Health workers’ use of routine health information and related factors at public health institutions in Illubabor Zone, Western Ethiopia

Amanuel Benti Abdisa1, Kifle Woldemichael Hajito2, Dawit Wolde Daka3, Meskerem Seboka Ergiba3, Asaye Birhanu Senay2, Ketema Lemma Abdi4 and Muluemebet Abera Wordofa5

Abstract

Background: Proper utilization of health data has paramount importance for health service management. However, it is less practiced in developing countries, including Ethiopia. Therefore, this study aimed to assess routine health information utilization and identify factors associated with it among health workers in the Illubabor zone, Western Ethiopia.

Methods: A facility based cross-sectional study was conducted from March to June 2021 with a total of 423 randomly selected health workers. Data were collected using an interviewer-administered questionnaire that was developed based on the performance of routine information system management (PRISM) framework. We created composite variables for health workers' knowledge, attitude, abilities, and information utilization based on existing data. Multivariate logistic regression analysis was performed and the statistical association between the outcome and independent variables was declared using 95% CI and a $P < 0.05$.

Results: About two-thirds or 279 health workers (66.0%, 95% CI 61.3, 70.4) had good health information utilization. Two-thirds of health workers think organizational decision-making culture (67.1%, 95% CI 62.6, 71.5) and facility managers’ or supervisors’ promotion of information use (65.5%, 95% CI 60.9, 69.9) are positive. Over half of health workers (57.0%, 95% CI 52.2, 61.6) have a positive attitude toward data management, and the majority (85.8%, 95% CI 82.2, 88.9) believe they are competent of performing routine data analysis and interpretation activities. Only about two-thirds of health workers (65.5%, 95% CI 60.9, 69.9) were proficient in data analysis and interpretation.

Conclusions: The use of routine health information was lower than the national target and data from other literatures. Unacceptably large number of health personnel did not use information. As a result, efforts should be made to increase health workers’ data management knowledge and skills, as well as the organizational culture of data utilization.

Keywords: Culture, Information use, Health workers, Knowledge, Perception, Skill, Ethiopia

Introduction

A health information system (HIS) is one of the six building blocks of a health system that interacts with the remaining blocks. An effective HIS produces reliable and real-time evidence on the health status of a population, determinants of health and health system performance. It provides information that aids in the direction

© The Author(s) 2022. Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article’s Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article’s Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated in a credit line to the data.
of activities in all other components of the health system, such as the health workforce, service delivery, access to essential medicines, finance, and health system leadership and governance. Beyond health system management, the routine health information system can be a source of data for research purposes [1–8].

Proper information utilization is considered the foundation for effective health system performance and a strategy to attain health-related targets in the Sustainable Development Goal (SDG) era. Despite this fact, the narrow scope and weaknesses of the existing information systems coupled with a low culture of information use are hindering the progress made towards health goals. The major determinants of information use are categorized as technical factors, behavioral factors, and organizational factors. Low access to quality health data, influenced by a lack of data management and analysis capacity, a lack of information promotion culture at organizations, and an unfavorable attitude toward data, continue to be the main challenges to information utilization in low and middle income countries' health system [9–14].

The government of Ethiopia has considered strengthening the health information system as a mechanism to enable effective monitoring and evaluation of health policies, programs, projects and strategies since 2006. However, until the fourth health sector development plan (HSDP IV), little emphasis has been given to evidence-based decision-making. In Ethiopia, the main source of evidence for routine health decisions is the health management information system, and policy-level decisions are made based on evidence generated through national surveys, censuses and planned operational research. Following the introduction of the health sector transformation agenda, data-driven decision making has taken due consideration as it is reflected in one of the agendas, ‘Information Revolution’ [15, 16].

Though Ethiopia has implemented routine health information systems for more than a decade, the progress made in terms of information utilization is steady. Information utilization among health workers stands at 57.42% [17]. Whereas cross-sectional studies revealed that information utilization among health workers in Ethiopia ranged from 37.3 to 78.5% [18, 19]. Weak information utilization at the point of data generation is attributed to various factors, mainly grouped under technical, organizational, and behavioral factors. Health worker’s characteristics, availability of HIS focused training and supportive supervision, good perceived culture of health information, having a standard set of indicators, competence of health workers on health information tasks, and good governance were the determinants of information use [17, 19, 20]. Understanding the factors affecting of health information use at the point of data generation by taking into consideration the broader determinants has paramount importance for improving the health information system. Therefore, this study aimed to determine the level of information utilization and factors associated with it among health workers and health care managers at various levels of the health system in Illubabor zone, Oromia regional state, Ethiopia.

Methods and materials

Study setting and period

The study was conducted in public health facilities and health administrations of the Illubabor zone, Western Ethiopia. Illubabor is one of the 20 zonal administrations in Oromia Regional State, located 600 km west of Addis Ababa, the capital city of Ethiopia. The total population of the zonal administration was 968, 303 as of 2020. The zonal administration is comprised of 14 rural woredas, 1 town administration, 23 urban kebeles and 263 rural kebeles. Regarding health service coverage, there were 2 hospitals, 41 health centers, and 263 health posts. Moreover, the zone was comprised of 1114 health workers with various professional categories and 606 supportive staff. Of the health workers, 60 (5.4%) were health informatics technicians (HIT) [21]. The study was conducted from March to June 2021 (Fig. 1).

Study design and participant’s selection

An institution-based cross-sectional study was conducted in the selected health facilities and health administrations of the zone. All health workers who were directly involved in health data management (recording, data collection, data aggregation, data analysis, interpretation, and reporting), as well as those who were the focal of the department or the head of the health institution, and those with six months or more of service experience, were eligible. Health workers who were on annual leave, sick leave, maternity leave, and study leave were excluded.

The sample size was determined by using the OpenEpi Version 3.01 sample size calculator for cross-sectional surveys [22] considering the assumptions and parameters: 95% confidence level, 5% margin of error, proportion of routine health information among health professionals as 78.5% from the study conducted in Gondar [19], 1.5 design effect, and a 10% non-response rate. The calculated sample size yields 428.

A multi-stage sampling strategy was employed to select health facilities, health administrations, and study participants. In the first stage, 50% of woredas (n = 7) were selected randomly. We have included all health centers in the selected woredas and hospitals in the zone. Health Workers were selected using a purposive sampling strategy. The selected 7 woredas comprise of 23 health centers. Eight health workers that fulfilled
the inclusion criteria were included in the study from each of the selected health centers ($n = 184$). A total of 50 health workers were selected from each of the hospitals, making a total of 100 health workers and eighteen health workers were selected from the selected woreda health offices ($n = 126$). Moreover, eighteen health workers were selected and included in the study from the zonal health department.

The government of Ethiopia is administratively divided into regional states and city administrations. Regions are further divided into zones and zones into lower administrative units called Woredas or districts. Whereas, Woredas are sub divided into the lowest administrative units called a kebele. Woredas serve an estimated 100,000 people and are governed by an elected Woreda council. Based on health system of Ethiopia, on average Woredas have 20 health posts, 4 health center and 1 primary hospital. Thus, the woreda health office is responsible for managing the health facilities under it. Each health units (zonal health department, woreda health office, health facilities) of Ethiopian health system have departments or case teams equipped with one focal and health workers under it responsible for coordinating and managing health service delivery [23].

