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Vol: 1 & Iss: 1

Research Article

Utilization of Routine Health Information for Pharmaceutical Procurement and Associated Factors at Health Facilities in, Amhara Region, Northwest Ethiopia

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Citation: Zeleke BW, Meshesha NA, Tsehay AT, et al. Utilization of Routine Health Information for Pharmaceutical Procurement and Associated Factors at Health Facilities in, Amhara Region, Northwest Ethiopia. *Arch Wom Health 2025;* 1(1): 42-48.

Received: 19 February, 2025; **Accepted:** 25 February, 2025; **Published:** 28 February, 2025

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ABSTRACT

Background: Procurement of pharmaceutical drugs plays a crucial role in the management of health. It takes a large part of the country's budget to provide quality healthcare services from primary to tertiary healthcare levels. The primary challenges are quality, quantity and delivery time (lead time). There may be different associated factors with poor routine information utilization but there is limited empirical evidence found on routine information utilization for pharmaceutical procurement. In Ethiopia, there are limited studies conducted on routine information utilization for pharmaceutical procurement. Therefore, this study aimed to assess the utilization of routine health information for pharmaceutical procurement and associated factors at health facilities in Bahir Dar and West Gojjam zone, Northwest Ethiopia.

Methods: An institution-based cross-sectional study was conducted among pharmaceutical procurement committees at healthcare facilities found in northwest Ethiopia from March 15 to May 5, 2023. The total sample was 533. A stratified and simple random sampling technique was applied to select health institutions and study units, respectively. Data were collected by structured self-administered questionnaires after giving training for data collectors. The collected data were entered into Epi Data 4.6 and exported to SPSS version 25 for analysis. Descriptive statistics, bi-variable and multivariable logistic regression analyses were done to identify the associated factors.

Result: Of all 492 respondents, 296 (60.2%) [CI 95%, 55.7, 64.4] used routine health information for pharmaceutical procurement. Training [AOR=2.33; 95% CI; 1.218, 4.472] organizational culture of information use [AOR=2.401; 95% CI; 1.076, 5.356] and user-friendly report format [AOR=2.555; 95% CI; 1.333, 4.899] were found positively associated with utilization of routine health information for pharmaceutical procurement.

Conclusion: Overall, this study finding showed that more than half of respondents had a good level of utilization of routine health information for pharmaceutical procurement. Trainning for data use, user-friendly system design and organizational culture of information use were significant factors for pharmaceutical procurement. The provision of training on data use, developing an organizational culture of information use and designing a user-friendly system could improve the utilization of routine health information for pharmaceutical procurement.

Keywords: Ethiopia, RHIS, utilization, pharmaceutical procurement

1. Introduction

Pharmaceutical is drugs and medical supplies/equipment which are used to provide healthcare services in different types of health facilities. Pharmaceuticals play a critical role in the improvement of healthcare services as well as trust in healthcare facilities when the pharmaceutical procurement process is based on routine health information which is generated within the health facilities[1,2]. Pharmaceutical procurement takes a large part of the country's budget to provide quality healthcare service from primary to tertiary healthcare level though the quality, quantity and time of delivery (lead time) are the main challenges[3].

A routine health information system is a system whereby health data are recorded, stored, retrieved and processed to improve decision-making about health. It is vital for the day-to-day patient management, disease prioritization, drug procurement, health education, resource allocation and decision making as well as for the planning, monitoring and evaluation of health care service activities[4,5]. Pharmaceutical procurement is a multi-disciplinary process requiring medical, pharmaceutical, managerial, financial and often political expertise. An effective pharmaceutical procurement process should ensure the availability of the right drugs in the right quantities, at the right time, for the right patients at reasonable prices and at recognizable standards of quality[6]. It is important for continuous availabilities of medicines in resource-limited countries but without routine health information, the underpinnings for evidence-based decision-making and scientifically sound health information system is not only used for efficient and effective clinical service but also for nonclinical (administrative) service[7].

