was increased by taking the design effect to 1.5. Finally, the total sample size was $422 \times 1.5 = 633$.

Sample size determination for the second objective:

Factors associated with Integrated Disease Surveillance Response practice.

Based on the following assumptions, the sample size was determined using the statistical computation of Epi Info software version 7.1 for some of the parameters related to integrated disease surveillance response practice among health professionals gathered from various types of literature. Assuming an 80% power level, the 95% confidence interval and the unexposed-to-exposed ratio are almost equal to 1.

Table 1: Sample size determination for factors associated with IDSR practice among health workers at public health facilities in East wallaga zone, Western Oromia, Ethiopia, 2025

Factors	IDSR practice		AOR	DE (1.5)	10% Non-response rate	Sample size	Reference
	Yes	No					
Knowledge	66.44	33.56	2.77	213	21	234	Yusuf et al, 16(2023) (9)
Attitude	81.88	18.12	3.30	192	19	211	Yusuf et al, 16(2023)....(9)
Availability of reporting format	90.2	9.8	0.94	270	27	297	(25)

Since the sample size for the first objective was higher than the second objective, 633 was the final sample size.

4.5.2 Sampling Techniques and Procedures

The multistage sampling method was used, wherein in the primary stage of sampling, from 17 woredas, seven woredas and one hospital were selected. Of the total health facilities in the zone, 69 (2 primary hospitals, 1 general hospital, and 66 primary health care units), from those health facilities (1 primary hospital and 27 Primary health care units) were selected by simple random sampling. Then the sample was allocated proportionally to each selected health facility based on the number of health professionals in each health facility. Then, in the secondary stage of sampling, all health professionals found in the selected health facilities were proportionally allocated. A SRS was used to select the study units in each selected health facility. The sampling interval “k” was calculated thus: $k = N/n$, where N is the estimated population size, n is the sample size, and $k = \frac{1,297}{633} = 2.05 \approx 2$. After the first participant was chosen by the lottery method, the next study participant was selected every 2nd by the systematic sampling technique. Finally, the determined sample size for each facility was recruited using a simple random sampling technique to get study participants based on the list that was available in the human resource department of each selected health facility.

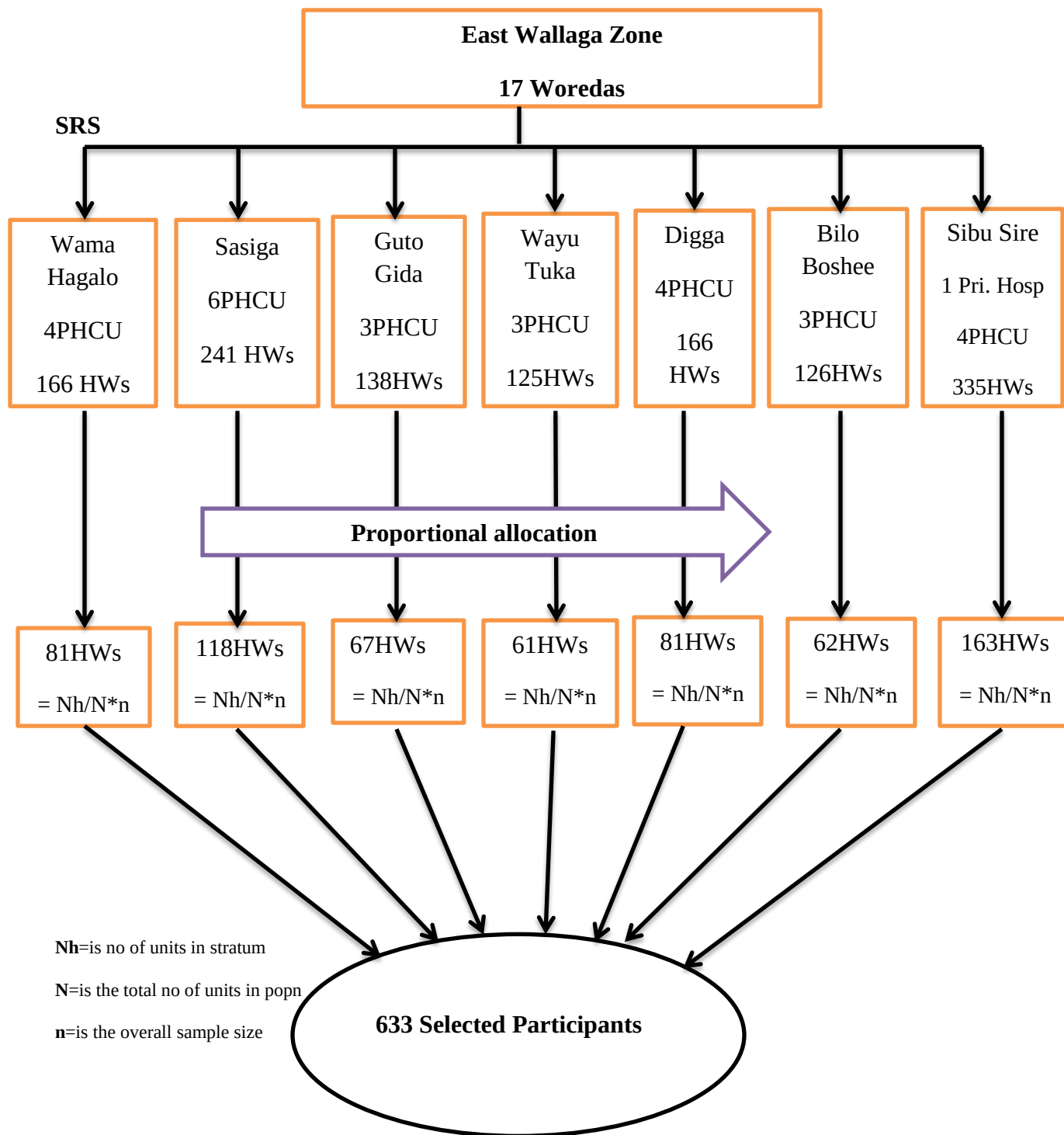


Figure 3: Schematic representation of sampling procedure for IDSR practice and associated factors among health professionals working in public health facilities of East Wallaga Zone, Western Oromia, Ethiopia, 2025 (36).

4.6 Data Collection Method and procedures

4.6.1 Data collection tool

Data were collected using a structured questionnaire that was adapted from relevant literature and similar studies (4,5,20,25,27,29,33). The questionnaire was prepared in English, and it was translated into Afan Oromo to ensure respondent understanding, and after that, back-translated to English to maintain consistency as well. The instrument consists of four parts, which are sociodemographic factors, technical factors, organizational factors, and behavioral factors. Socio-demographic characteristics have five questions, behavioral factors have thirteen questions, and technical and organizational factors have seven questions, with seven other questions assessed on a 5-point Likert scale (strongly agree (5) to strongly disagree (1)), and also IDSR practice has seven questions.

Then the questionnaire was pre-tested at Leka Dulacha Woreda on 5% of the sample size, which was 31 participants, to check the wording flow, understandability, and time it takes to interview. The pretest showed that the reliability coefficient, Cronbach's alpha, was 0.82, indicating that the scale has very good internal consistency. Also, there were no unclear questions during the pretest.

4.6.2 Data collection procedure

Training was given to data collectors and supervisors for two days on the objective of the study, understanding of the questions, and how to handle ethical issues. Data was collected by self-administered techniques using the prepared questionnaire from health workers of randomly selected health facilities. A total of seven data collectors (7 BSc nurses) were assigned for data collection, and two (2) supervisors were of Master of Public Health Professionals. The principal investigator and supervisors followed the overall activities every day to ensure the completeness of the questionnaires, and they were also responsible for the overall data collection process.

