




BMJ Open Health information use and associated factors among healthcare professionals in Ilu Aba Bor zone, Oromia region, Ethiopia: an institution-based cross-sectional study

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ABSTRACT

Background Health information systems are essential for collecting data for planning, monitoring and evaluating health services. Using reliable information over time is an important aid in improving health outcomes, tackling disparities, enhancing efficiency and encouraging innovation. Studies on the level of health information use among health workers at the health facility level in Ethiopia are limited.

Objectives This study was designed to assess the level of health information use and associated factors among healthcare professionals.

Methods An institution-based cross-sectional study was conducted among 397 health workers in health centres in the Iluababor zone of Oromia region in southwest Ethiopia, who were chosen using a simple random sampling technique. Data were collected using a pretested, self-administered questionnaire and an observation checklist. The Strengthening the Reporting of Observational Studies in Epidemiology reporting checklist was used to report the summary of the manuscript. Bivariable and multivariable binary logistic regression analysis was used to identify the determinant factors. Variables with a p value <0.05 at 95% CIs were declared significant.

Results It was found that 65.8% of the healthcare professionals had good health information usage. Use of Health Management Information System (HMIS) standard materials (adjusted OR (AOR)=8.10; 95% CI 3.51 to 16.58), training on health information (AOR=8.31; 95% CI 4.34 to 14.90), completeness of report formats (AOR=10.24; 95% CI 5.0 to 15.14) and age (AOR=0.4; 95% CI 0.2 to 0.77) were found to be significantly associated with health information use.

Conclusion More than three-fifths of healthcare professionals had good health information usage. Completeness of report format, training, use of standard HMIS materials and age were significantly associated with health information usage. Ensuring the availability of standard HMIS materials and report completeness and providing training, particularly for newly recruited health workers are highly recommended to enhance health information usage.

INTRODUCTION

A health information system is a system that integrates health data collection, processing,

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The key components of health information were used to quantify information use.
- ⇒ The study included health workers from all primary public health facilities.
- ⇒ Qualitative data were not used to support the findings.
- ⇒ Self-reported bias might have been introduced, which may overestimate the level of information use.

reporting and use of the information necessary for improving health service delivery, effectiveness and developing efficiencies in the reporting systems.¹ Without a reliable and appropriate health information system, healthcare managers and service providers cannot improve the quality of health services.^{1,2}

Health information is healthcare data that has been organised in a meaningful format, aggregating information about all patients and other relevant information for patients or clients, as well as for overall services.^{2,3} Sound and reliable health information is the foundation of decision-making across all health system building blocks and is essential for health system policy development and implementation, governance and regulation.¹ Health information is becoming increasingly important for measuring and improving the quality and coverage of health services, and is considered fundamental to the efficient delivery of high-quality healthcare.^{4,5} Data delivered through the health management information system comes from service delivery and administrative records kept as a part of routine transactions at health facilities and management offices.^{1,5}

For information to be used effectively, it must be available, accessible, of high quality,

have knowledge of its applications and be user-friendly.⁶ Implementation of health information is the backbone for planning and management of health services at district levels, as it can play an important role in effective and efficient health service delivery, decision-making and the improvement of the programme.⁷ Poor health information usage indicates inefficient and ineffective resource usage, especially in low-income and middle-income countries.⁸

Significant human and financial resources are being invested in improving health information at the health facility and district level, particularly in low-income and middle-income countries.⁹ The 2015 SDGs within the context of universal healthcare coverage have emphasised measurement and accountability, which can only be achieved through a vibrant national health information system aligned to the five-point call to action in measurement at the June 2015 Washington summit.¹⁰ However, the health information systems are unnecessarily fragmented and not harmonised during data management at health facilities, even though the ministries of health of different countries have formulated different policies.¹¹

A major issue facing Africa is its inability to quantify and analyse the situation it faces with credible data and to use the information in planning and managing service delivery.¹¹ The poor performance is caused by an inability to implement health system improvement policies and strategies as a result of deteriorating socioeconomic situations, made worse by inadequate information systems for evidence-based management of the health system.¹²

According to studies conducted across Africa, the effective use of health system information was only 48.1%, indicating poor planning and performance of health outcomes, as well as insufficient budget allocation.¹³ According to the WHO's global report on health data systems and capacity, at least 50% of the world's countries must have a regular system to monitor the availability, quality and effectiveness of health information.¹⁴