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. 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[8]. In Africa health information utilization among health professionals at healthcare facilities for decision-making is low, it ranges from 27% to 69[9-11]. Studies conducted in Addis Ababa, Western Amahara, East Gojjam Zone and Hadya Zone revealed that the Routine health information utilization rate was 37.3%, 38.4%, 45.8% and 69.3% respectively[5,12-14]. It indicates utilization of health information is lower than the national expectation which is 90%[15]. Another study conducted in Gamo and Gofa Zone revealed that the utilization of RHI for pharmaceutical procurement was 69.9%[1]. It leads to gaps in essential drug availability and the procurement of poor-quality medicines at unnecessarily high prices[16].

Procurement practice without evidence contributes to non-availability, unaffordability and poor stock management of drugs, which leads clients forced to buy drugs with high prices and affected by financial crisis[1]. Availability of generic medicines in public sectors is less than 60% across WHO regions, especially in Africa region[17]. Even though significant human and financial resources have been invested to improve routine health information systems globally and in Ethiopia, the use of information for evidence-based decision-making for pharmaceutical procurement is still very weak. Especially for data produced by health facilities. As a result, many health systems fail to make evidence-based decisions and responed to priority health needs, including pharmaceuticals.

In consideration of this fact, Ethiopia has been intensely dedicated to reinforcing its national HIS by taking different actions. Several studies have been conducted on routine health information utilization for general decision-making; however, there is limited evidence specifically for pharmaceutical procurement. The factors that affect routine health information for pharmaceutical procurement are technical organizational, behavioral and the integration of the health information unit and pharmacy unit[5,13,18,19]. Therefore, this study assessed the utilization of routine health information for pharmaceutical procurement in selected health facilities at Bahir Dar City Administration and West Gojjam health facilities.

2. Methods and Materials

2.1. Study setting and period

The study was conducted in the Amhara region, Northwest Ethiopia, particularly at Bahir Dar City and West Gojjam Zone, from March 15 to May 5, 2023. Bahir Dar city is the capital city of the Amhara Region. West Gojjam is one of the 11 admenistrative zones in the Amhara region**.** Finote Selam is the administrative town of the West Gojjam Zone, which is 100 km from Bahir Dar city administration and Bahir Dar is 491.4 km away from Addis Ababa, the capital city of Ethiopia.

2.2. Study design

Institution-based cross-sectional study design was conducted since the study assessed both the outcome and the factors simultaneously at a single point in time in the health institution.

2.3. Source population

All health professionals who were engaged in the pharmaceutical procurement committee in health facilities at Bahir Dar city administration and West Gojjam zone were source populations.

2.4. Study population

All health workers who were engaged in the pharmaceutical procurement committee in randomly selected health facilities at Bahir Dar city administration and West Gojjam zone.

2.5. Inclusion and exclusion criteria

2.5.1. Inclusion criteria: Those health professionals who were engaged in the pharmaceutical procurement committee were included.

2.5.2. Exclusion criteria: Selected respondents who were recruited less than six months in the health facility were excluded.

2.6. Sample size

The total sample size determined was 355, using a single population proportion formula from the prevalence of utilization of routine health information for pharmaceutical procurement (69.9%), with a confidence interval of 95% and a margin of error of 5%.

$$n = \frac{(Z\alpha/2)^2 pq}{d^2}$$

$$n = \frac{(1.96)^2 0.301 x 0.699}{0.05^2}$$

n = 323.

With 10% none response rate and design effect of 1.5, n= 533.

Where, n =sample size, d= margin of error, p=proportion of RHIS for pharmaceutical procurement, q=1-p.

2.7. Sampling technique and sampling procedure

A stratified sampling method was employed to select health facilities. Health facilities were stratified as hospitals and health centers by considering the presence of a difference between health facilities' utilization of RHI for PP and the calculated sample size for respondent's self-administered questionnaire was proportionally allocated to each health center and Hospital and then health professionals were selected by using lottery method. A total of 6 hospitals and 51 health centers were selected from 11 hospitals and 101 health centers respectively. From each selected health facility 18 respondents were at specialized hospitals, 14 at General hospitals, 12 at primary hospitals and 10 at HC committees. Among them by simple random 75 and 458 respondents were selected from hospitals and health centers respectively.