4.7 Variable

4.7.1 Dependent Variable

Integrated disease surveillance response practice

4.7.2 Independent Variables

- Socio-demographic of respondents (age, working department, educational background, types of profession, work experience)
- Technical factors (availability of standard case definition, availability of reporting format, availability of guideline)
- Organizational factors (training, regular supportive supervision, work overload, feedback)
- Behavioral factors (knowledge, attitude)

4.8 Operational definition

Practice of IDSR is the act of identification of cases, investigation, registration, notification, and reporting of priority disease data to relevant bodies. The IDSR practice score has a total of seven questions. The HCW IDSR practice was measured; when his or her total score is above or equal to four out of seven questions, it is categorized as good practice, and below that is as poor practice of IDSR (10).

Good knowledge of IDSR: A respondent has good knowledge when his or her total knowledge questions are $\geq$ the mean of the cumulative knowledge scores. The knowledge-related question has a total of eight questions (9).

Poor knowledge of IDSR: A respondent has poor knowledge when his or her total knowledge questions are below the mean of the cumulative knowledge scores.

Attitude: It is a health professional's beliefs, opinions, and agreement regarding IDSR, whether positive or negative. A scoring system was used in which the respondent's correct and incorrect answers (9).

Positive attitude: The respondent has a good perception when his or her total score on attitude questions is greater than or equal to three on attitude towards IDSR.

Negative attitude: A respondent has a poor perception when his or her total attitude questions are below the mean of the cumulative scores on attitude towards.

Standard case definition: It is a case definition that is agreed upon to be used by everyone within the country. It can be classified as confirmed, probable, possible, or suspected. These definitions must be used at all levels, including the community, health professionals working at health posts, health centers, hospitals, and health offices at different levels (1).

Reporting format: In this study, the reporting format is a tool used to facilitate and guide the reporting of prioritized diseases and conditions to be utilized at different levels of the health system.

Weekly reportable diseases: Reporting of the total number of cases and deaths seen within a week (Monday to Sunday) and reported to the next level (i.e., health facilities to woreda reported every Monday, woreda to zone every Tuesday, zone to region every Wednesday, region to Ethiopian Public Health Institutes (EPHI) every Thursday, and EPHI to stakeholders every Friday (1)).

4.9 Data quality assurance

Two days of training were given for supervisors and data collectors on objectives of the study, understanding of the tools, and how to handle ethical issues. The questionnaires were pretested in a similar study population in Leka Dulacha Woreda, taking 5% of the actual sample size before the main study to identify potential problems in the proposed study, such as data collection tools, and to modify some of the vague questions as soon as possible. For the content validity of the tool, advisors and experts were consulted. Regular supervision by the supervisors and principal investigator was made to ensure that all necessary data were properly collected. Furthermore, data was checked and explored during entry into the computer before analysis.

4.10 Data processing and analysis

After data collection, each questionnaire was checked for completeness and coded before the data entry. Data was entered into EpiData version 4.6 and exported to SPSS version 27; cleaning and analysis were done accordingly. Binary logistic regression was carried out to identify factors associated with health professionals' integrated disease surveillance response practice. Descriptive summaries, frequency, and percentages were computed. Those variables having a p-value less than 0.25 were candidates for multivariate logistic regression to identify the effect of each independent variable on the dependent variables upon controlling for confounding factors. Multi-collinearity tests were carried out to see the correlation between independent variables and checked by using the variation inflation factor (VIF), which ranges from the lowest 1.14 to the highest 1.82. Also, the fitness of the model was tested by the Hosmer-Lemeshow goodness of fit, which is 0.4. A crude and adjusted odds ratio together with the corresponding 95% confidence intervals was computed. Backward: LR was used as a method of variable selection during multivariable logistic regression analysis. Variables that have a statistically significant association were identified on the basis of p-values < 0.05 and AOR with 95% confidence intervals. Finally, the findings of this study were presented in texts, tables, and graphs.

4.11 Ethical Consideration

Ethical clearance was obtained from the Institutional Health Research Ethics Review Committee on February 13, 2025, with Ref. No. IHSREC/02/092/2025 of the Institute of Health Science, Wallaga University. A support letter was taken from Wallaga University to the East Wallaga Zone Health Office and from the zone to the respective selected Woredas of health facilities and one primary hospital. The study participants were informed that the data would be kept confidential and used only for research. The participants were also informed that they have the right to refuse and withdraw at any time they want. Informed, voluntary written, and signed consent was obtained from each participant after the nature of the study was explained well and understood.

4.12 Plan for dissemination of results

The result of the study will be disseminated to responsible bodies such as Wallaga University's Institute of Health Science School of Public Health, the East Wallaga zonal health office, and woredas. The study findings will also be published in a reputable journal.

5. RESULT

5.1 Socio-demographic characteristics of the respondents

A total of 619 respondents have participated in the study from February 14 to April 20, 2025, with a response rate of 97.8%. Around three-fourths (65.1%) of the respondents' ages were within the range of 30-39. Of the study participants, 72.4% were BSc holders, and more than half, 52.3%, were nurses in the profession, and 28.6% of the respondents were working in the maternal and child health department. Around 48.1% of the respondents have more than 10 years of working experience. (Table 2)

Table 2: Socio-demographic characteristics of the respondents working at public health facilities of East wollega zone, Western Oromia, Ethiopia 2025

Variables	Category	Frequency	Percent (%)
Age of respondents	20-29	178	28.7
	30-39	403	65.1
	40-49	22	3.6
	>=50	16	2.6
Educational status	Dipiloma	153	24.7
	BSc Degree	448	72.4
	Above BSc degree	18	2.9
Professional	Health Extension Worker	86	13.9
	Midwife	44	7.1
	Nurse	324	52.3
	Health officer	76	12.3
	Lab.Technician/Technologist	50	8.1
	Pharmacist or druggist	34	5.5
	Physician	5	.8
Work currently engaged	Adult OPD	93	15.0
	Under 5 OPD	98	15.8
	MCH	177	28.6
	Medical Ward	15	2.4
	Pediatric Ward	17	2.7
	Lab. Ward/room	50	8.1
	PHEM Officer	34	5.5
	Other*	135	21.9
Work experience	less than 1 year	34	5.5
	1-5 year	83	13.4
	6-10 years	204	33.0
	above 10 year	298	48.1

*: Other than listed such as ART room, TB room, Dispensing room

5.2 Behavioural factors

5.2.1 Knowledge:

Regarding the meaning of public health emergency management (PHEM), out of 619 study participants, 73.8% know the exact meaning of public health emergency management. Also, of the study participants who know diseases that are reported under surveillance, 89.8% are notified. From the total of study participants, those who know the number of diseases that are notified under surveillance are 224 (36.2%). In sum, 66.2% of the health professionals had good knowledge of IDSR. (Table 3)

Table 3: Knowledge level of IDSR among health professionals working in public health facilities in east wallaga, western oromia, Ethiopia 2025 (n=619)

Variable	Response	Frequency	Percent %
Know meaning of Public health emergency management	Yes	457	73.8
	No	162	26.2
Know disease that are notified under surveillance	Yes	556	89.8
	No	63	10.2
Know the number of disease that are notified	Yes	224	36.2
	No	395	63.8
ND are both communicable and non-communicable disease	Yes	342	55.3
	No	277	44.7
Know reporting forms	Yes	540	87.2
	No	79	12.8
Know notification procedures	Yes	495	80.0
	No	124	20.0
Notifying ND is useful to detect epidemics	Yes	588	95.0
	No	31	5.0
Notification is the public health responsibilities of health worker	Yes	598	96.6
	No	21	3.4
Knowledge level	Good	410	66.2
	Poor	209	33.8

5.2.2 Attitude

Regarding the importance of surveillance, 97.3% of study participants believe in the importance of surveillance. Out of the study participants, 95.6% believe that surveillance was used to detect epidemics. More than half, 65.8%, of study participants believe that they are convenient with a surveillance system. In sum, 82.1% of the health professionals had a positive attitude towards integrated disease surveillance response.