**Data collection**

A structured questionnaire was used to collect the data. The questionnaire was adapted from the Performance of Routine Information System Management (PRISM) framework [24]. Moreover, a template was developed to collect data regarding the availability of routine health information system inputs and visualizations in the health facilities and health administrations. The paper based questionnaire was uploaded to the Open Data Kit (ODK) for data collection. Additional file 1: The questionnaire file.

The data collection tool was translated into local languages (Afan Oromo and Amharic) and then back translated into English by two independent experienced translators to ensure consistency. A pre-test was conducted on 5% of the sample size and corrections were made.

Seven data collectors who were health professionals and had a bachelors of science degree were recruited from outside of the study area. Moreover, two supervisors with a health background and a master’s degree were involved in the study. A two-day training was given to data collectors and supervisors focused on data collection tools, data collection techniques, research ethics, and the application of the Open Data Kit (ODK). Data
were collected at the health institutions after taking consent from health workers. Supervisors have closely monitored the overall data collection process and provided support at the field level whenever needed.

**Study variables**

The outcome variable was routine health information utilization. The independent variables were health workers’ characteristics (age, sex, service experience, qualification, professional background and position); health workers’ training, mentorship, and supervision status related to routine health data management; health workers’ knowledge of routine health data and its management; health workers self-perception of health data and its management; perceived organizational culture of information use promotions; and health workers’ self-efficacy and skill in a data analysis and interpretation.

Routine health information utilization was measured using 10 items with a Likert scale ranging from strongly disagreed (1) to strongly agreed (5). Among the topics covered were use of data for day-to-day management of health services, identifying and managing epidemics, observing the trend of health services in the catchment area, planning, drug supply and management, disease prioritization, resource allocation, monitoring performance, decision-making, and community mobilization and discussion. Those health workers above the mean value were categorized as having good information use practices and those below the mean value as having poor information use practices.

The health worker’s knowledge was measured using 27 items, each comprised of ‘Yes/No’ responses. Health workers who responded above median value of the items were regarded as having good comprehensive knowledge, while those below the median value were categorized as having poor comprehensive knowledge.

Six items on a scale of ‘0’ to ‘10’ were used to assess health workers’ self-efficacy in health data analysis and interpretation. The self-efficacy items are comprised of: ‘I can check data accuracy, I can calculate percentage or rate correctly, I can plot trends on a chart, I can explain the findings of data analysis and its implications, and I can use data to identify performance gaps and their root cause.’ To categorize health workers’ self-efficacy as “High” (> 34) or “Low” [33], a threshold demarcation formula [(Total highest Score-Total lowest score)/2] + Total lowest score was used.

Health workers’ skills towards data analysis (computation of percent and rate) and interpretation were measured using 6 items. Correct responses were labeled as ‘Yes = 1’ and incorrect responses as ‘No = 0’. The questions were distributed to health workers, and responses were collected. Health workers who scored above the median value were regarded as having ‘high competency’ and those below median value as having ‘low competency’.

Health workers’ self-perception of health data and management was measured using 6 items having a Likert scale ranging from “strongly disagree” (1) to “Strongly agree” (5). Mean value was used as a cutoff point to categorize health workers’ perception as “favorable” (Mean-value ≥ 21.0) and “unfavorable” (Mean-value < 21).

The perceived information use promotion culture of the organization was assessed using ten items on a Likert scale ranging from strongly disagree (1) to strongly agree (5). A demarcation formula was used to categorize health workers’ perception as ‘Favorable’ (value > 31) and ‘Unfavorable’ (value < 30). Likewise, promotion of information utilization by facility managers or supervisors was measured using 10 items and categorization was made using a demarcation formula: ‘Favorable’ (value > 31) and ‘Unfavorable’ (value < 30). Information use promotion by department staff was measured using eight items ranging from strongly disagree (1) to strongly agree (5). The mean value was used as a cutoff value to categorize department staff’s promotion as ‘favorable’ and ‘unfavorable’.

**Data processing and analysis**

Each data record was checked for completeness and consistency, and duplicated records were removed. The data were transferred to SPSS version 25 for analysis, and descriptive statistics were mostly utilized to describe and summarize the characteristics of health workers. Secondly, bivariate logistic regression was used to identify candidate variables for multivariate logistic regression analysis. The primary outcome of the study was routine information utilization from the health management information system. In the bivariate logistic regression variables with $P < 0.25$ were taken as candidates to multivariate logistic regression. The strength of association was expressed in Odds ratio, and 95% confidence interval and $P < 0.05$ were used as cut-off point to declare significance in the final model.

**Results**

**Characteristics of health workers**

A total of 423 health workers participated in the study, with a response rate of 98.8%. Approximately four out of every ten health workers (43%) came from health centers, and nearly one-third (29%) came from the woreda health office. Six out of ten of the health workers (60%) were males and most (92%) had two or more years of service experience. The mean age of health workers was 31 years (SD 5.85) with a minimum and maximum age of 20 and 57 years, respectively. In terms of profession, nurses and
midwives made up the majority (55%) of health workers, followed by health officers (14%).

Three hundred seventy-five (88.7%) health workers were trained on health information system. Out of this, 193 (57%) were trained before the last 12 months of survey period and 144 (43%) trained in the last 12 months.

Three hundred ninety-three (92.9%) health workers had received at least one supportive supervision focused on health information system in the last six months of the survey period. Likewise, 297 (70%) of health workers were mentored at least once in the last 6 months of the survey period. Out of those health workers supervised in the last 6 months, 194 (49.4%) were supervised once, 160 (40.7%) were supervised twice, and 39 (9.9%) have been supervised three or more times (Table 1).

### Knowledge of data management and use

Six out of ten of the health workers had good knowledge of the reasons for collecting and using aggregated disease data (59.1%) and aggregated immunization data (62.2%). The majority of health workers (85.1%) had a strong understanding of why aggregated geographic data is collected and used, as well as the purposes of population or demographic data (75.7%). Eight out of ten health workers (81.1%) had an excellent understanding of data quality aspects, while 58.6% had a good understanding of data quality improvement measures (Fig. 2).

### Promotion of information use in the workplace (decision-making climate)

A majority of health workers agreed that organizational decisions were made based on evidence and data (72.6%), history/what was done in the previous periods (73.3%), health sector strategic objectives (74%), health needs of the catchment population (71.9%), relevant cost of interventions (71.2%), and taking inputs from relevant staff (69.7%). Overall, two-thirds (67.1%, 95% CI 62.6, 71.5) of health workers agreed that the organizational decision making climate was favorable (Table 2).

### Information use promotion by facility managers or supervisors

Majority of health workers agreed that health institution managers or supervisors seek inputs from relevant staffs (71.2%), emphasis data quality procedures to be followed during data management (68.3%), promote health information system feedback mechanisms (70.4%), and ensure that performance data are reviewed and discussed in the regular meetings (64.1%). Overall, two-thirds of health workers (65.5%, 95% CI 60.9, 69.9) agreed that RHIS promotion by facility managers or supervisors was favorable (Table 2).

