Routine health information utilization and associated factors among health care professionals working at public health institution in North Gondar, Northwest Ethiopia

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Abstract

Background: Routine health information systems (RHIS) are vital for the acquisition of data for health sector planning, monitoring, and evaluation. However, in developing countries the insufficient quality of the data produced by RHIS limits their usefulness in decision-making. As routine health information utilization is still low in Ethiopia, this study aimed to assess the magnitude of routine health data utilization and associated factors among health care professionals in some public health institutions in North Gondar, northwest Ethiopia.

Methods: An institution based cross-sectional study was conducted from March to April 2017, at public health institutions of North Gondar Zone, northwest Ethiopia. A total of 720 health care professionals were selected from public health institutions using the multi-stage sampling technique. Data were collected using a structured self-administered questionnaire and an observational checklist, cleaned, coded, and entered into Epi-info version 3.5.3 and transferred into SPSS version 20 for further statistical analysis. In the multiple logistic regression analysis, a less than 0.05 P-value was considered statistically significant.

Result: In this study, the level of good routine health information utilization among health professionals was 78.5% (95% CI: 73.2%, 84.3%). According to the multivariable logistic regression analysis, sex (AOR = 2.19, 95% CI: 1.47, 3.27), type of institution (AOR = 3.57, 95% CI: 2.39, 5.32), standard indicators (AOR = 3.28, 95% CI: 1.90, 5.65), data analysis skills (AOR = 1.90, 95% CI: 1.12, 3.23), and good governance (AOR = 1.97, 95% CI: 1.31, 2.95), were found significantly associated with a good level of health information utilization.

Conclusion: Over three-fourths of the health care professionals working at public health institutions of North Gondar utilized health information better than the respondents in previous studies. Sex, type of institution, standard indicators, data analysis skills, and governance were factors related to routine health information utilization. Therefore, standard indicators, data analysis skills and good governance are highly recommended for improving routine health data utilization of health care professionals working at public health institutions.

Keywords: Routine health information utilization, Health care professionals, North Gondar, Ethiopia
Background

Health information system (HIS) is a system designed for the collection, processing, use, and dissemination of health related data to improve health care outcomes. It is one of the six fundamental blocks of a health care system which includes health information system resources, indicators, data sources, data management, information products, dissemination, and use [1–3]. HIS involves the essentials for the overall health system which informs decision making in each of the other five blocks of the system and important in improving clinical and managerial decisions for providing quality information for evidence-based health practices [4, 5]. Data generated from healthcare facilities at regular intervals (routine health information system) are vital not only for the planning, monitoring, and evaluation of health care service activities, but also for the day-to-day patient management, health education, resource allocation, disease prioritization, and decision making [1, 6]. A properly functioning routine HIS gets the right information into the right hands at the right time, enabling policymakers, managers, and service providers to make decisions based on evidence, ultimately leading to sustainable health outcomes in the community they serve [1, 7, 8].

Globally, significant human and financial resources have been invested to improve routine health information systems for planning, reporting, community health mobilization, and observing disease trends. Recently, more attention has been given to strengthen evidence-based decision through good governance, transparency, and accountability. However, health system managers in developing countries tend to miss the role of routine data in tracking the performance of health programs and the overall health system, and neglect their typically used part of the performance of evaluation of district priority health targets [3, 8–10]. As a result, many health systems fail to fully link evidence to decisions and suffer from a reduced ability to respond to priority health needs at all levels of the health care system [1, 11]. Health information systems in low and middle income countries face challenges of inadequate data analysis; as a result the utilization of routine data for decision making remains very weak [12–14]. Too often, data are sat in reports, shelves, cabinets, databases and left unanalyzed to be sufficiently utilized for policy and program improvements [15, 16].

Routine health information system is vital for operational, tactical, and strategic decision making. Utilization of information at all levels of the health system through effective data analysis, interpretation, and utilization is important. However, poor data quality (incompleteness and incorrectness), and limited use remain the major concerns [3, 17]. Most health care providers in developing countries simply report routine health data without adequate utilization and feedback, and health care providers and managers at lower levels of the health care system have minimum understanding of the benefits of information. Findings from Africa indicate that routine health information utilization remains low [18, 19], 42% in Tanzania, 59% in Uganda [20], 58% in Liberia, and 65% of the health workers in South Africa [21] use routine health data for planning, management of health commodities, detecting outbreaks, and monitoring the performance of the health system. Despite efforts made to improve Health Management and Information System, data quality and use remain inadequate at peripheral health systems which are responsible for health care delivery [17]. Studies at various places in Ethiopia reported that routine health information utilization ranged from 22.5–69% [2, 22–29].

