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Research Article

Audit of the Quality of Data on Human Immunodeficiency Virus Infection in 2022 in Burkina Faso

[1,2]Ismaël Diallo, [3]Maurice Sarigda, [4]Eric Arnaud Diendere, [5]Abdoulaye Sawadogo, [6]Abdoul Gafourou Arsène Ouedraogo, [7]Jacques Zoungrana, [6]Mamoudou Savadogo and [8]Smaïla Ouedraogo

[1]*Infectious Diseases and Tropical Medicine Department, Yalgado Ouédraogo Teaching Hospital, Burkina Faso*
[2]*Training and Research Unit in Health Sciences, Joseph Ki-Zerbo University of Ouagadougou, Burkina Faso*
[3]*Department of Sociology, RTU/HuS, University Thomas Sankara, Ouagadougou, Burkina Faso*
[4]*Division of Infectious Diseases, Bogodogo University Hospital, Ouagadougou, Burkina Faso*
[5]*Division of Infectious Diseases, Regional University Hospital, Ouahigouya, Burkina Faso*
[6]*Division of Infectious Diseases, Yalgado Ouedraogo University Hospital, Ouagadougou, Burkina Faso*
[7]*Division of Infectious Diseases, Souro Sanou University Hospital, Bobo-Dioulasso, Burkina Faso*
[8]*Department of Public Health, RTU/HS, University Joseph Ki-Zerbo, Ouagadougou, Burkina Faso*

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Corresponding Author:
Ismaël Diallo
Infectious Diseases and Tropical Medicine Department, Yalgado Ouédraogo Teaching Hospital, Burkina Faso
Training and Research Unit in Health Sciences, Joseph Ki-Zerbo University of Ouagadougou, Burkina Faso
Email: ismael.diallo@ujkz.bf

Abstract: Burkina Faso pledged to reach the worldwide objective of eliminating HIV/AIDS by 2030. Therefore, its information system must be able to provide quality data for monitoring and evaluating progress. This study assessed the quality of data on HIV/AIDS in Burkina Faso. We conducted an audit on the promptitude, exhaustivity, and exactitude in the management of data regarding HIV/AIDS. The survey occurred in the care centers for People Living With HIV (PLWHIV) between January and March 2022 and focused on data collected between August and October 2021. Out of the 75 care centers for PLWHIV that were assessed, 2 (2.7%) had a level of exhaustivity in register filling that was satisfying and 4 (5.3%) had a level of exhaustivity that was very satisfying. The proportion of discordant data was 32.0%. According to the type of center, this proportion was of 72. 7% in public centers versus 66.7% in nonprofit private centers and 20.0% in for-profit private centers. The main reasons were lack of training, data reporting and counting errors. The promptitude of monthly activity report transmission was unsatisfactory in 4.0% and very satisfactory in 96.0% of cases. The exhaustivity and the exactitude of data on HIV/AIDS are unsatisfying in Burkina Faso. The training of workers, the promotion of self-control on quality and effective data usage could improve those findings.

Keywords: Audit, Quality of Data, HIV, Burkina Faso

Introduction

In Burkina Faso, the infection by Human Immunodeficiency Virus (HIV) is a major concern. Although recent data in general population reveal a global prevalence below 1%, the prevalence of HIV continues to be high among key populations such as sex workers, prisoners and men having sex with other men (ONUSIDA, 2024). This situation persists throughout western Africa and is a barrier to achieving the goal of eliminating HIV/AIDS as a major public health concern by 2030.

The permanent secretary of the national council responding to HIV/AIDS and Sexually Transmitted Infections (SP/CNLS-IST) manages the national organization responsible for responding to HIV/AIDS epidemics in Burkina Faso. The management structure for responding to AIDS and STI in the sub-sector of health is managed by the sectorial health program (PSSLS-IST) at the working level. Several structures, including public, for-profit private and nonprofit community-based structures, provide HIV medical care and conduct screenings, prevention care and treatment for individuals with HIV (PLWHIV) (Ouedraogo *et al.*, 2024). In addition, these structures record their activities in source documents like registers and produce a monthly report of their activities that is sent to the health district that manages them (Diakité Ouedraogo *et al.*, 2023).