### Table 1 Characteristics of health workers, and their training and supervision status in public health institutions of Illubabor zone, Ethiopia, March to June 2021

| Variables                              | Frequency (N = 423) | Percent (%) |
|----------------------------------------|---------------------|-------------|
| Age in years                           |                     |             |
| 20–24                                  | 41                  | 9.7         |
| 25–29                                  | 175                 | 41.4        |
| 30–34                                  | 110                 | 26.0        |
| 35–39                                  | 69                  | 16.3        |
| ≥40                                    | 28                  | 6.6         |
| Work place                             |                     |             |
| Admin unit                             | 144                 | 34.0        |
| Hospital                               | 95                  | 22.5        |
| Health center                          | 184                 | 43.5        |
| Sex                                    |                     |             |
| Male                                   | 255                 | 60.0        |
| Female                                 | 168                 | 40.0        |
| Service experience in years            |                     |             |
| ≤5 years                               | 111                 | 26.2        |
| 6–9 years                              | 181                 | 42.8        |
| ≥10 years                              | 131                 | 31.0        |
| Profession                             |                     |             |
| Master’s degree in public health       | 30                  | 7.1         |
| Physician                              | 7                   | 1.7         |
| Health officer                         | 59                  | 13.9        |
| Nurses and midwifery                   | 234                 | 55.3        |
| Health informatics technician           | 30                  | 7.1         |
| Laboratory professionals               | 21                  | 4.9         |
| Druggist or pharmacist                 | 18                  | 4.3         |
| Other profession                       | 24                  | 6.1         |
| Position or title                      |                     |             |
| Head                                   | 168                 | 39.7        |
| Expert                                 | 255                 | 60.3        |
| RHIS training                          |                     |             |
| Last 12 months                         | 144                 | 34.0        |
| Before last 12 months                  | 193                 | 45.6        |
| No training                            | 86                  | 20.3        |
| RHIS supervision last 6 months          |                     |             |
| Yes                                    | 393                 | 92.9        |
| No                                     | 30                  | 7.1         |
| RHIS supervision frequency in the last 6 months (n = 393) | | |
| Once                                   | 194                 | 49.4        |
| Twice                                  | 160                 | 40.7        |
| Three or more times                    | 39                  | 9.9         |

* Other profession: environmental (n = 10), health education (n = 5), health extension worker level-IV (n = 5), applied biology (n = 1), health service management (n = 1), anesthesia (n = 1), biomedical (n = 1)
Promotion of information use by facility staffs
A majority of the health workers agreed that department staff in their health institutions complete RHIS tasks (69%), display commitment to ensure data quality and evidence-based decision making (68.1%), are held accountable for poor performance (74.7%) and prepare data visuals showing achievements toward targets (72.1%). Overall, seven out of ten (71.9%, 95% CI 67.4, 76.0) of health workers agreed that department staff had a favorable information use promotion culture in their health institutions (Table 3).

Health workers’ perception on RHIS data and management
A majority of health workers feel discouraged when data collected is not used (66.9%), and collect data only if it is useful to them (69.5%). One-third of health workers believe that collecting data is tedious (33.1%) and that data collection tasks are not the responsibility of health-care providers (29.6%). Overall, over half (57.0%, 95% CI 52.2, 61.6) of the health workers had a favorable attitude towards RHIS data and its management (Fig. 3).

Self-efficacy of data management and use
With rates ranging from 58.9 to 75.9%, the majority of health workers believe they can use data for operational decisions, interpret data analysis findings, identify performance gaps, calculate percentages and rates, plot trends on charts, and check data accuracy. Overall, greater than eight out of ten (85.8%, 95% CI 82.2, 88.9) of health workers believe that they had a high self-efficacy of data analysis, interpretation and use (Table 4).

Data analysis and interpretation skill of health workers
The majority of health workers had high competency in data analysis (83.9%), and interpreting data (71.6%). Slightly more than half (54.1%) of health workers were competent in plotting graphs based on given data. Overall, two-thirds (65.5%, 95% CI 60.9, 69.9) of health workers had high competency in data analysis and interpretation (Fig. 4).

Information utilization
The majority of health workers use data to identify and manage epidemics (75.7%), to observe the trend of health services in the catchment area (72.8%), to plan (81.8%), to manage medicine supply and management (77.5%), and disease prioritization (79.2%). Information was used by slightly more than half of health workers (56.3%) for day-to-day management of health services. Overall, two-thirds of health workers (66%, 95% CI 61.3, 70.4) had good information use habits (Table 5).

Factors associated with information utilization
Health workers’ service experience, title or position, work place, RHI trainings, knowledge of data quality improving strategies, self-efficacy of data analysis and
### Table 2  Information utilization promotion culture at public health institutions of Illubabor zone, Ethiopia, March to June 2021

| Variable                                                                 | Frequency (N = 423) | Percent (%) (95% CI) | Mean (SD)  |
|--------------------------------------------------------------------------|----------------------|-----------------------|------------|
| In organization decisions are made based on:                            |                      |                       |            |
| Personal preference of decision makers                                   | 230                  | 54.4(49.6–59.1)       | 3.0(1.07)  |
| Superior directives                                                      | 199                  | 47.0(42.3–51.8)       | 3.2(1.07)  |
| Evidence/ facts/data                                                     | 307                  | 72.6(68.2–76.7)       | 3.7(0.99)  |
| History/ what was done last year                                        | 310                  | 73.6(68.9–77.3)       | 3.4(0.99)  |
| Funding directives from higher level                                     | 235                  | 55.6(50.8–60.3)       | 3.0(1.22)  |
| Political consideration                                                  | 226                  | 53.4(48.7–58.2)       | 2.9(1.21)  |
| Health sector strategic objectives                                       | 313                  | 74.0(69.7–78.0)       | 3.7(0.97)  |
| Health needs of the catchment population                                | 310                  | 73.3(68.9–77.3)       | 3.4(0.99)  |
| Relative cost of interventions                                           | 301                  | 71.2(66.7–75.3)       | 3.5(0.95)  |
| Taking inputs from relevant staffs                                      | 295                  | 69.7(65.2–74.0)       | 3.5(0.97)  |
| Organizational decision making climate is:                              |                      |                       |            |
| Favorable                                                                | 284                  | 67.1(62.6–71.5)       |            |
| Unfavorable                                                              | 139                  | 32.9(28.5–37.5)       |            |
| Health facility managers or supervisors:                                |                      |                       |            |
| Seek inputs from relevant staffs                                        | 301                  | 71.2(66.7–75.3)       | 3.5(0.95)  |
| Emphasis that data quality procedures be followed in the compilation and submission of period reports | 289                  | 68.3(63.8–72.6)       | 3.5(1.01)  |
| Promote feedback mechanism to share or present information within the team and to lower and upper level of the system | 298                  | 70.4(66.0–74.7)       | 3.3(1.04)  |
| Use routine health information system data for service performance monitoring and target setting | 319                  | 75.4(71.1–79.3)       | 3.6(0.88)  |
| Emphasis the need to use RHIS data to identify potential disparities in service delivery or use | 301                  | 71.2(66.7–75.3)       | 3.4(1.04)  |
| Conduct routine data quality checks at points where data are captured, processed and aggregated | 299                  | 70.7(66.2–74.9)       | 3.4(1.02)  |
| Ensure that performance data are reviewed and discussed in the regular meetings | 271                  | 64.1(59.4–68.5)       | 3.2(1.10)  |
| Ensure that decisions are made and follow-up actions identified in performance monitoring team meetings based on presented data | 264                  | 62.4(57.7–66.9)       | 3.2(1.08)  |
| Provide regular feedback on reported data quality to the person responsible for compiling and reporting data | 237                  | 56.0(51.3–60.7)       | 3.0(1.11)  |
| Recognize or reward for good work performance                           | 208                  | 49.2(44.4–53.9)       | 2.8(1.27)  |
| Routine health information system promotion by facility managers or supervisors is: |                      |                       |            |
| Favorable                                                                | 277                  | 65.5(60.9–69.9)       |            |
| Unfavorable                                                              | 146                  | 34.5(30.1–39.2)       |            |

