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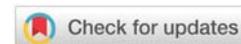
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## Research Article

# Enhancing health facility-based data quality and use for decision making at primary health care units to improve health service delivery of maternal newborn child and adolescent health, Tigray Ethiopia 2018

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## Abstract

**Objective:** information use is fundamental for evidence based decision making but data quality and information use in health facility is limited in low and middle income countries. Therefore, a facility based cross sectional using mixed approach was conducted to assess *data quality and use for decision making* in 12 selected health facilities of Tigray, Ethiopia, 2018.

**Results:** District Health Information System 2 (DHIS2) software was practiced in 12 of the facilities. Completeness and consistency rate of register and reports was 53.5%, 56.3%, and 38.9%. Respectively. The lot of quality assurance system of service and disease report was 7(61.1%). The performance monitoring team is established decision-making rate on key coverage indicators was 42.9%. Comparisons of performance in a district /national targets were 5(41.5a high rate of incompleteness, inconsistencies, low lots of data assurance and low use of data for decision making. Therefore, DHIS2 tool needs to be used to generate a report, use data and disseminating platforms both inside and outside health facilities using the website and other channels.

## Abbreviation

DHIS2: District Health Information System 2; e-HMIS: electronic Health Management Information Systems; FMOH:

Federal Ministry of Health; HC: Health Center; LQAS: Lot Quality Assurance System; OPD: Out Patient Department; WHO: World Health Organization.



## Introduction

The *District Health Information Software* (DHIS) is an open-source software platform for reporting, analysis, and dissemination of data for all *health* programs and is practiced in more than 60 countries in the world [1]. Facility-based information systems are necessary for the information revolution era [2]. The World Health Organization (WHO) identified six critical building blocks one of them is health information systems [3]. Health sector managers need timely, reliable and accurate information for planning and evaluating interventions [4–7]. Considering all the facts the world health organization wants to strengthen the health facility to use the existing health information.

Despite the fact, in sub-Saharan Africa, routine health data usually unavailable, underutilized, rarely complete and usually not used for decision making at the facility level [8,9].

To strengthen routine health data systems, the GTP II Ethiopia has focus on three agendas one is information revolution, [10]. Decentralization the transfer of authority and power from the higher level of government to lower levels [11,12]. Ethiopia's health policy decentralize decision at facility level but DHIS2 is rarely used [13,14]. However, the government of Ethiopia has the plan to utilize the health facility data for decision making at the grass-root level [15].

Nevertheless limited fiscal resources, lead to inefficiencies in the allocation of resources [16]. Huge volumes of data are created, but less is used to directly benefit programs [17]. Fostering effective data demand and utilization, therefore, is critical for improving health system effectiveness [2,18,19]. Therefore the purpose of this study is to assess health facility-based data completeness, consistency, data quality assurance and data for decision making to improve health service delivery of maternal new-born child and adolescent health, Tigray, Ethiopia 2019.

## Main text

### Methods

**Study design and setting:** A facility-based cross-sectional study using qualitative and quantitative approach was employed and the sample size was determined by using the Ethiopian MOH recommended sample size for routine data quality assessment protocol. We selected 12 health facilities from randomly selected 4 zones in the region, from each zone we selected randomly twelve districts and within the selected districts we select twelve health center or primary hospital with OPD per capita greater than  $\geq 0.5$  per year [20].

### Data collection tool and procedure

Data was collected with the standardized questionnaire that was adopted and contextualized for our study from the federal ministry of health Ethiopia and world health organization. A one-year data were reviewed using checklist. Completeness, consistency and data use for decision making were checked. Based on experts' opinion, four indicators (i.e. skilled birth

attendance, Penta three vaccination, family planning use and pneumonia in under five children) were selected to be checked from reports, registers, and plans of health facility of three randomly selected months of the year 2018. Four public health experts recruited from other health facilities were collected the data after 5 days training was given prior to data collection.

### Data processing and analysis methods

Data were checked and cleaned before data entry & analyzed using SPSS version 16 software. Qualitative data were transcribed, translated, using color-coded, thematically analyzed and triangulated with the quantitative.

## Results

### Characteristics of the health facilities

Twelve health facilities were employed for this study. The response rate was 100%. Eight of them were health centers namely Alamta, Korem, Machew, Samre, Abi adi Adishihu werkamba, semein and four of them were primary hospitals Mekoni, Adigidom, Hagerslem, Yechla. Three of them were from rural and nine from urban. All of the health facilities were governmental health facilities.

National open source data processing system DHIS2 was practiced for entry and analysis by all health facilities. Currently, e-HMIS is replaced by DHIS2. None of the health facilities were used access-based data processing.