3. Variables of the Study

3.1. Dependent variable

The outcome variable is the utilization of routine health information for pharmaceutical procurement. Pharmaceutical procurement is procuring or purchasing drugs, supplies and diagnostic reagents other than receiving them through donation. In this study, respondents who respond to more than half of the procurement questions understand the pharmaceutical procurement process/procedure. Routine health information utilization for pharmaceutical procurement refere uses of generated health information from healthcare facilities at regular intervals for pharmaceutical procurement. Measured by computing ten 'yes' or 'no' questions adapted from literature conducted in Gamo and Gofa Zone. The assessment tool has a 'yes' or 'no,' and categorical part, recodes the categorical part into 'yes' or 'no'. The data distribution was skewed, so median scores are used for health information utilization for pharmaceutical procurement as having good routine health information utilization for pharmaceutical procurement when they scored above and equal to the median value or poor routine health information utilization when they scored below the median value[20].

3.2. Independent variables

Socio-demographic factors: age of respondents, level of education, gender and profession. Technical factors: routine health information system report formats, computer and data analysis skills. Organizational factors: training on routine health information utilization, supervising lower-level staff, availability of resources (human, financial and material) and feedback from higher levels. Behavioral factors: motivation on using routine health information, knowledge and attitude about routine health information utilization.

3.3. Data collection procedure

A structured self-administered questionnaire was adapted and modified using information from the literature. Pre-tests were done in Awi General Hospital to check reliability before the conduct of the actual data collection. The data were collected by five trained data collectors guided by two supervisors. The two-day training was given to conduct the research's objective properly. The consistency and accuracy of the data have been checked by the data collector and supervisor. Finally, the investigator made the overall supervision. The questionnaire was developed in English and then translated to Amharic to create smooth and clear communication.

3.4. Data quality assurance

A modified and pretested questionnaire was used with appropriate training for the data collectors and the data was collected with a clear understanding by the support of the collector for respondents. Then it was entered using statistical software to reduce data entry errors. Finally, missing values, noisy data and incompleteness were validated. Based on the suggestion of respondents during the pretest, some words were modified for easy understanding; Cronbach's alpha was computed to determine the internal consistency of the assessment tools.

3.5. Data processing and analysis

The data was checked for its completeness and cleaned, edited and coded by using Epi data version 4.6 and then exported to SPSS version 25. Cronbach's Alpha was used to check the reliability test for those associated factors of routine health information utilization for pharmaceutical procurement; technical factors reliability test (Cronbach's alpha 0.766) organizational factors reliability test (Cronbach's Alpha 0.920) and 26 behavioral factors (Cronbach's Alpha 0.897) which means it has strong internal consistency among Likert items in technical factors organizational factors and behavioral factors of utilization of routine health information and associated factors in health facilities.

Descriptive statistics (mean, standard deviation, median, frequency and percentages) were computed depending on the nature of the variables and results were presented as graphs and tables. The association between the dependent and independent variables was checked by using bi-variable and multivariable logistic regression analysis. Odds Ratio with a 95% confidence interval and p-values <0.05 were used to measure the strength of association and identify statistical significance. The goodness of model fitness was tested by the Hosmer and Lemeshow test with a p-value of 0.064. These data were checked for multi-collinearity through variance inflation factor with a mean value of 1.79.

3.6. Ethical consideration and consent to participate

Ethical approval was obtained from the Institutional Review Board (IRB) of the College of Medicine and Health Science, Bahir Dar University with protocol number 675/2023. Informed consent was secured from each study participant. Confidentiality was assured through collecting anonymous information and by informing the participants that personal identifiers would not be revealed to a third party during data collection, analysis and reporting of the findings.

4. Results

4.1. Socio-demographic characteristics of the respondents

From 533 study subjects, 492 participated in the study with a response rate of 92.3%. Among a total of 492 respondents, 225 (45.7%) were female and more than half of the respondents, 296 (60.%), were above 30 years old, with a mean age of 33 ±5.817 **(Table 1)**.

