

# Effectiveness of Performance-Based non-Financial Incentive for Improved Health Data Quality and Information Use at Primary Health Care Units, Northwest Ethiopia

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## Abstract

**Introduction:** Several internal and external factors in the health system pose challenges to the quality and use of health data. One of the behavioral and moral variables that can impact data quality and information use practices is the motivation of the health workforce. A performance-based non-financial incentive intervention was put into place in primary healthcare units of rural districts.

**Objective:** This research aimed to measure the effectiveness of PBNI intervention on data quality and information use in rural districts of primary healthcare units in Northwest Ethiopia.

**Methods:** Quasi-experimental design using a facility-based survey was employed to form groups of incentivized and non-incentivized health facilities. The study was conducted in the Wogera and Tach-Armacheho districts, which were the intervention and control districts. Awards, certifications, scholarships, and promotions for the best-performing individual, department, or health facility were provided as an incentive. The proportion and mean of the characteristics of participants were presented descriptively, and a difference in difference analysis was conducted to measure the effectiveness of PBNI on data quality and information use.

**Results:** A total of 84 and 90 departments were included in the base-line and end-line in Wogera (Intervention) and control (Tach-Armacheho) districts respectively. Wogera district had 40 (47%) and 44 (48.89%) departments included during the base-line and end-line periods. In the Wogera district, the average Level of data quality increased from 15% baseline at month 1 to 25% endline at month 2. In tach armacheho, however, the quality dropped from 11.7% at the start to 9.2 at the end. Evidence on using available information to inform decision-makers was found in 36% and 28% at the base-line and 50% and 60% in the end-line assessment in Tach Armachiho and Wogera districts, respectively. The average mean Difference in information use between intervention and control groups was 30.4 percentage points (p-value=0.008) between the end line and base-line assessments. The Difference in information use change in the intervention district compared to its counterpart was 25, at 95 % CI [2%, 47%] percentage points, P-value =0.003.

**Conclusion:** Performance-based non-financial incentive has significantly changed the health data quality and information use in the intervention site. Thus, scaling up the intervention to other similar contexts is essential. [*Ethiop. J. Health Dev.* 2023;37 (SI-1)]

**Keywords:** Performance-based financing, data quality, information utilization, Amhara, Ethiopia

## Introduction

Information use practice is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of communities and populations in the domain of healthcare maintenance and improvement. It is also said to be the process of integrating science-based interventions with community preferences to improve the health of populations (1). Utilizing information generated from healthcare data for planning and decision-making could secure health system improvement in a given setting (2).

Healthcare data that could be collected and stored at each level of the health system is critically important to use for decision-making in the healthcare system which

in turn helps improve individual and community health status (3). Ethiopia has been implementing multiple strategies for decades to enhance the performance of routine health information systems at different levels. Of these, we are advancing the data collection, aggregation, analyzing, and reporting received due attention for quality data production and use. Moreover, promoting the culture of evidence-based decision-making, harnessing information communication systems, addressing the human element, and multi-sectoral approaches where some steps made (3).

In Ethiopia, a health management information system has been implemented at all health care delivery system levels to ensure the information used for

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evidence-based planning and decision-making (4). Because it is the basis for planning and policymaking at all levels of the health care system, still the government of Ethiopia is harmonizing the issue as one of the frontline agendas of the health sector transformation plan (3). However, it still faces several challenges, and the changes are satisfactory.

The timely use of health care data is seldom in resource-constrained countries despite evidence-based practice recommendations (4). Multiple studies show that different levels of information use are recorded in different countries. Health care data use in South Africa is 65% (5), in Cote D'Ivoire 38% [6], Uganda (59%) (7), Jimma Ethiopia (32.9%) (8), North Gondar 22.9% (9) and Eastern Ethiopia (53.1%) (10).

Factors influencing information use are completeness, consistency, relevance, and non-user friendliness of HMIS formats and poor feedback from higher officials (4). Other factors related to low healthcare data use are poor healthcare data management, poor management commitment, inadequate infrastructure, and high staff turnover (8,10-12).