The national surveillance system for HIV infection involves collecting, analysing and interpreting organized, systematic and continuous data with the aim of following trends and adapting the national response (Ouedraogo *et al.*, 2024). A study conducted in 2019 aimed to evaluate the attribution of this surveillance system. According to the authors, the primary data collected was not consistent with those transmitted to the above level (11% overestimation) and the reports were not timely or responsive (86% delay) (Ouedraogo *et al.*, 2024). Based on these shared results, the national authorities responsible for HIV response took corrective measures.

This study assesses the quality of data on HIV infection, emphasizing exhaustivity, promptitude and exactitude.

Materials and Methods

Type and Period of Study

We audited the quality of HIV infection data reported by care centers across the country. The survey took place between January 1st, 2022 and March 15th, 2022 and focused on data reported from August to October 2021. The audit was on promptitude, exhaustivity and exactitude. This study was guided by the guide on routine health data quality in Burkina Faso. This document of reference recalls the different tasks that should be executed in the process of controlling the quality of routine data, the timeframe for the quality control of data and the quality dimension of those data. Promptitude is defined as the timely transmission of data, according to this reference. The monthly reports should be transmitted no later than the 5th of the following month. The evaluation of exhaustion is done by completing field filling up in data collection tools. Therefore, no field should be left blank. Concordance is when the same data values from different sources within the same period of time have no differences when compared. Otherwise, it is referred as discordance (Soubeiga *et al.*, 2022).

Population of Study

The data collected for this study came from registers and monthly activity reports of public and private (for-profit and nonprofit) centers for medical care of PLWHIV at the different level of the health system in Burkina Faso.

Sample/Sampling

The survey found that 35 out of 125 care centers for PLWHIV were unavailable due to insecurity related to armed terrorist groups. The surveyed care centers consisted of the 90 remaining centers that were accessible. The number of health centers that were to be surveyed was determined by the formula below:

$$n \geq \frac{N*p(1-p)}{p(1-p)+\frac{l^2}{z^2}(N-1)}$$

n = desired sample size

N = the number of care sites for PLWHIV, meaning 90

p = 80%, WHO standards, quality index ($p \geq 80\%$)

l = Precision (5%)

Threshold for significance $\alpha = 5\%$, $Z_{\alpha}=1.96$:

$$n = \frac{90\times 0.80\times 0.20}{0.24} = 66.1$$

The minimum population required was 73 health centers due to a 10% non-response rate.

The survey selected care centers for PLWHIV by stratifying by two degrees. There were three groups of care centers: public, nonprofit private and for-profit private. The initial degree involved choosing a health center. The number of centers selected for each category corresponded to the total count of centers in that category. Using Excel version 2013, the names of the care centers for PLWHIV were typed, ordered and numbered in each category. The software for conducting a simple random sampling was identical, but the center to be surveyed was changed. The second degree involved auditing the enrolment registry for new cases of PLWHIV and their contacts, as well as the monthly activity report for the survey period. The random sample excluded care centers for PLWHIV that were not functioning during the survey period because of security reasons.

Study Variables

The data collected encompassed variables concerning care centers for PLWHIV, data organization and management and necessary information to evaluate data promptness, exhaustivity and exactitude (Table 1).

Data Collection

Two techniques were used to collect data. The initial method involved conducting interviews with each responsible care site, which enabled the collection of information related to data management and the elaboration of reports. This process included the designation of the person responsible for reports' elaboration, the training of this person on the national integrated system of surveillance and the existence of an internal mechanism of data quality control (existence of a setting for data validation, periodic performance of routine data quality control). The second method involved a documentary review that allowed the gathering of data about the exhaustion of filling register items for newly enrolled PLWHIV and their case contact. It enabled the collection of data that could be verified by cross-referencing different data sources. The sources consisted of notification registers for new cases of PLWHIV and their case contacts, as well as monthly activity reports. The KoboCollect software was utilized for gathering data. This tool was set on the mobile android phones of the surveyors. To guarantee better data collection, the surveyors received training in advance on the study protocol, which focused on collecting techniques, data sources and evaluation forms.

