

Barriers and Enhancers of Data Quality in Health Sector of Somali Regional State, Eastern Ethiopia

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Abstract

Background: Health data quality and use remain weak within the health sectors of low and middle-income countries (LMICs). Health data quality is so important to improve health management and prevailing practices. However, it is not satisfactory in the health sector of Ethiopia, including in public health facilities of Somali Regional State. Thus, this qualitative study aimed to explore the potential barriers and enhancers of health data quality in the health sector of Somali Regional State, Ethiopia.

Methods: A qualitative case study design with an in-depth interview technique was conducted as part of the baseline assessment of an implementation research in Jigjiga Woreda of Somali regional State, Ethiopia. The study was conducted in three randomly selected public health facilities, Woreda Health Office and Somali Regional Health Bureau. Data were collected from 17 purposively selected key informants using in-depth interviews; and observations of facilities and health administration units. Data were transcribed, coded, and analyzed using thematic content analysis to identify pre-defined themes. Open code version 3.4 was used for coding data and categorizing codes as thematic areas to identify barriers and enhancers of data quality in sector.

Results: Behavioral and technique-related factors were the most dominant barriers to data quality in the study setting. Of these, low commitment to data recording and compilation, negligence of the workforce on recording, lack and inadequate training on Health Information System, low value given to data, and low motivation of the workers. Additionally, lack of accountability for data recording and documentation, lack of Performance Monitoring Team commitment and regular meetings, and lack of regular supervision from PMT and immediate supervisors were the main institutional barriers to data quality in the region.

Conclusions: Behavioral and technique-related factors were the most dominant barriers to ensuring data quality in the study setting. Thus, tailored training on data recording and documentation should be given to the workers; and PMT should give support and feedback to the workforce, continuously. It is also relevant to design an intervention strategy to intervene in the contextual problems regularly and take immediate corrective action. [*Ethiop. J. Health Dev.* 2022;36 (SI-2)]

Keywords: health data quality, Barriers, enhancers, implementation research, formative assessment, public health facilities, Jigjiga, Ethiopia

Introduction

High-quality data refer to whether data meets the expectations of the users which can be human users or systems or can be defined as data that is fit for use by data consumers (1). There are evidences that timely and reliable data is essential for the provision of equity and quality of healthcare at all levels of healthcare system(2, 3). Whether the specific data quality requirements are met is usually measured along a certain number of data quality dimensions(4). Thus, data quality is recognized as a multi-dimensional concept across Health Information System (HIS) and it is useful at all levels of the healthcare system (2, 4, 5).

It is crucial to improve the quality of health and health-related data for planning, monitoring, and informed decisions for continuous improvement in the health system. Without good-quality data, the decision-making process based on evidence will be hampered at all levels of the health sector (6-9). Though the quality of health data is so important at all levels of the sector, prevailing practices in terms of data quality dimensions are not satisfactory in the country (10, 11).

Quality of healthcare data is correlated with technical, behavioral, and organizational factors. Technical

determinants may affect health data quality directly or through behavioral determinants. Similarly, technical determinants can be affected by organizational determinants as well (12-14). Evidence show that data quality is poor and is not utilized for program decisions in low-income and middle-income countries (LMICs)(3, 15), including in Ethiopia, especially at lower levels of healthcare and it remains a major challenge(14). In Ethiopia, the overall routine HIS data quality varied across the regions (11, 16, 17).

Despite the efforts made at national and regional levels, health data quality and use remain weak within the health sector, particularly at the facility and district levels, which have primary responsibility for operational management(18, 19). Although data quality has always been an important topic in public health, it is evidenced that the quality of data is compromised by different contextual factors. Thus, this qualitative study aimed to assess contextual barriers and enhancers of public health data as part of the formative assessment of implementation research. Evidence generated from this qualitative study gave an in-depth insight into the contextual barriers and enhancers of health data quality, and help in developing bottom-up

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implementation intervention strategies to improve data quality in the sector.