Table 4: Attitude level of IDSR among health professionals working in public health facilities in east wallaga, western oromia, Ethiopia 2025:

Variable	Response	Frequency	Percent %
Reporting notifiable disease is important	Yes	602	97.3
	No	17	2.7
Surveillance is useful to detect epidemic	Yes	592	95.6
	No	27	4.4
How do you feel notifiable disease in general	Convenient	407	65.7
	Non convenient	191	30.9
	Not familiar	21	3.4
Reporting notifiable disease is time consuming and should not be done by HW	Yes	109	17.6
	No	510	82.4
Reporting procedure are difficult tasks for HWs	Yes	301	48.6
	No	318	51.4
Attitude level	Positive	508	82.1
	Negative	111	17.9

5.3 Technical and Organizational Factors

More than two-thirds (68.3%) and around three-fourths (75.6%) of the health professionals have not received training on IDSR/PHEM and feedback from higher levels, respectively. Of the total participants, 398 (64.3%) have received regular supportive supervision. Also, the study shows that 360 (58.2%), 491 (80.1%), and 572 (92.4%) had PHEM guidelines, weekly and case-based notification formats, and standard case definitions for notifiable diseases in their health facilities, respectively. Out of 619 participants in the study, 361 (58.3%) respondents agreed that in their working health facility, trained staff were able to fill out forms. Also, more than half of the study participants, 322 (52.0%), agreed that in their health facility, there are well-designed data collection and reporting forms. The majority of the study participants, 351 (56.7%), agreed that there are reporting forms, tally sheets, and registers as common tools for data collection and reporting. More than half of the respondents, 63.8% of health professionals, agreed that there is report completeness in their facilities.

Table 5: Organizational and technical characteristics among health professionals working in public health facilities in east wallaga, western oromia, Ethiopia 2025:

Variable	Response	Frequency	Percent %
Training on IDSR/PHEM	Yes	196	31.7
	No	423	68.3
Supportive supervision from higher level	Yes	398	64.3
	No	221	35.7
Feedback quarterly from higher level	Yes	151	24.4
	No	468	75.6
Availability of PHEM guideline	Yes	360	58.2
	No	259	41.8
Availability of reporting formats	Yes	496	80.1
	No	123	19.9
Availability of standard case definition	Yes	572	92.4
	No	47	7.6
Work load	Yes	172	27.8
	No	447	72.2

Reporting immediately reportable disease	Yes	494	79.8
	No	125	20.2
Reporting weekly reportable disease	Yes	565	91.3
	No	54	8.7
Report to	Medical director	21	3.4
	Surveillance officer	77	12.4
	Woreda health office	483	78.1
	Zonal health office	38	6.1
Method of reporting	Internet	12	1.9
	Reporting sheet	485	78.4
	Telephone	68	11.0
If you are busy to report would you report notifiable disease	Yes	304	49.1
	No	315	50.9
Reporting date	Monday	499	80.6
	Tuesday	49	7.9
	Wednesday	17	2.7
Given feedback to the reporting health facility	Yes	289	46.7
	No	330	53.3

5.4 Integrated disease surveillance response practice among health professionals

Out of 619 health professionals who participated in the study, 61.9% (95% CI: 57.9-65.7) have good practice of IDSR, and 38.1% of the respondents have poor practice.

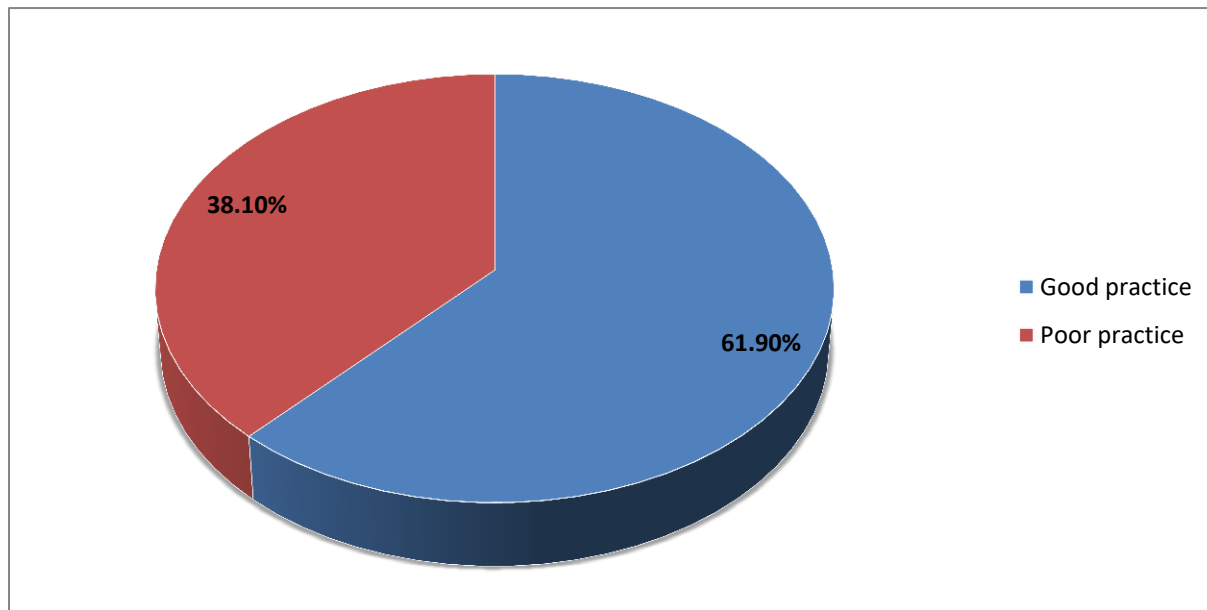


Figure 4: Integrated disease surveillance response practice among health professional working in public health facilities of east wallaga zone, western oromia, Ethiopia, 2025

5.5 Factors associated with IDSR practice among health professionals

The association of selected sociodemographic, behavioral, technical, and organizational factors with IDSR practice among health professionals was investigated using both bivariate and multivariable logistic regression techniques. Accordingly, Variables candidate in the bivariate analysis were age of the participant, educational status, profession, current work engaged in (working department), work experience, knowing meaning of PHEM, knowledge of IDSR, method of reporting, training, supportive supervision, regular feedback, availability of PHEM guidelines, availability of report format, and workload. (Table 6)

Table 6: Bivariate analysis associated with IDSR practice among health professional working in public health facilities of east wallaga zone, western Oromia, Ethiopia 2025