Table 1: Socio-demographic characteristics of the respondents among health facilities in Bahir Dar city and West Gojjam Zone, 2023.

Variables	Category	Frequency	Percentage (%)
Sex Female	Male	267	54.3%
	225	45.7%	
Age Above 30 years	Below and equal to 30 years	196	39.8%
	296	60.2%	
Religion Islam Other	Orthodox	342	69.5%
	63	12.8%	
	87	17.7%	
Level of education Diploma Degree Masters and Above	Certificate	24	4.9%
	78	15.9%	
	291	59.1%	
	99	20.1%	
Profession Doctor health officer Nurse (clinical/midwifery) Accountant/economics/marketing management, etc. Health information technician/ health informatics environmental health Other	Pharmacy	129	26.2%
	70	14.2%	
	75	15.2%	
	63	12.8%	
	66	13.4%	
	46	9.3%	
	20	4.1%	
	23	4.7%	
Work experience Greater than 5 years	less than 5 years	300	61.0%
	192	39.0%	
Procurement experience Greater than 4 years	1-4 years	197	40.0%
	295	60.0%	
Responsible department health information technician/ health informatics Accountant/economics/marketing management, etc. Other	Pharmacy	128	26.0%
	40	8.1%	
	54	11.0%	
	270	54.9%	

4.2. Utilization of routine health information for pharmaceutical procurement

Of the total respondents, 296 (60.2%) had good utilization of routine health information for pharmaceutical procurement.

4.3. Behavioral factors of the utilization of routine health information for pharmaceutical procurement

From a total of participants, 263 (53.5%) respondents did not get the motivation to use routine health information for pharmaceutical procurement and 371 (75.4%) respondents did not have good feelings about pharmaceutical procurement performance planning and monitoring. The majority of respondents, 383 (77.8%), did not understand the roles and responsibilities of uses of routine health information for pharmaceutical procurement during decision-making **(Table 2)**.

Table 2: Behavioral factors of utilization of routine health information system for pharmaceutical procurement in health facilities, 2023.

Variable	Categories	Frequency	Percentage (%)
Confidence on RHI	Agree	130	26.40%
	Disagree	362	73.60%
Confidence on utilize RHI for PP	Agree	211	42.90%
	Disagree	281	57.10%
Motivating staff to use RHI for PP	Agree	229	46.50%
	Disagree	263	53.50%
Enforce on RHI	Agree	189	38.40%
	Disagree	303	61.60%
Gives me feelings for planning and monitoring pharmaceutical procurement performance	Agree	121	24.60%
	Disagree	371	75.40%
The committee uses RHI	Agree	132	26.80%
	Disagree	360	73.20%
Understand the roles and responsibilities of uses of RHI for PP during decision making	Agree	109	22.20%
	Disagree	383	77.80%
PP decisions are made based on the annual pharmaceutical budget	Agree	206	41.90%
	Disagree	286	58.10%
Managerial enforcement for PP based on RHI	Agree	145	29.50%
	Disagree	347	70.50%

4.4. Technical factors of utilization of routine health information systems for pharmaceutical procurement

From a total study of participants, 177 (31.9%) respondents disagreed with the user-friendliness of system design to manage the data. Among study subjects, 235 (52.8%) disagreed with the accessibility of routine health information. 270 (54.9%) of respondents disagreed with the orientation of staff on data collection tools **(Table 3)**.

4.5. Organizational factors of utilization of routine health information for pharmaceutical procurement

Of a total of participants, 54.3% disagree with supportive supervision on routine health information uses and 276 (56.1%) of respondents disagree with getting timely feedback from higher officials. Among all study subjects, 235 (47.8%) of respondents disagree with getting training on data management and use **(Table 4)**.

Table 3: Technical fators of utilization of RHIS for PP in health facilities, 2023.