Reports showed that routine health information utilization can be affected by organizational [1, 30], technical, and behavioral characteristics of health care professionals [1]. Among the factors reported, analysis skills [24, 31, 32], lack of culture of information use [32], lack of supervision and regular feedback [22, 24], organizational infrastructure and HMIS training [24], knowledge, work load, computer skill, computer access, availability of HMIS guidelines and formats [29], availability of human resources [33], and data quality [15] are commonly associated with routine health information utilization. A report from Uganda showed that health care workers who lack training on computer software, data management, and HMIS were unable to understand the standard indicators and quality of data, subsequently making a limited use of routine health data [34, 35].

The Federal Ministry of Health (FMoH), Ethiopia introduced an Information Revolution to strengthen the method and practice of collecting, analyzing, and disseminating information for decisions. The revolution was targeted not only at changing the techniques of data and information management but also at bringing fundamental cultural and attitude change regarding the practice of information utilization. More of the strategy promoted the utilization data generated from peripheral health care systems. However, district facility staff rarely used routine data to identify performance gaps, make plans, and monitor progress. Information used health data only for report purposes and not to drive decisions and program improvements [35, 36]. Furthermore, the inadequacy of information use among health care professionals at the study setting remains a problem. Therefore, this study aimed to assess routine health information utilization among health care professionals and its predictors in North Gondar government health institutions. The finding will help to effectively implement different health sector programs and strategies, including the Health Sector Development Program (HSDP), social and community health insurances, and
health care financing to address constraints in performance fulfillment of targets at district health care level.

Methods

Study design and setting

An institution-based cross-sectional study was conducted at public health institutions of North Gondar Administrative Zone from March to April 2017. The city of Gondar is located 747 km from Addis Ababa, the capital of Ethiopia. According to the plan and program report of the administrative zone health department, there are 2244 health care professionals working at hospitals and health centers.

Study participants, sample size, and sampling procedure

All health care professionals in selected health facilities were included in the study. Sample size was calculated using the single population proportion formula, assuming 53.3% prevalence of health information utilization in eastern Ethiopia [23], a 95% level of confidence, a 5% of margin of error, a design effect of 2, and a 5% of non-response rate. Finally, a minimum sample of 720 was obtained. In the zone, there were a total of nine hospitals and 135 health centers. Out of the total health facilities, 3 hospitals and 45 health centers were selected by the random sampling technique. Using proportional allocation technique, 720 health care professionals were selected.

Data collection tool and procedure

The questionnaire was adapted from the PRISM framework on the system. It was defined as the use of routine health information for treating patients, disease prioritization, drug procurement, the day-to-day monitoring of health service activities, checking data quality, resource allocation, planning, department performance evaluation, evaluation of staff performance, selection of best experience within the health facility, sharing of health data to other facilities and stakeholders, decision making, and community mobilization and discussion. All these components of the assessment tool have likert scale measures, ranging from “strongly disagree” to “strongly agree”, finally, health workers’ mean scores were used to label health professionals’ health information utilization as “has good routine health information utilization” when they scored above the mean value, or “has poor routine health information utilization” when they scored equal to and below the mean value. Health care professionals in this study were defined as any health personnel who were collecting health data in order to utilize the information for the improvement of health status.

Data processing and analysis

Data were entered into Epi-info version 7 and exported to the Statistical Package for Social Sciences (SPSS) version 20 for further analysis. Descriptive statistics, including frequencies and proportions, were computed using the binary logistic regression model in order to summarize variables. Variables with a p-value of less than 0.2 in the bi-variable analysis were entered into the multivariable logistic regression analysis. Both Crude Odds (COR) and Adjusted Odds Ratios (AOR) with 95% confidence interval were estimated to show the strength of associations. Finally, a p-value of less than 0.05 in the multivariable logistic regression analysis was used to identify variables significantly associated with the utilization of routine health information.