Variable	Category	IDSR practice status		COR (95%CI)	P-Value
		Good	Poor		
Age category	20-29	119(66.9%)	59(33.1%)	1	
	30-39	257(59.9%)	172(40.1%)	1.347 (0.946, 1.983)	.096*
	40-49	6(66.7%)	3(33.3%)	1.008 (0.281, 2.033)	0.580
	>=50	1(33.3%)	2(66.7%)	4.034 (0.721, 5.641)	0.181*
Educational status	Dipiloma	101(66.0%)	52(34.0%)	0.198 (0.067, 0.586)	0.003*
	BSc Degree	277(61.8%)	171(38.2%)	0.237 (0.083, 0.678)	0.007*
	Above BSc degree	5(27.8%)	13(72.8%)	1	
Profession	HEWs	53(61.6%)	33(38.4%)	1	
	Midwife	30(68.2%)	14(31.8%)	0.749 (0.347, 1.617)	0.462
	Nurse	208(64.2%)	116(35.8)	0.896 (0.549, 1.463)	0.660
	Health officer	27(34.2%)	52(65.8%)	3.093 (1.637, 5.845)	0.001*
	Lab.Technician/ Technologist	36(72%)	14(28%)	0.625 (0.294, 1.329)	0.222*
	Pharmacist or druggist	28(82.4%)	6(17.6%)	0.344 (0.129, 0.920)	0.033*
	Physician	3(60%)	2(40%)	1.606 (0.097, 2.561)	0.741
Work currently engaged	Adult OPD	33(35.5%)	60(64.5%)	1	
	Under 5 OPD	55(56.1%)	43(43.9%)	0.430 (0.240, 0.770)	0.005*
	MCH	141(79.7%)	36(20.3%)	0.140 (0.080, 0.246)	0.001*
	Medical Ward	7(46.7%)	8(53.3%)	0.629 (0.209, 1.888)	0.408
	Pediatric Ward	13(76.5%)	4(23.5%)	0.169 (0.051, 0.561)	0.004*
	Lab. Ward/room	38(76%)	12(24%)	0.174 (0.080, 0.377)	0.001*
	PHEM Officer	12(35.3%)	22(64.7%)	1.008 (0.443, 2.293)	0.984
	Other	84(62.2%)	51(37.8%)	0.334 (0.193, 0.578)	<0.001*
Work experience	less than 1 year	24(70.6%)	10(29.4%)	0.503 (0.232, 1.089)	0.081*
	1-5 year	63(75.9%)	20(24.1%)	0.383 (0.221, 0.666)	0.000*
	6-10 years	133(65.2%)	71(34.8%)	0.645 (0.446, 0.931)	0.019*
	above 10 year	163(54.7%)	135(45.3%)	1	

Knowledge of IDSR	Good	223(54.4%)	187(45.6%)	2.738 (1.883, 3.982)	0.000*
	Poor	160(76.6%)	49(23.4%)	1	
Attitude on IDSR	posetive attitude	314(61.8%)	194(38.2%)	1.015 (0.665, 1.550)	0.945
	negative attitude	69(62.2%)	42(37.8%)	1	
Training	Yes	75(38.3%)	121(61.7%)	4.321 (3.018, 6.187)	0.000*
	No	308(72.8%)	115(27.2%)	1	
Suportive supervision	Yes	227(57.0%)	171(43%)	1.808 (1.273, 2.568)	0.001*
	No	156(70.6%)	65(29.4%)	1	
Regular feedback	Yes	67(44.4%)	84(55.6%)	2.606 (1.792, 3.792)	0.000*
	No	316(67.5%)	152(32.5%)	1	
Availability of PHEM guidline	Yes	189(52.5%)	171(47.5%)	2.700 (1.905, 3.828)	0.000*
	No	194(74.9%)	65(25.1%)	1	
Availablity of report format	Yes	288(58.1%)	208(41.9%)	2.450 (1.551, 3.872)	0.000*
	No	95(77.2%)	28(22.8%)	1	
Availablity of standard case definition	Yes	356(62.2%)	216(37.8%)	0.819 (0.448, 1.496)	0.516
	No	27(57.4%)	20(42.6%)	1	
Work load	Yes	78(45.3%)	94(54.7%)	1	
	No	305(68.2%)	142(31.8%)	2.588 (1.806, 3.711)	0.000*

1- Reference category

*-Significant at P-Value of < 0.25

Variables with p-values up to 0.25 were included in the multivariable logistic regressions. Among the variables included in multivariable logistic regression, work currently engaged (work department), work experience, and training were found to have statistically significant associations with IDSR practice at a P-value < 0.05. Accordingly, those health professionals who had worked in MCH were 80% (AOR=0.20, 95% CI: 0.09, 0.46) less likely to practice IDSR compared with those who worked in the outpatient department. Similarly, health professionals who had worked in a pediatric ward were 81.6% (AOR=0.184, 95% CI: 0.04, 0.88) less likely to practice IDSR compared with those who worked in an Outpatient department. Health professionals who had work experience of less than one year were 65% (AOR=0.35, 95% CI: 0.14, 0.91) less likely to practice IDSR compared with those who had work experience of above ten years. Respondents who had training were 2.68 (AOR=2.68, 95% CI: 1.64, 4.38) times more likely to better practice IDSR compared with those who had not. (Table 7)

Table 7: Bivariate and multivariable analysis associated with IDSR practice among health professional working in public health facilities of east wallaga zone, western Oromia, Ethiopia 2025

Variable	Category	IDSR practice status		COR (CI 95%)	AOR (CI 95%)	P-Value
		good	Poor			
Age category	20-29	119(66.9%)	59(33.1%)	1	1	
	30-39	257(59.9%)	172(40.1%)	1.347 (0.946, 1.983)	0.78 (0.45, 1.34)	0.369
	40-49	6(66.7%)	3(33.3%)	1.008 (0.281, 2.033)	0.34 (0.10, 1.08)	0.069
	>=50	1(33.3%)	2(66.7%)	4.034 (0.721, 5.641)	0.96 (0.29, 3.16)	0.956
Educational status	Dipiloma	101(66.0%)	52(34.0%)	0.198 (0.067, 0.586)	0.788 (0.155, 4.014)	0.774
	BSc Degree	277(61.8%)	171(38.2%)	0.237 (0.083, 0.678)	0.911 (0.208, 3.993)	0.902
	Above BSc degree	5(27.8%)	13(72.8%)	1	1	
Profession	HEWs	53(61.6%)	33(38.4%)	1	1	
	Midwife	30(68.2%)	14(31.8%)	0.749 (0.347, 1.617)	1.928 (0.058, 6.430)	0.714
	Nurse	208(64.2%)	116(35.8)	0.896 (0.549, 1.463)	4.219 (0.151, 7.691)	0.397
	Health officer	27(34.2%)	52(65.8%)	3.093 (1.637, 5.845)	2.709 (0.104, 7.611)	0.549
	Lab.Technician/Technologist	36(72%)	14(28%)	0.625 (0.294, 1.329)	4.760 (0.178, 6.990)	0.352
	Pharm/drugist	28(82.4%)	6(17.6%)	0.344 (0.129, 0.920)	2.754 (0.135, 5.841)	0.339
	Physician	3(60%)	2(40%)	1.606 (0.097, 2.561)	0.531 (0.016, 1.164)	0.721