Variables	Categories	frequency	Percentage (%)
Have good knowledge to effectively use RHI	Agree	172	35.0%
	Disagree	320	65.0%
Have good information technology skills to effectively use	Agree	155	31.5%
	Disagree	337	68.5%
Is the report format user-friendly	Agree	337	68.1%
	Disagree	155	31.9%
The simplicity of RHIS makes it easy for health workers	Agree	257	52.2%
	Disagree	235	47.8%
The pharmacy unit and other units have strong integration on RHI utilization	Agree	160	32.5%
	Disagree	332	67.5%
RHI is easily accessible to health professionals	Agree	232	47.2%
	Disagree	260	52.8%
Have feedback from facility managers/higher officials	Agree	190	38.6%
	Disagree	302	61.4%
Have data analysis and use skills	Agree	160	32.5%
	Disagree	332	67.5%
Staff are oriented on the use of data collection tools	Agree	222	45.1%
	Disagree	270	54.9%

Table 4: Organizational factors of utilization of routine health information system for pharmaceutical procurement in health facilities, 2023.

Variables	Categories	Frequency	Percentage (%)
Staffs trained in data management and use	Agree	255	51.6%
	Disagree	238	48.4%
Strong, supportive supervision on routine health information uses.	Agree	225	45.7%
	Disagree	267	54.3%
There is reporting on RHI	Agree	125	25.4%
	Disagree	367	74.6%
Timely feedback on routine health information from higher officials	Agree	216	43.9%
	Disagree	276	56.1%
Organization culture of information use	Agree	250	50.8%
	Disagree	242	49.2%
There is quality report	Agree	210	42.7%
	Disagree	282	57.3%
Enforced to culture of information	Agree	155	31.5%
	Disagree	337	68.5%
Conduct data quality control	Agree	236	48.0%
	Disagree	256	52.0%
Commite has confidence to use RHI	Agree	138	28.0%
	Disagree	354	72.0%
Hospital officials gives regular feedback	Agree	222	45.1%
	Disagree	270	54.9%
Based on feedback	Agree	127	25.8%
	Disagree	365	74.2%
Use RHI for PP	Agree	233	47.4%
	Disagree	259	52.6%

4.6. Factors associated with the utilization of routine health information for pharmaceutical procurement

Bivariable and multivariable logistic regression was undertaken to select significant factors associated with the utilization of routine health information for pharmaceutical procurement. Bi-variable logistic regression analysis revealed that training, supportive supervision, report quality, motivation, regular feedback, user-friendly report format and information culture of the organization were all significantly related to the utilization of routine health information for pharmaceutical procurement. Bi-variables with a p-value < 0.2 were candidates for multivariable analysis. In the multivariable analysis of organizational culture of information use, training for data management and use and user friendly of report format were significant factors with a p-value of less than 0.05.

The odds of the utilization of routine health information for pharmaceutical procurement among respondents who had training were 2.33 times higher than those who didn't have training (AOR=2.33; 95% CI; 1.218, 4.472). Organizations with a culture of information use were 2.4 (AOR=2.401; 95% CI; 1.076, 5.356) more likely to have good utilization of RHI for PP compared to organizations that did not have an information use culture. A user-friendly report format to manage data was 2.56 times more likely to utilize routine health information for pharmaceutical procurement (AOR=2.555; 95% CI; 1.333, 4.899) **(Table 5)**.

Table 5: Factors associated with utilization of routine health information system for pharmaceutical procurement at health facilities, 2023.

Variable	Response	Utilization of RHIS for PP		COR (95% CI)	AOR (95% CI)
		Good	Poor		
Training in data management and use	Trained	134	120	1.909 (1.322,2.756)*	2.333 (1.218-4.472)**
	Not trained	162	76		
Organization culture of information use	Good culture	129	121	2.089 (1.445-3.019)*	2.401 (1.076-5.356)**
	Poor culture	167	75	1	1
User-friendly format	User-friendly	231	106	0.33(0.224-0.491)*	2.555(1.333-4.899)**
	Not user-friendly	65	90	1	1