The Ethiopian Federal Ministry of Health emphasised HMIS as a key to the successful implementation of the Health Sector Transformation Plan and achieving the Sustainable Development Goals (SDGs).⁸ Considering this initiative, the Ethiopian Health Sector Strategic Plan underlines that routine data generated at district health facilities should be considered the entrance to using health information as a primary source of information for continuous monitoring of health services in the country, and that data should be used at the place where it was generated.⁴

Studies conducted across Ethiopia revealed suboptimal health information usage by health professionals.^{4 8 9 15 16} The proportion of health information use ranges from 32.9% in Jimma zone⁵ to 57.8% in Amhara region.⁸ The proportion of good health information usage was 51.3% and 42.1% among primary healthcare units and health posts, respectively.^{4 5 8} Out of 84.3% of the data collected daily, only 22.5% were used, changing the data into

information at the district and facility level and using it for immediate decision-making.^{8 9}

Age, lack of user involvement, inadequate knowledge of how to use health information systems, understaffing, and a lack of refresher training are all factors that influence health information system usage.^{17 18} Data requirements are frequently chosen without taking into account the technical skills of the health workers collecting the data or the available diagnostic equipment in peripheral health facilities.^{19–21} Data quality, on the other hand, is lacking due to a lack of motivation among healthcare workers and a lack of feedback for healthcare supervisors and peripheral health workers on data reported to the higher level.²

Different studies conducted at the health facility level in Ethiopia revealed suboptimal health information usage practices,^{5 15 22 23} but the studies did not consider different working units within these facilities where health information services are actually practiced. Even though improving healthcare data quality and usage at facility levels has become a primary agenda (currently, the information revolution is one of the transformation agendas at the primary level for the Ethiopian government), the magnitude of optimal usage of health information among health professionals is unclear. This study was designed to determine the level of health information use and associated factors among healthcare professionals in health facilities in Iluababor zone, Southwest Ethiopia. The study can serve as a baseline to improve the implementation and usage of health information in health facilities and conduct further studies.

METHODS

Study design and setting

An institution-based cross-sectional study was conducted among healthcare professionals selected from 40 public health centres in the Iluababor zone, Oromia region, Southwest Ethiopia, from June to August 2021. The Iluababor zone is one of the Oromia region's 20 zones. It is located 600 km southwest of Addis Ababa, the capital city of Ethiopia. There are 40 functional health centres and 14 woreda health offices, which offer outpatient services, laboratory services, pharmacy services, maternal and child health services (family planning, antenatal care, delivery care, postnatal care, safe abortion and immunisation services) and inpatient services. The woreda health offices perform managerial tasks such as supporting and supervising health centres and ensuring timely service report delivery. In the Ethiopian context, woreda is a local administration containing at least 60 000 people, and it is then divided into kebele (the lowest administrative level), which contains about 5000 people.

Study participants

The study included health workers who were collecting health data in order to use the information for the improvement of health status and actively interacting

with patients in their daily activities, which includes health officers, nurses, midwives, laboratory technologists and pharmacists in health centres found in the Iluababor zone. The study population consisted of health workers who were in charge of 15 service delivery points at the health centre level. Health workers who were on annual leave during the study period were excluded.

Sample size and sampling techniques

The sample size was calculated using the single population proportion formula, $n = (Z\alpha/2)^2 * p(1 - p) / d^2$, with the following assumptions: 38.4% proportion of good health information usage (p) at East Wollega,²⁴ with a 95% level of confidence, a 5% margin of error and a 10% non-response rate. Finally, a sample size of 397 was obtained. Forty (40) health centres found in the Ilubabor zone were included in the study. Fifteen participants from each service delivery point of health centres that were intended to use the HMIS were considered, which included triage, outpatient departments, emergencies, laboratory services, pharmacies, family planning, antenatal care, delivery care, postnatal care, Expanded Program on Immunization (EPI), under-five-year outpatient department (OPD), inpatient units, the anti-retroviral therapy (ART) clinic, the TB-leprosy clinic and youth-friendly services. One health worker from each of the 15 service delivery points was selected by a simple random sampling technique from the health centres included in the study by using the employee work attendance register to prepare the sampling frame.