Results

Socio-demographic and behavioral characteristics

A total of 720 healthcare professionals were included in the study, giving response rate 100%. Just over half (52.1%) of the respondents were male health care professionals, 64.2% of whom were diploma graduate nurses. Slightly more than half (50.4%) nurses took part in this study than other health workers. Almost half (49.7%) of the respondents earned monthly salary of 100–150 dollar. More than half (58.6%) had positive belief in routine health information utilization. The majority (84.1%) gave no value to routine health information utilization, and 76.9% had no custom of routine health information utilization (Tables 1 and 2).
Organizational and technical factors
Of the total participants, 52, 57.6, 50.7 and 57% of had no culture of information utilization, had supervision on routine health information utilization (RHIU), had governance for RHIU and had good governance for RHIU. In addition, slightly higher than half (50.9 and 53.8%, respectively) used routine health data for planning, and received feedback on routine health information utilization. The majority (87.9% and 99.8%, respectively) of respondents received no training and no professional skill on RHIU. More than two-thirds (75% and 70.1%, respectively) had no professional knowledge about national indicators, and had no professional data analysis skills (Tables 3 and 4).

Routine health information system utilization
In this study, the majority (94%) of the respondents used routine health data for treating patients, 90.1% for disease prioritization, 85% for drug procurement, 89.6% for monitoring day to day health service activities, 92.6% for checking data quality, 86.7% for resource allocation, 89% for planning, 88% for department performance evaluation, 86.5% for evaluation of staff performance, 85% for selection of best experience within a health facility, 82.8% for sharing health data to other facilities and stakeholders, 87.8% for decision making, and 87.1% for community mobilization and discussion. Good routine health information system utilization was noted among 78.5% of the health care professionals. The proportion of good health information utilization was 84.9% at health centers and 64.1% at hospitals Table 5.
Factors associated with good routine health information system utilization

In the bivariable logistic regression analysis, sex, type of facility, standard indicator, data analysis skills, culture of information, supervision, governance, planning and position were factors associated with good routine health information utilization at a p-value of less than 0.2. Consequently, these variables were subjected to multivariable logistic regression analysis, and it was noted that sex, type of facility, standard indicators, data analysis skills and governance were significantly associated with good routine health information utilization at a p-value of 0.05.

In this study, the high odds of good routine health information system utilization were noted among male health care professionals [AOR = 2.91; 95% CI: 1.47, 3.27], types of facility [AOR = 3.57; 95% CI: 2.39, 5.32], standard indicators [AOR = 3.28; 95% CI: 1.90, 5.65], data analysis skills [AOR = 1.91; 95% CI: 1.12, 3.23], and good governance [AOR = 1.91; 95% CI: 1.12, 3.23] (Table 6).

Discussion

The aim of this study was to identify factors associated with poor routine health information utilization of health care professionals at public health institutions. According to our findings, the magnitude of routine health information utilization of health care professionals was 78.5%. This finding is higher than that of a study conducted in North Gondar (22.5%) [22], Jimma (32.9%) [23], East Gojjam (45.8%) [24], Hadiya zone (69%) [25], west Amhara (38%) [29], and in Ethiopia (48%) [2]. This variation might be due to differences in study periods. Besides, recently the government has given a special emphasis to utilization of information for

| Variable                  | Good Frequency (%) | Poor Frequency (%) |
|---------------------------|--------------------|--------------------|
| Beliefs for routine health information utilization |                  |                    |
| Positive                  | 337 (79.9%)        | 85 (20.1%)         |
| Negative                  | 228 (76.5%)        | 70 (23.5%)         |
| Custom for routine health information utilization |                  |                    |
| Good                      | 135 (81.3%)        | 31 (18.7%)         |
| Poor                      | 430 (77.6%)        | 124 (22.4%)        |
| Value for routine health information utilization |                  |                    |
| Good                      | 90 (78.3%)         | 25 (21.7%)         |
| Poor                      | 475 (78.5%)        | 130 (21.5%)        |

Table 3 Organizational characteristics of public health institutions in North Gondar zone, Ethiopia, 2017

| Variable                  | Good Frequency (%) | Poor Frequency (%) |
|---------------------------|--------------------|--------------------|
| Information use culture   |                    |                    |
| Yes                       | 282 (81.5%)        | 64 (18.5%)         |
| No                        | 283 (75.7%)        | 91 (24.3%)         |
| Supervision               |                    |                    |
| Yes                       | 346 (83.4%)        | 69 (16.6%)         |
| No                        | 219 (71.8%)        | 86 (28.2%)         |
| Governance                |                    |                    |
| Yes                       | 348 (84.7%)        | 63 (15.3%)         |
| No                        | 217 (70.2%)        | 92 (29.8%)         |
| Planning                  |                    |                    |
| Yes                       | 311 (84.7%)        | 56 (15.3%)         |
| No                        | 254 (72%)          | 99 (28%)           |
| Feedback                  |                    |                    |
| Yes                       | 324 (83.5%)        | 64 (16.5%)         |
| No                        | 241 (72.6%)        | 91 (27.4%)         |

