



Original Research

Community Health Center Information Systems Assessment in Bamako (Mali)

Évaluation des systèmes d'information des centres de santé communautaires de Bamako (Mali)

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ABSTRACT

Background. Managing health information is one of the building blocks of a health system. The practice of health care is based on evidence-based decisions and requires the use of quality health care data. **Objective.** To evaluate community health centers information system in Bamako, Mali. **Methodology.** This is a quantitative, descriptive study using a questionnaire to assess the health information system in community health centers in the health districts of Bamako, Mali. This study used secondary data collected in 2020 from the health information system. **Results.** Out of 47 participants in this survey, approximately 60% of participants received training in data collection, entry, compilation, and analysis. Less than half have received training in the use of DHIS2. Almost three quarters of CSCComs, or about 70%, have benefited from supervision by the health district. This study reported insufficient filling of primary data collection source, incomplete filling, late transmission of monthly activities reports and a poor agreement in data from register to monthly activities report, also from monthly activities report to DHIS2. **Conclusion.** This study provided an update on the quality of the data in the CSCComs. Six indicators were assessed and overall, there was no agreement between the data recorded in the primary media and those reported at the higher level. It is therefore important to strengthen the capacities of actors and to set up an effective health information system.

RÉSUMÉ

Contexte. La gestion de l'information sur la santé est l'un des éléments constitutifs d'un système de santé. La pratique des soins de santé est fondée sur des décisions fondées sur des données probantes et exige l'utilisation de données de qualité sur les soins de santé. **Objectif.** Évaluer le système d'information des centres de santé communautaires à Bamako, au Mali. **Méthodologie.** Il s'agit d'une étude quantitative et descriptive utilisant un questionnaire pour évaluer le système d'information sur la santé dans les centres de santé communautaires dans les districts de santé de Bamako, au Mali. Cette étude a utilisé des données secondaires recueillies en 2020 à partir du système d'information sur la santé. **Résultats.** Sur les 47 participants à ce sondage, environ 60 % des participants ont reçu une formation sur la collecte, la saisie, la compilation et l'analyse des données. Moins de la moitié ont reçu une formation sur l'utilisation du DHIS2. Près des trois quarts des CSCComs, soit environ 70%, ont bénéficié de la supervision du district sanitaire. Cette étude a signalé un remplissage insuffisant de la source de collecte de données primaires, un remplissage incomplet, une transmission tardive des rapports d'activités mensuels et une mauvaise concordance dans les données du registre au rapport mensuel des activités, ainsi que du rapport mensuel sur les activités au DHIS2. **Conclusion.** Cette étude a fourni une mise à jour sur la qualité des données dans les CSCComs. Six indicateurs ont été évalués et, dans l'ensemble, il n'y avait pas d'accord entre les données enregistrées dans les médias primaires et celles rapportées au niveau supérieur. Il est donc important de renforcer les capacités des acteurs et de mettre en place un système efficace d'information sanitaire.

HIGHLIGHTS

What is already known on this topic?

At the DHIS-2 level, much of the data collected regarding the primary health care system and the general health of the population is thought to be inconsistent and unreliable in Mali.

What question this study addressed?

Quality of community health centers information system in Bamako

What this study adds to our knowledge?

The study highlighted the shortcomings of the Health Management Information System in Bamako. These are mainly insufficient filling of primary data collection source, incomplete filling, late transmission of monthly activities reports and poor agreement in data from register to monthly activities report.

How this is relevant to practice, policy or further research?

Our findings could guide decision-makers to further strengthen the health information management system.

INTRODUCTION

Health information management is one of the building blocks of a healthcare system. The quality of the health information system improves access and quality of service delivery through evidence-based practice (Kebede et al., 2020).

The performance of health systems cannot be adequately monitored when health information data is incomplete, inaccurate, or inappropriate (Mutale et al., 2013). Decisions made using inaccurate data can mislead management. Thus, to solve these problems, the system must design strategies and ensure that data quality is maintained.

The implementation of the Health Management Information System (HMIS) is generally challenged by a number of factors that can be classified into technical, behavioral, and organizational factors (Aqil et al., 2011). Previous studies conducted in health districts in Africa have reported that limited access to computers and the Internet, inadequate technical support, and unskilled human resources contribute to poor management of the health information system (Kiberu et al., 2014; Ledikwe et al., 2014)

Poor management of the information system for health management could be due to organizational and technical factors. Some studies have reported that organization-related factors include workload, poor supervision, lack or poor feedback, poor assessment of data quality, turnover, and lack of tools (e.g., scoring). Technical and behavioral factors included undocumented telephone reports, no recording and/or counting, illegible data, negligence (recklessness), manipulation for competition, low competence (skills deficit), lack of experience sharing, lack of commitment, and absences (loss) report (Endriyas et al., 2019).