Methods

Study Setting and period

This qualitative study was conducted as part of an implementation study to improve data quality in three selected public health facilities (Kara Mara hospital, Jigjiga, and Ayardaga health centers), Woreda Health office, and the Regional Health Bureau of Somali Regional State, Ethiopia. Geographically, the region shares international borders with Kenya in the South, Somalia in the southeast and east, and Djibouti in the northwest. The region contains 11 administrative zones subdivided into 96 districts (*Woredas*), and 6 town councils (20). The region has an estimated total population of 5,899,000 by 2018 (3,165,000 male and 2,734,000 female) (21). More than 85% of the population practice pastoralism, nomadic or agro-pastoralism. Regarding health-system organization, the top hierarchy is the Regional Health Bureau (RHB) which manages Woreda/district Health Offices (WoHO) and hospitals. The WoHO, in turn, manages health centers and health posts in each district. According to 2019/2020 Health and Health Related Indicators published by MoH, the Ethiopian Somali region has 12 Hospitals, 208 Health Centers, and 1214 Health Posts (22). The baseline assessment was conducted from April 10-29, 2021.

Study design and population

This qualitative case study design was used to explore barriers and enhancers of data quality in the selected health facilities (one hospital and two health centers), and health administrative units and key informants, who were head of bureau/office, PMT members, program coordinators/heads and HMIS focal persons. A total of 17 key informants were involved in the in-depth interviews (6 from Kara Mara general hospital, 2 from Jigjiga health center, 3 from Ayardaga health center, 4 from Jigjiga Woreda Office, and 2 from the regional health Bureau). The study participants were selected purposively based on their HIS-related work experience and their responsibility in the facilities and the administrative units.

Data collection tools and techniques

A semi-structured in-depth interview guide and observational checklist were used for the qualitative data collection. The questions were adapted from the previous studies (PRISM) (11, 23), and the WHO

document (5). The semi-structured questions include questions related to social-demographic, data collection process, and data analysis and data use. A pretest was conducted on the neighboring district, Harorays Woreda, before the actual data collection. The pretest allowed looking into the context of the health sector in the pastoralist setting. Three trained and experienced public health and health informatics professionals were involved in the data collection. Data were collected consistently using audio recording and notes taking of each interviewer, and it was continued until no new information appears. The data collection was supervised continuously on daily basis by the research team members.

Data Processing and Analysis

The audio record is transcribed and translated into English and transcription was read by two senior public health professionals to validate the content of the data. The data were transcribed, coded, and analyzed to identify pre-defined themes and also reported as verbatim notes. Open code version 3.4 was used for coding data and categorizing codes as thematic areas (socio-demographic, organizational factors, technical factors, and behavioral factors); and analyzed using thematic content analysis.

Ethical Consideration

The ethical approval and clearance for this research project were obtained from Haramaya University College of Health and Medical Sciences Institutional Health Research Ethics Review Committee (IHRERC) (Ref No. COHMS/10.0/9392/20, dated August 27, 2020). Permission was obtained from all concerned health facilities and offices. All of the study participants were involved voluntarily, and confidentiality was ensured during and after the data collection. This study was conducted in consideration of COVID-19 pandemic intervention measures.

Results

Socio-demographic characteristics

In this qualitative study, a total of 17 key informants were involved in the in-depth interview (6 from Kara Mara general hospital, 2 from Jigjiga health center, 3 from Ayardaga health center, 4 from Jigjiga Woreda Office, and 2 from the regional health Bureau). Of the study participants, 5 (29.4%) were facility heads, 7(41.2%) were department heads/coordinators and the remaining 5 (29.4%) were HMIS focal persons (Table 1).