Table 4 Technical characteristics of health care professionals at public health institutions in North Gondar zone, Ethiopia, 2017

| Type of training in the last 12 month | Trained | Untrained |
|--------------------------------------|---------|-----------|
| Data collection                      | 172 (24%)| 548 (76%) |
| Data analysis                        | 172 (24%)| 548 (76%) |
| Information presentation             | 172 (24%)| 548 (76%) |
| Information use                      | 172 (24%)| 548 (76%) |

Table 5 Routine health information utilization of health care professionals at public health institutions in North Gondar zone, Ethiopia, 2017

| Activities used from routine health information utilization | (n = 565) | Yes | No |
|-----------------------------------------------------------|----------|-----|----|
| For treating patient                                      | 531 (96%)| 34 (6%)|
| For disease prioritization                               | 509 (90.1%)| 54 (9.9%)|
| For drug procurement                                      | 482 (85.3%)| 83 (14.7%)|
| For monitoring day to day health service activities       | 506 (89.6%)| 59 (10.4%)|
| For checking data quality                                 | 523 (92.6%)| 42 (7.4%)|
| For resource allocation                                   | 490 (86.7%)| 75 (13.3%)|
| For departments performance evaluation                    | 497 (88%)| 68 (12%)|
| For planning                                              | 503 (89%)| 62 (11%)|
| For monitoring the performance of staffs                  | 489 (86.5%)| 76 (13.5%)|
| For selecting good experience with in the facility        | 480 (85%)| 85 (15%)|
| For sharing of best experience for other facility and stakeholders | 468 (82.8%)| 97 (17.2%)|
| For decision making                                       | 496 (87.8%)| 69 (12.2%)|
| For community mobilization and discussion                 | 492 (87.1%)| 73 (12.9%)|
evidence based decision making and the improvement of health care professionals’ information using culture [8]. Similarly, the finding was higher than those of studies reported from outside Ethiopia, that is Uganda (59%) [20], South Africa (65%) [21]. This might be due to variations in study periods and the criteria for measuring routine health information use [15].

According to the multivariable logistic regression analysis, the higher odds of routine health information utilization were noted among health professionals who had good governance when compared to health care professionals who had poor governance. The finding was supported by those of other studies reported elsewhere [1]. This might be due to the fact that the presence of good governance at public health institutions encourages staff to use routine health information for evidence based decision by strengthening health information systems [2]. Routine health information utilization among