### Table 3  Information use promotion by department staffs at public health institutions of Illubabor zone, Ethiopia, March to June 2021

| Variable                                                                 | Frequency | Percent (%) (95% CI) | Mean (SD) |
|--------------------------------------------------------------------------|-----------|----------------------|-----------|
| Department staffs:                                                       |           |                      |           |
| Complete RHIS task (recording, reporting, processing, aggregation and reporting) on time | 292       | 69.0(64.5–73.3)      | 3.5(0.99) |
| Display commitment to ensure data quality and evidence-based decision making | 288       | 68.1(63.5–72.4)      | 3.3(0.98) |
| Pursue indicative national targets and set feasible local targets for essential service performance | 304       | 71.9(67.4–76.0)      | 3.4(0.99) |
| Feel personal responsibility for failing to reach performance targets    | 299       | 70.7(66.2–74.9)      | 3.3(1.04) |
| Prepare data visuals (graphs, tables, maps) showing achievement towards targets | 305       | 72.1(67.7–76.2)      | 3.5(0.92) |
| Can monitor whether an initiative or intervention achieved the target or goal | 305       | 72.1(67.7–76.2)      | 3.3(1.06) |
| Are held accountable for poor performance (e.g., failure to meet reporting deadlines) | 316       | 74.7(70.4–78.7)      | 3.6(0.95) |
| Admits mistakes (related to data management) if/when they occur and take corrective action | 304       | 71.9(67.4–76.0)      | 3.6(0.96) |
| Promotion of information use by department staffs                         |           |                      |           |
| Favorable                                                                | 304       | 71.9(67.4–76.0)      |           |
| Unfavorable                                                              | 119       | 28.1(24.0–32.6)      |           |
interpretations, data analysis and interpretation competency, perceived organizational culture of information use promotion, and information use promotion by department staffs were all statistically associated with good information use practices among health workers in the multivariate logistic regression. The following is the interpretation:

When comparing health workers with more than or equal to 10 years of service experience to those with less than 5 years, the odds of good information use practices were four times higher (AOR = 4.01, 95% CI 1.59, 10.12). When compared to experts, head health workers were twice as likely to have good information use practices (AOR = 1.85, 95% CI 1.01, 3.39).

Information use practices were 85% (AOR = 0.15, 95% CI 0.05, 0.41) and 86% (AOR = 0.14, 95% CI 0.05, 0.39) less likely among health workers who had received training on RHI compared to those who did not train. The odds of health information utilization were 58% (AOR = 0.42, 95% CI: 0.18, 0.98) less likely among health workers at hospitals compared to administrative unit (zonal or woreda health offices). The odds of information use were two times (AOR = 2.01, 95% CI 1.16, 3.47) more likely among health workers who were knowledgeable about data quality improving strategies compared to their counter parts.

### Table 4  Health workers' self-efficacy of data analysis, interpretation and use

| Variable                                                   | Frequency | Percent (%) (95% CI) | Mean (SD) |
|------------------------------------------------------------|-----------|----------------------|-----------|
| I can check data accuracy                                  | 321       | 75.9 (71.6–79.8)     | 7.35 (1.59) |
| I can calculate percentage (or rate) correctly             | 306       | 72.3 (67.9–76.5)     | 7.45 (1.82) |
| I can plot a trend on chart                                | 307       | 72.6 (68.2–76.7)     | 7.25 (1.71) |
| I can explain the findings of data analysis and their implications | 274       | 64.8 (60.1–69.2)     | 6.95 (1.77) |
| I can use data for identifying performance gaps and its root cause | 304       | 71.9 (67.4–76.0)     | 7.19 (1.56) |
| I can use data for operational (or management) decision    | 249       | 58.9 (54.1–63.5)     | 6.66 (1.72) |

Health workers self-efficacy

|                | Frequency | Percent (%) (95% CI) | Mean (SD) |
|----------------|-----------|----------------------|-----------|
| High           | 363       | 85.8 (82.2–88.9)     |           |
| Low            | 60        | 14.2 (11.1–17.8)     |           |
Health information utilization was 2.5 times (AOR = 2.51, 95% CI 1.17, 5.36) more likely among health workers with high self-efficacy of data analysis and interpretation compared to low self-efficacy. Whereas, the odds of information utilization were three times (AOR = 2.90, 95% CI 1.71, 4.91) more likely in health workers who were competent in data analysis and interpretation compared to their counterparts.

Good information use practice was about three times (AOR = 2.61, 95% CI 1.43, 4.77) more likely among health workers who perceived organizational information use promotion culture as favorable compared to those who

---

### Table 5 Information use practices of health workers

| Variable                                           | Frequency | Percent (%) (95% CI) | Mean(SD) |
|----------------------------------------------------|-----------|-----------------------|----------|
| I often use data for day-to-day management of health service | 238       | 56.3 (51.5–60.9)     | 3.04(1.04) |
| I often use data to identify and manage epidemics   | 320       | 75.7 (71.4–79.6)     | 3.62(0.85) |
| I use data to observe the trends of health services in my catchment | 308       | 72.8 (68.4–76.9)     | 3.57(0.90) |
| I often use data for planning                       | 346       | 81.8 (77.9–85.3)     | 3.81(0.82) |
| I use data for drug supply and management           | 328       | 77.5 (73.4–81.3)     | 3.69(0.83) |
| I often use data for disease prioritization         | 335       | 79.2 (75.1–82.9)     | 3.75(0.80) |
| I often use data for resource allocation            | 320       | 75.7 (71.4–79.6)     | 3.62(0.88) |
| I use data for monitoring performance               | 307       | 72.6 (68.2–76.7)     | 3.61(0.87) |
| I use data for decision making                      | 302       | 71.4 (67.0–75.6)     | 3.55(0.93) |
| I often use data for community mobilization and discussion | 293       | 69.3 (64.7–73.5)     | 3.52(0.93) |
| Overall information utilization                     |           |                       |          |
| Good practice                                       | 279       | 66.0 (61.3–70.4)     |          |
| Poor practice                                       | 144       | 34.0 (29.6–38.7)     |          |
perceived it as unfavorable. Moreover, the odds of good information use were 2.5 times (AOR = 2.46, 95% CI 1.19–5.08) more likely among health workers who perceived the promotion of information use by department staff as favorable compared to their counterparts. The gender of health workers has only a marginal relationship with information use practices (Table 6).

Discussion
According to this study, two-thirds of health workers had good information usage practices. Two-thirds (67.1%) of health workers rated the organizational decision-making climate and information use promotion by facility managers or supervisors (65.5%) as favorable. The facility’s information use promotion measures were rated positively by seven out of ten (71.9%) health workers.