Data collection tools

A pretested, self-administered questionnaire and an observation checklist were used to collect data. Sociodemographic descriptions, knowledge and practice of data management and use, the purpose of information use and factors affecting health information use were major questionnaire contents (see online supplemental file 1). The questionnaire used in this study was compiled after an extensive review of related literature to ensure content validity.^{1 3-5 9} Questionnaires were distributed to each respondent and collected after completion, and an observation checklist was used to collect data related to records like Lots Quality Assurance Score (LQAS). Four data collectors (nurses) and one supervisor (a public health professional) participated in data collection. Training the data collectors and supervisors, providing supportive supervision and making study participants clear on the study objectives were activities performed to ensure data quality. Besides, the questionnaire was pretested on 20 healthcare professionals outside the study area, at Bedele Health Center. Necessary adjustments were made to ensure the validity and reliability of the tool prior to commencing the actual data collection. The internal consistency (reliability) of the tool was measured by the Cronbach alpha coefficient, which resulted in an internal consistency coefficient of 0.76.

Data collection procedures

In this study, usage of health information was assessed in terms of using information for decision-making in management and clinical services by using six-item questions adapted and modified from WHO guidelines and previous articles.^{1 9 24} These were: (1) using information for decision-making to take action; (2) providing and accepting feedback from respective supervisors; (3) monitoring day-to-day health service activities using report formats; (4) presence of key indicators with charts or using HMIS materials (differ across service units); (5) presentation of achievements of targets at the last health centre and woreda team minutes for departmental performance evaluation; and (6) data quality check using an LQAS sample. All these components of the assessment tool have Likert scale measures, ranging from 'strongly disagree' (1 point) to 'strongly agree' (5 points). Health workers' mean scores were used to decide the health professionals' level of health information. Accordingly, healthcare professionals were considered to have good usage of health information when they scored above the mean value; otherwise, they were considered to have poor or limited usage of health information.^{4 5 15 24}

Data management and analysis

The data were entered into Epi-data V.3.1 and exported to SPSS V.20 for further analysis. All questionnaires were checked for completeness after completion by the study participants. Descriptive statistics, including frequencies and proportions, were computed. Descriptive statistics, including frequencies and proportions, were computed. To identify the associated factors, variables with a p value of less than 0.25 in the bivariable analysis were entered into the multivariable logistic regression analysis for further analysis. Finally, to demonstrate the strength of the associations, an adjusted OR (AOR) with 95% CIs was calculated. Then, using multivariable logistic regression analysis at a p -value less than 0.05, variables significantly associated with the use of health information were identified. The model's fitness was checked by the Hosmer and Lemeshow goodness-of-fit test.

Patient and public involvement

Patients and/or the public were not involved in the design, conduct, reporting or dissemination plans of this research.

RESULTS

Sociodemographic characteristics of healthcare professionals in Iluababor zone

A total of 392 healthcare professionals completed questionnaires, with a response rate of 98%; only five questionnaires were missed. The mean (\pm SD) age of the respondents was 28.84 ± 6 . Their ages ranged from 22 to 53. The majority (62.2%) of the healthcare professionals were men. One hundred and twenty (30.6%) were nurses, 27.3% were health officers, 16.8% were midwife

Table 1 Sociodemographic characteristics of healthcare professionals in health centres in Iluababor zone, Oromia region, Ethiopia, 2021

Variable	Categories	Frequency	Percent
Age	Below 30 years	250	63.8
	Above 30 years	142	36.2
Sex	Male	244	62.2
	Female	148	37.8
Marital status	Never married	91	76.8
	Married	301	23.2
Monthly salary	2001–2400	1	0.4
	2401–2800	72	18.4
	>2800	319	81.41
Professional category	Health officer	107	27.3
	Nurse	120	30.6
	Midwife	66	16.8
	Laboratory	64	16.3
	Pharmacist	35	8.9
Service year	Below 5 years	85	21.7
	5–10 years	106	27
	Above 10 years	201	51.3
Level of education	Diploma	281	71.7
	Bachelor	103	26.3
	Masters	8	2.0

nurses, 16.3% were laboratory professionals and pharmacists made up 8.9%. More than half (51.3%) of the health workers had served for more than 10 years. The majority (76.8%) of the health workers were married, and the majority (84.1%) of them earned more than 2800 ETB per month (refer to [table 1](#)).

