Research Article ISSN 2835-6276

American Journal of Medical and Clinical Research & Reviews

Evaluation of the HIV/AIDS Epidemiological Surveillance System, Nouakchott Outpatient Treatment Center, Mauritania

Mohamedou HMEIED MAHAM[1,2], Pauline Kiswendsida YANOGO[2,3], Djibril BARRY[2], Yoda HERMANN[2], Abdarrahmane BAYE[4], Nicolas MEDA[2].

1. Field Medicine Service, General Directorate of Health Services of the Armed Forces and Security, Ministry of National Defence, Mauritania.
2. Burkina Field Epidemiology and Laboratory Training Program Burkina Faso, Joseph KI ZERBO University.
3. Faculty of Medicine, Joseph KI ZERBO University, Burkina Faso.
4. Department of Planning and Monitoring and Evaluation, National Executive Secretariat for the Fight against HIV/AIDS, Mauritania.

*Correspondence: Dr. Mohamedou HMEIED MAHAM

Received: 20 Feb 2025; Accepted: 25 Feb 2025; Published: 05 Mar 2025

Citation: Dr. Mohamedou Hmeied Maham. Evaluation of the HIV/AIDS Epidemiological Surveillance System, Nouakchott Outpatient Treatment Center, Mauritania. AJMCRR. 2025; 4(3): 1-8.

Abstract

Background: *HIV/AIDS continues to be a public health problem and a major global concern. West and Central Africa had 4.9 million cases in 2019, including 240,000 new cases and about 140,000 deaths related to HIV/AIDS. In Mauritania, in 2019, according to WHO estimates, the prevalence of HIV/AIDS is estimated at 0.2%. We evaluated the HIV/AIDS surveillance system in the Nouakchott region to describe its organization and functioning, determine its usefulness, and assess its attributes according to the updated guidelines of the Center for Disease Control and Prevention for the evaluation of public health surveillance systems.*

Methods: *This descriptive cross-sectional study was conducted from May 1st, 2020, to December 2020 and involved data from January 2019 to December 2019. The study population consisted of actors directly involved in surveillance at all levels of the country's surveillance system. Data were collected through document review and semi-structured interviews. Data analysis was done using Epi Info® 7.2.5.6 and Excel®2020. Proportions and rates were calculated. The characteristics were assessed by estimating the average of the results obtained on each variable.*

Results: *The monitoring system is complex but useful, achieving its objectives. An average utility level of 52% was noted, with a 95% confidence interval (CI) [16 – 85%]. The average simplicity was 64%, CI [33-94%]. The performance level in terms of flexibility was 47%, CI [16 - 77%]. Similarly, the level of performance regarding acceptability was 47%, CI [21 – 70%]. Average responsiveness was 65%, CI [39 – 89%]. The Positive Predictive Value (96.24%) was high in 2019.*

Conclusions: *The monitoring system was found to be useful and met its objectives. Flexibility and acceptability need to be improved. We recommend to the national AIDS program to establish other HIV/AIDS testing centers and outpatient treatment centers at the districts and regional levels, at the DRS, it is recommended to regularly supervise surveillance activities in the districts and to organize quarterly health training. For the CTA of Nouakchott, it is advisable to strengthen collaboration with the DRS and INRSP for the screening of suspected cases of HIV/AIDS in non-hospitalized patients.*

Key Words: Evaluation, Surveillance, HIV/AIDS, Mauritania.

Introduction

Infection with the human immunodeficiency virus (HIV) is now not only a public health problem but also a social development problem [1]. HIV is a human immunodeficiency virus that attacks the immune system. It is an RNA virus of which two types are currently known, they are HIV 1 and HIV 2 [2]. According to the UNAIDS 2020 data report, approximately 690,000 people worldwide died from HIV/AIDS-related illnesses in 2019. The report shows undeniable successes in HIV testing and treatment monitoring worldwide. Of the 38 million people living with HIV, theSub-Saharan Africa is the most affected region with 25.6 million cases in 2018, or 70% of the world's People Living with HIV (PLHIV) [3]. In Mauritania, according to UNAIDS SPECTRUM, in 2020 the number of individuals affected by HIV in Mauritania is estimated at 5700 (4200-8300) with a prevalence of the virus among 15-49 year olds of 0.2%. The country is facing a concentrated epidemic as a higher prevalence of the virus is observed in certain high-risk groups such as sex workers (9%) and men who have sex with men (MSM) (23.4%). The country experienced fewer than 500 new HIV cases in 2020. Among PLHIV, 57% benefited from ART in 2020. There were fewer than 500 (200-500) HIV-related deaths in the same year [4].