Work currently engaged	Adult OPD	33(35.5%)	60(64.5%)	1	1	
	< 5 OPD	55(56.1%)	43(43.9%)	0.430 (0.240, 0.770)	0.830 (0.409, 1.682)	0.604
	MCH	141(79.7%)	36(20.3%)	0.140(0.080, 0.246)	0.204(0.090,0.461)**	0.000
	Medical Ward	7(46.7%)	8(53.3%)	0.629(0.209, 1.888)	1.095(0.278, 4.315)	0.896
	Pediatric Ward	13(76.5%)	4(23.5%)	0.169(0.051, 0.561)	0.184(0.038,0.882)**	0.034
	Lab. Ward/room	38(76%)	12(24%)	0.174(0.080, 0.377)	0.151(0.008, 2.822)	0.206
	PHEM Officer	12(35.3%)	22(64.7%)	1.008(0.443, 2.293)	1.760(0.642, 4.826)	0.272
	Other	84(62.2%)	51(37.8%)	0.334(0.193, 0.578)	0.880(0.366, 2.115)	0.774
Work experience	< 1 year	24(70.6%)	10(29.4%)	0.503(0.232, 1.089)	0.352(0.137,0.906)**	0.030
	1-5 year	63(75.9%)	20(24.1%)	0.383(0.221, 0.666)	0.457(0.198, 1.056)	0.067
	6-10 years	133(65.2%)	71(34.8%)	0.645(0.446, 0.931)	0.592(0.356, 0.985)	0.044
	above 10 year	163(54.7%)	135(45.3%)	1	1	0.037
Knowledge of IDSR	Good	223(54.4%)	187(45.6%)	2.738(1.883, 3.982)	0.679(0.370, 1.249)	0.213
	Poor	160(76.6%)	49(23.4%)	1	1	0.088
Attitude on IDSR	positive attitude	314(61.8%)	194(38.2%)	1.015 (0.665, 1.550)	0.634 (0.371, 1.085)	0.096
	negative attitude	69(62.2%)	42(37.8%)	1	1	
Training	Yes	75(38.3%)	121(61.7%)	4.321(3.018, 6.187)	2.683(1.643,4.381)**	0.000
	No	308(72.8%)	115(27.2%)	1	1	
Supportive supervision	Yes	227(57.0%)	171(43%)	1.808(1.273, 2.568)	0.708(0.410, 1.221)	0.214
	No	156(70.6%)	65(29.4%)	1	1	
Regular feedback	Yes	67(44.4%)	84(55.6%)	2.606(1.792, 3.792)	1.411(0.833, 2.388)	0.200
	No	316(67.5%)	152(32.5%)	1	1	
Availability of PHEM guideline	Yes	189(52.5%)	171(47.5%)	2.700(1.905, 3.828)	1.485(0.915, 2.412)	0.110
	No	194(74.9%)	65(25.1%)	1	1	
Availability of report format	Yes	288(58.1%)	208(41.9%)	2.450 (1.551, 3.872)	1.479 (0.786, 2.781)	0.225
	No	95(77.2%)	28(22.8%)	1	1	
Availability of standard case definition	Yes	356(62.2%)	216(37.8%)	0.819 (0.448, 1.496)	0.274 (0.121, 0.623)	0.890
	No	27(57.4%)	20(42.6%)	1	1	
Work load	Yes	78(45.3%)	94(54.7%)	1	1	
	No	305(68.2%)	142(31.8%)	2.588(1.806, 3.711)	1.528(0.940, 2.483)	0.087

1-Reference category

** Significant at a P-value of < 0.05

6. DISCUSSION

This study showed that the IDSR practice among health professionals were 61.9% (95% CI: 57.9-65.7) of health professionals identified to better practice IDSR. And also, the current study revealed that work currently engaged (work department), work experience, and training have a significant association with the practice of IDSR among health professionals.

The proportion of the study participants who practice IDSR (*i.e.*, 61.9%) is almost in line with the study finding from Nigeria, Taraba State, 60.0% (2). Similarly, a study done in South-South Nigeria found 63.5% (21). However, it is lower than the studies conducted in different parts of the world; compared to the study done in Iraq's found that over 82.4% (17). And also, a study conducted in Nigeria's Oyo state found that 67.3% (5) had good IDSR practice; the study conducted in Nigeria's Plateau State, 73.6% (19), a study conducted in Johannesburg City (South Africa) found that 84% (3) had good IDSR practice. The reason for the underperformance of IDSR practice can be due to a lack of training in IDSR, due to a negative attitude of health professionals, and can be due to a lack of IDSR guidelines (27). In contrast, the result of this study is better than the study conducted in Jordanian only 27.4% of health professionals had good IDSR practice (10), and the other study done in Enugu state, Nigeria, found that only 39% of healthcare providers had good IDSR practice (37), Also, in the study conducted in the eastern region of Ghana, 54.47% did (25), and in the study done in the Oromia region of Ethiopia, 50.17% did (9). The reason for this discrepancy may be a knowledge difference (2), can be reporting system of the countries may be due to differences in sample size or health workers' attitudes toward disease notification.

This study identified that training has a significant association with integrated disease surveillance response practice. Respondents who had training were 2.68 times more likely to practice better IDSR compared with those who had not. This finding was in line with the study conducted in the state of Bihar, situated in the eastern region of India: health care workers who had received formal training on the integrated disease surveillance program were 3 times more likely to report notifiable diseases compared to those who had not received formal training (14). However, the study conducted in Nigeria, Taraba State, shows that training on the disease notification has no statistically significant association with IDSR practice (2). In another similar study conducted in Zimbabwe's Chegutu District, the majority of the respondents had a lack of

training (91%), which was the existing limitation that prevented the practice of notifiable disease surveillance reporting (27). This implies that providing adequate training increases the awareness and knowledge of the health professionals and enables them to notify the disease to the appropriate authorities. And training effectively closes the IDSR practicing gap and therefore improves the attitude, skill, and practice of health professionals in disease notification.

This study also identified that work experience has a significant association with IDSR practice. Health professionals who had work experience of less than one year were 65% less likely to practice IDSR compared with those who had work experience of above ten years. This study was supported by a study conducted in Nigeria, Oyo state, HCWs with more than 10 years since basic qualification are about two times more likely to have practice compared to those with less than 10 years post-basic educational qualification (5). And another study conducted in the eastern region of Ghana found that respondents who had served for more than ten years at their current position were about three times more likely to have an effective surveillance system in place compared to respondents who had served less than a year at their current position (25). This implies that health professionals who had more work experience practiced notifiable diseases more than those who had less work experience.

Health professionals among those currently engaged (working department) who had worked in MCH were 80% less likely to practice IDSR compared with those who worked in the outpatient department. This result is supported by the study conducted in South Africa; health workers who had worked in a pediatric ward were less likely to notify a notifiable disease correctly (24). In the maternal and child health department, poor practice of IDSR may be due to workload and a lack of training.

The strength of this study different health facilities and health professionals were included in the study, with a high response rate and a large sample size, and also the data is primary. Whereas, the limitation of this study was that since the data collection technique used for the current study is a self-administered questionnaire, the reliability of the response might be biased. However, despite the explained limitation, the health facilities and health professionals in the area were equally involved in the study by proportional allocation system to reduce selection bias. Therefore, the study findings can be generalizable for all health facilities in the study area. Additionally, the study design is cross-sectional and it doesn't establish a cause-and-effect relationship.

7. CONCLUSION AND RECOMMENDATION

7.1 Conclusion

Generally, more than half of the respondents working in the East Wallaga Zone have reported practicing on IDSR. The results implied that there might be a lack of uniformity and consistency in the practices of IDSR among health professionals working in public health facilities. Among many factors predicted by the IDSR practice, training, work currently engaged in (working department), and work experience were statistically significant associations with IDSR practice.

7.2 Recommendation

Based on the findings from the study, the following recommendations are forwarded for zonal and woreda health offices, health facilities, and health professionals.

East Wallaga zonal and Woreda health office:

- ☞ Provide training for health professionals working in health facilities and ensure that mentorship, regular and scheduled supervisory support. Also, to sustain and improve better practice of IDSR.
- ☞ Providing training for health professionals working in different departments.

Health Facilities

- ☞ Health facilities are recommended to request capacity-building training from the zonal and woreda health office and other stakeholders.
- ☞ Health facilities should give organizational support, like supportive supervision and feedback, to all individuals working in the health institution on integrated disease surveillance and response practice.