Table 1. Socio-demographic characteristics of the study participants in Somali, Eastern Ethiopia, 2021

Variables	Frequency	Percentage (%)
Facilities/Bureaus		
Karamara general hospital	6	35.3
Health centers	5	29.4
Woreda health office	4	23.5
Regional health bureau	2	11.8
Sex		
Male	14	82%
Female	3	18%
Professions		
Medical doctors	3	17.6
Health officers	1	5.9

Nurses	4	23.5
Midwifery	2	11.8
HIT	5	29.4
Others	2	11.8
Educational status		
Masters	2	11.8
First Degree	7	41.2
Diploma	8	47
Role and responsibility		
Facility head	5	29.4
Department heads/coordinators	7	41.2
HMIS Focal person	5	29.4

Behavioral related factors

The participants perceived that one of the challenges of ensuring data quality in the health sector was the lack of HIS training in the pre-service training at the University and College levels. It was reported that most graduates who have joined the health sector perceived that data recording, compiling, and ensuring data quality is not their responsibility.

A unit head in the hospital *“HIS is not included in pre-service training (medical schools and colleges), they only focus on the clinical or nursing aspect, and excluding the data management associated with it which led the healthcare professionals to assume maintaining patient data and ensuring the data quality as it is not their responsibility”*.

In addition, the quality of in-service HIS-related training was another factor explained by the participants that most of the HIS-related training are not properly delivered to the trainees which affected health professionals in acquiring the right competency to ensure health data quality. The other challenge during providing training was not recruiting the right person for the training and not interested in practicing and cascading the knowledge and skills gained from the training. A department head from one of the health centers explained this: *“Healthcare professionals do not translate and practice knowledge and skills gained from training because many often or person sent from training is not a person that works on HIS.”*

The participants also depicted that the turnover of trained manpower was another factor for health data quality, well-trained and experienced healthcare providers including HMIS focal persons/HIT professionals most often moved to other places including changing their profession due to lack of opportunity for career development. Sometimes HITs have difficulty understanding medical terms to enter the data into DHIS₂. On the other hand, because training are given to the focal person and others are not considered, health professionals feel that anything related to data is not of their concern, but the focal person was assumed the only person to compile healthcare data and ensure the quality of the data. In addition, the capacity of the HITs was another challenge as it is stated by the participants of the study. The discussants mentioned that most HITs have skills problems in documentation, coding data, and minor computer maintenance.

In addition, the study participants stated that there is a lack of commitment to ensure the quality of the data which is the greatest problem experienced in the region. They explained that even though lots of efforts are made to improve health data quality dimensions in healthcare facilities, the data documentation is still so poor.

The study participants stated that the lack of the understanding of the meaning of data was another challenge that minimizes the quality of data in healthcare facilities and health administrative units in the region. As explained by one of facility heads, *“Some workforces don’t understand the importance of data or have a low understanding regarding the data, not knowing the importance of the data paves to not understanding the reporting format to be filled”*. Similarly, one of the HIT personnel said that *“There is a misunderstanding about HIT profession and it considered the lowest (inferior) profession and what they do is considered useless, which led the HIT experts demotivated and change their profession imposing negative effects on health data quality”*.

Because of not understanding the value of data, reports are completed without paying due attention and in less time, considering that data compilation is not the work of healthcare professionals as explained by the study participants. Moreover, as little value they give to data, healthcare professionals prefer being busy with personal activities or working overload and don’t take filling registries as their responsibilities. Besides, the study participants stated that nowadays negligence/ignorance observed among healthcare providers seriously impaired the health data management and quality of data at all levels of the health system.

Skill gaps seen in most healthcare providers towards compiling, capturing, analyzing and interpretation the healthcare data is also identified as the main challenge to improve data quality by the participants of the study. Sometimes healthcare professionals have the knowledge on the healthcare data but fail to exercise in real situations which lead them not to acquire the right competency which again affects the quality of data. Lack of inadequate knowledge on the use and purpose of data is also a challenge to data quality even though, healthcare providers have the clinical and patient care-oriented knowledge in their respective professions, they don’t have adequate knowledge of the details of the data to be maintained in their scope of practice

which imposes the data quality dimensions in question as mentioned by the study participants. One of the participants has also mentioned that significant number of healthcare professionals have a negative attitude toward the importance of data quality.