Regarding RHIS data and its management, over half (57.0%) of health workers had a favorable perception. More than eight out of ten (85.8%) health workers believed that they had high self-efficacy in data analysis, interpretation, and use. However, only about two-thirds (65.5%) of health workers actually had high competency in data analysis and interpretation. Information utilization among health workers was predicted by service experience, title or position, work place, RHI training, knowledge of data quality, self-efficacy and competency in data analysis and interpretation, organizational decision-making climate, and information promotion by department staff. The sexes had marginal associations with good information utilization and utilization.

Information use practices in the study area were comparable to a study done in Kenya (69.6%), East Wollega zone, Western Ethiopia (66%), and Hadiya zone, Southern Ethiopia (62.7%) [20, 25, 26]. This is better than studies done in the East Gojam zone, Northern Ethiopia (45.8%) [27] Diredawa, Eastern Ethiopia (53.1%) [28], Addis Ababa (37.3%) [18], Western Amhara (38.4%) [29], Oromia special zone (52.8%) [30], hospitals of Oromia regional state (56%) [31], and Southwest Ethiopia (57.3%) [32]. The finding was also better than a study conducted in selected districts of Amhara region (46%) [33], estimated pooled prevalence of information use at the national level (57.4%) [17], a study conducted in Tanzania [34] and another study conducted in Kenya among health care providers (34%) [35]. The current study’s finding, on the other hand, was lower than that of a study conducted in North Gondar, Northwest Ethiopia (78.5%) [19], and the North Shewa zone of the Oromia region (71.6%) [36]. The possible explanation for the variations in study findings might be contextual differences, differences in the period of assessments, and scope of the study. However, the current level of information use at the point of data generation and supervisory level was unacceptably low in the study area. This has a considerable impact on the performance of the health system.

The majority of health workers have utilized health information to observe health service trends in their catchment area, identify and manage epidemics, drug supply and management, disease prioritization, and plan with an information utilization rate ranging from 72.8 to 81.8%. Only over half (56.3%) of health workers have utilized health data for day-to-day management of health services. That is a finding lower than a study conducted at health centers in Oromia special zone (77.5%) and public health centers in North Gondar (89.6%) [19, 30]. The good practice of information use by healthcare providers and managers helps to improving primary health care and achieve universal health coverage [37].

Two-thirds of health workers believe a favorable culture of health information use promotion exist in their organization, and managers or supervisors have a positive attitude towards information use. This finding was better than a study conducted in Southern Ethiopia in which 58.8% of health workers had a good perceived culture of health information [20] and that of Northern Ethiopia, where 48.1% of health workers had a good perceived culture of health information [19]. Besides, the majority of health workers had a favorable attitude towards data management, including data collection, organization, analysis, and reporting. It is believed that these organizational and behavioral factors enhance the proper utilization of health data in health institutions. Many barriers to information use are linked to organizational and behavioral factors, and as such strengthening routine information systems involves building an information culture where information is valued at all health system levels [10].

Though most health workers had high self-efficacy in data analysis and interpretation, the study revealed that only two-thirds of them were competent in data analysis and interpretation. In terms of RHI task competency, the findings of this study outperformed the findings of a study conducted in Northwest Ethiopia (East Gojam (51.5%) and North Gondar (29.9%) [19, 24], as well as a study conducted in Southern Ethiopia (Hadiya zone (56.7%) [20]. The variations in health workers’ RHI skills might be due to contextual differences, differences in the scope of the study, and differences in supports in terms of training and supervision. In comparison to other research regions, the majority of health workers in the study area have been trained (88.7%) and supervised (92.9%) with an emphasis on RHI tasks [19, 20, 27].

In the study area, proper information use practices were predicted by service experience, title or position held by health workers, trainings, the existence of a favorable organizational decision-making climate, information use
### Table 6  Factors associated with information utilization

| Variables                                | Information Utilization | COR (95% CI) | AOR (95% CI) |
|------------------------------------------|-------------------------|--------------|--------------|
|                                          | Good (n, %)             | Poor (n, %)  |              |
| Age in years                             |                         |              |              |
| 20–24                                    | 26(9.3)                 | 15(10.4)     | Ref          |
| 25–29                                    | 117(42.0)               | 58(40.3)     | 1.16(0.57–2.37) |
| 30–34                                    | 67(24.0)                | 43(29.9)     | 0.90(0.43–1.89) |
| ≥35                                      | 69(24.7)                | 28(19.4)     | 1.42(0.66–3.08) |
| Sex                                      |                         |              |              |
| Male                                     | 178(63.8)               | 77(53.5)     | 1.53(1.02–2.31)** | 1.67(0.91–3.04) |
| Female                                   | 101(36.2)               | 67(46.5)     | Ref          | Ref          |
| Service experience in years              |                         |              |              |
| ≤5 years                                 | 75(26.9)                | 36(25.0)     | Ref          | Ref          |
| 6–9 years                                | 104(37.3)               | 77(53.5)     | 0.65(0.40–1.06)* | 1.55(0.72–3.32) |
| ≥10 years                                | 100(35.8)               | 31(21.5)     | 1.55(0.88–2.73)* | 4.01(1.59–10.12)** |
| Title or position                        |                         |              |              |
| Head                                     | 128(45.9)               | 40(27.8)     | 2.20(1.43–3.40)** | 1.85(1.01–3.39)** |
| Expert                                   | 151(54.1)               | 104(72.2)    | Ref          | Ref          |
| RHI training                             |                         |              |              |
| Yes, last 12 months                      | 81(29.0)                | 63(43.8)     | 0.12(0.05–0.28)** | 0.15(0.05–0.41)** |
| Yes, before 12 months                    | 121(43.4)               | 72(50.0)     | 0.16(0.07–0.36)** | 0.14(0.05–0.39)** |
| No training                              | 77(27.6)                | 9(6.2)       | Ref          | Ref          |
| RHI supervision                          |                         |              |              |
| No visit                                 | 26(9.3)                 | 4(2.8)       | Ref          | Ref          |
| One visit                                | 107(38.4)               | 87(60.4)     | 0.19(0.06–0.56)** | 0.38(0.09–1.67) |
| Two visit                                | 117(41.9)               | 43(29.9)     | 0.42(0.14–1.27)* | 0.52(0.12–2.34) |
| Three or more visit                      | 29(10.4)                | 10(6.9)      | 0.45(0.13–1.60)* | 0.79(0.13–4.94) |
| Work place                               |                         |              |              |
| Admin unit                               | 107(38.4)               | 37(25.7)     | Ref          | Ref          |
| Hospital                                 | 40(14.3)                | 55(38.2)     | 0.25(0.15–0.44)** | 0.42(0.18–0.98)** |
| Health center                            | 132(47.3)               | 52(36.1)     | 0.88(0.54–1.44) | 1.66(0.74–3.73) |
| Knowledge on reason for collecting and using aggregated disease data | | | |
| Poor knowledge                           | 127(45.5)               | 46(31.9)     | Ref          | Ref          |
| Good knowledge                           | 152(54.5)               | 98(68.1)     | 0.56(0.37–0.86)** | 1.21(0.65–2.26) |
| Knowledge on reason for collecting and using aggregated immunization data | | | |
| Poor knowledge                           | 115(41.2)               | 70(48.6)     | Ref          | Ref          |
| Good knowledge                           | 164(58.8)               | 74(51.4)     | 1.35(0.90–2.02)* | 1.19(0.66–2.14) |
| Knowledge on reason for collecting and using aggregated age or sex of patient (or client) data | | | |
| Poor knowledge                           | 93(33.3)                | 74(51.4)     | Ref          | Ref          |
| Good knowledge                           | 186(66.7)               | 70(48.6)     | 2.11(1.40–3.19)** | 1.47(0.81–2.67) |
| Knowledge on reason for collecting and using aggregated geographical data | | | |
| Poor knowledge                           | 38(13.6)                | 25(17.4)     | Ref          | Ref          |
| Good knowledge                           | 241(86.4)               | 119(82.6)    | 1.33(0.77–2.31) |
| Knowledge on why population data is needed | | | |
| Poor knowledge                           | 63(22.6)                | 40(27.8)     | Ref          | Ref          |
| Good knowledge                           | 216(77.4)               | 104(72.2)    | 1.32(0.83–2.09)* | 0.84(0.43–1.64) |
| Knowledge on dimensions of data quality  | | | |
| Poor knowledge                           | 37(13.3)                | 40(27.8)     | Ref          | Ref          |
| Good knowledge                           | 242(86.7)               | 104(72.2)    | 2.52(1.52–4.16)** | 1.16(0.54–2.50) |
| Knowledge on data quality improving strategies | | | |
practices by department staff, and self-efficacy and competency in data analysis and interpretation. In support of this, insufficient skill in information use core competencies, poor data quality, insufficient data availability, system design, relationships between actors who produce and use data, decision making autonomy and authority structures, information use leadership, information use culture, and low individual commitment and motivations are all barriers to information use in low and middle-income countries [38]. Similarly, another study revealed that awareness gaps, lack of motivating incentives, irregularity of supportive supervision, lack of community engagement in health report verification, and poor technical capacity of health professionals were found to be the major barriers to information use [39]. The presence of competent professionals in data analysis and interpretations remains a critical factor to improve information use practices at health care setting [40].