Finally, recommendations for the East Wallaga zonal health office, the Woreda health office, and the respective health facilities involved in this study to conduct regular supervision, follow-up, and review meetings to strengthen the IDSR practice.

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ANNEXES

ANNEX 1: Appendices (information sheet, consent form, data collection tools)

Participant Information Sheet

My name is _____ I am working as a data collector for the study being conducted in this health facility by Teklu Bedassa Ofgea, who is studying for his master's degree at Wallaga University, Institute of Health Science, School of Public Health in Epidemiology. I kindly request you lend me your attention to explain to you about the study and being selected as the study participant.

The study title: Integrated disease surveillance response practice and associated factors among health professionals working in public health facilities of East Wallaga Zone, Western Oromia, Ethiopia

Purpose of the study: The results of the study will serve to improve disease surveillance notification, which will enhance the identification of uncommon illness or epidemic occurrences, trend monitoring, and the overall use of information for Zone action. Additionally, the goal of this study is to produce a thesis, which is a requirement for the primary investigator to complete a portion of the requirements for a Master's program in epidemiology.

Procedure and duration: I will provide health workers with a questionnaire that includes relevant information that will be useful for the study; they will have to complete some questions on their own, and the questionnaire should take them 20 to 30 minutes to complete.

Risks and benefits: This study simply requires a few minutes of the participant's working hours, thus there is very little risk involved. The study would not pay participants directly. However, the research's conclusions might provide important information for the East Wallaga zonal health planner.

Confidentiality: Will be maintain the confidentiality of the information they provide. No specific participant identification information will be available. Nothing specific about any individual will be reflected in the study's findings. Names will not be displayed on the coded

questionnaire. Participants will not be associated with the research in either written or verbal reports.

Rights: Being a participant in this research is entirely voluntary. You have the freedom to choose whether or not to take part in this research. Participation in the study is entirely voluntary, and withdrawal will not result in any loss of benefits to which you would otherwise be entitled. You are free to choose not to respond to any of the questions.

Contact address: If there are any questions or inquiries at any time about the study or procedures, please contact, Principal investigator: **Mr. Teklu Bedassa Ofgea**

Mobile: 0917-83-73-69 or/& Email:- teklu1bedassa@gmail.com

Participant Informed consent:

I've read the participant information document, and she/he has read it. I am fully aware of the research's objectives, methods, risks, and advantages, as well as confidentiality concerns, participation rights, and contact information in case I have any questions. Any queries I may have about anything that wasn't obvious will be welcome. I shall be made aware of my right to discontinue participation in the study at any moment or to refuse to answer any questions. So that we may proceed with our questionnaires, could you kindly confirm with your signature? I thus hereby confirm that I voluntarily consent to taking part in this research.

Name and Signature of the participant _____ Date:_____

Name and signature of data collector _____ Date:_____

ANNEX II: English Version of Data collection Tool

Questioner for assessing Integrated disease surveillance reporting practice and associated factors among health professionals working in public health facilities of East Wallaga Zone, Western Oromia, Ethiopia, 2024

Date:_____ Code:_____ Health Facility:_____

Part I: Socio demographic Characteristics			
S/no	Question	Response	Skip
101	Age	1. 20 – 29 years	
		2. 30 – 39 years	
		3. 40 – 49 years	
		4. ≥50 years	
102	What is your educational status?	1. Certificate	
		2. Dipiloma	
		3. BSc Degree	
		4. Above BSc degree	
		5. Other specify:_____	
103	What is your profession?	1. Health Extension Worker	
		2. Midwife	
		3. Nurse	
		4. Health officer	
		5. Lab.Technician/Technologist	
		6. Pharmacist or druggist	
		7. Physician	
		8. Other specify:_____	
104	What type of work you are currently engaged in?	1. Adult OPD	
		2. Under 5 OPD	
		3. .MCH	
		4. Medical Ward	

		5. Pediatric Ward	
		6. Lab. Ward/room	
		7. PHEM Officer	
		8. Others mention:_____	
105	What is your work experience as a health worker?	1. less than 1 year	
		2. 1-5 year	
		3. 6-10 years	
		4. above 10 year	
Part II: Behavioral factors			
2.1 Knowledge;			
201	Do you know the meaning of Public Health Emergence Management (PHEM)?	1. Yes	
		2. No	
202	Do you know diseases that are notified under surveillance?	1. Yes	
		2. No	
203	Do you know the number of diseases that are notified under surveillance?	1. Yes	
		2. No	
204	Notifiable diseases are including both communicable and non-communicable diseases?	1. Yes	
		2. No	
205	Do you know notifiable disease reporting forms?	1. Yes	
		2. No	
206	Do you know the notification procedures with in your institution and next higher level?	1. Yes	
		2. No	
207	Does notifiable disease surveillance notification is useful to detect epidemics?	1. Yes	
		2. No	
208	Notification of notifiable disease is the public health responsibilities of health worker.?	1. Yes	
		2. No	
2.2 Attitude			
209	Reporting notifiable disease or unusual occurrence of diseases is important	1. Yes	
		2. No	

		3. Don't know	
210	Is surveillance is useful to detect epidemic ?	1. Yes	
		2. No	
		3. Don't know	
211	How do you feel notifiable disease surveillance (NDS) and reporting system in general	1. Comvenient	
		2. Non convenient	
		3. Not familiar	
212	Reporting notifiable diseases is time consuming and should not be done by health care workers	1. Yes	
		2. No	
		3. Don't know	
		1. No	
		2. Don't know	
213	Reporting procedure are difficult tasks for health workers	1. Yes	
		2. No	
		3. Don't know	
Part III: Integrated disease surveillance response practice			
301	Do you report immediately reportable disease by using case based form.	1.Yes 2.No	
302	Do you report weekly reportable disease?	1.Yes 2.No	If no go to 307
303	Where do you report	1.Medical director	
		2.Surveillance officer	
		3.Woreda health office	
		4.Zonal health office	
		5.The next higher level	
304	What was methods of reporting	1. Fax	
		2. Internet	

		3. Reporting sheet	
		4. Telephone	
		5. Other mention:_	
305	If you are very busy to report (if you are engaged in another work like training) would you report notifiable diseases	1. Yes	
		2. No	
		3. Don't know	
306	When do you report the weekly reportable disease to the next reporting level	1.Monday	
		2.Teusday	
		3.Wednesday	
		4.Thrusday	
		5.Friday	
		6.Other:_____	
307	Have you ever given feedback information to the reporting health facilities	1.Yes 2.No	

Part V: Technical and Organizational factors with Practice of IDSR and reporting

401	Did you ever receive training on IDSR/ PHEM ?	1. Yes	
		2. No	
402	Have you received supportive supervision from higher level?	1. Yes	
		2. No	
403	Have you received feedback quarterly from higher level?	1. Yes	
		2. No	
404	Do you have PHEM Guide line at your facility/department/unity?	1. Yes	
		2. No	
405	Do you have weekly and case based notification/reporting formats at your facility/department/unity?	1. Yes	
		2. No	
406	Do you have standard case definition for notifiable disease at your facility/ department/unity?	1. Yes	
		2. No	
407	Are you assigned at more than one job possession at this health facility?	1. Yes	
		2. No	

Technical and Organizational factors with Practice of IDSR and reporting

Indicate level of agreement on the following statements regarding how technical and organizational factor affecting health professionals IDSR practice

Mark your answer by writing this symbol (√)

(1= Strongly disagree, 2= disagree, 3= neutral, 4= Agree, 5= Strongly agree)