Table 1: Variables of the study

Variables	Modalities
Level of care	1^{st} level, 1^{st} scale (CHSP/MC)
	1^{st} level, 2^{nd} scale (MCSU)
	2^{nd} level (RH)
	3^{rd} level (UH)
Type of center	Public
	For-profit private
	Non-profit private
Organization of data management	Existence of a responsible in charge of elaborating the monthly activity reports
	Training of the responsible for data on the national information system
	Existence of an internal mechanism for quality control (existence of a setting for data validation, periodic performing of quality control of routine data)
Promptitude	Number of expected reports by the above level during a set period
	Number of reports transmitted on time to the above level during a period of reference
Exhaustivity	Number of items that should be filled in the enrolement registry for new cases of PLWHIV
	Number of items that should be filled in the screening registry of case contacts
	Number of items that are filled in the enrolement registry for new cases of PLWHIV
	Number of items filled in the screening registry for case contacts
Exactitude	Number of new cases of PLWHIV counted in the register
	Number of new cases of PLWHIV mentioned in the monthly activity report
	Number of new contact cases screened and counted in the register
	Number of new contact cases screened and mentioned in the monthly activity report
	Existence of discordances
	Reasons for discordances

CHSP health center for health and social promotion; MC medical center; MCSU medical center of surgical unit; RH regional hospital; UH university hospital; PLWHIV people living with the human immune-deficiency virus

Treatment and Statistical Analysis of Data

IBM SPSS statistics version 25 was utilized to analyze exported data. To describe the main characteristics of care centers for PLWHIV, a descriptive analysis was carried out first. The quality of data was assessed by estimating and interpreting data quality indicators, which include promptness, exhaustion and exactitude.

Promptness refers to how quickly monthly activity reports are transmitted from care center sites to the level mentioned above. It was assessed by the following formula:

$$\frac{\textit{Number of monthly reports transmitted on time}}{\textit{Number of expected monthly reports}} \times 100$$

Exhaustivity allows the appreciation of completeness of filling registers' items for new cases of PLWHIV. The evaluation was done using a calculated score, which separated the numbers that were filled in from the ones that needed to be filled in. The number of items required is calculated by multiplying the number of newly registered PLWHIV by the number of items set for each register. The number of items filled in is a function of the correct number of items multiplied by the number of newly registered PLWHIV. The resulting result was multiplied by 100.

The degree of discordance between the events recorded in the registers and those mentioned in the monthly activity reports was used to assess accuracy. The following formula was used to estimate accuracy:

$$\frac{E_{MAR}-E_{MR}\times 100}{E_{MR}}$$

Where,

E_{MAR} = Number of events in the monthly activity report

E_{MR} = Number of events mentioned in the registry

In Table (2), we present the various indicators of data quality with their meanings.

Table 2: Interpretation of the different quality indicators on data of the human immunodeficiency virus

Variables	Threshold	Interpretation
Exhaustivity	<50%	Mediocre
	≥50 and <80 %	Less satisfying
	≥80 and <95%	Satisfying
	≥95%	Very satisfying
Exactitude	= 0%	No discordance (perfect concordance)
	<5%	Discordance of less than 5%
	≥5 and <10%	Discordance than 5% but less than 10%
	≥10%	Discordance of less than 10%
Promptitude	<90%	Not satisfying
	≥90 and <100%	Satisfying
	= 100%	Very satisfying

Ethics Considerations

Ethical clearance for the research protocol was given by the Ministry of Health Ethics Committee (CERS number 2021-11-263). Each participant freely gave informed consent during the survey and it was required prior to each inclusion. Finally, we respected the anonymity of participants (the managers of data from the registers) and didn't offer any financial or material compensation for their participation in this study.