UNAIDS 90-90-90 targets [5,6] aim to reach the testing of 90% of people living with HIV (PLHIV) by 2020. Among these, it is recommended that 90% be on ART and that 90% of them have a suppression of their viral load, which could make it possible to end the HIV/AIDS epidemic as a threat to Public Health by 2030 [3].

Mauritania, like other countries where HIV is rampant, has set up a coordination unit of the sectoral committee for the fight against HIV/AIDS, the National Executive Secretariat for the Fight against AIDS (SENLS), whose purpose is to implement the actions decided by the National Committee for the Fight against AIDS (CNLS) in (24 March 2003) [7]. Despite the measures taken, cases are still being reported there. Between 2010 and 2020, the CTA's activity was the subject of numerous reports and parcel evaluations and no significant

long-term evaluation was carried out. Among the difficulties described, the increase in its patient base and the solutions put forward to solve them were often discussed. Based on previous figures, HIV/AIDS remains a public health problem in Mauritania. We thought it would be interesting to propose an evaluation of the surveillance system in order to suggest to the national authorities proposals to improve the organization and quality of care for HIV/AIDS cases and to orient their development strategies in line with current difficulties and future challenges. HIV/AIDS surveillance in Mauritania is part of Integrated Disease Surveillance and Response (ISRM)[8]. The HIV/AIDS surveillance system is passive, with suspected cases identified in health facilities. It is therefore crucial to ensure the effectiveness of our surveillance system for diseases with epidemic potential (EPP) such as HIV/AIDS. The objectives of the HIV/AIDS surveillance system are to detect cases at an early stage for rapid management and control, and to monitor the pattern of spread. We sought to determine whether the objectives of the surveillance system are being met and to assess the performance of the features of the HIV/AIDS surveillance system.

Materials and Methods

Scope of the study

Mauritania is a country in West Africa with an area of 1,036,000 km2. It borders Algeria to the northeast, Western Sahara to the northwest, Mali to the east and southeast, Senegal to the southwest and the Atlantic Ocean to the west. The national territory is divided into 15 regions (Figure 1) and each of them is subdivided into moughataa (District, 63 in total). The moughataas are subdivided into communes (216 communes in total). Our study took place at the Outpatient Treatment Center (CTA) of the National Hospital Center of Nouakchott. The CTA in Nouakchott was created in 2004 thanks to cooperation between the French Red Cross (FRC), the Mauritanian Red Crescent and the Ministry of Health. This center is part of the National Executive Secretariat for the Fight against HIV/AIDS (SENLS) under the Directorate for the Control of Communicable Diseases (DLMT) of the Ministry of Health. The Centre works in collaboration with the care units in other Wilayas (Trarza, Gorgol, Nouadhibou, Assaba, Hodh El Chargui). The health system in Mauritania is structured at three levels: central, intermediate and regional. Epidemiological surveillance, covering HIV/AIDS and other MSEs, is integrated at all levels, with weekly reporting of MSPs and compilation and analysis of data at the central level.

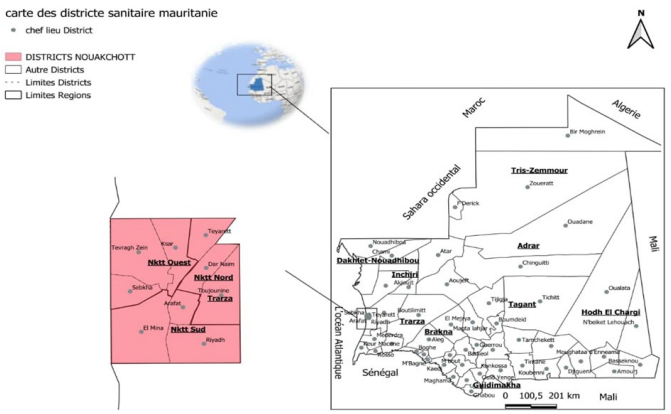

Figure 1: Health mapping of Mauritania.
Data source, Ministry of Health

Type and period of study

A descriptive cross-sectional study of HIV/AIDS epidemiological surveillance was conducted, using a mixed approach (quantitative and qualitative). This study covered the period from 2019 to 2020. Data collection took place from May 2020 to December 2020.

Operational definitions

Organization and operation

In the Nouakchott region, HIV/AIDS surveillance is part of the SIMR system. This HIV/AIDS surveillance process is structured in several operational levels, with active collaboration of local health professionals to detect cases and take appropriate measures. At the regional level, the coordination of surveillance activities is ensured by the Regional Directorate of Health (DRS). The surveillance focal points at the district and regional levels are responsible for compiling and transmitting data at the central level, with daily, weekly, monthly and quarterly periodicity. The means of communication were e-mail, telephone calls or messages or social networks, in particular WhatsApp. The central level is responsible for the analysis and interpretation of the data.