The Federal Ministry of Health of Ethiopia (MOH) has introduced a collaborative program called capacity-building mentorship and partnership program (CBMP) with six local universities, including the University of Gondar. While implementing CBMP, the universities were also conducting different implementation science research that could support the health system delivery (13-15). The research team at the University of Gondar designed an intervention called performance-based non-financial incentive mechanism as a motivation to improve data quality and information use at the health facility level. Theoretically, it is known that motivating and incentivizing staff enhance their performance, improving service outcomes. A study in low and middle-income countries showed that incentivizing health outcome improvement is an increasingly important attribute in the health system (16). The low motivation of health workers is one of the contributing factors to the observed Level of low information use (2).

Empirical evidence revealed that performance-based incentives significantly affect data quality, patient care, and healthcare provision (17-23). Moreover, incentives can improve patient-centred care and reporting improvements (16). However, a specific empirical finding on PBNI intervention for better information use and quality data has not yet been evidenced in the study area. Thus, this implementation science research aimed to assess the effectiveness of PBNI intervention on healthcare data quality and information use.

## Methods

### *Study design and period*

This research is part of a series of implementation science studies conducted in the Wogera and Tach Armacheho districts between October 2020 and July 2021 (14). A pragmatic type II hybrid effectiveness implementation and quasi-experimental study designs were employed as they allow simultaneous mixed-methods assessments of intervention effectiveness and

implementation strategies in the real-world situation of health systems settings (24).

### **Intervention description and procedure**

Non-financial incentives were provided to individuals, departments, and health facilities based on performance. Four incentive packages were prepared for the intervention group: an award, certification, scholarship, and promotion for the best performing individual, department, or health facility. The specification of the incentive package includes;

**Award/reward:** Providing performance-based non-financial incentive intervention awards that were prepared and decided by implementers in the woreda,

**Certification:** Those who score high get public recognition and certificates from higher officials (UoG, zonal, regional, and MoH), and

**Scholarship:** Scholarship opportunities were offered to a high-performing individual in the woreda at the leading university in collaboration with the Ministry of Health. The scholarship would include all health care professionals, including health extension workers,

A multistage individual/department/health center screening was performed to identify the best performing individual, case teams, and facility to recommend for the incentive packages. First, the Wogera district plan department was asked to select and rank among the high performing 12 health workers considering their performance in the past two months. In addition, the district office was asked to rank two staff from each health facility using similar criteria as above. Furthermore, the head of each health facility was asked to select and rank two health workers considering the health information system performance. Finally, the recent month's performance of each individual on data quality and information use was assessed using quantitative data regarding the data quality and use through checking the records or registers. Thus, by triangulating the data collection method from the woreda to the health facility and adding the quantitative data, we minimize the possible biases.

The incentives were provided every two months for six months for two or three staff in the district. Likewise, the performance of health centers and departments was assessed quantitatively by assessing the data quality generation and use in the past two months. The health center and departments that scored the highest in the three rounds were incentivized.

### **Study setting**

The study was conducted in Wogera and Tach-Armacheho districts located in Northwest Ethiopia and adjacent to each other. Wogera district (Intervention) constituents 51 Kebeles and has a total population of about 278,942. There is one primary hospital, eight health centers, and 41 health posts in the district, which provide preventive, promotive, and curative services. Regarding the health workforce, there are 108 health extension workers (HEWs), 678 health workers (HWs), and 215 support staff. The Tach-Armacheho (Comparison) district has 24 kebeles with a population of 121,321. One primary hospital, 6 health centers, and 28 health posts exist. A total of 53 HEWs, 202 HWs,

and 141 support staff work in the primary healthcare system in the district. These two districts were selected because they were part of capacity building mentorship and partnership implementation sites. As mentioned in the introduction, CBMP is one of the initiatives by MOH implemented by six universities to improve data quality and information use. MOH, RHB, and the University of Gondar administered the PBNI intervention.

### **Sample size and sampling procedure**

All health centers except those with security concerns and the respective departments in the districts of Wogera and Tach-Armacheho were included in the base-line and end line assessment. The two health centers that were not included in the study were Jankle and Mereba, both of which were in the Wogera district. In between the base-line and end line periods, six health centers and all active departments in those health centers of the intervention and comparator districts were studied. The same departments in both intervention and comparator districts were used to measure changes in intervention outcomes. The number of individuals included in the study was 204 in the intervention district, whereas 190 in the comparator district.