Proper information use practice was positively associated with health workers’ service experience, title or position possessed by health workers, and workplace. Good health information utilization was four times more likely among health workers having service experience of greater than 10 years compared to those with less than 5 years. Moreover, health information utilization was more likely among head health workers than experts and health workers at admin units compared to health facilities. Experienced health workers had the knowledge and motivation to manage data and utilize information compared to less experienced ones as they felt more responsibility. Most health decisions are made by people in positions located at administrative units rather than health facilities.

In this study, information use practice was less likely among trained health workers compared to untrained health workers. This finding was in contradiction to other studies that found RHI training was positively associated with proper information utilization [17, 20, 27, 29, 30, 32]. In the study area, the majority of health workers were trained, with a higher proportion of them having received training before the 12 months of survey period and most had received RHI training with a component of data management and quality assurance. Training may be one factor influencing data management and information utilization, but so may changes in health workers’ knowledge, attitude, motivation, and competency, and, in turn, information utilization may be influenced by supervision, mentorships and other interventions [41]. Besides coverage of RHI training, the quality of delivery in terms of content, duration

| Variables | Information Utilization | COR (95% CI) | AOR (95% CI) |
|-----------|-------------------------|-------------|--------------|
|           | Good (n, %)             | Poor (n, %) |              |
| Poor knowledge | 94(33.7)           | 81(56.3)   | Ref          | Ref          |
| Good knowledge  | 185(66.3)          | 63(43.7)   | 2.53(1.68–3.82)** | 2.01(1.16–3.47)*** |
| Competency of data analysis and interpretation | 54(19.4)          | 92(63.9)   | Ref          | Ref          |
| Low competency | 225(80.6)         | 52(36.1)   | 7.37(4.69–11.58)** | 2.90(1.71–4.91)*** |
| High competency |                 |            |              |              |
| Organizational decision making climate |              |            |              |              |
| Unfavorable | 55(19.7)          | 84(58.3)   | Ref          | Ref          |
| Favorable  | 224(80.3)         | 60(41.7)   | 5.70(3.66–8.89)** | 2.61(1.43–4.77)*** |
| Information use promotion by managers or supervisors |              |            |              |              |
| Poor | 63(22.6)          | 83(57.6)   | Ref          | Ref          |
| Good   | 216(77.4)         | 61(42.4)   | 4.67(3.02–7.20)** | 1.56(0.77–3.15) |
| Information use promotion by department staffs |              |            |              |              |
| Unfavorable | 43(15.4)          | 76(52.8)   | Ref          | Ref          |
| Favorable | 236(84.6)         | 68(47.2)   | 6.13(3.87–9.73)** | 2.46(1.19–5.08)*** |
| Health workers perception of data management |              |            |              |              |
| Unfavorable | 107(38.4)         | 75(52.1)   | Ref          | Ref          |
| Favorable | 172(61.6)         | 69(47.9)   | 1.75(1.16–2.62)** | 0.84(0.44–1.62) |
| Health workers self-efficacy of data analysis, interpretation and use |              |            |              |              |
| Low | 30(10.8)          | 30(20.8)   | Ref          | Ref          |
| High  | 249(89.2)         | 114(79.2)  | 2.18(1.26–3.80)** | 2.51(1.17–5.36)*** |

RHI, routine health information; CI, confidence interval; Ref, reference category; COR, crude odds ratio; AOR, adjusted odds ratio

*P < 0.25 for COR, **P < 0.05 for COR, ***P < 0.05 for AOR
and frequency is critical to influence positive changes in information usage behavior [42].

Health workers’ knowledge of health data quality improving measures was positively associated with information use practices in that information use practice were two times more likely among health workers with good RHI knowledge. Health workers who have a better knowledge of data quality and its measures have a high probability of generating good quality data. Access to good quality data in turn influences better utilization of information. This finding was supported by other studies that showed health workers’ knowledge of RHI management was associated with good information utilization [17, 20].

Health workers’ self-efficacy in data analysis and interpretation was positively associated with good information use among health workers in that high self-efficacy health workers utilized information 2.5 times more than their counterparts. Likewise, health workers’ skill in data analysis and interpretation also showed a positive association, in which good information utilization was three times more likely among competent health workers in data analysis and interpretation. This finding was consistent with other studies [19, 20, 27, 30, 32]. Lack of skills to analyze, interpret, and use data among health workers impedes real-time decision making in organizations.

The existence of a favorable organizational decision-making climate and information promotion by department staff was positively associated with information use among health workers. Information use is about three times more likely among health workers’ in organizations with a favorable decision making climate and among health workers in organizations where information is promoted by department staff. Information use promotion culture in an organization is identified as an important factor in the effective utilization of information by its workers and managers. This finding was supported by other studies [18–20, 27]. The presence of regular supervision and managerial support, and provision of feedback is important to improve health workers’ commitment to information use [43] and enhance primary healthcare service delivery [44]. On the contrary, the social and political dynamics (such as political conflict, interest of significant others etc.) in decision making process hinders better information use practice [45].

In the bivariate analysis, variables such as sex of health workers, existence of supportive supervision, type of health institution, knowledge of collecting and using aggregated health data (disease, age and sex), and dimensions of data quality, and information use promotion by department managers or supervisors were shown to have an association. However, the association was not maintained when adjusted for other confounding variables. In other studies, these variables were statistically associated with good information utilization among health workers [17–20, 27–30, 32]. The organizational determinants, including feedback mechanisms, supportive supervision and resource availability in the health information system, were predictors of information use among health workers [46].