Results

General Characteristics of Care Center for PLWHIV

The investigation was conducted on 75 health centers, which included 55 public centers, 15 non-profit private centers and 5 for-profit private centers. The centers in the first scale of the health system were 58 (16 in the first scale and 42 in the second scale). The second and third scales had 9 and 8 individuals, respectively.

Data Management Organization (Table 3)

Analysis of care sites shows that 98.2% of public centers, 93.3% of non-profit centers and 100% of for-profit centers have a data manager. However, only 44.4% of public service center managers have received recent training on the National Integrated Monitoring System (NISS) in the past three years, compared to 71.4% in non-profit centers and 80.0% in non-profits centres, 0% in for-profit centers. These results show a training deficit in public structures, which could compromise the quality of data.

Table 3: Distribution of care sites for people living with the human immunodeficiency virus according to the organization of data management in 2021, Burkina Faso (N = 75).

Variables	Number	Frequency	
		No (n, %)	Yes (n, %)
Existence of a responsible in charge of data management			
Public	55	1 (1.8)	54 (98.2)
Non-profit private	15	1 (6.7)	14 (93.3)
For-profit private	5	0 (0.0)	5 (100.0)
Existence of a responsible for the elaboration of reports and trained on NISS* during the last three years			
Public	54	30 (55.6)	24 (44.4)
Non-profit private	14	4 (28.6)	10 (71.4)
For-profit private	5	1 (20.0)	4 (80.0)
Existence of an internal mechanism for data quality control			
Public	55	4 (7.3)	51 (92.7)
Non-profit private	15	1 (6.7)	14 (93.3)
For-profit private	5	1 (20.0)	4 (80.0)

**National integrated surveillance system*

Completeness of Records (Table 4)

Regarding the completeness of the records, 84.0% of the sites were considered "less satisfactory", while only 5.3% achieved a quality "very satisfactory". "poor" completeness was more common in for-profit (40.0%) than in public (3.6%) or non-profit (13.3%) centers. These results indicate structural gaps in for-profit centers, requiring strengthened control mechanisms to improve the completeness of records.

Table 4: Distribution of care sites for people living with the human immunodeficiency virus according to the exhaustivity of filling-in registers in 2021, Burkina Faso (N = 75)

Variables	Number	Exhaustivity (n, %)			
		Mediocre	Less Satisfying	Satisfying	Very Satisfying
Public	55	2 (3.6)	50 (91.0)	1 (1.8)	2 (3.6)
For-profit private	5	2 (40.0)	2 (40.0)	0 (0,0)	1 (20.0)
Nonprofit private	15	2 (13.3)	11 (73.3)	1 (67)	1 (6.7)
Overall	75	6 (8.0)	63 (84.0)	2 (2.7)	4 (5.3)

Timeliness of Data Transmission (Table 5)

Data transmission was overall "very satisfactory" in 96.0% of sites. For-profit and non-profit centers are characterized by perfect transmission (100 and 93.3%, respectively). However, 3.6% of public centers reported "unsatisfactory" transmission. These results show a general homogeneity in the timeliness, but highlight specific challenges in public centers that require particular attention.

Table 5: Distribution of care sites for people living with the human immunodeficiency virus according to the promptitude of data transmission in 2021in Burkina Faso (N = 75)

Variables	Number	Promptitude (n, %)		
		Not Satisfying	Satisfying	Very Satisfying
Public	55	2 (3.6)	0 (0.0)	53 (96.4)
For-profit private	5	0 (0.0)	0 (0.0)	5 (100.0)
Non-profit private	15	1 (6.7)	0 (0.0)	14 (93.3)
Overall	75	3 (4.0)	0 (0.0)	72 (96.0)

Data Accuracy: Rate of Discrepancy (Figure 1 and Table 2)

Figure (1) shows the rates of concordance and discrepancy between the records and monthly reports. Public centers have the highest perfect match rates (72.7%), followed by non-profit centers (66.7%) and for-profit centers (20.0%). In contrast, discrepancies above 10% are particularly common in for-profit centers, accounting for 80.0% of cases, compared with 25.5% and 29.3% respectively for public and non-profit centers. These disparities could be explained by the lack of internal validation mechanisms or insufficient training of data managers in for-profit centers.