### **Operational Definition**

**Report timeliness:** was measured by the number of reports delivered up to the deadline for facility head over the number of reports expected to come

**Data accuracy:** was measured by calculating the number from the source document over the number from a report submitted to the next Level. Based on a 10% tolerance for data accuracy was classified as follows; Overreporting (<0.90), Acceptable limit (0.90 – 1.10), and underreporting (>1.10).

**Information use:** The Level of information use at both districts was measured using five indicators as a composite index, such as available evidence utilized, calculating coverage, calculate target versus achievement, identifying indicators, and providing feedback.

### **Data collection, management, and analysis**

Data collection tools were developed based on the literature review and incorporating experts' views in the area. The data collectors received training on the data collection tool by experts from the University of Gondar, MOH and regional health burea. The data quality was maintained through the selection and training of data collectors. A one-day training focus on sampling procedure, techniques of interview, and data collection process were provided. Moreover, the process of data collection was supervised by the research team.

The data entry was employed using SPSS, and analysis was conducted by using STATA version 14 software. Both descriptive (proportion and mean) and inferential results were presented, and statistically significant variables were presented using 95% CI. The effect of the Intervention on data quality and information use was measured by comparing the base-line data with data at different intervention periods.

Data quality dimensions such as timelines, completeness, and data consistency between the source document and report were used for calculating the overall data quality score before and after the Intervention. Considering the program impact and expert judgment, the research team assigned out of the 100% value, 30% to the completeness, 30% to timelines, and 40% to data consistency. Finally, the overall data quality score was calculated by summing the three dimensions before and after period assessments.

Information use was measured as a composite score using five indicators: identifying indicators, calculating target vs. achievement, calculating program coverage, providing feedback to lower levels, and evidence on the use of available data for decisions. We calculated the average value of these five indicators before and after intervention and comparator districts to compute the net effect of the Intervention on data use. Finally, the difference-in-difference (DID) analysis technique compared information use between intervention and comparator districts.

### **Ethical clearance**

Ethical clearance was obtained from the Research Ethics Review Committee of the University of Gondar. Oral informed consent was taken from each participant. Permissions were obtained from all health facilities. All data were collected based on codes instead of mentioning the respondents' names to avoid indicating any personal characteristics. The data were secured in University repository and prevented any access to an unauthorized person to ensure confidentiality. All methods were carried out following relevant guidelines and regulations.

## **Results**

### ***Participant characteristics***

The study was conducted in ICAmhara regional State's Wogera (Intervention) and Tach Armachiho (Comparison) districts. A total of 84 and 90 departments were enrolled in the study at the base-line and end-line assessment. The baseline survey included six health centres with 40 departments in the intervention district. In the endline with the same number of health centers the departments were 44. The number of individuals included in the study was 204 in the intervention district, whereas 190 in the comparator district.

### **Data quality:**

#### ***Data consistency***

Consistency was evaluated using the ratio of data consistency between the register and report for selected indicators and compared to the standard for the comparison groups. The indicators include data verification of ANC1, Family planning, Delivery, HIV+, and Pneumonia. We took three months of verification for each indicator. We finally measured the difference in deviations to show the effect of PBNI on data consistency among the intervention and control woreda. We calculated the average deviation from one for the intervention and control sites.

The result revealed that the intervention site (Wogera) had an average base-line deviation from 1 of 0.1467 (with an average accuracy level of 0.8533), whereas, the endline deviation was just 0.013 (average accuracy 0.987). Hence, in light of this, the overall improvement of accuracy, the overall accuracy improvement in the intervention site was 0.1337. However, in the control site (Tacharmacheho) the baseline average deviation from 1 was found to be 0.1483 (accuracy level of (0.8517). However, the average endline deviation from

1 was 0.14 (accuracy level 0.86). Thus, the overall improvement of accuracy in the control site was found to be 0.0083.

Finally, the Difference Dbetween the intervention and control sites was found to be 0.1254 or 12.54 percentage points. Hence, PBNi intervention brought 12.54 percentage points reduction in the average accuracy deviation (Table 1).