Institutional characteristics of health centres in Iluababor zone

The majority (93.9%) of health workers in health centres were supervised once, and only 3.3% of them were supervised twice in the last 6 months. The majority (88%) of the service units reported health service activities on time. One hundred and forty-nine (38%) of the service delivery units did not have standard HMIS materials. Regarding training, the majority (60.7%) of the respondents had received training on data analysis and management, as indicated in [table 2](#).

Health information use among healthcare professionals in Iluababor zone

Most (69.1%) of the respondents did not receive regular feedback from the next higher health authority. On the other hand, 46.7% of the respondents indicated that they faced a lack of key indicators in charts and tables during the usage of health information, and during data collection, 39.5% of them had no tools. In 38% of the service delivery units, however, reports were incomplete. Only 23.7% of health professionals use report formats to monitor day-to-day health service activities, and 38.3% do not perform the LQAS (refer [table 3](#)).

Table 2 Organisational characteristics of health centres in Iluababor zone, Oromia region, Ethiopia, 2021

Variables	Category	Frequency	Percent
Supportive supervision in the last 6 months	Once	368	93.9
	Twice	11	2.8
	Above two	13	3.3
Health workers received training	Yes	238	60.7
	No	154	39.3
Change data to information	Yes	189	48.2
	No	203	51.8
Availability of standard HMIS materials	Yes	243	62.0
	No	149	38.0
Reporting schedule	Timely	345	88.0
	Not timely	47	12.0
Completeness of report formats	Yes	242	61.7
	No	150	38.3
Using catchment map	Yes	167	42.6
	No	225	57.4
Availability of documentation	Yes	277	70.6
	No	85	29.4

In this study, 258 (65.8%) of the healthcare professionals across different service delivery units in health centres in the study area used health information (95% CI 61% to 71%) while 34.2% did not ([figure 1](#)).

The majority of service delivery units in the studied health centres made good use of health information. The least was among the youth-friendly service unit, which was 4.6% (refer to [table 4](#)).

Factors associated with usage of health information

In the multivariable logistic regression analysis, the completeness of report format, training on health information, use of standard HMIS guidelines and age were found to be significantly associated with health information usage among health service units. Accordingly, the odds of using health information among health workers who had training were eight times higher compared with those without training (AOR=8.31; 95% CI 4.34 to 14.90). Also, the odds of using health information among health workers in units having standard HMIS guidelines were eight times higher than their counterparts (AOR=8.10; 95% CI 3.51 to 16.58). In addition, the odds of health workers in units with complete service reports were ten times higher than those with incomplete report formats (AOR=10.24; 95% CI 5.0 to 15.14). Furthermore, health workers whose age was above 30 years were 60% more likely to use health information than those below 30 years (AOR=0.4; 95% CI 0.2 to 0.77) (refer to [table 5](#)).

DISCUSSION

The current study was aimed at assessing the magnitude and identifying factors associated with health information usage among healthcare professionals at health

Table 3 Components of health information use among healthcare professionals in health centres of Iluababor zone, Oromia region, Ethiopia, 2021

Variables	Categories	Frequency	Percent
Using information for decision-making to take action	Yes	298	76.0
	No	94	24.0
Provision and acceptance of feedback from respective supervisors	Yes	271	69.1
	No	121	30.9
Monitoring day to day health service activities using report formats	Yes	93	23.7
	No	299	76.3
Presence of key indicators with charts or using HMIS materials	Yes	209	53.3
	No	183	46.7
Presentation of achievements of targets at the last health centre minutes for performance evaluation	Yes	231	58.9
	No	161	41.1
Data quality check using Lots Quality Assurance Score (LQAS)	Yes	150	38.3
	No	242	61.7
Health information use	Good	258	65.8
	Poor	134	34.2

centres. According to our findings, 65.8% of the healthcare professionals in health centres demonstrated health information usage. This finding is in line with the results of studies conducted at Hadya (69.3%)¹⁶ and in East Wollega (66.0%).²⁴ This might be due to the similarity between population structure and the health information generating system at health centres. However, the results of this study were higher than those of previous studies in Kenya, 48.1%,¹³ in North Gonder, 38.4%,⁸ in East Gojam, 45.81%¹⁵ and in Jimma at 32.9%,⁵ and another district based study in Ethiopia.²⁵ The variation might be due to study design, sample size, the emphasis given to training on HMIS to build the capacity of staff on health information usage at the study area, and the time difference among the studies. Furthermore, the government has recently placed a special emphasis on the use of information for evidence-based decision-making and the improvement of healthcare professionals' information-use culture.⁹