The motivation of health professionals affects data quality as stated by the study participants. One of the

facility heads said that *“If you do everything right and submit report, and don’t get the results you want, then you will lose motivation and you don’t do it properly. E.g., I tell you the problems I have and don’t get any solutions for that, you don’t work properly; that means feedback”*. It was also reported that the lack of interest, and willingness to correct errors was also common in healthcare facilities.

Table 2. Frequency of main behavioral barriers to data quality in Somali, Eastern Ethiopia, 2021

Reasons mentioned as main barriers to data quality	Frequency	Percentage (%)
HIS training-related factors (lack of pre-service training, poor quality of in-service training, not involving the right person in the HIS training)	11	64.7
Commitment by the healthcare professionals	8	47.1
Lack of understanding of the value (importance) of health data	6	35.3
Negligence (ignorance)	5	29.4
Lack of competency (poor competence/lack of skill)	5	29.4
Inadequate knowledge	4	23.5
Lack of motivation	2	11.8

Technical related factors

From the technical determinant of data quality, the participants mentioned that complexity related to registries and formats that are used to generate and compile data has partly contributed to poor data quality. They pointed out that this complexity has resulted in data inconsistency which resulted from inappropriately filled registries and formats. This has

contributed to inconsistency in reported data and data on the source document. One of the study participants emphasized that *“Document keeping is one of the problems we have, sometimes the diseases recorded on registry different from the one on HMIS and therefore, there inconsistencies in reported data and the one on the registries”*.

Table 3. Frequency of main technical barriers to data quality in Somali, Eastern Ethiopia, 2021

Reasons mentioned as main barriers to data quality	Frequency	Percentage (%)
Complexity of registers (delivery register, ART register, EPI, NICU registers)	4	23.5
Non-customized reporting formats	3	17.6
Difficulty use of HIS applications and Computers (Skill gap)	12	70.5
Privilege to access DHIS2	7	41.7
Not relying on guidelines	3	17.6
NCoD related Challenges	11	64.7

Another challenge with formats mentioned by the participants was that the reporting formats are not customized to the level of service the hospital provides. At the end of the reports, all the services that are included in the format must be submitted while the services are not being provided in a hospital which means reporting formats are the same for district, general, and referral hospitals. For instance, one of the study participants from the hospital said, *“National report formats have lists of service that we don’t provide in this hospital, the first five pages. The report format is not customized to our hospital and sometimes staffs leave blank spaces when the services have been given”*.

The other technical factor contributing to poor data quality is the difficulty to use computers and applications such as DHIS₂. Most of the participants mentioned that the difficult use of computers and HIS applications have been contributed to poor data quality. This indicates a basic computer skill gap and the use of

applications is even much more difficult including using a PIN to sign in to the application. For example, the MCH focal person of a health center said, *“--they have difficulty in understanding medical terms and entering data into DHIS₂ what is given to him (HIS). Therefore, there is a problem when they enter the data”*. A district health office head mentioned, *“Sometimes things related to user passwords (DHIS₂), we have facilities that don’t have user passwords---results inability to access the contents of DHIS₂, the data. There are technical problems that you may see in DHIS₂, unintentional reporting”*. Participants also noted that some of the challenges related to HIS applications are due to not following the national guidelines. Hence, HMIS does not accept the terms of diagnosis used by physicians. A study participant from the hospital said, *“Clinicians do not use National Classification of Disease guideline, HMIS system doesn’t have some diseases that should be entered. The diseases recorded by doctors and NCoDs do not match. For example, an NCoDs diagnosis says ‘edema’, no*

clinician used this classification because edema is a symptom, and due to this the record is always zero. During transferring data during data to the registry, all data elements may not be transferred. For example, the diagnosis may be AFI secondary to Malaria, typhoid, etc., but nurses record only AFI, and all necessary data elements don't get transferred."