**Table 1. Level of data accuracy in Wogera and Tach Armachiho districts, 2021**

<b>Wogera</b>								
	ANC1	FP	Delivery	Malaria	HIV	Pneumonia	Average	Accuracy
<b>Baseline</b>	<b>1.15</b>	<b>1.11</b>	<b>1.09</b>	<b>0.75</b>	<b>0.85</b>	<b>1.13</b>		
Base-line Deviation from 1.00	0.15	0.11	0.09	0.25	0.15	0.13	0.15	0.85
<b>Endline</b>	<b>1.01</b>	<b>1.02</b>	<b>0.99</b>	<b>0.96</b>	<b>1</b>	<b>1</b>		
Endline Deviation from 1.00	0.01	0.02	0.01	0.04	0	0	0.01	0.99
-Under-reporting at Base-line for Malaria and HIV: average = 0.80								
-Over reporting at baseline for ANC1, FP, and Delivery: Average = 1.12								
-Overall improvement in accuracy								
								0.13
<b>Tach-armacheho</b>								
	ANC1	FP	Delivery	Malaria	HIV	Pneumonia	Average	Accuracy
<b>Base-line</b>	<b>0.88</b>	<b>0.9</b>	<b>0.88</b>	<b>1.1</b>	<b>1.1</b>	<b>0.65</b>		
Base-line Deviation from 1.00	0.12	0.1	0.12	0.1	0.1	0.35	0.15	0.85
<b>Endline</b>	<b>1.13</b>	<b>0.9</b>	<b>0.94</b>	<b>0.92</b>	<b>1.12</b>	<b>0.63</b>		
Endline Deviation from 1.00	0.13	0.1	0.06	0.08	0.12	0.35	0.14	0.86
-Under reporting at baseline for ANC1, FP, Delivery and Pneumonia: Average = 0.88								
-Overreporting at base-line for Malaria and HIV = 1.11								
- Overall improvement in accuracy								
								0.01
<b>Difference in Difference in accuracy /DID</b>							(0.1337 - 0.0083) = 0.1254	

#### **Timeliness of report submission**

Report timeliness was evaluated using the expected report to be submitted timely between the intervention and control sites. Only 4 of the anticipated six services and OPD reports, for both intervention and control

sites, were timely submitted according to the base-line finding. In contrast, all of the reports (100%) of the intervention groups at the end-line were reported on time Ccompared to the control sites were below 70% (Table 2).

**Table 2. Report timeliness in Wogera and Tach Armachiho districts before and after the implementation of PBFNI, 2021**

	Baseline				End line			
	Tach armachiho		Wogera		Tach armachiho		Wogera	
Report timeliness	N	%	N	%	N	%	N	%
Service report expected M1	6		6		6		6	
Service report submitted timely M1	4	67	4	67	4	67	6	100
Service report expected M2	6		6		6		6	
Service report submitted timely M2	4	67	4	67	4	67	6	100
OPD report expected M1	6		6		6		6	
OPD report submitted timely M1	4	67	4	67	4	67	6	100
OPD report expected M2	6		6		6		6	
OPD report submitted timely M2	4	67	4	67	5	83	6	100

**Report completeness**

Report completeness was measured using a total of six components to be reported to be considered as complete. However, only three and four were submitted to the next Level in Tach Armachiho before and after the Intervention. In the pre-intervention

period, only four complete reports were submitted to the next higher Level in the Wogera district. On the other hand, five and six complete reports were submitted in Month1 and Month 2 after the PBNI implementation in the intervention district, respectively (Table 3).