Identifying factors that affect the usage of health information is very important to improving healthcare services through the usage of health information for decision-making. In this study, healthcare professionals using standard HMIS materials like registers and tall sheets were

eight times more likely to contribute to the usage of health information than those not using standard materials from the HMIS. This finding is supported by a study conducted in North Gonder,⁸ which showed that using HMIS materials improves usage of health information. The possible explanation for this is that if the standard HMIS materials are available at health facilities, there is a greater likelihood of usage of health information, and without these materials, it is even more difficult to generate health information.

Table 4 Usage of health information by service delivery points in health centres in Iluababor zone, Oromia region, Ethiopia, 2021 (result of observation checklist)

Service delivery point	Total participated	Health information	
	n (%)	Good, n (%)	Poor, n (%)
Expanded program on immunization (EPI)	24 (12.17)	16 (6.2)	8 (5.97)
Antenatal care	27 (14.04)	17 (6.58)	10 (7.46)
Admission	26 (13.29)	17 (6.58)	9 (6.71)
Antiretroviral therapy/voluntary counseling and testing (ART/VCT) clinic	26 (13.29)	17 (6.58)	9 (6.71)
Delivery	27 (13.68)	18 (6.97)	9 (6.71)
Emergency	27 (13.68)	18 (6.97)	9 (6.71)
Family planning	27 (13.68)	18 (6.97)	9 (6.71)
Laboratory	27 (13.68)	17 (6.58)	10 (7.46)
TB-leprosy clinic	27 (13.68)	18 (6.97)	9 (6.71)
Triage	27 (13.68)	18 (6.97)	9 (6.71)
Outpatient department	27 (13.68)	18 (6.97)	9 (6.71)
Pharmacy	27 (13.68)	18 (6.97)	9 (6.71)
Postnatal care	27 (13.68)	18 (6.97)	9 (6.71)
Under-five OPD	27 (13.68)	18 (6.97)	9 (6.71)
Youth-friendly service	19 (9.87)	12 (4.65)	7 (5.22)
Total	392(100)	258 (65.8)	134 (34.2)

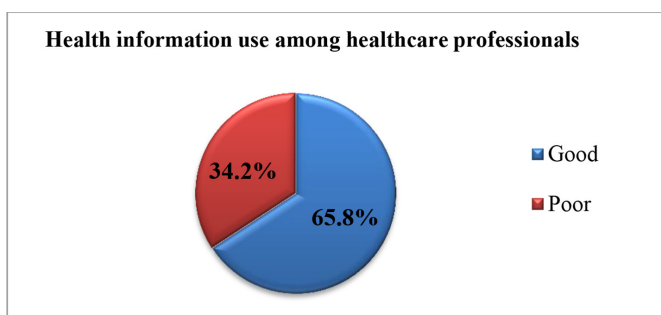


Figure 1 Usage of health information among healthcare professionals in Iluababor zone, Oromia region, Ethiopia, 2021.

Table 5 Factors associated with health information usage among healthcare professionals in Iluababor zone, Oromia region, Ethiopia, 2021

Variable	Health information use		COR (95% CI)	AOR (95% CI)
	Good (%)	Poor (%)		
Age				
≤30 years	157 (62.8)	93 (37.2)	0.68 (0.44 to 1.07)	0.4 (0.2 to 0.77)*
>30 years	101 (71.1)	41 (28.9)	1	1
Received feedback				
Yes	145 (63)	85 (37)	0.74 (0.48 to 1.14)	0.66 (0.34 to 1.26)
No	113 (69.8)	49 (30.2)	1	1
Number of supervision				
Above 2	11 (84.6)	2 (15.4)	2.9 (0.65 to 13.60)	0.5 (0.03 to 8.61)
Twice	8 (72.7)	3 (27.3)	1.44 (0.38 to 5.52)	0.41 (.04 to 4.07)
Once	239 (64.9)	130 (35.1)	1	1
Completeness of report format				
Yes	207 (85.5)	35 (14.5)	11.5 (7.02 to 18.8)	10.24 (5.0 to 15.14)*
No	51(34)	99 (66)	1	1
Training				
Yes	197 (82.8)	41 (17.2)	7.3 (4.6 to 11.68)	8.3 (4.34 to 14.90)*
No	61 (39.6)	93 (60.4)	1	1
Using standard HMIS tools				
Yes	196 (80.7)	47 (19.3)	5.8 (3.71 to 9.23)	8.10 (3.51 to 16.58)*
No	62 (14.6)	87 (58.4)	1	1
Using catchment map				
Yes	104 (62.3)	63 (37.7)	0.7 (0.50 to 1.16)	0.82 (0.39 to 1.69)
No	154 (68.4)	71 (31.6)	1	1
Local decision				
Yes	111 (58.7)	78 (41.3)	0.54 (0.36 to 0.83)	1.68 (0.83 to 3.42)
No	147 (72.4)	56 (27.6)	1	1
Availability of documentation				
Yes	209 (68.2)	68 (31.9)	2.25 (0.96 to 2.56)	0.57 (0.27 to 1.21)
No	49 (57.6)	36 (42.4)	1	1