In Mali, the implementation of DHIS-2 has been effective in Mali since 2018. Data entry is highly dependent on the operational standard and financial health of Community Health Centres (CSCoM). However, many CSCoM does not have computers and internet connections. Data can often be captured at other higher levels and at the district level. At the DHIS-2 level, much of the data collected regarding the primary health care system and the general health of the population is inconsistent and unreliable

(Ministry of Health and Social Development of Mali, 2021). However, it should be noted that data quality remains a concern.

METHODOLOGY

Study setting

This is a quantitative, descriptive study using a questionnaire to evaluate the health information system in the community health centers of the health districts of Bamako, Mali. This study was carried out in the six communes of Bamako in Mali through the CSCoMs. In Bamako, each commune is equivalent to a health district. There are therefore six health districts throughout the city and each district corresponds to a health area. The CSCoM is the first contact structure and gateway to the public sector care system.

Participants

The population of this study concerned the technical directors and their substitutes in the six health districts of Bamako, Mali. At the Bamako level, there are 63 CSCoMs and six Reference health center (CSRef). The 1 in 5 methods, similar to that of Mali's 2018 demographic health survey, was chosen for the identification of community health centers in the six health districts.

Data collection

This study used secondary data collected in 2020 from the Health Information System. A questionnaire was used to collect the information. This questionnaire has been adapted from the tools (SIS supervision guide for health facilities and the DHIS2 supervision grid) of the MSHP - Mali and the performance management tools of the routine information system of the *Measure Evaluation* manual. The following parameters have been exploited: human resources.

- Availability of management tools.
- Completeness and timeliness of reports.
- Supervision by the health district.
- Assessment of data accuracy

Data analysis

The data were analyzed using SPSS version 22 software. A descriptive analysis including frequencies and percentages was performed. For the assessment of data accuracy, data consistency was checked for each indicator by CSCoM per month.

Ethical considerations

The protocol of this study was submitted for approval to the scientific committee of the Higher Institute of Public Health of Mali. It was not necessary to submit a consent form since the data is secondary data. The data of the participants will remain confidential.

RESULTS

Staff training on data management and the use of DHIS2 in CSCoM

This study included 47 CSCoMs. Out of 47 participants in this survey, approximately 60% of participants received training in data collection, capture, compilation, and analysis. Less than half received training on the use of DHIS2 (Table 1).

Table 1: Staff training on data management and the use of DHIS2

Items	Yes N (%)	No N (%)
Staff trained in data collection and entry	28 (59,6)	19 (40,4)
Staff trained in compiling data in a report	28 (59,6)	19 (40,4)
Staff trained in data analysis and interpretation	28 (59,6)	19 (40,4)
Staff trained in the use of DHIS2	23 (48,9)	24 (51,1)

Management of monthly activity reports at community health center

In terms of primary data collection materials, the data sources of consultations, family planning, antenatal care and monthly activities report templates for the past three months were available in all CSCoMs. Correct monthly

activity reports filling was observed in 59.6% of CSCoMs and less than 50% of CSCoMs had a monthly activity report fully filled. More than half had submitted their monthly activity reports (MAR) on time. Table 2 summarizes information on the management of MARs.

Table 2: Management of monthly activity reports at community health center

Items	Yes N (%)	No N (%)
Correct monthly activity reports filling	28 (59,6)	19 (40,4)
Full monthly activity reports filling	22 (46,8)	25 (53,2)
Timely transmission of the monthly activity reports	26 (55,3)	21 (44,7)

Supervision by the health district at community health center (CSCoM) level

During the quarter surveyed, nearly three-quarters of the CSCoMs or about 70% benefited from supervision by the health district. Data quality verification and staff coaching were observed in 29 CSCoMs or 61.7%. Table 3 provides us with more details on the supervision of the CSCoMs.

Table 3: Supervision by the health district at community health center

Items	Yes N (%)	No N (%)
District supervision of CSCoMs for the past three months	33 (70,2)	14 (29,8)
Verification of data quality by routine supervisor	29 (61,7)	18 (38,3)
Staff coaching on data quality by the routine supervisor	29 (61,7)	18 (38,3)

Distribution of data by indicator between the registry and the monthly activity reports

Overall, registry data were lower than monthly activity reports. Table 4 shows the positive difference by indicator between the two media.

Table 4: Assessment of data accuracy by indicator between the registry and the monthly activity reports (MAR)

Indicators	Register	MAR	Deviation* (+/-)
Total number of consultations of children aged 0-5 years (new cases + old cases)	21872	43851	21979
Simple malaria cases confirmed by RDT (0-4 years; 5 years and older; pregnant women)	23463	37305	13842
Number of positive RDTs	36598	56999	20401
Number of Cases of Cough<15 days, low acute respiratory infection: Pneumonia, Bronchopneumonia (0-11 months, <4 years)	2029	3446	1417
Number of new family planning registrations (new cases)	5782	8120	2338
Number of pill packs distributed	560	1611	1051
Total	90305	151332	61027

* Positive deviation: registry data lower than rma data; Negative deviation: registry data greater than monthly activity reports (MAR); RDT= Rapid Diagnostic Test

Distribution of data by indicator between MAR and DHIS2

A negative deviation was reported for five indicators indicating that the MAR data were higher than the DHIS2 data. For the following indicators (single malaria cases), a positive deviation was observed reflecting that the MAR data are lower than those of DHIS2 (see Table 5).