Organizational related factors

The majority of participants noted that availability and HIS supplies have compromised data quality. Participants from the facilities mentioned inadequate supplies of patient folders, registries, appointment cards, and MPI. The results in the use of non-standard registries and formats that do not conform to national HMIS and data from these healthcare facilities are not being included in a national database. Some participants mentioned lack of supplies such as a printer, power banks, flash discs, a laptop (computer), and maintenance service have also contributed to sub-optimal data quality. The head of a health center said, "Absence of standardized recording tools at the lower level of healthcare facilities, and some healthcare facilities use their recording and reporting tools".

Additionally, some participants pointed out that inadequate working space including card room and office has compromised data quality. Inadequate card room space results in unordered and misplaced patients' cards and hence duplication of cards that further occupy already limited space. Office space affects data quality in such a way there is no wall corner for posting key performance indicators. One of

the heads of the health center said, "We have no adequate space in places such as TB and ART clinics. Another head of a health center said, "Data quality problem may be problem-related document/registry misplacement, the place may affect utilization, as the time goes by these documents get damaged". HMIS focal person of a health center said, "We had a big problem in the card room. Worker issued a new card instead of searching the old one on the shelf for a pregnant woman that had ANC1, ANC2, ANC3, and blood test results. Now we have dealt with this problem and one might get a card in place for a patient that visited the health center before 7 or 8 months"

The main reason for inadequate supplies is the lack of budget related to HIS supplies. The ability to keep steady HIS supplies including registries, formats, and charts depend on purchasing capacity of the health facilities, and the lack of financial resources compromises the ability to maintain the supplies and has a direct negative impact on data quality. The head of a health center reiterated how the lack of HIS-related budget event at a higher level has created inadequate supplies. He said, "We don't have an adequate budget to maintain supplies. In the past, the regional health bureau provides us with HIS supplies, but now it is the woreda (sub-district) that allocates the budget for these supplies. However, the Woreda does not have adequate budget and therefore, there is a stoke outage of the basic supplies such as appointment cards, and master cards". Some participants pointed out interruption of power as one of the main reasons to update and access HMIS and DHIS2 data.

Table 4. Frequency of main organizational barriers to data quality in Somali, Eastern Ethiopia, 2021

Reasons mentioned as main barriers to data quality	Frequency	Percentage (%)
Unavailability of HIS supplies (patient folders, registers, and supplies)	11	64.7
Lack of printers, flash, power bank, laptop	2	11.7
Maintenance problems	1	5.8
Inadequate working space (card room)	3	17.6
Absence of HIS specific budget	1	5.8
Power supply interruption	2	11.7
Absence of supervision	15	88.2
Lack of motivation/recognition	3	17.6
Turnover of health workers/HITs	2	11.7

Most of the participants indicated that the absence of supervision has contributed to poor data quality. Supervision is important that it sensitizes the staff that they have the activity to perform and someone, a higher-level official would look at the activities performed and provide verbal and written feedback. This helps improve the performance and data quality. The Head of a health center said, "If there is no supervision and feedback, you become negligent and do not carry your duty properly. Therefore, regular supervision of higher authority is important to improve the performance or document handling from higher. If no supervision, they (supervisors) do not come to us, do not ask us if we have a problem or gap".

The majority of the participants acknowledged the importance of motivation in improving the

performance and of the motivation strategy is a promotion which often, according to them overlooked. Therefore, the absence of promotion demotivated staff, and thus, the quality of data was compromised. One of the discussants said, "Staff is poorly motivated and thus have a poor commitment". Another discussant from the district also said, "The reason for poor data quality is that health professionals may have done everything right and submit a report, and often do not get the results (promotion) you want, then you will be demotivated and you don't do it properly. For example, I tell you the existing problems and I do not get any solutions for that, you do not work properly, and it demotivates you. Therefore, encouraging and recognizing of HIT—could improve the data quality".

