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Research Article

Assessment of Report and Requisition Form (RRF) Data Quality, in Case of EPSA Bahirdar Branch

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Abstract

Supply chain facilities including service delivery points should maintain the data quality of their reports and also submit their reports within the specified schedule, especially for program drugs like HIV, TB, malaria, maternal and child health and family planning products. The aim of this case study was assessment of RRF report data quality, in case of EPSA Bahirdar hub. from Jan 20/2021, to Feb 12/2021 used both quantitative for secondary data and qualitative research methods for face-to-face interview by using semi structured questionaries in a single facility based cross-sectional descriptive study design.

A total of 127 RRF report included and analyzed in this case study by using three data quality dimensions i.e., accuracy, completeness and time lines. From a total of 127 RRF reports 46(36.2%) were accurate but the remaining 81(63.8%) reports were inaccurate and 87(68.5%) were complete but the rest 40(31.5%) were incomplete and also 96(75.59%) were submitted to the hub on time before 10th day after the reporting period.

Almost all respondents said that reliable and complete RRF report is very important to have accurate forecasting approach and optimal distribution performance if it is reached on time. If health facilities report their consumption data correctly to the hub, the hub will supply the needed items.

Keywords: Report and Requisition Form; Data Quality; Health Commodities and Wastage Rate

Abbreviations

EFMHACA: Ethiopian Food, Medicine and Health Care Administration and Control Agency; EPSA: Ethiopian Pharmaceutical Supply Agency; FEFO: First Expired First Out; FY: Fiscal Year; HF: Health Facility; HIV: Human Immune Deficiency Virus; IFRR: Internal Facility Report and Resupply; IPLS: Integrated Pharmaceutical Logistic System; LMIS: Logistic Management Information System; LIAT: Logistics Indicator Assessment Tool; MCH: Maternal and Child Health; PFSA: Pharmaceutical Fund and Supply Agency; RHB: Regional Health Bureau; RRF: Report and Resupply Form; SDP: Service Delivering Point; TB: Tuberculosis; USAID: United States Agency for International Development; WHO: World Health Organization

Introduction

Health supplies management data are broadly used for a variation of purposes including consumption data reviews, quantification, program monitoring, quality improvement and logistics performance reporting. For this reason, it is critical to have high-quality data on performance in the health sector available routinely.

Good decisions are based on sound data; therefore, it is essential to ensure that the data are of good quality. Health-facility data constitute a primary data source for assessing the performance of the health sector. Ministries of Health therefore assemble data regularly to track progress towards goals and objectives, to plan for future

needs, and to set priorities for the health system. However, data of poor-quality result in a lack of trust among users [1].

Program pharmaceuticals are ordered every two months by hospitals and health centers and delivered by EPSA to these facilities directly or indirectly. Direct delivery sites are facilities that receive program pharmaceuticals directly from EPSA hubs whereas non-direct delivery sites are health centers that receive products from EPSA hubs through Woreda Health Offices [2].

When determining funding levels for programs and priority areas of the health system, health proposers need to know what level of trust they can place in the data. Planners also need to know what investments they must make to strengthen data quality and reporting systems. Assessment results should be distributed widely within the Ministry of Health and to development partners and other stakeholders to make known the strengths and limitations of the data. Poor-quality data can weaken demonstrations of progress towards health sector objectives and may hinder annual planning processes by providing misleading results. It is therefore crucial to discuss any problems of data quality, to identify measures to improve quality, and to develop action plans to implement such measures [1].

Based on the activities taken on supplies in the logistics system (i.e., storing, moving and using the supplies), three basic types of logistics records are used to monitor and track the status of the products in the pipeline. It includes stock keeping records, transaction records, and consumption records. Stock keeping records hold information about products in a storage e.g., bin-cards and stock-cards whereas the transaction records keep information about products being moved e.g., report and resupply forms (RRFs), internal facility and resupply forms (IFRRs), different vouchers and etc. The consumption records maintain information about products being consumed at the health facility e.g. patient registration book [3].