**Table 3. Report completeness in Wogera and Tach Armachiho districts before and after the implementation of PBFNI, 2021**

	Baseline				End line			
	Tach Armachiho		Wogera		Tach Armachiho		Wogera	
Report timeliness	N	%	N	%	N	%	N	%
service report expected M1	6		6		6		6	
Complete service report submitted M1	3	50	4	67	4	67	5	83
service report expected M2	6		6		6		6	
Complete service report submitted to M2	3	50	4	67	4	67	6	100
OPD report expected M1	6		6		6		6	
Complete OPD report submitted to M1	4	67	3	50	4	67	5	83
OPD report expected M2	6		6		6		6	
Complete OPD report submitted to M2	4	67	3	50	4	67	6	100

**Overall Data Quality Change**

Overall data quality scores were assessed based on the three dimensions in the intervention and comparison districts in the base-line and end lines survey. The average data quality score for Month 1 in intervention districts increased from 46.7% to 61.7% and from 48% to 60% in the comparison district during the base-line and end-line period, respectively. Similarly, for Month

2, the average change in data quality score for Tach Armachiho and Wogera increased from 53.3% to 62.5% and 75% to 100%, respectively. Thus, the average data quality change in Month1 and Month2 from base-line to end line in Tach Armachiho were 11.7% and 9.2%, and for Wogera, 15% and 25%, respectively, which shows a visible change of data quality due to the PBNI intervention (Table 4).

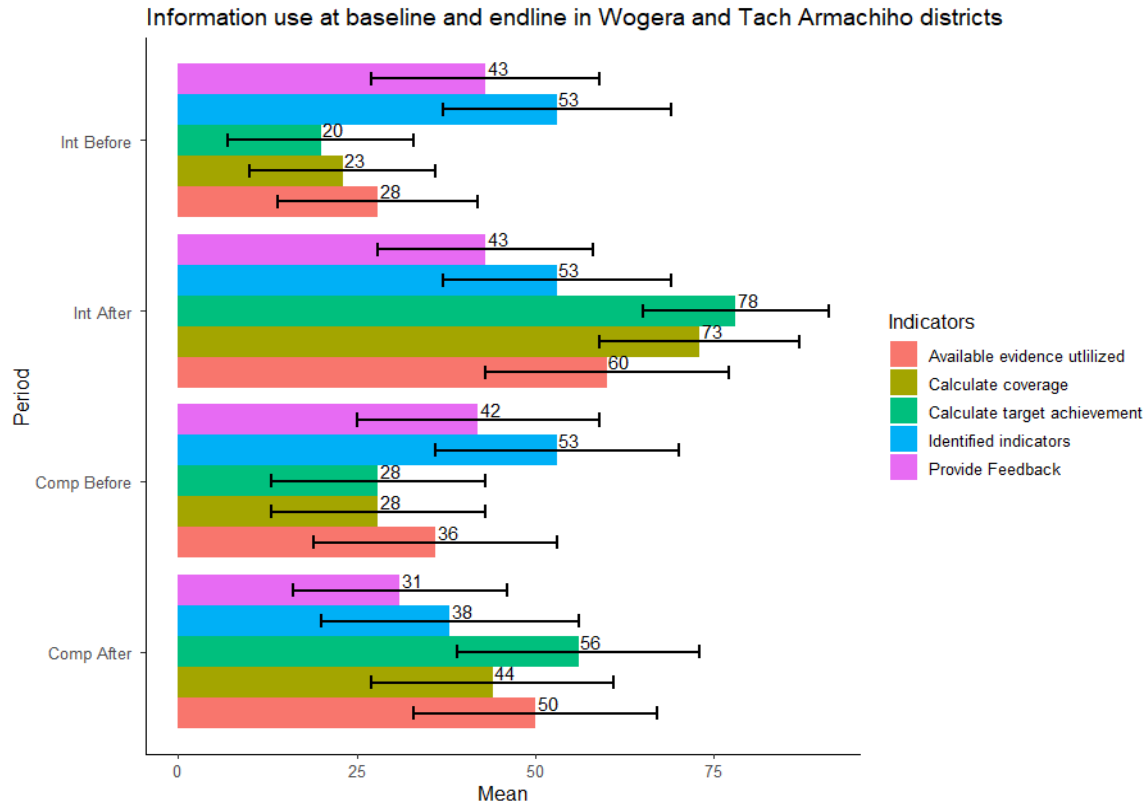
**Table 4. Average level of data quality in Wogera and Tach Armachiho districts before and after the implementation of PBFNI, 2021**