	Question	Strongly disagree	Disagree	neutral	Agree	Strongly agree
408	In your working health facility trained staffs able to fill out forms?					
409	In your working health facility, there is well designed data collection and reporting forms?					
410	In your working health facility there is reporting forms, tally sheets, and registers as a common tool for data collection and reporting?					
411	Is there skilled human resource in your working health facility to collect health data?					
412	In your health facility is expected surveillance reports are submitted timely to next level health office?					
413	In your health facility, immediate and weekly reports are submitted by a specified deadline to the next-level health office?					
414	In your health facility surveillance data elements in the expected in weekly and immediately reports are completely filled					

ANNEX III: Afan Oromo Version for Participant Information Sheet and Informed, voluntary Consent Form

Waraqaa ragaa fi walii galtee ogeeyyii fayyaa dhaabbilee fayyaa mootummaa keessatti

hojjatan wajjiin godhamu:

Maqaan koo _____ jedhama. Qorannoo dhaabbata fayyaa kana keessatti gaggeeffamaa jiruuf Takiluu Badhaasaa Ofga'aa Yunivarsiitii Wallaggaa, institute of health science, school of public health, in epidemiology keessatti digrii lammaffaa barachaa jiruuf ragaa walitti qabaa ta'ee hojjechaan jira. Dursee kanan isin gaafadhu waa'ee qorannichaa waanan isiniif ibsuuf yaadaan akka na dhaggeeffattanii fi irratti hirmaattan isiniin jedha.

Mata duree qorannichaa: Hojii gabaasa hordoffii dhukkubaa walitti hidhame shaakaluu fi wantoota kanaan walqabatan Ogeessota Fayyaa Dhaabbilee Fayyaa Hawaasaa Zoonii Wallaggaa Bahaa, Lixa Oromiyaa, Itiyoophiyaa

Kaayyoo qorannichaa: Bu'aan qorannoo kanaa kan fayyadus Waajjira Eegumsa fayyaa godina Wallagga Bahaa yoo ta'u, ogeeyyin fayyaa haala gabaasa ragaa faana dhayiinsaa dhaabbilee fayyaa mootummaa keessatti hojjatanii fi sababoota kanaan wal-qabatan beekanii akka irratti hojjetaniif kan gargaaru ta'a. Kan biroo kaayyoon qorannoo kanaa eebba barnoota digrii lammaffaa geggeeffamaa jiruufi.

Adeemsaa Fi yeroo qorannichaa: Gaaffii hojjetoota fayyaa kan ragaa barbaachisaa ta'ee fi qorannichaaf gargaaru of keessaa qabu nan kenna. Gaaffileen deebii kennuu qaban eessatti ofuma isaaniitiin gaafficha akka guutan jiru. Gaaffiin kun naannoo daqiiqaa 20 hanga 30 kan fudhatu ta'a.

Miidhaa fi Faayidaa qorannichaa: Qorannoo kana keessatti hirmaachuu keetiif faayidaan kallattiin siif kennamus hinjiru akkasumas miidhaan sirra gahu baay'ee xiqqaadha kunis yeroo qabdu keessaa muraasa kennuun alatti kan hinjirre ta'uu hubachuu qabda. Garuu bu'aan qorannoo kanaa ogeeyyii fayyaa naannawa sanarratti hojjatanii fi karoora baasaniif galtee barbaachisaa ta'a.

Iccitii: Ragaalee ati naaf kennituuf iccitiin isaa kan eegamu ta'a. Odeeffannoon addatti hirmaattota adda baasu hin jiraatu. Argannoon qorannichaa waan addaa namoota dhuunfaa hin calaqqisiisu. Gaaffiin maqaa agarsiisu akka hin dabalamneef koodii ni kennama. Gabaasa afaaniin ykn barreeffamaan hirmaattoota qorannicha waliin walqabsiisuu danda'u keessatti eeruun hin kennamu.

Mirga: Hirmaattonni qorannoo kanaa hundi hirmaachuu kan danda'an mirga isaaniin ta'a. Hirmaachuu diduuf mirga qabda. Yoo hirmaachuuf murteessite, gaaffii fi deebii kennitu yeroo barbaaddetti addaan kutuu dandeessa, kana jechuun faayidaan ala taate jechuu miti. Gaaffii fi deebii keessatti gaaffii hin barbaadneef deebii kennuu diduu ni dandeessa.

Karaa ittiin qaama dhimmi ilaaluun wal qunnamtu

Yoo gaaffiis ta'ee komii tokkollee qabaatte yeroo barbaadanitti lakkoofsa bilbilaa armaan gadiin bilbiluun wal-qunnamuu dandeessa.

Maqaa qorataa: Takiluu Badhaasa , E-mail: teklu1bedassa@gmail.com

Lakk Bilbilaa: +251-917837369

Walii galtee hirmaattota qorannichaa waliin geggeeffamu

Ani Waraqaa odeeffannoo hirmaattotaa dubbiseen jira. Kaayyoo qorannichaa, hojimaata, balaa fi faayidaa, dhimmoota iccitiin, mirga hirmaannaa fi teessoo qunnamtii gaaffii kamiifuu sirriitti hubadheera. Wantoota ifa hin taane ta'uu danda'aniif gaaffii yoo qabaadhe akkan gaafadhu carraan naaf kennamee jira. Yeroo barbaadetti qo'annoo keessaa ba'uuf ykn gaaffii ani hin barbaanne kamiyyuu deebisuuf mirga akkan qabu ta'eera. Kanaafuu gaaffilee keenya itti fufuuf mee mallattoo keessaniin na mirkaneessuu dandeessu? Kanaafuu, qorannoo kana irratti hirmaachuuf fedhii kootiin hayyama akkan kenne nan ibsa.

Maqaa fi mallattoo hirmaattuu/hirmaataa _____ Guyyaa _____

Maqaa fi mallattoo ragaa funaanaa _____ Guyyaa _____

ANNEX IV: Afan Oromo Version of Data collection Tools

Gaaffii hojii gabaasa hordoffii dhukkubaa walitti hidhame shaakaluu fi wantoota kanaan walqabatan ogeessota fayyaa dhaabbilee fayyaa hawaasaa godina Wallaggaa Bahaa, Lixa Oromiyaa, Ethiopia

Guyyaa:_____ Dhaabbata Fayyaa_____

Koodii_____ Maqaa nama gaafatuu_____

Kutaa 1^{ffaa} : Gaaffiiwwan Hawaasummaa			
Lak	Gaaffii	Deebii	Irra darbuu
101	Umurii waggaadhaan	1. 20 - 29 2. 30 - 39 3. 40 - 49 4. ≥ 50	
102	Sadarkaan barnoota kee maalidha?	1. Sertifikeetii 2. Dippiloomaa 3. Digirii jalqabaa 4. Digiriidhaa ol 5. Kan biroo:_____	
103	Ogummaankee maalii?	1. HEF 2. Deessistuu 3. Narsii 4. Qondaala Fayyaa 5. Ogeessa Laaboraatoorii 6. Ogeessa Qorichaa 7. Hakiima 8. Kan biroo:_____	
104	Hojiin amma keessa jirtu eessaa?	1. Kutaa yaalii deddeebii 2. Kutaa yaalii daa'immanii	