A levels of the data management and reporting system

Data collected, aggregated and reported to measure indicators flow through a data management and reporting system that begins with the recording of an encounter between a client and a program staff member, a commodity distributed, or a person trained. Data are collected on source documents (e.g., patient records, client intake sheets, registers, training registers, commodity distribution logs, etc.) Through the data management and reporting system, the data from source documents are aggregated and sent to a higher level (e.g., a district, a partner or principal recipient or a sub-partner or a sub-recipient) for further aggregation before being sent to the next level, culminating in aggregation at the highest level of a program (e.g., the M&E Unit of a National Program, the Principal Recipient of a Global Fund grant). The data from countries is frequently sent to international offices for global aggregation to show progress in meeting goals related to health initiatives [4].

Data quality dimensions

The routine data quality assessment is grounded in the components of data quality, namely, that Programs/projects need accurate and reliable data that are complete, timely, precise or accuracy, credible and maintained under conditions of confidentiality, when appropriate [4].

As described in Medicines Waste Management and Disposal Directive of Ethiopian Food, Medicines and Health care Administration and Control Authority (EFMHACA) pharmaceutical waste encompasses at least one of the following; expired, unused, spilt, and contaminated medicines [5]. These problems are highly depending on poor data quality released and used in the area of logistics management information system.

A quality health service requires the availability of safe, effective, affordable and qualified drugs in adequate quantity at all times with appropriate dose and dosage forms. However, managing drug supply is a very complex process that requires a strong organizational structure, and integrated supply chain. It involves a number of interrelated logistics functions accompanied by appropriate support functions in a supply chain and governed by stringent policy and legal framework.

These functions can be kept effective and integrated well if quality information moves up and downstream of a supply chain. Thus, a properly managed information systems should be established in each health supply chain facilities. Good report data quality across all the supply chain levels increases program impacts, i.e., maintains commodity availability and improves service seeking of the

community, enhances the quality of care, increases professional satisfaction and morale. Motivated staff are more likely to deliver a higher quality of service, improves efficiency and effectiveness [3].

In Ethiopia, studies on RRF reporting data quality and related logistics information system are very limited. Therefore, the aim of this case study was to evaluate RRF data quality for program drugs and its effect on supply chain activities in EPSA Bahirdar hub.

Statement of the problem

The quality and timeliness of the RRF reports have a sound impact on the sustainable accessibility of essential medicines particularly program drugs and prevent both under and over stock availability. Supply chain facilities including service delivery points (SDP) should maintain the data quality of their LMIS tools and also submit their reports within the specified schedule, especially for program drugs like HIV, TB, malaria, maternal and child health (MCH) and family planning products.

In supply chain management data quality can have strong effects on operations in the supply chain. Consider, for instance, the bullwhip effect, understock or overstock in the EPSA hub though there may be high or low demand in the health facility respectively. This may result in poor health quality service and/ high pharmaceutical wastage rate. This means that if a certain piece of data in a supply chain is erroneous or uncertain for example, the demand forecast of a certain product is far from the actual demand, then fluctuations increase rapidly along the supply chain. This effect is affected by data quality, as logistics management processes rely on data provided by others.

Poor quality data can imply a multitude of negative consequences in almost all pharmaceutical supply agency as well service delivering points like health facilities. The implications of poor-quality data can lead to less customer satisfaction, increased running costs, inefficient decision-making processes, lower performance and lowered employee job satisfaction. Poor data quality also increases operational costs since time and other resources are spent detecting and correcting errors. Poor data quality also means that it becomes difficult to build trust in the agency service, which may imply a lack of user acceptance of any initiatives based on such data [6].

To sum up, the problem that come from poor report data submitted to EPSA hub particularly Bahirdar hub from health facilities can cause inefficient health supply chain management practice like high wastage rate, under or over stock in the hub and low customer satisfaction especially for program health commodities.

Significance of the case study

The findings of this case study are expected to contribute a lot for different stakeholders. The primary significance of this study was to Ethiopian pharmaceutical supply agency (EPSA) in getting an information about the current status of health facilities" (HFs) stock status of program health commodities appropriateness is crucial for its good handling of stock in the warehouse that may decrease wastage rate and stock out.