5. Discussion

The prevalence of utilization of routine health information for pharmaceutical procurement at health facilities was 60.2% [CI 95%, 55.7, 64.4]. This is almost in line with studies conducted in Northwest Ethiopia (64%)[21], North Wolo Zone(58.4%)[22], Hadiya Zone (62.7%)[14] and South Region, Ethiopia (63.1%)[18]. However, the findings of this study were higher than those of studies reported from Dire Dawa (53.1%)[23], East Gojjam Zone (45.8%)[13], Amhara region (46%)[24] and Addis Ababa (37.3%)[5]. This difference might be due to the variation in study periods, the differences in study participants and the government's recent strong emphasis on using health information. Another possible reason is health professionals' attitudes toward health information utilization and health information system policy. Similarly, cultural and attitudinal change regarding the perceived value and practical use of health information as a result of the implementation of the information revolution agenda may have played a significant role[19].

However, the findings of this study were lower than the study conducted in the Northern Gondar Zone, 78.5 %[20], the North Shewa Zone of the Oromia regional state, 71.6%[25] and the Gamo and Gofa Zone (69.9%). In the North Gondar Zone, the reason for this variation may be due to good supervision, feedback and a large sample size. Also, this study is specific and focused on the utilization of routine health information for pharmaceutical procurements and participant variation, since in this study the respondents were professionals who engaged in the pharmaceutical procurement committee.

According to the multivariable logistic regression analysis, the higher odds of utilization of routine health information for pharmaceutical procurement were noted among professionals who had training on data management and use compared to those who hadn't had training. This is due to training and data management guidelines that will improve users' knowledge, attitude and availability of inputs (HMIS registration formats, guidelines, paper and markers), which will enable users to apply their knowledge and skills for data processing and information use. The finding was supported by those of other studies reported from East Gojjam and Western Amhara, Ethiopia[13,26].

Another significant factor in this study was the organizational culture of information use. The culture of information use is a subset of organizational culture; it can be strengthened if all people within an organization participate. Organizations that had a good culture of information use had 2.4 (AOR=2.401; 95% CI; 1.076, 5.356) times more likely to utilize RHIS for PP. The possible reason could be useful information can lead to the right decision-making. This finding is supported by a study conducted by Yekatit 12 Hospital Addis Ababa[27].

Those professionals who didn't face difficulty understanding the reporting format were 2.56 (AOR=2.555; 95% CI; 1.333, 4.899) times more likely to have utilized routine health information for pharmaceutical procurement than those professionals who faced difficulty understanding the report format. The reason could be that understanding the report format leads to easily retrieving and using information. This finding was supported by studies conducted in East Gojjam Zone, Northwest Ethiopia, Addis Ababa Health Bureau and Gamo and Gofa Zone.

6. Conclusion

Overall, this study finding showed that more than half of respondents had a good level of utilization of routine health information for pharmaceutical procurement. Organizational culture of information use, user-friendly report format and training for data use were significant factors in the utilization of RHIS for PP. Developing an organizational culture of information use, designing a user-friendly format and providing training for data use could improve the utilization of RHIS for PP.

7. Lists of Abbreviations

HIT: Health Information Technology; HMIS: Health Information Management System; HO: Health Officer; HSTP: Health System Transformation Plan; M&E: Monitoring and Evaluation; MOH: Ministry of Health; PP: Pharmaceutical procurement; RHI: Routine Health Information; RHIS: Routine Health Information System; SPSS: Statistical Package for Social Science; WHO: World Health Organization.

8. Consent for publication

Not applicable.

9. Competing interests

The authors declare that they have no competing interests.

10. Availability of data and material

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

11. Funding

The authors have not received a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

12. Authors' contributions

BGZ conceptualized the study, designed the study, collected the data, analyzed and interpreted the data and drafted the manuscript. NAM, AKTs, GG, BBA, EMA and YAM contributed to statistical analysis and reviewed the manuscript. All authors contributed to critical revisions for important intellectual content. They all read and approved the final manuscript.

13. Acknowledgments

First of all, we would like to express our greatest gratitude to Bahir Dar University, the College of Health Sciences and the School of Public Health for giving us this golden opportunity to conduct this research. Secondly, we would like to extend our heartfelt gratitude to study participants for their helpful and valuable contributions.

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