	Wogera				Tach Armachiho			
	Timely (%)	Complete (%)	Accurate (%)	Average (%)	Timely (%)	Complete (%)	Accurate (%)	Average (%)
Before M1	20	20	6.7	46.7	20	15	13.3	48.3
After M1	30	25	6.7	61.7	20	20	20	60
Before M2	20	15	40	75	20	20	13.3	53.3
After M2	30	30	40	100	22.5	20	20	62.5

**Information use among departments before and after the PBFNI intervention**

The Level of information use among department and facilities heads in the Wogera and Tach Armachiho districts was assessed using five indicators as a composite index. Departments and facilities heads who evaluated their performance by comparing a target with achievement increased from 28% to 56% and 20% to 78% from base-line to end line in Tach Armachiho and

Wogera districts, respectively. Similarly, the proportion of departments that calculated program coverage increased from 28% to 44% in Tach Armachiho and 23% to 73 % in the Wogera district. Evidence on -using available information to inform decisions was found in 36% and 28% at the base-line and 50% and 60% at the end-line assessment in Tach Armachiho and Wogera districts, respectively (Figure 1).



**Figure 1: Performance of composite indicators for information use in Wogera and Tach Armachiho before and after the PBFNI, 2021**

**Average information use in the Wogera district**

The health facilities in the Wogera district were assigned to the Intervention using the stepped wedge approach. Of the six health centers, Ambagiorgis and Birra Health centers were assigned to the Intervention at the first stage. Ambagiorgis scored 40%, 45%, 100%, and 83% in the assessment's first, second, third, and fourth rounds. For Bira and Gedebye health centers, the Level of information use increased from 41% and 32% to 72% and 69% in the second and

fourth rounds of assessment, respectively. Similarly, Dergaj, Woybey, and Tirgosgie health centers scored the level of information from 12%, 27%, and 35%, to 40% and 53%, respectively. The average value of the use of information for the second and third round assessment increased from 40% to 43% (P=0.001) and 87 % (P=0.001), respectively. Likewise, the average value of information used for decisions significantly increased from the baseline of 31% to 61% (P=0.008) in the end-line assessment (Table 5).

Table 5. The average level of information use among health centers in Wogera district, 2021.

	Amb a- Gior gis	Bira	Gedebye	Dergaj	Woybey	Tirgosge	N, Average information used for Intervention	N, Average information use for Comparison	Mean Difference (P- value)
1st round	40	16	38	12	27	55	6(31)	-	-
2nd round	45	41	32	21	21	31	2(43)	4(26.5)	16.5(0.001)*
3rd round	100	100	75	75	50	50	4(87.5)	2(50)	37.5(0.001)*
4th round	82.5	72	68.5	40	53	52.5	6(61.4)	-	30.4 (0.008)**

\*Stands for Comparison between intervention and control groups within the same round;  
\*\*Stands for Comparison between base-line (control) and end-line (Intervention) groups

The overall program effectiveness among the Intervention and the comparison districts was measured using the difference-in-difference analysis based on the pre-intervention and post-intervention data. The average -of information use at the base-line assessment for Tach Armachiho and Wogera districts was 37% [24, 50] and 33% [30%, 58%], respectively. For the -line assessment, the level of information used in Tach

Armachiho and Wogera was 43% [30%, 58%] and 59% [40%, 70%], respectively.

The DID analysis showed that the PBNI resulted in a 25 percentage points (2%, 47%),  $P=0.003$  net program change on the average Level of use of information in the intervention district compared to its counterparts (Table 6).

Table 6. Effectiveness of PBNI on the Level of information use among departments in Wogera and Tach Armachiho districts, 2021

Parameter	Program Effect size	95% CI	P-value
Intercept		0.37 [0.25, 0.48]	$P<.001$
Group (Treated vs. Control)		-0.04 [-0.20, 0.12]	$P=0.65$
Time (After vs. Before)		0.03 [-0.13, 0.19]	$P=.069$
DID (Group*Time)		0.25 [0.02, 0.47]	$P=.003$
	<b>Before</b>	<b>After</b>	<b>Change over time</b>
Comparison	0.37	0.4	0.03
Intervention	0.33	0.69	0.28
Change across groups	0.04	0.29	0.25

### Discussions

This study evidenced that the performance-based non-financial incentives (PBNI) program resulted in a 25 percent improvement in information use in the intervention district compared to its counterpart. Besides, the average data quality score for Month 1 in intervention districts increased from 47% to 62% and from 48% to 60% in the comparison district during the base-line and end-line period, respectively.