The findings of this case study will help the health facilities to know how their report quality affect their health care service and the overall supply chain management related to health commodities. And also, it can use for the Ministry of health, RHBs, Zonal health Department's, Woreda Health Office's, and Non-governmental organizations working in the area to identify the gap in Practicing appropriate health supply chain report data quality.

By understanding the effect and benefits of RRF report data quality EPSA may enhance delivery of pharmaceuticals to Hospitals and Health Centers which have submitted a completed and approved RRF on time. Hospitals and Health Centers receive pharmaceuticals every other month. At the time of delivery, EPSA trucks will wait while products are counted and verified, to take note of any discrepancies, to obtain proof of delivery (Model 19), to collect signed and sealed EPSA Delivery for the pharmaceutical's shipment.

Literature Review

The data quality of RRF was assessed using indicators such as accuracy, timeliness, and completeness. Accordingly, of the total sampled RRF, 89 (64.6%) of them were accurately filled, and 43 (31.2%) were found to be inaccurate. However, when we consider by facility type, the hospitals and the health centers respectively filled 13 (72%) and 77 (63.9%) of their RRFs accurately. From inferential statistical analysis, RRF data accuracy had a significant association with staff training [3].

Selection and quantification of medicines without proven data/ evidence and techniques result in wastage due to expiry. Poor quantification and forecasting of medicines will lead to overstocking of the medicines. Overstocking of medicines normally leads to high number of expired medicines, high cost of storing excess stock

and high incidences of pilferage of high potent medicines all these are could be due to poor data quality [7].

A study done in east wollega zone in Oromia, Ethiopia showed that Out of a total of 225 service registration book data, 176 (78.2%) were complete. Out of a total of 200 service delivery and morbidity report data, 172(86%) were complete. The timeliness of health facility reports to the next respective level of the health system was 21(70%), 10(66.7%), and 4(80%) for Health posts, Health Centers, and district health offices, respectively. And data quality in terms of accuracy only 24(48%) of the 6 months health facility service delivery report was within the acceptable range. The study shows that the overall status of data quality in terms of report timeliness, report completeness, and data accuracy was 72.2, 86, and 48%, respectively, which are far less than the national targets. Data quality was slightly improved, looking from a health post to the district health office [8].

A study on Inventory management performance for laboratory commodities in public hospitals of Jimma zone, Southwest Ethiopia showed that the total estimated bin-cards, 225 (69.9%) of them held along with the items, and only 30.4% of them filled accurately and the wastage rate of the commodities in the hospitals was 27.2% and resulted in a loss of about 10,248.5 US dollars [9].

Objectives

General objective

Assessment of Report and Requestions Form (RRF) data quality, in case of EPSA Bahirdar branch.

Specific objectives

- To assess RRF report data time lines.
- To assess RRF report data completeness.
- To measure RRF report data accuracy.

Methodology

Study area and period

The study was done in the Northwestern cluster of EPSA which is Bahir Dar branch located in Bahir Dar town in West Amhara. The Amhara regional state capital city (Bahir Dar) is located 565km away from Addis Ababa. The cluster serves for catchments of Gondar Branch, Dessie Branch, Assosa Branch and direct deliver for 2 regions, a total of 488 institutions (6 zones health offices, 67 Woredas health offices, 34 public hospitals,2 military and 5 private hospitals,373 health centers, and 1 research institutions). The hub delivers health commodities especially program drugs to direct delivered site through 18 routs using 12 vehicles having from small to large volume by categorizing the rout EVEN and ODD in every other month.

This case study was conducted from Jan 20/2021, to Feb 12/2021.

Study design

This case study was used both quantitative for secondary data and qualitative research methods for face-to-face interview by using semi structured questionaries in a single facility based cross-sectional descriptive study design.

Inclusion and exclusion criteria

For face-to-face interview respondents are selected who are professional working on supply chain operational activities. And for secondary data RRF report submitted to hub in 2013 FY two consecutive months (sept. and oct) are used.