This study has assessed information use practices and associated factors guided by validated framework (PRISM framework) and by considering both organizational and individual factors comprehensively. Both healthcare providers and healthcare managers were included in the study. The assessment was conducted based on a representative district in the zonal administration and, hence, the findings have the possibility of generalizability. The study was not without limitations. Information use is measured based on the perception of health workers and this might obscure the actual practice. As the assessment was conducted at facility level, information bias might be introduced because the data collection setting is the same as the working environment. The health workers might be afraid to give the correct information. Since we have used data collectors outside of the study settings and adequate explanations were provided about the aim of the study to respondents, this bias might be minimized.

Conclusions
Informed decision-making in primary health care (PHC) is a foundation of universal health coverage. This study concluded that about two thirds of health professionals practice proper information utilization, however the routine information usage at public health institutions remains lower than the regional and national expectations. This might impede efforts towards improving health system performance at the primary health care level. The study also revealed that health workers’ knowledge on health data quality, and their self-efficacy and skills of data analysis and interpretations, existence of information use promotion culture at organizations, among health care managers and department staffs were positively associated with information use practices among health workers. Therefore, efforts should be made to improve the organizational decision making climate, and health workers knowledge towards health data management and use. The value of data should be advocated and promoted at all levels of the health system.
Abstract

The current study assessed the utilization of routine health information (RHIS) and explored the associated factors among health workers in health facilities in southern Ethiopia. RHIS is vital for improving the quality of healthcare delivery. However, limited studies have assessed RHIS utilization in Ethiopia, which highlights the need for local research. The objectives were to assess RHIS utilization and the associated factors among health care professionals working in health facilities in southern Ethiopia. A cross-sectional, facility-based study was conducted involving 211 health professionals across 11 health facilities in Jimma, Southern Ethiopia. The data were collected using structured self-administered questionnaires, and the means of analysis were descriptive statistics and logistic regression. The study found that RHIS utilization was low with 42.6% of respondents indicating they had used RHIS in the last 30 days. The factors associated with RHIS utilization were age, work experience, and perceived benefit. The study concludes that RHIS utilization in health facilities in southern Ethiopia is low. There is a need to improve RHIS utilization and make it accessible to every healthcare provider to improve the quality of healthcare delivery.

Keywords

Routine health information; RHIS; Health care professionals; Ethiopia; Health facilities

Abbreviations

AOR: Adjusted odds ratio; CI: Confidence interval; COR: Crude odds ratio; RHIS: Routine health information; HIMS: Health management information system.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12911-022-01881-y.

Additional file 1. Organizational and Behavioral Assessment Tool for Health Facility.

Acknowledgements

We would like to acknowledge the funder Doris Duke Charitable Foundation (DDCF). This work would not be possible without the financial support of Doris Duke Charitable Foundation under grant number 2017187. We also acknowledge the authorities of Illubabor zone health department and Woreda health offices.

Author contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas. DWD, wrote the first draft of the manuscript and AB, KWH, MSE, ABS, KLA, MAW revised the manuscript. All authors read and approved the final manuscript.

Funding

The funder had no role in the design of the study and collection, analysis, and interpretation of data and in writing the manuscript.

Availability of data and materials

The datasets used and/or analyzed during the current study are not openly available because data is part of ongoing research project and available from the corresponding author (dave86520@gmail.com or dawit.daka@ju.edu.et) on reasonable request.

Declarations

Ethical approval and consent to participate

Research ethical clearance was obtained from the Jimma University Institute of Health Research Ethics Review Board (Reference number: IHREP/1058/20 on 17/12/2020). The support letter was taken from Oromia regional health bureau and Illubabor zone health department. The research was conducted according to the Helsinki Declaration. The research aim, benefits, and risks were explained to each health worker. Following this, a written informed consent was obtained from all participants. No personal identifiers were recorded and codes were used on each questionnaire. Electronic data were secured with a confidential password. Research data will only be used for the intended aim and will not be shared with third parties.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Author details

1Child Development and Sponsorship Project, Jimma Town, Jimma, Ethiopia.
2Department of Epidemiology, Faculty of Public Health, Jimma University, Jimma, Ethiopia.
3Department of Health Policy and Management, Faculty of Public Health, Jimma University, Jimma, Ethiopia.
4Capacity Building Mentorship Partnership Program, Faculty of Public Health, Jimma University, Jimma, Ethiopia.
5Faculty of Public Health, Institute of Health, Jimma University, Jimma, Ethiopia.

Received: 18 January 2022 Accepted: 16 May 2022

References

1. Hodge N. What are health information systems, and why are they important? Pac Health Dialog. 2012;18(1):15–9.
2. Hoyle P. Health information is central to changes in healthcare: a clinician’s view. Heal Inf Manag J. 2019;48(1):48–51.
3. Fenton SH, Low S, Abrams KJ, Butler-Henderson K. Health information management: changing with time. Yearb Med Inform. 2017;26(1):72–7.
4. Alothaim YK, Federico E. The impact of health information technology on patient safety. Saud Med J. 2017;38(12):1173–80.
5. Moucheraud C, Schwitter C, Boudreaux C, Giles D, Kilmarx PH, Ntolo N, et al. Sustainability of health information systems: a three-country qualitative study in southern Africa. BMC Health Serv Res. 2017;21. https://doi.org/10.1186/s12913-016-1971-8.
6. Thomas JC, Reis A, Fleming V. Principled health information systems: ethics beyond data security. Measure Evaluation, University of North Carolina, Chapel Hill; 2019. p. 24.
7. WHO. Framework and standards for country health information systems, vol. 2, World Health. 2008. http://www.who.int/healthinformatics/documents/hmn_framework200803.pdf.
8. Hung YW, Hoxta K, Irwin BR, Law MR, Grépin KA. Using routine health information data for research in low- and middle-income countries: a systematic review, vol. 20, BMC Health Services Research. BMC Health Services Research; 2020.
9. Kruk ME, Gage AD, Arsenault C, Jordan K, Leslie HH, Roder-deWan S, et al. High-quality health systems in the sustainable development goals era: time for a revolution—the Lancet global health commission on high quality health systems in the SDG era. Lancet Glob Heal. 2018;6:e1196–252.
10. Lippeveld T. Routine health facility and community information systems: creating an information use culture. Glob Heal Sci Pract. 2017;5(3):338–40.
11. Farnham A, Utzinger J, Kulinkina AV, Winkler M S. Using distinct health information system to monitor sustainable development. Bull World Health Organ. 2020;98(1):69–71.
12. Tamfon BB, Bilounga Ndongo C, Bataliack SM, Ngoufack MN, Nguefack-Tsague G. Routine health information system in the health facilities in Yaoundé—Cameroon: assessing the gaps for strengthening. BMC Med Inform Decis Mak. 2020;20:316. https://doi.org/10.1186/s12911-020-01351-3.
13. Suthar AB, Khalifa A, Joos O, Manders EJ, Abdul-Quader A, Amoyaw F, et al. National health information systems for achieving the sustainable development goals. BMJ Open. 2019;9:e027689.
14. Nabyonga-Orem J. Monitoring sustainable development goal 3: How ready are the health information systems in low-income and middle-income countries? BMU Glob Heal. 2017;2(4):e000433.
15. Ethiopian MOH. Ethiopian health sector transformation plan I.2015/16-2019/20, 2015.
16. Ethiopian MOH. Health sector transformation plan II. 2020/21–2024/25, vol. 25, 2021.
17. Mekonnen BD, Gebeyehu SB. Routine health information utilization and associated factors among health care workers in Ethiopia: a systematic review and metaanalysis. PLOS ONE. 2021;16(7):e0254230. https://doi.org/10.1371/journal.pone.0254230.
18. Mengistu M, Taye G, Ayelle W, Haftamu T, Biruk E. Assessment of routine health information utilization and its associated factors among Health Professionals in Public Health Centers of Addis Ababa, Ethiopia. Ethiop J Heal Dev. 2021;35:05–14.
19. Dagnevi E, Woreta SA, Shiferaw AM. Routine health information utilization and associated factors among health care professionals working at public health institution in North Gondar, Northwest Ethiopia. BMC Health Serv Res. 2018;18:685.
20. Wude H, Woldie M, Melese D, Lolaso T, Balcha B. Utilization of routine health information and associated factors among health workers in stock facilities in Yaoundé–Cameroon: assessing the gaps for strengthening. BMC Med Inform Decis Mak. 2020;20(3):16. https://doi.org/10.1186/s12911-020-01351-3.
Hadiya Zone, Southern Ethiopia. PLoS ONE. 2020;15(5):e0233092. https://doi.org/10.1371/journal.pone.0233092.