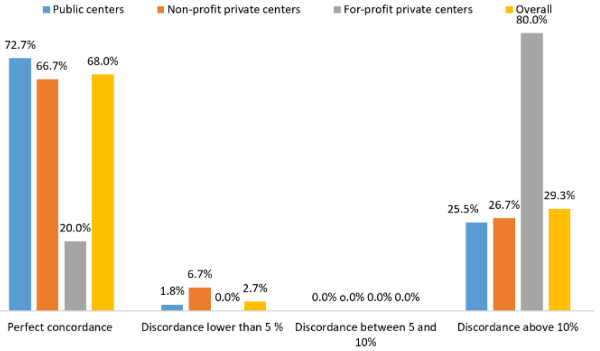

Fig. 1: Distribution of concordance rates and discordance rates between data from registers and monthly activity reports according to the status of care sites for people living with human immunodeficiency virus in 2021, Burkina Faso (N = 75)

Summary of Quality Indicators (Table 2)

By applying interpretation thresholds, the performance of quality indicators varies between centers and data types. For example, discrepancies between the data in the records and monthly reports, which are particularly visible in profit-making centers, reveal weaknesses in the accuracy of the data transmitted.

These results call for the implementation of specific quality controls, especially in centers where performance is lowest.

Discussion

Limits

Due to insecurity in some regions of Burkina Faso, some data from care sites located in inaccessible areas could not be collected. The analyses therefore focused on available data, while recognizing that this may limit the national representativeness of results.

Interpretation of Results

Despite a well-organized national integrated surveillance system, there are still insufficiencies in the monthly activity reports' filling in. During this study which consisted in an audit on the quality of HIV data reporting, we noticed that 8% of care centers for PLWHIV had a satisfying and very satisfying level of exhaustivity and 32% had a non-satisfying level of exactitude. At least 96% of health centers were prompt in transmitting monthly activity reports.

Less than one care center for PLWHIV out of 10 (8%) had a level of exhaustion that was satisfactory or very satisfactory with regard to filling in registers. Our results were lower than those reported by Habiyambere and co-authors (Ouedraogo *et al.*, 2024). In their study on auditing the data quality of PLWHIV registries in 2019, Burkina Faso (33%) was found to have a high level of compliance. Chiba *et al.* (2012) reported in their Kenyan study that at least 50% of study sites had completed HIV drug use items while evaluating the performance of routine health information system in Burkina Faso, noticed that 75% of pertinent data related to the new cases of PLWHIV were filled in. Our results are in the same way less performing than those of Nicol *et al.* (2016) in their study on quality of routine data in term of Prevention of HIV Transmission from Mother to Child (PTMC) ; the exhaustivity of data in the study was relatively high reaching 91% in the care centers (Nicol *et al.*, 2016). The differences in these studies may be due to the choice of indicators and the number of items found in the registers used to evaluate the quality of data. For example, in the study of Nicol *et al.* (2016), 16 items were evaluated versus 21 in our current study. The low performance in the exhaustivity of registers' fill in that was reported in our study could be explained by the lack of training of people in charge of data management on the national integrated surveillance system. It has been found that only 50% of the individuals responsible for data management received proper training in the last three years. Ali Moussa *et al.* (2025) had a similar conclusion in their study on the performance of the hospital information system at Yalgado Ouedraogo University Hospital (YOUH) in Burkina Faso. The results of the interventional studies conducted by Dumont *et al.* (2012); Ahanhanzo *et al.* (2015), do confirm the importance of training in interventions that seeks to improve the quality of data. In Mali and Senegal, Dumont *et al.* (2012) reports indicate that forms' fill-in exhaustion increased from 72% in the first trimester to 90% in the fourth trimester. The training of health workers was part of capacity reinforcement actions that led to this progress (Dumont *et al.*, 2012; Ahanhanzo *et al.*, 2015). Ahanhanzo *et al.* (2015) before introducing new tools for data collection, particularly registers for curative visits in Benin, they carried out an initial evaluation in their study. In the future, the workers received training on these tools and a final evaluation was performed. The results revealed that the time taken to fill out registers jumped from 16% (initial evaluation) to 89% (final evaluation) and there was a significant statistical difference between the two proportions (Dumont *et al.*, 2012; Ahanhanzo *et al.*, 2015).