Discussion

It is evidence that HIS is a foundation of public health. Thus, data can help public health agencies to make appropriate decisions at all levels of the healthcare system, take effective and efficient operational and strategic actions, and evaluate the outcomes (7). This study identified barriers and enhancers of routine data quality in the health facilities and administrative units of Somali Regional State, Ethiopia. The predominant barriers were behavioral and technical problems in the data recording, documentation, coding, compilation, and reporting process, especially in the documentation of patient or client data by the healthcare providers in the service units. Accordingly, the low commitment of data recording and compilation, the low understanding to the importance of documentation, negligence of the workforce on recording, lack and inadequate training on Health Information System, low value given to data, low motivation of the workforce, and lack of accountability for data recording and documentation, lack of PMT commitment and regular meeting, lack of regular supervision from PMT, and lack of HIS supplies were the main barriers to data quality in the region. Meanwhile, the establishment of PMT, the presence of CBMP project, presence of separate record units, computers, shelves, and report formats were among the enhancers to ensure data quality in the sector.

Data documentation of the patient or client data was one of the data quality problems in the facilities, though it is so vital to the subsequent stage of data processing such as coding, compilation, and reporting of the data. Another study in the country has also shown that health workers have limited understanding of registration and other forms and lacks the basics of data entry skills (24). It was indicated that incomplete recording of patient history, diagnosis, treatment, and illegible handwriting of the healthcare providers were the major challenges for data coding and report compilation. This finding is consistent with other studies conducted in Benin(25), and a qualitative study conducted in Alberta, Canada also showed that documentation was a major challenge to ensure data quality(26). This may lead to under or over-reporting of service and disease reports. Thus, data quality can be improved by intervening in data documentation by the healthcare providers.

It was also reported that low motivation of the workforce, the lack of PMT commitment and regular meeting, the lack of regular supervision from PMT were the main barriers. This is consistent with a study conducted in the country, which reported that low motivation, presence of non-function PMT, and the lack of supervision were reasons of poor data quality in the routine HIS (27); poor support of management, the lack of accountability for the false report, and poor supportive supervision(24, 28). However, it is inconsistent with a qualitative study conducted in Botswana, where facilities and districts had good supervision (29).

In addition, behavioral factors such as lack of knowledge and skills of health workers on HIS-related training were mentioned as reasons for poor data

quality in the facilities. Additionally, there were shortages of patient folders, registries, appointment cards, printer, power banks, flash disc, computer, and maintenance service in the facilities. The finding is similar with a study conducted in Jimma, Ethiopia, where facilities had shortages of registration and compilation forms (30). The introduction of DHIS₂ could improve the timeliness and completeness of data reporting over time, and organizational and behavioral factors could limit the use of the software by the facilities and health workers(31). There are evidence that targeted interventions could enhance the quality of data in health facilities (32),

The limitation of this study is its generalizability outside the country, the contextual barriers and enhancers of data quality may also vary across the regions of the country. Thus, we recognize that the facilities in Jigjiga Woreda may not represent those of other Woredas in the region due to the fact that the assessment was conducted during the implementation of the CBMP project, which aimed to provide HIS support in the study area. However, the use of multiple data collection approaches and the inclusion of facilities and health administration units of Woreda and the region gives an insight into the overall data quality problems in the region. We also do believe that the barriers we found may be similar to other facilities in the region and country as well.

Conclusion

In the study setting, behavioral and technical problems in the data recording, documentation, compilation, and reporting process were observed, especially in the documentation of patient or client data in the service units. These problems were exacerbated by the organizational challenges of the facilities. The low commitment to data recording and documentation, low perception of the importance of documentation, negligence of the workers on recording, low value given to data, low motivation of workers, lack of accountability for data recording and documentation, and lack of functional PMT were the major challenge to ensure data quality. Meanwhile, the presence of PMT structure, separate recording units, computers, shelves, and report formats were among enhancers to ensure the quality of data in the study setting. Thus, tailored onsite training and mentoring intervention should be given on data recording and documentation for healthcare providers at all levels of the health system; and efforts should also be made in pre-service training of health professionals. In addition, the PMT members should take refreshment training to revitalize their continuous work and supportive supervision for their workers.

Conflict of interest

The author(s) declared that they have no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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