21. Zonal Health Department. Annual Report of Illubabor Zone Health Department. 2013 EPR.
22. Dean AG, Sullivan KM, Soe MM. OpenEpi: open source epidemiologic statistics for public health. Version. www.OpenEpi.com, updated 2013/04/06, accessed 2022/04/12.
23. Ethiopian MOH. Woreda transformation implementation manual. 2017.
24. Aqil A, Lippeveld T, Traore M, Barry A. PRISM tools: user guide. USAID. 2012. https://www.measureevaluation.org/resources/publications/prisms-12-51.
25. Emiru K, Oljira H, Ifa M. Assessment of utilization of health information and associated factors at district level in East Wollega Zone, Oromia Regional. J Med Physiol Biophys. 2018;44:9–17.
26. Gilbert NM. Use of routine health information for decision making among health workers at coast general hospital, mombasa county, Kenya. Research thesis submitted in partial fulfillment of the requirements for the award of the degree of master of public health. 2017.
27. Shiferaw AM, Zegeye DT, Assessa S, Yenit MK. Routine health information system utilization and factors associated thereof among health workers at government health institutions in East Gojam Zone, Northwest Ethiopia. BMC Med Inform Decis Mak. 2017;17:116.
28. Teklegiorgis K, Gebremariam K, Mirute G, Lerebo W. Factors associated with low level of health information utilization in resources limited setting, Eastern Ethiopia. Int J Intell Inf Syst. 2014;3(6):69–75.
29. Asemahagn MA. Determinants of routine health information utilization at primary healthcare facilities in Western Amhara, Ethiopia. Cogent Med. 2017;4(1):1387971. https://doi.org/10.1080/2331205X.2017.1387971.
30. Seid OA, Bayou NB, Ayele FY, Zerga AA. Utilization of routine health information from health management information system and associated factors among health workers at health centers in oromia special zone, Ethiopia: a multilevel analysis. Risk Manag Healthc Policy. 2021;14:1189–98.
31. Asrat F, Dalu MS, Bedada T. Routine health service records utilization and Administrative reports for decision making in four hospitals of Oromia Regional State, Ethiopia. Heal Sci J. 2021;15(8):1–10.
32. Kanfe SG, Debele GR, Berhanu RD, Nguie HS, Ahmed MH. Utilisation of district health information system and its associated factors among health professionals working at public health facilities of the southwest of Ethiopia: cross-sectional survey. BMJ Open. 2021;11:e046578.
33. Chanyalew MA, Yitayal M, Atnafu A, Tilahun B. Routine health information system utilization for evidence-based decision making in Amhara national regional state, northwest Ethiopia: a multi-level analysis. BMC Med Inform Decis Mak. 2021;21:28. https://doi.org/10.1186/s12911-021-01400-5.
34. Mboera LEG, Rumiisha SF, Mbata D, Mermi IR, Lyimo EP, Joachim C. Data utilisation and factors influencing the performance of the health management information system in Tanzania. BMC Health Serv Res. 2021;21(1):4–11.
35. Kario EK, Otieno GO, Mogere S. Determinants of data use for decision making in health facilities in Kitui County, Kenya. Quest J Manag Soc Sci. 2021;3(1):63–75.
36. Tulu G, Demie TG, Tessema TT. Barriers and associated factors to the use of routine health information for decision-making among managers working at public hospitals in north shewa zone of oromia regional state, ethiopia: a mixed-method study. J Healthc Leadersh. 2021;13:157–67.
37. English A, Lanzara C, Awale A, Hatt L. Measuring what matters: case studies on data innovations for strengthening primary health care. Primary Health Care Performance Initiative. 2018.
38. Measure Evaluation. barriers to use of health data in low- and middle-income countries: a review of the literature. Carolina population Center University of North Carolina at Chapel Hill 123 West Franklin Street, Suite 330 Chapel Hill, North Carolina 27516. 2018. https://www.measureevaluation.org/resources/publications/wp-18-211.
39. Tilahun B, Teklu A, Mancuso A, Endehabtu BF, Gashu KD, Mekonnen ZA. Using health data for decision-making at each level of the health system to achieve universal health coverage in Ethiopia: the case of an immunization programme in a low-resource setting. Heal Res Policy Syst. 2021;19:48. https://doi.org/10.1186/s12911-021-01604-1.
40. Todd J, Mahande MJ. Editorial: the use of routine health data in low- and middle-income countries. Front Public Health. 2020. https://doi.org/10.3389/fpubh.2020.00413.
41. Blikis M, Sambo NM. Can training of health care workers improve data management practice in health management information systems: a case study of primary health care facilities in Kaduna State, Nigeria. PAMJ. 2018;30:289.
42. Daneshkoian A, Alimordi M, Ahmadi M, Alipour J. Data quality and data use in primary health care: a case study from Iran. Inform Med Unlocked. 2022;28:100855. https://doi.org/10.1016/j.imu.2022.100855.
43. Kanfe SG, Endehabtu BF, Ahmed MH, Mengestie ND, Tilahun B. Commitment levels of health care providers in using the district health information system and the associated factors for decision making in resource-limited settings: cross-sectional survey study. JMIR Med Inf. 2021;9(3):e23951.
44. Rendell N, Lokuuge K, Rosewell A, Field E. Factors that influence data use to improve health service delivery in low- and middle-income countries. Glob Heal Sci Pract. 2020;8(3):566LP–581.
45. Wickremasinghe D, Hashmi IE, Schellenberg J, Avan BI. District decision-making for health in low-income settings: a systematic literature review. Health Policy Plan. 2016; 31:i12-24.
46. Oteno MO, Muiruri ML, Kawita C. Organizational determinants of health information utilization in making decision among healthcare managers in Mombasa County, Kenya. J Heal Med Nurs. 2020;5(2):1–17.

Publisher’s Note
Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.