Besides the lack of proper training of the persons responsible in charge of data management in this study that seeks to explain the noticed low exhaustivity, the feeble use of data by workers on care sites could explain the non-favorable behaviors with regards to exhaustive fill in of registers. The importance of using data generated by and for producers in improving their quality standards has been demonstrated in multiple studies (Dumont *et al.*, 2012; Miltiade, 2019). In fact, the more data is used, the more producers can detect related discrepancies; this would trigger a stronger implication on their side and the onset of measures seeking to improve their performance (Ahanhanzo *et al.*, 2015). Dysfunctions in the chain of care for PLWHIV could also cause a weak performance on exhaustivity in the filling in of registers. Reporting the results of biological laboratory exams in registers is necessary. This implies that they not only return to the prescriber's site, but also receive updates in the registers from the workers. All dysfunctions on this chain could impact the efficiency of filling in related items (Chiba *et al.*, 2012). Workers may be negligent in updating a number of data due to this dysfunction. In this situation, health workers may choose important information and report it in the registers. Workers' behavior that is not in line with official standards is caused by their interpretation, which leads to their own standards being produced (Bureau, 2014). The internal mechanisms for data quality control may be causing the lack of quality caused by the exhaustivity of filling in registers. Although this tool was used by 9 out of 10 (92.0%) sites, there is reason to doubt its effectiveness given the findings of this study. The existence of this could be in conformity with official standards for health data management in Burkina Faso (Soubeiga *et al.*, 2022). However, one of the roles of this mechanism is to allow internal control and validate data that is produced on care sites. The lack of such setting does not favor good quality of data. Kisiata *et al.* in their study on the quality of data related to HIV surveillance in 2012 in the Democratic Republic of Congo, it was mentioned that none of the care centers validated the produced data (Kisiata *et al.*, 2023). To improve the quality of collected data, validation sessions must be organized with all workers involved in patient care. In these meetings, various data are presented, discussed and validated. Shortcomings are identified and solutions that aim to improve the quality of data are suggested and evaluated during the following sessions.

More than 3 care centers for PLWHIV out of 10 (32%) reported discrepancies between monthly activity reports and registers. These results were better than those reported by Ali Moussa *et al.* in YOUH where data concordance index was 22.4% in this hospital (meaning a discordance rate of 77.6%) (Ali Moussa *et al.*, 2025). The difference between the two results can be explained by the type of sites involved in the study. Sory and colleagues' study included all care units and technical units in YOUH, but this current study was only focused on care sites for PLWHIV. In the same perspective, our results were better than those from Nicol *et al.* (2016) in their study on the prevention of HIV transmission from mother to child in South Africa in which the mean precision between the register and the monthly activity reports was 51% (meaning a discordance of 49%) (Nicol et al, 2016). However, our results are not better than those reported in the evaluation of data quality conducted by the Ministry of Health in which the data concordance on newly enrolled PLWHIV and monthly activity in 2021 was of 96.5% (meaning a discordance of 3.5%) (Soubeiga *et al.*, 2022); our findings are also lower than those reported in the Lingwala health zone in Democratic Republic of Congo, where data concordance was 95.6% (meaning a discordance of 4.4%) (Kisiata *et al.*, 2023).

The main reasons that could explain the low concordance of data in our study are among others: The lack of proper training of the persons responsible in charge of data management, the lack of internal mechanism of data quality control in a number of sites, the reporting errors and counting errors. Li *et al.* in their study realized in China on the quality of HIV data, had also pointed out errors in reporting and counting data (Li *et al.*, 2014). In Kenya, Chiba *et al.* The main reasons for the discrepancy in data between sources were reported as the loss of pages from registers and monthly reports and the negligence of midwives (Chiba *et al.*, 2012). Promoting self-control in data quality and usage could help healthcare workers improve, as well as training them on the national integrated surveillance system.