Table 5: Assessment of data accuracy by indicator between MAR and DHIS2

Indicators	MAR	DHIS2	Discrepancy *(+/-)
Total number of consultations of children aged 0-5 years (new cases + old cases)	43851	42957	-894
Simple malaria cases confirmed by RDT (0-4 years; 5 years and older; pregnant women)	37305	37417	112
Number of positive RDTs	56999	56994	-5
Number of Cases of Cough<15 days, low acute respiratory infection: Pneumonia, Bronchopneumonia (0-11 months, -4 years)	3446	3152	-294
Number of new family planning registrations (new cases)	8120	6989	-1130
Number of pill packs distributed	1611	1524	-87
Total	151332	149034	-2298

* Positive deviation: MAR data lower than DHIS2; Negative deviation: MAR data greater than DHIS2

DISCUSSION

This study highlighted the quality of health data by assessing the accuracy of data between DHIS2 and routine media such as the registry and the monthly activity report (MAR). The data from this study covered six indicators over a three-month period. This figure is similar to a previous study conducted in Rwanda comparing maternal and child health data from DHIS 2 with settlement register data for a period of three months in 2017 (Ntawuyirusha et al., 2020).

This study reported that more than half of the participants received training on data collection, capture, compilation, and analysis. Less than half received training on the use of DHIS2. This figure is almost similar to a study conducted in Ethiopia where all hospitals have at least one computer specifically assigned to HMIS, while none of the hospitals have an allocated budget for HMIS. In terms of service training, 82% of respondents had received MNIS training (Bogale, 2021).

This study reported a deficiency in the filling of primary data collection media, incomplete filling, out-of-time transmission of AMRs and a discrepancy in the data from the registry to the MAR, also from the MAR to DHIS2.

The results of this study were also similar to an earlier study conducted on the quality of routine institutional data for monitoring priority indicators of mother and newborn in DHIS2: a case study from Gombe State, Nigeria. The Nigeria study reported that of 14 priority maternal and newborn health indicators that could be tracked through facility data, 12 were included in Gombe's DHIS2. Between July 2016 and June 2017, data reported by establishments in DHIS2 were incomplete at least 40% of the time, under-reported by 10% to 60% of events documented in establishment registers and showed inconsistencies over time between related indicators and with an external data source (Bhattacharya et al., 2019). Our results are further confirmed with a study conducted in the same year in hospitals in the southwestern area of Shoa, Oromia, central Ethiopia. This study also mentioned low rates in promptness (58%) and

completeness (55%) in health information management (Bogale, 2021).

Routine health information systems are essential for monitoring service delivery. This study reported poor completeness of the data entered on DHIS2. Despite the existence of this platform in Mali since 2018, this situation could be explained by the lack of capacity building of new staff on the use of DHIS2 in Mali. Training in the health management information system improves the data management practice of health workers. On-the-job training and retraining should be done to improve health workers' data management practices (Nwankwo et al., 2020; Nwankwo, et al, 2018). Health workers at all levels within the health system need knowledge and a positive attitude towards the health information management system, recognizing that they are the key to recording accurate and reliable data (Nwankwo et al., 2020).

The implementation of DHIS2 has improved the timeliness and completeness of routine reporting of outpatient, inpatient and district health service utilization at the national level (Kiberu et al., 2014). The low completeness in DHIS2 reported in this study could also be explained by the lack of internet connection in CSComs and the lack of regular supervision in CSComs. An earlier study conducted in Uganda reported that continuous supervision and mentoring of on-site support and further system/infrastructure improvements, including internet connectivity, are needed to further improve the performance of DHIS2 (Kiberu et al., 2014). Overall, poor accuracy and quality of data were reported, and performance-based financing could be an approach to improve the quality of data at the health center level (Ngha et al., 2018).

CONCLUSION

This study provided an update on the quality of the data at health center level. Primary data collection source and DHIS2 were available in all CSComs. Unfortunately, shortcomings have been observed in the filling of its media including the low completeness of the data in the DHIS2. Six indicators were assessed and overall, there was no agreement between the data recorded in the

primary media and those reported at the higher level. It is therefore important to strengthen the capacities of actors and to set up an effective health information system. The assessment was made at the level of 47 CSCs out of 65 covered in the Bamako health region. This same exercise could be done in all community health centers to improve the health data quality in Mali.

COMPETING INTERESTS

The authors declare that they have no competing interest in the preparation of this document.

AUTHORS' CONTRIBUTIONS

All authors participated in the conceptualization and the design of this manuscript. In addition, they provided essential comments for the data analyzes and the manuscripts. The co-authors have read and approved the final version for submission.

CONSENT FOR PUBLICATION

There are no individual details, videos, or images used in this study. Therefore, consent to post is not applicable. It was not necessary to submit a consent form since the data are secondary data. The data of the participants will remain confidential

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