### Completeness and consistency of data in register and reports

**Completeness of data in register and reports:** Four indicators (i.e. skilled birth attendance, family planning use, Penta 3 vaccination, and pneumonia under five-year children) were selected and checked for completeness of data through three randomly selected months (i.e. September, December and November from 2018). The overall register and report completeness rate were found to be 53.5% and 56.3%, respectively. For details of the completeness for all indicators see (Table 1).

### Reasons for data incompleteness

The possible reasons for the missing data source document Register (is not filled in, were one health facility explained by Staffing issue(s) (shortage, absence, six health facilities explained by Not understanding the data element, other one health facility Presence of other vertical reporting requirement, one health facility The recording tool is not designed as user-friendly).

### Consistency of register versus reports

The overall consistency rate was 38.9%. The reasons for the discrepancy inconsistency were data entry errors, Arithmetic errors and lack of emphasis for data accuracy. Detail see (Table 2).

### Data quality assessment

Timelines of reporting: twelve of the health facilities know



**Table 1:** Cumulative completeness of register and reports for selected indicators in the randomly selected three months, September, December and November 2018, Tigray Ethiopia.

Availability and completeness status of register and Reports	Cumulative completeness of register and reports for selected indicators								Total	
	Register				Report				Register	Report
	Skilled birth attendance	Family planning users	Penta-3 vaccination	Pneumonia under five children	Skilled birth attendance	Family planning users	Penta-3 vaccination	Pneumonia under five children		
Available and complete*	20	19	18	20	26	18	18	19	53.5	56.3
Available but partly complete*	16	17	18	16	10	18	18	17	46.5	43.7
Completeness rate	55.6	52.8	50.0	55.6	72.2	50.0	50.0	52.8	53.5	56.3

\*Register and Report completeness- means at first hand it is available, variable elements were checked whether filled or not .

**Table 2:** Review of consistency of source document for monthly reporting register versus reports of health facilities in randomly selected three months of 2018.

Health facilities	Family planning users in register versus report months September, December and Nov 2018			Penta3 Immunizations in users in register versus report of September, December and Nov 2018			under five pneumonia in register versus report of September, December and Nov 2018		
	Count from register	Recount from report	Consistency	Count from register	Recount from report	Consistency	Count from register	Recount from report	Consistency
Samre HC	358	398	In consistent	60	67	Inconsistent	45	45	consistent
Werkamba HC	272	192	In consistent	52	48	Inconsistent	277	208	Inconsistent
Machew HC	383	297	In consistent	138	138	Consistency	13	13	Consistent
Hagereslam primary hospital	430	251	Inconsistent	7	13	Inconsistent	147	181	Inconsistent
Yechla primary hospital	501	495	In consistent	75	91	Inconsistent	126	126	Consistent
Adi shihu	314	314	Consistent	58	51	Inconsistent	140	151	Inconsistent
Korem HC	413	413	Consistent	164	164	Consistency	10	10	Consistent
Abi Adi HC	642	463	Inconsistent	186	195	Inconsistent	21	18	Inconsistent
Alamata HC	447	447	Consistent	307	307	Consistency	287	260	Inconsistent
Adi gudom primary hospital	704	704	Consistent	111	111	Consistency	50	50	Consistent
Mekoni primary hospital	1024	1032	In consistent	183	177	Inconsistent	140	130	Inconsistent
Semien HC	1466	982	Inconsistent	374	391	Inconsistent	31	31	consistent
consistency rate in three months			33.3%			33.3%			50%
Over all consistency rate	38.9%								

that the deadline for submission, but half of the health facilities checked the arrival of the report and all of the health centers did not record the report submission date.

Lot Quality Assurance System (LQAS): LQAS service was reported in months one, two and three by 8, 7 and 7 health facilities, respectively. Besides, the LQAS disease report in months one, two and three were practiced by 6, 5 and 5 of the health institutions, respectively. Seven health facility maintained a record of LQAS check sheets and only one health facility kept feedback to its staff on data quality self-assessment findings.

In all of the performance monitoring team established, the team is established according to the standard made of the head of health facility, HMIS in charge, and all representatives of case teams. Even in two of the health facilities (i.e. Yechla primary hospital and Adishihu primary hospital) the team is not functional.

Medical in chief one health facility said “This is routine, just completeness, consistency.”