| Table 6 | Factors associated with routine health information among health care professionals at public health institution in North Gondar zone, Ethiopia, 2017 |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------|
|         | Routine health information utilization (n = 720)                                                                                          | COR (95% CI)       | AOR (95% CI)       |
|         | Poor                                                                                                                                   | Good              |                   |
| Sex     | Male                                                                                                                                   | 67 (17.87%)       | 308 (82.13%)      | 1.55 (1.08, 2.22) | 2.19 (1.47,3.27)** |
|         | Female                                                                                                                                | 87 (25.22%)       | 258 (74.78%)      | 1                   | 1                   |
| Type of institution |                                                                                                                                     |                   |                   |
|         | Hospital                                                                                                                            | 80 (35.87%)       | 143 (64.13%)      | 1                   | 1                   |
|         | Health center                                                                                                                        | 74 (14.89%)       | 423 (85.11%)      | 3.19 (2.21,4.62) | 3.57(2.39,5.32)** |
| Professionals skill |                                                                                                                                    |                   |                   |
|         | No                                                                                                                                    | 149 (22.51%)      | 513 (77.49%)      | 1                   | 1                   |
|         | Yes                                                                                                                                   | 5 (8.62%)         | 53 (91.38%)       | 3.08 (1.21,7.84) |
| Standard indicator |                                                                                                                                     |                   |                   |
|         | No                                                                                                                                    | 134 (28.63%)      | 334 (71.37%)      | 1                   | 1                   |
|         | Yes                                                                                                                                   | 20 (7.94%)        | 232 (92.06%)      | 4.65 (2.83,7.66) | 3.28 (1.90,5.65) |
| Data analysis skills |                                                                                                                                     |                   |                   |
|         | No                                                                                                                                    | 130 (25.74%)      | 375 (74.26%)      | 1                   | 1                   |
|         | Yes                                                                                                                                   | 24 (11.16%)       | 191 (88.84%)      | 2.76 (1.73,4.41) | 1.91(1.12,3.23)** |
| Information use culture |                                                                                                                                     |                   |                   |
|         | Poor                                                                                                                                  | 91 (24.33%)       | 283 (75.67%)      | 1                   | 1                   |
|         | Good                                                                                                                                  | 63 (18.21%)       | 283 (81.79%)      | 1.44 (1.01,2.07) |
| Supervision |                                                                                                                                     |                   |                   |
|         | No                                                                                                                                    | 85 (27.87%)       | 220 (72.13%)      | 1                   | 1                   |
|         | Yes                                                                                                                                   | 69 (16.63%)       | 346 (83.37%)      | 1.94(1.35,2.77) |
| Governance |                                                                                                                                     |                   |                   |
|         | Poor                                                                                                                                  | 92 (29.77%)       | 217 (70.23%)      | 1                   | 1                   |
|         | Good                                                                                                                                  | 62 (15.09%)       | 349 (84.91%)      | 2.38 (1.65,3.43) | 1.96 (1.31,2.95)** |
| Planning |                                                                                                                                     |                   |                   |
|         | No                                                                                                                                    | 98 (27.76%)       | 255 (72.24%)      | 1                   | 1                   |
|         | Yes                                                                                                                                   | 56 (15.26%)       | 311 (84.74%)      | 2.13 (1.47, 3.08) |
| Feedback |                                                                                                                                     |                   |                   |
|         | No                                                                                                                                    | 90 (27.11%)       | 242 (72.89%)      | 1                   | 1                   |
|         | Yes                                                                                                                                   | 64 (16.49%)       | 324 (83.51%)      | 1.88 (1.32, 2.70) |
| Position |                                                                                                                                     |                   |                   |
|         | Management member                                                                                                                  | 28 (29.79%)       | 66 (70.21%)       | 1                   |                     |
|         | Staff                                                                                                                                | 126 (20.13%)      | 500 (79.87%)      | 1.68 (1.04, 2.73) |

**Variable significant at p-value less than 0.05**
male respondents was higher than among females. It was revealed that the odds of health information utilization among male health professionals were 2.9 times higher than among females. This might be due to the fact that the majority of respondents were male.

Among the reported significant organizational factors, higher odds of routine health information utilization were noted among health professional working at health centers compared with those working at hospitals. This finding was supported by that of a study conducted in East Gojjam zone [24]. This might be due to the attention given by the government to district health facilities in terms of supervision and regular feedback [28, 37].

In our work, the odds of routine health information utilization of health care professionals who had data processing skills were 1.9 times more likely compared to health care professionals who had no data processing skills. This might be due to the fact that data analysis skills are one of the inputs for utilizing routine health information. Thus, without turning data into information, it is difficult to utilize routine health information for evidence-based decision making. This finding is supported by that of a study conducted in East Gojjam zone [24], that is, perhaps because data analysis skills are very important for turning data into information.

Furthermore, the odds of health information utilization among health care professionals who had standard indicators in their offices were 3.28 times higher than those who no such indicators to utilize routine health data. This might be due to the presence of data sources (standard indicator) which provides utilization of information for evidence-based decision making [1].

Conclusion
This study found that more than three fourths of the health care professionals at public health institutions in North Gondar had good routine health information utilization. Sex, standard indicators, good governance, and type of health facility had significant associations with routine health information utilization. Therefore, the standard indicators, and good governance at public health institutions are highly recommended. The study also suggested further investigations on the culture of health information utilization among health care providers where routine data are generated.

Additional file

**Additional file 1:** Questionnaire to assess routine health information utilization and associated factors in north Gondar, northwest Ethiopia. (DOCX 36 kb)

Abbreviations
AOR: Adjusted Odds Ratio; CI: Confidence Interval; RHIS: Routine Health Information System; SPSS: Statistical Package for Social Science

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Availability of data and materials
Data will be available upon request from the corresponding author.

Authors’ contributions
ED conceived of the study, coordinate data collection. ED, SAW, and AMS performed statistical analysis and drafted the manuscript. All authors read and approved the final manuscript.

Ethics approval and consent to participate
Ethical clearance was obtained from the Ethical Review Board of the University of Gondar. A letter of permission was obtained from North Gondar zonal health department. After the objective of the study was explained, verbal consent was obtained from each participant. Moreover, privacy and confidentiality of information was strictly guaranteed by all data collectors and investigators. The information retrieved was used only for the study.

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

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