The average Level of data use for evidence-based decision-making in the intervention district was

significantly improved from the base-line to the end-line period compared to the comparison district. The finding was in line with the study done in Botswana that reported improved use of health data for disease surveillance, operational research, and planning purposes after implementing the Monitoring and Evaluation (M&E) task shifting as part of the HIS intervention (1). It was also congruent with the Ethiopian Information Revolution Roadmap and the Health Sector Transformation plan (HSTP) strategies (2,3). A good culture of data use among health workers helps to improve resource allocation and wise use of

scarce resources in the healthcare system, enhancing the quality of care rendered for clients and patients. On the other hand, a poor culture of data use leads to compromised health service delivery at the point of care. Thus, the PBNI had immensely improved the culture of data use at granular levels.

The intervention district improved in calculating target versus achievements and utilizing available evidence to make decisions. Nonetheless, most health workers were not providing feedback to lower levels, which is unsatisfactory compared to the desired level (4). Besides, it was also inconsistent with the findings obtained in Egypt that reported the effectiveness of Feedback and Analytic Comparison Tool intervention in improving clinicians' capacity to provide feedback (5). The Difference might be because the latter was a single intervention primarily targeted at improving the feedback mechanisms. Generating synthesized evidence indicating the health workers' strength and weakness in the health system, is one of the solemn expected activities, among others, in realizing the IR agenda (2). Thus, ineffective feedback mechanisms render poor quality services to clients and patients.

The PBNI intervention did not result in a significant change in identifying key performance indicators to monitor and evaluate performance against the target set among health workers. It was inconsistent with a single study done in Zanzibar and Tanzania that showed the data-use workshop improved local use of target indicators (6). Identifying and utilizing indicators in the health system enables health workers to measure the occurrence of disease or other health conditions and factors contributing to it (7). Contrarily, most health workers were not demonstrating using indicators and analyzing the performance achievements made in the health facilities. Besides, they missed the importance of indicators linking information to actions (8).

The average data quality score for the intervention district was higher than the comparison district. The Intervention resulted in a remarkable change in data quality score from month1 to month 2 compared to the comparison district. Quality data is a driver for rendering quality services and helps address health system equity (3,10). Thus, this Intervention helped health workers produce quality data that enhanced informed decisions. In general, quality data's benefits include reduced errors and improved clinical decision-making (11).

#### **Limitation of the study**

This study evidenced that PBNI played an essential role in improving data quality and enhanced the use of routine health information for decisions. However, the Hawthorn effect, participants' disclosure from the Intervention, small sample size, and short intervention period were some of the limitations of the study. Whereas, use of implementation science research method, iterative data collection technique with modifications of implementation strategy, and method triangulations were the main strengths of this study.

#### **Conclusions**

The performance-based non-financial incentive intervention has brought significant change in health data quality and information use in the Wogera district. Most health workers utilized available evidence while making decisions, calculating target and program coverage in their departments. The data quality dimensions, such as report timeliness, completeness, and consistency, were significantly improved from the base-line to the end line period. Thus, it is recommended to motivate health workers working in similar settings and contexts to improve the quality and use of health information by following the intervention model.

#### **Conflict of interest**

Authors declared no financial and non-financial conflict of interest.

#### **Availability of data and materials**

Data will be available upon the request from the corresponding author

#### **Consent for publication**

Not applicable

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#### **Abbreviations**

CIFR: Consolidated Framework for Implementation Research, DUP: Data Use Partnership, HC: Health Center, HEWs: Health Extension Workers, HIS: Health Information System, HMIS: Health Management Information System, PBNI: Performance Based Non-Financial In-Kind Incentive, HWS: Health Workers, HEWS: Health Extension Workers, DID: Difference in Difference, PMT: Performance Monitoring Team, ZHD: Zonal Health Department, WHO: World Health Organization, PRM: Performance Review Meeting, RE-AIM: Reach, Effectiveness, Adoption, Implementation, and Maintenance, RHB: Regional Health Bureau, UoG: University of Gondar

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