Sampling methods

The sample size of the RRF report to assess its quality was determined based on the USAID delivery project guideline (i.e., a logistics indicators assessment tool) that recommends taking at least 15% of the total facilities expected to submit their RRF report but I took more than 20% to increase the power of generalizability. Therefore, I assessed 127 RRF report data quality from expected 488 health facilities RRF report submitted to the hub every other month by using random sampling technique.

For qualitative part key informants are selected and 7 respondents are interviewed in both Amharic and English and finally transcribed to English version by considering information saturation point.

The questioner that I have used contain significance and very important questions that can be touch valuable area of my work.

Data collection procedures

Different data collection tools were used to collect relevant information based on the study objectives. The quantitative section was adopted from LIAT and some other literatures on data quality assessment and Semi-structured questionnaire was developed by the principal after reading some articles and consulting experts in the area.

Data processing and analysis

Quantitative data was clean and checked for completeness of information and entered into the Excel spread sheet for analysis.

Errors related to inconsistency of data was checked and corrected during data information cleaning. The qualitative part was analyzed manually using the thematic analysis technique.

Ethical consideration

Permission for this case study was obtained from School of Pharmacy, Health Science College, Addis Ababa University and EPSA Bahirdar branch. Informed consent also obtained from hub managers and employees in the hub. They are assured that the information gathered from the institution and respondents are highly confidential.

Operational definitions

- **Data quality:** It is the accuracy, completeness, and timeliness of logistics data.
- **The completeness of reports:** Data from program health commodities included in the RRF were used to check the completeness of the reports. A report is considered complete if all the columns for each product listed in the report are filled in for at least one product listed under each program unless the facility does not manage the product. It also includes the name and signature of the personnel who write and approve the report should be placed as well the full address and seal of the institution.
- % of Complete Reports (i.e., contains all the relevant data to measure the indicator) = Number of reports that are complete from all Service Delivery Points/Total number of reports submitted*100.
- **Timeliness:** As per the integrated pharmaceutical logistics system (IPLS) of Ethiopia, A report is said to be timely submitted if, the health facilities directly submit their RRF to the higher supplier (EPSA) until the 10th day after the reporting period.
- % of On Time Reports (received by the due date) = Number of reports received on time from Service Delivery Points/Total number of reports submitted to the hub*100.
- **Facility reporting rates:** The facility reporting rate was computed using the following formula.
- Reporting rate = number of facilities submitted their report in the specified schedule/ a total number of facilities expected to submit their report*100
- **Program health commodities:** In the current case study are drugs used to treat or prevent TB/ leprosy, HIV/AIDS, malaria, maternal and child health (MCH) and family planning and other health commodities delivered to health facilities free of cost and used in health facilities.
- **Accuracy:** Also known as validity: For this case study report accuracy assures the beginning balance of the RRF report is identical with the previous report ending balance and in each report column free of errors in mathematical calculation for each product. Data have integrity when the system used to generate them are protected from deliberate bias or manipulation for political or personal reasons.
- % of report accuracy = number of reports free from mathematical errors from health facilities/Total number of reports submitted to the hub*100
- **Health commodities waste:** Refers damaged, expired, or leftover health commodity products.
- Health commodities wastage rate = Total amount of unusable (expired +damaged) health commodities in a specific period/ Total amount of health commodities received in the same review period *100.

Results

- A total of 127 RRF report included and analyzed in this case study by using three data quality dimensions i.e., accuracy, completeness and time lines.
- From a total of 127 RRF reports 46(36.2%) were accurate but the remaining 81(63.8%) reports were inaccurate which is caused by mainly inappropriate consumption calculation and mismatched amount of the beginning balance with the previous ending balance.
- From a total of 127 RRF reports 87(68.5%) were complete but the rest 40(31.5%) were incomplete mainly due to many free spaces on health facilities address, name and signature of personnel who should approve the report, no stock status indicating number on health commodities item list on the report format that managed by health facilities.
- From a total of 127 RRF reports 96(75.59%) were submitted to the hub on time before 10^{th} day after the reporting period. The remaining 31(24.41%) were submitted to the hub after 10^{th} day of the reporting period which is late that affect the hub aggregate report that will submit to central hub. If the submission date is very late beyond 18^{th} days of the reporting period to the hub, the health facilities take their health commodities by themselves.