		3. .Kutaa fayyaa haadholii fi daa'immanii	
		4. Garee meedikaalii	
		5. Garee yaalii daa'immanii	
		6. Kutaa Laaboraatoorii	
		7. Offiisera PHEM	
		8. Kan biroo:_____	
105	Akka ogeessa fayyatti muxannoon hojii keetii hangami?	1. Waggaa 1 gadi	
		2. Waggaa 1-5	
		3. Waggaa 6-10	
		4. Waggaa 10 ol	
Kutaa 2^{ffaa}: Gaaffilee walqabattee amalaa			
2.1 gaaffii beekumsaa;			
201	Hiika dhibeewwan balaa fayyaa uummataa beektaa?	1. Eeyyee	
		2. Lakki	
202	Dhibeewwan gabaafamuu ykn beeksifamuu qaban beektaa?	1. Eeyyee	
		2. Lakki	
203	Lakkoobsa dhibee gabaafamuu qabanii beektaa?	1. Eeyyee	
		2. Lakki	
204	Dhibeen gabaafamuu qaban dhibee daddarboo fi daddarboo hin taane waliini?	1. Eeyyee	
		2. Lakki	
205	Unka gabaasa dhukkuboota ittiin gabaafamu beektaa?	1. Eeyyee	
		2. Lakki	
206	Adeemsa dhibee gabaasuu dhaabbata keessan keessattii fi qaama itti aanutti beeksisuu ni beektaa?	1. Eeyyee	
		2. Lakki	
207	Dhukkuboota Torbee fi hatattamaa gabaasuun weerara dhukkubaa adda baasuuf ni gargaara?	1. Eeyyee	
		2. Lakki	
208	Dhibeewwan torbee fi hatattamaa gabaasuun itti gaafatamummaa ogeessota fayyaati?	1. Eeyyee	
		2. Lakki	

2.2 Gaaffilee ilaalchaan wal qabatan			
209	Dhibeewwan torbee fi hatattamaa gabaasuun ykn beeksisuun barbaachisaa dha	1. Eeyyee	
		2. Lakki	
		3. Hin beekamu	
210	Weerara adda baasuuf hordoffiin ni fayyadaa ?	1. Eeyyee	
		2. Lakki	
		3. Hin beekamu	
211	Akka walii galaatti sirna gabaasa dhibeewwan torbee fi hatattamaa gabaasuu ykn beeksisuu akkamiin ilaaltaa?	1. Mijataa	
		2. Mijataa miti	
		3. Hin baramne	
212	Dhukkuboota beeksifaman gabaasuun yeroo kan fudhatu waan ta’eef hojjetoota eegumsa fayyaatiin hojjetamuu hin qabu	1. Eeyyee	
		2. Lakki	
		3. Hin beekamu	
213	Hojimaanni gabaasuu hojjetoota fayyaatiif hojii ulfaataadha	1. Eeyyee	
		2. Lakki	
		3. Hin beekamu	
Kutaa 3 ^{ffaa} : Gaaffii Shaakala deebii hordoffii dhukkubaa Walitti hidhame waliin walqabatee			
301	Unka dhimma irratti hundaa’e fayyadamuun dhukkuba hatattamaan gabaafamuu danda’u ni gabaaftuu.	1.Eeyyee 2. Lakki	
302	Dhukkuba torbanitti gabaafamuu danda’u ni gabaaftuu?	1.Eeyyee 2.Lakki	Yoo lakki ta’e 307
303	Eessatti gabaaftuu?	1.Daayrektara medikaalaa tti	
		2.Qondaala hordoffiitti	
		3.Waajjira fayyaa waradaa	

		4.Waajjira fayyaa Godinaa	
		5. Sadarkaa olaanaa itti aanu	
304	Malli ittiin gabaafamu maali?	1. Faaksii	
		2. Interneetii	
		3. Waraqaa gabaasaa	
		4. Bilbila	
		5. Kan biroo: _	
305	Yoo baayyee busy ta'e gabaasuu (yoo hojii biraa akka leenjii irratti bobbaate) dhukkuboota beeksisuu danda'an ni gabaafataa?	1. Eeyyee	
		2. Lakki	
		3. Hin beeku	
306	Dhukkuba torbanitti gabaafamuu danda'u sadarkaa gabaasa itti aanutti yoom gabaafu	1.Wixata	
		2.Kibxata	
		3.Roobii	
		4.Kamisa	
		5.Jimaata	
		6.kan biroo: _____	
307	Dhaabbilee fayyaa gabaasa dhiyeessaniif odeeffannoo yaada kennuu kennitanii beektuu?	1.Eeyyee 2.Lakki	
Kutaa 4^{ffaa}: Gaaffii dhimmoota teeknikaa fi Jaarmiyaa wajjin walqabatee Shaakala IDSR fi gabaasa waliin			
401	DSR/ PHEM irratti leenjii fudhattanii beektuu ?	1.Eeyyee	
		2.Lakki	
402	Sadarkaa olaanaa irraa to'annoo deggersaa argattaniittuu?	1.Eeyyee	
		2.Lakki	
403	Sadarkaa olaanaa irraa kurmaana kurmaanaan yaada argattaniittuu?	1.Eeyyee	
		2.Lakki	
404	Dhaabbata/kutaa/tokkummaa keessan keessatti sarara	1.Eeyyee	

	Qajeelfama PHEM qabduu?	2.Lakki	
405	Dhaabbata/kutaa/tokkummaa keessan keessatti bifa beeksisa/gabaasa torbanitti fi dhimma irratti hundaa'e qabduu?	1.Eeyyee 2.Lakki	
406	Dhukkuba beeksisuu danda'uuf hiika dhimma istaandaardii dhaabbata/kutaa keessanii qabduu?	1.Eeyyee 2.Lakki	
407	Dhaabbata fayyaa kana keessatti bakka hojii tokkoo ol ramadamtee jirtaa?	1.Eeyyee 2.Lakki	

Dhimmoota teeknikaa fi Jaarmiyaa wajjin walqabatee Shaakala IDSR fi gabaasa waliin

Akkaataa dhimma teeknikaa fi gurmaa'insaa ogeeyyii fayyaa irratti dhiibbaa geessisu IDSR ilaalchisee ibsa armaan gadii irratti sadarkaa waliigaltee agarsiisi.

Mallattoo kana (✓) barreessuudhaan deebii kee kenni.

(1= cimsee walii hin galu,2= walii hin galan,3= qaama bilisaa,4= Walii galuu,5= cimsee walii galu)

	Gaafannoo	cimsee walii hin galu	walii hin galan	qaama bilisaa	Walii galuu	cimsee walii galu
408	Dhaabbata fayyaa hojii keessan keessatti hojjettoonni leenji'an unka guutuu danda'uu?					
409	Dhaabbata fayyaa hojii keessan keessatti, unka odeeffannoo walitti qabuu fi gabaasuu akka gaariitti qophaa'e jiraa?					
410	Dhaabbata fayyaa hojii keessan keessatti unka gabaasaa, waraqaa lakkoofsaa, fi galmeewwan akka meeshaa waliigalaa odeeffannoo walitti qabuu fi gabaasuuf gargaarutti ni jiraa?					
411	Dhaabbata fayyaa keessan keessatti humni namaa ogummaa qabu kan ragaa fayyaa walitti qabuu danda'u jiraa?					
412	Dhaabbata fayyaa keessan keessatti gabaasa hordoffii yeroon waajjira fayyaa sadarkaa itti aanutti dhiyaachuu ni eegama?					

413	Dhaabbata fayyaa keessan keessatti gabaasa hatattamaa fi torban torbaniin yeroo murtaa'een waajjira fayyaa sadarkaa itti aanutti ni dhiyaata?					
414	Dhaabbata fayyaa keessan keessatti, qaamoleen daataa hordoffii gabaasa torban torbanii fi battalaa keessatti eegamu keessatti guutummaatti guutamu					