The promptness in the transmission of reports was satisfactory (96.0%). The results corroborate those reported by Drabo and co-authors. In Burkina Faso, 98.7% of health centers from the 1st scale transmitted their reports on time (Drabo *et al.*, 2016). The promptness in the transmission of HIV data in this study is better than the one reported by Diakité *et al.* in the study on performance of routine health information system in Burkina Faso that showed a rate of 82% (Diakité *et al.*, 2023).The difference in the results of those two studies could be explained by the fact that nearly all survey sites (>95%) had a person in charge of data management including the elaboration and transmission of reports. Our results were superior to those of Ali Moussa *et al.* in Burkina Faso and Soubeiga *et al.* in Democratic Republic of Congo that reported respective promptitude rates of 53.6 and 18% (Ali Moussa *et al.*, 2025 ; Kisiata *et al.*, 2023). The results' differences can be traced back to the placement of evaluated sites within our health system organization and its effects. In the current study, more than three out of four sites (77.3%) belong to the first level of care in the health pyramid. As for the studies of Ali Moussa *et al.* and Kisiata *et al.* the health facilities belonged to the third level of care. The work load that could be higher at the third level of care (Drabo *et al.*, 2016) and the complex organization of these facilities could explain the differences in results.

Data management supports for monitoring HIV-infected patients must be correctly filled in. The implementation of a mechanism for appropriating the results through an internal audit should be the subject of a directive, while ensuring the training of those involved. This will undoubtedly make it possible to improve data quality, which is the key to achieving results through targeted actions.

It is important to take into account a number of shortcomings when interpreting our results. The security environment throughout Burkina Faso since 2016 made it impossible for us to include care sites for PLWHIV in zones of high insecurity. The survey solely assessed the quantitative dimension in terms of the value of data quality. Moreover, we did not explore the other factors that could influence quality such as knowledge, attitude and practices of agents, the functionality of internal mechanisms of quality control, the organizational difficulties and the financial and material resources necessary for an efficient management of data. Despite these shortcomings, our sampling method allowed the inclusion of health center from all health sectors (public, for-profit private and nonprofit private), from all level of health pyramid and a relatively high number of care sites for PLWHIV (more than 50% of all sites countrywide).

Conclusion

This study revealed that despite satisfying promptitude in the transmission of monthly activity reports, the exhaustivity in the filling in of registers and the exactitude of data between the registers and the monthly activity reports related to HIV/AIDS are not satisfying. These shortcomings are due to the absence of training on the national integrated surveillance system and the absence or improper functioning of self-control mechanisms for data quality. These results offer the perspective of exploring the factors that could influence the quality of data (knowledge, attitudes, practices of agents, as well as the functioning of quality control mechanisms, the organizational difficulties and the financial and material resources) and the other aspects of quality that are preventive, corrective and adaptative dimensions.

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Author Contributions

Ismaël Diallo: Conceptualization; Methodology; Administration of the project; Software; Writing (original version); Writing (proofreading and editing); Resources.

Maurice Sarigda: Investigation; Methodology; Software; Writing (proofreading and editing).

Eric A. Diendere and Jacques Zoungrana: Supervision; Validation; Visualization.

Abdoulaye Sawadogo: Supervision; Validation.

Abdoul G. A. Ouedraogo: Validation; Visualization; Writing (proofreading and editing).

Mamoudou Savadogo: Validation; Visualization.

Smaïla Ouedraogo: Conceptualization; Methodology; Administration of the project; Writing (original version); Writing (proofreading and editing); Resources.

Ethics

The research protocol received the ethical clearance of the ministry of health ethics' committee (CERS number 2021-11-263).

Conflict of Interest

The authors declare no conflict of interest.

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