Senior health care provider health facility said “DHIS2 is the whole activities of the organization but we did not know the production of the DHIS2”

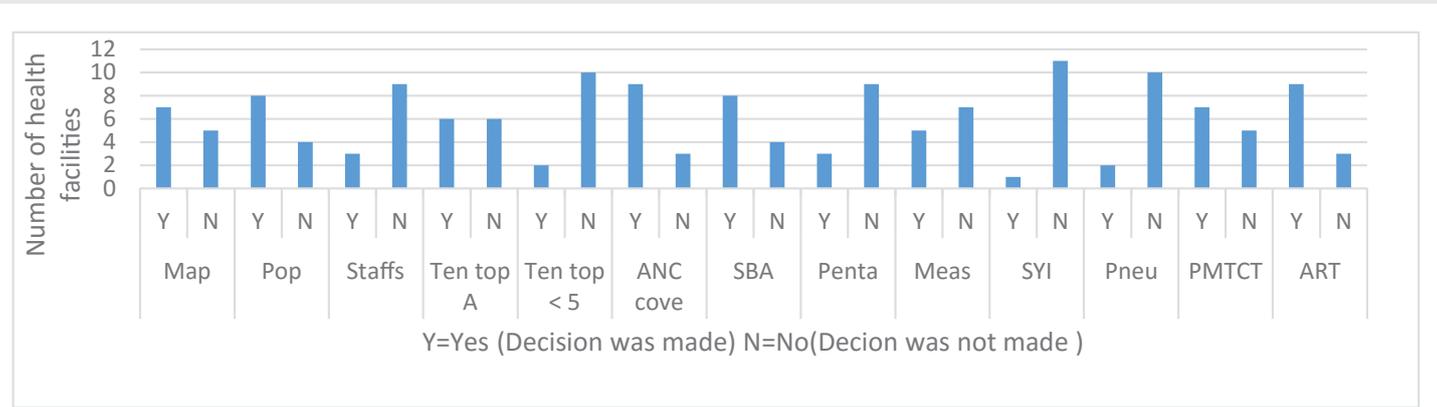
Many of HIT technician said “Medical director of the health facility and many of the members of the PMT they did not want to participate and interest on the interpretation of the products of DHIS2 database “

### Decision-making rate

Thirteen public health important indicators were used for decision according to plan, register and report documents of performance. The decision making rate was found to be 42.9%. For each decision see (Figure 1).

### Discussion

The study showed that DHIS2 software was practiced in 12 of the facilities. Completeness and consistency rate of register and reports was 53.5%, 56.3%, 38.9% respectively. Lot quality assurance system of service and disease report was 7(61.1%)



**Figure 2:** Intraoperative image, Complete section of the pancreas body.

and the decision-making rate was on selected key indicators of performance were 42.9%.

This result also similar to the study conducted by measure evaluation encounter collapse and inconsequential efforts to strengthen facility-based health information systems. Many studies showed that this last step of translating data into action is the most challenging, and many barriers have been identified such as poor data quality, poor access to data, lack of capacity of health managers and providers [21].

Other studies also showed that the use of health information and understanding of its role is paradoxical in many low and middle-income countries this may be the reflection of poorly defined information needs, major data quality issues [2]. Other barriers may be mechanical barriers like the skill of the personnel on computer literacy and user-friendly of the software compounded by organizational behavior on the use of data for decision-making matters. Therefore working on the culture on the use of data, prioritize organizational activities with strategies information revolution era with the performance of health sector transformation plans needs attention [22,23].

Many studies conducted in Kenya, Tanzania, Nigeria and Eastern Cape Province on health information systems showed that rather than growth of quality and use of health information it becomes hectic and fragmented way, with data collected inconsistently and in a disorganized manner, this is same with the current study completeness, consistency rate is 53.5%, 56.3%, respectively as a result information needed for decision-making is also 38.9% this is not only very small but also may be unreliable, irrelevant, ineffective too [24-27].

A study conducted in Gondar, Jimma and East Gojam, Ethiopia, showed that 32.1%, 32.9 %, and 45.8 % of health workers use data for decision making this is same as the current study 42.9 % selected health indicators gate decision this may indicate to us the decision making process in health facility is a great problem in the past and continues as it is even in the information revolution era [28-30].

In conclusion, the completeness rate of register and report was 53.5% and 56.3% and consistencies and decision rate was

38.9 %, 42.9% respectively. No website and annual bulletins prepared for their work thus training on DHIS2, supportive supervision based on hand on practice, creating a website and publishing annual bulletin for dissemination.

### Limitation of the study

The DHIS2 is in transition stage from e-HMIS, it would be better if its impact for decision making is assessed using pre and post analysis.

### Declarations

#### Ethics approval and consent to participate

Ethical approval was obtained from the institutional review board of Mekelle University, College of Health sciences. Support letter was obtained from Tigray Regional Health Bureau and district health offices. Informed consent was taken from each participant and facility managers. Data were kept confidential and anonymous.

#### Funding

The project was partially funded by Mekelle University College of health sciences.

#### Authors' contributions

AAG is participated in inception, designing, analyzing data, and drafting the manuscript and thus, acts as the corresponding author of the manuscript. MTB, MMA, KEG and MK have participated in data collection, analysis, and revising the manuscript.

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#### Availability of data and materials

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



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