*Significant at p value <0.05.

AOR, adjusted OR; COR, crude OR.

Likewise, units with complete report formats were ten times more likely to increase usage of health information than those with incomplete report formats. This study is in line with a study conducted in Hadya zone¹⁶ that indicated the association and contribution of completing a format report to health information management and usage. The possible explanation for this is that complete reports will lead to health information and aid in decision-making or the usage of information.

Health workers who had taken HMIS training were eight times more likely to use health information than those who were not trained in HMIS. These findings were supported by studies conducted in East Gojam¹⁵ and North Gondar.⁹ This is due to the fact that training improves data generation, compliance, and decision-making, and the usage

and interpretation of data captured from training would enhance the usage of health information.

Health workers under the age of 30 were approximately 60% less likely to use health information than those over the age of 30. This study contradicts studies in Harar²⁶ and the USA.²⁷ The variation could be explained by the fact that health workers under 30 years old are typically beginners who lack adequate skills, training, supportive supervision, and feedback related to the use of health information,²⁵ so that new health professionals are unfocused on health information rather than clinical services and do not actively participate in generating data and information using standard HMIS materials.

As a result, providing continuous in-service training and updating staff on health information at health centres

and departments of health centres, as well as continuously supporting HMIS materials and testing with LQAS tools, are essential to ensuring all indicators are completely filled in in the report format for health information usage for decision-making. Besides, improving the completeness of the report format, training of new staff on health information and the use of HMIS standards for materials are crucial to solving the gap.

This study provided important results regarding health information usage and the contributing factors since usage of health information is vital for operational, tactical and strategic decision-making. Health information usage is important at all levels of the health system and is generated through effective data processing, analysis and interpretation.

Although the purpose of the study was to examine how much health information was used and the characteristics that were related to it, there were some limitations. Since the use of health information was based on self-reported data, it could be subjected to overestimation. This study is limited to health workers at service delivery points in health facilities. Further studies supported by qualitative methods, including different stakeholders from health offices, are recommended.

CONCLUSION

This study concluded that more than three-fifths of healthcare professionals had good health information usage which is low, compared with the national cut-off point. Age of health workers, completeness of report format, use of standard HMIS tools and training on HMIS data use were the identified factors associated with health information usage at the health centre's service delivery units. Because the study was carried out in all health centres with a random sample of healthcare professionals, the results can be considered representative of the health professionals in Iluababor zone, Southwest Ethiopia. Improving users' data management inputs, providing training for all health workers, and availing and using standard HMIS tools are important to improving health information use in health centres. An attempt to provide training, supportive supervision and ensure report completeness may aid in improving and achieving the expected level of health information usage for decision-making.

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Patient consent for publication Consent obtained directly from patient(s)

Ethics approval This study involves human participants and was approved by the ethical review committee of the College of Health Science, Mattu University (approval number RCS/019/2019) and presented to Iluababor Zone Health Department and respective District Health Offices. An official letter was obtained from district health office and presented to the respective health facilities. The purpose and importance of the study were explained to the study participants, informing them of the right to withdraw at any time during the study period. Health workers were given the questionnaire after verbal consent was obtained and the privacy and confidentiality of participants. Any personal identifier were not included in the questionnaire. The participants gave informed consent to participate in the study before taking part. Participants gave informed consent to participate in the study before taking part.

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