In-depth interviews were held with technical staffs working on mainly in core departments of the hub like warehouse and inventory management department (cold chain management operators

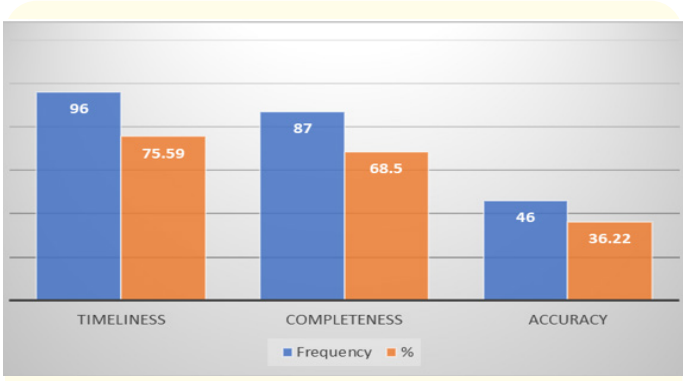

Figure 1: Data quality dimensions of the reviewed reports.

and warehouse managers), distribution and fleet management department, forecasting and capacity building department. Except one, all of the key informants were males. Majority of them were in the age group of 25-35 years with bachelor degree. The work experiences of the respondents ranged from 5 to 10 years. In-depth interviews were conducted to gather information about the benefit and effects of RRF report on supply chain activities like forecasting accuracy, distribution performance, stock availability and good warehouse, inventory management and effects on medicines wastage. And also challenges and recommendation to improve report data quality in health facilities.

The respondents also verified how medicine wastage affects service provision of the hub and any efforts took by the hub to prevent medicines wastage in the hub.

Qualitative findings

- Benefits and effects of RRF report data quality on core supply chain activities in the hub.
- Almost all respondents said that reliable and complete RRF report is very important to have accurate forecasting approach and optimal distribution performance if it is reached on time. If health facilities report their consumption data correctly to the hub, the hub will supply the needed items. So, based on the issued items the next year demand will forecast appropriately.
- Almost all respondents agreed on sending the reports on time with good quality data improves stock availability both in hub and service delivering points and crucial for warehouse and inventory management because of the hub refilled commodities from home offices by considering issued data to health facilities.
- Two respondents said that good report data is used to overcome the problem of storage cost, to not become under or over stock and to prevent frequent emergency orders by health facilities. This leads to good warehouse and inventory management.

Challenges and recommendation to improve RRF data quality

86% of respondents mentioned; negligence of professionals in health facilities, skill gab and poor training quality given to professionals are challenges or causes of poor report data quality submitted to the hub.

"One respondent also added that staff turnover, poor monitoring and evaluation and lack of awareness on the importance of quality data for supply chain activities in supplying agency and service delivery points are challenges to improve report data quality".

Delivery of quality training, continuous supportive supervision, on time feedback delivery, reach to last mile destinations to support and supervision as well assessment of the training Vs performance and awareness creation and realizing the importance of RRF for the health facilities are given as a recommendation to improve report data quality that will submit to hub.

"One respondent also added reward and punishment mechanisms should be applied to health professionals who are assigned to do the report since any defect in any points of report quality can disrupt the whole supply chain activities".

Factors that contribute for health commodities wastage in hub that estimated to be 1.49% in Birr and 1.60% in quantity with different unit of issue which below <2% (national recommended range) and total of 7,582,549.99 Ethiopian birr was loosed in the hub during the reviewed period are caused by poor forecasting accuracy or over quantifications, health facilities quantify more but buy less, poor inventory management, absence of fair and on time distribution, having not good reconciliations, are mentioned by all respondents are related to poor report data quality especially RRF report.

Discussions

Development of standard and uniform logistics recording and reporting tools/formats and proper use of these tools have a substantial role in the implementation of effective and efficient health supply chain management information systems. In this case study, some of the recording and reporting formats were different from

the majority one. Electronic recording and reporting system enhance the logistics management information system (LMIS) performances through reducing errors and task burden, saving time, and improving reporting rates.

Regarding data quality of reports, it has substantial impacts on the quality of health care and even on government budgets for the maintenance of health services. Therefore, every facility in a supply chain needs to improve its data quality and timely share it to maintain health care at an optimal level. In this case study, of the total sampled RRFs, 36.22% were accurate, 75.9% were timely reported and 68.5% of the reports were found to be complete. These indicate the health facilities' weak performance in recording their logistics data and reporting to EPSA Bahirdar hub. The findings are slightly lower than the assessment conducted by SIAPS in Cameroon and Burundi, where in the accuracy and timeliness of their reports were 75% and 90%, respectively [10,11]. The reason might be a difference in the degree of professional skills by higher officials in providing regular supportive supervision and feedback on the facilities performances and absence of continuous training for new coming staffs. Factors including unavailability of an electronic recording system, lack of awareness and the educational level of staffs might also be significantly affecting the data quality of report in the present study. Even though the wastage rate of the hub is in optimal range, poor RRF data quality submitted to the hub has great effect on health commodity wastage rate as almost all respondents assured in my qualitative findings.

Conclusion

From this case study, we concluded that the RRF report data quality including its timeliness, completeness and accuracy require improvements, nonetheless, their reporting rate was not a problem. EPSA Bahirdar hub and health facilities should give strong emphasis on awareness about how poor report data quality affect health supply chain management that leads to inadequate pharmaceutical availability result in weak health care service.

Recommendation

The major challenges that influence the facilities to do and submit appropriately were identified to be lack of commitment from professionals, staff turnover, poor awareness, skill gab and lack of electronic recording and reporting system. Generally, factors like training of staffs, availability of automated record systems, supportive supervision and feedback report had a significant association with the RRF data quality. Therefore, EPSA and partners should increase their frequency of supportive supervision and also provide constructive feedback to the facilities. The facilities, especially the health centers together with the concerned stakeholders, should strengthen their report data quality by implementing automated recording systems and give emphasis for data quality by considering "no quality data no drug" at all times.

Limitation of the Case Study

The first limitation of the case study was its coverage of only assessed RRF report submitted to EPSA Bahirdar hub from health facilities not include the aggregate report done by the hub to central EPSA.

The second limitation of the study was difficulty of getting respondents of the study at time of data collection due to time constraints and Lack of localized previous research papers in the area of the case study were also major constraints.

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Annex

Annex I

Semi structured questionaries

1. How could you describe the benefits and effects of RRF report on the following core supply chain activities?

A. Forecasting accuracy

B. Distribution performance

C. Stock availability

D. Good warehouse and inventory management

E. Pharmaceutical wastage especially for programs

2. What are the challenges to improve RRF data quality that will submit to the hub?

3. What do you recommend to improve RRF data quality in health facilities?

S.no	Health facility name by code	Timelines (< or = 10th days)		Completeness		Accuracy	
		Yes	No	Yes	No	Yes	No

Annex II: Data extraction format for secondary data.

E. Report and Requisition Form for Program Drugs

Health Facility: _____ Region: _____ Zone: _____ Woreda: _____

Supplying Branch: _____ Maximum Stock Level = 4 Months of Stock

Reporting Period: From: _____ To: _____ Emergency Order Point = 0.5 Months of Stock

SN	Product Description	Unit of Issue	Report Part							Requisition Part		
			Beginning Balance	Quantity Received	Losses/ Adjustments	Ending Balance		Calculated Consumption	Days Out of Stock	Maximum Stock Quantity	Quantity Needed to Reach Max	Quantity Ordered
						DU	Store					
			A	B	C	D	E	F = A + B +/- C - D - E	G	H = (120*F) /(60 – G)	I= H-D-E	
1	XI.	XII.	XIII.	XIV.	XV.	XVI.	XVII.	XVIII.	XIX.	XX.	XXI.	XXII.
2												
3												

Products with shelf life ≤ 6 months (S/No, Quantity and Expiry date): Remarks:

Completed by: _____ Signature: _____ Date: _____

Verified by: _____ Signature: _____ Date: _____

Approved by: _____ Signature: _____ Date: _____

Annex III: RRF format for my report data quality dimensions assessment

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