Definitions of the terms "overall utility", "simplicity", "flexibility", "acceptability" and "responsiveness" used in this work are given below.

Overall utility: A surveillance system is "globally useful" for preventing and controlling health events if it improves the understanding of their impacts on public health. The utility assessment, as directed by the Centers for Disease Control and Prevention (CDC), includes a review of functioning, objectives, and a quantitative analysis of epidemiological data. Respondents share their use of the system, their opinions on HIV/AIDS data and suggestions for better responsiveness[9]. This indicator was evaluated based on the detection of the number of cases per epidemiological week, the attack rate, the case fatality, as well as the implementation of control and prevention measures against the total number of criteria evaluated for overall utility.

Simplicity: Simplicity refers to both the structure and ease of use of a monitoring system. Simplicity is defined as the ease of routing data and managing the system[10]. It is important that the system is "simple" in order to obtain the buy-in of the actors responsible for data collection and to ensure that the monitoring system remains non-restrictive to implement (e.g. a quantity of data to be collected limited to the strict essential minimum, a form that is easy to fill out in less than 10 minutes, , low frequency of data collection, i.e. monthly). The assessment of this parameter was based on the responses of stakeholders in the survey, which focused on the ease of use of the system and its reliability in collecting, managing and accessing data. Simplicity was assessed by means of stakeholder ratings for buy-in and reliability in data collection, management and access.

Flexibility: The flexibility of a monitoring system is defined as its ability to easily adjust to changing information needs and operational conditions, requiring little investment in time, personnel or funds [11]. A surveillance system that is flexible can incorporate new diseases, adapt to emerging health issues, adjust case definitions, and vary reporting sources. It was evaluated on the basis of the system's integration with other monitoring systems and adaptability to the changing needs of the system[11]. This indicator was assessed using stakeholder ratings for the criteria of supervisory system flexibility.

Acceptability: It is a measure where supervisory staff are willing to implement the system and users of the system are willing to use the data generated by the system[11]. Acceptability was assessed through the survey questions submitted to stake-

holders on aspects of the system that promote or hinder the acceptability of the system. We determined the acceptability of the monitoring based on the completeness and timeliness of the notification [9]. This indicator was assessed by means of the ratings assigned by stakeholders for the notification of the surveillance system.

Reactivity: This parameter corresponds to the speed of succession of the various stages of a surveillance system[11]. The time between the date of the episode and the date of reporting to the system was examined for each case to assess responsiveness. The latter was measured by the number of reporting sites reporting cases and the time it took for DRS to receive information from health facilities in case of suspected cases [11].

The positive predictive value (PPV) is the proportion of people identified as actually having the disease under surveillance[11]. A questionnaire was used to assess the functioning of the surveillance system, i.e. overall usefulness, simplicity, flexibility, acceptability and responsiveness.

Data collection

The people involved in HIV/AIDS surveillance at all levels of the health pyramid made up the population surveyed. At the level of peripheral health facilities, epidemiological surveillance units, random sampling was carried out to select respondents in the region.

At the intermediate level, the Nouakchott Outpatient Treatment Centre (CTA), which is the reference structure in the region, has also been included. At the central level, the Directorate-General for Public Health (DGSP), the Directorate for Strategic Information and Epidemiological Surveillance (DISSE) and the National Institute for Public Health Research (INRSP) have been included. Respondents were interviewed using a questionnaire and the choice of respondents was based on their involvement in HIV/AIDS surveillance.

In total, 57 people were concerned, i.e. at least one person per surveillance unit. We reviewed the Mauritania Integrated Surveillance of Diseases and Response Manual and extracted data for the period from 1 January 2019 to 31 December 2020 for HIV/AIDS from the CTA database in Nouakchott, Mauritania, using a 2020 Excel® file. For this study, we used the CDC's Surveillance System Assessment Guide to assess the performance of the surveillance system[10].

Study Variables

We examined the following variables: age, sex of patients, number of reported cases, as well as utility variables and attributes of the surveillance system (simplicity, acceptability, stability, representativeness, flexibility, etc.).

Data analysis and processing

We performed a descriptive analysis of the data using Epi Info® software version 7.2.5.6. Duplicates were removed and missing data were completed from the registers available at the CTA in Nouakchott. The characteristics were assessed by estimating the average of the results obtained on each variable.

Results

The HIV/AIDS surveillance system has been subjected to a comprehensive evaluation with the participation of 57 out of 60 key actors initially identified, i.e. 95% of our target. They all answered our questions after giving their consent. We visited all

the CSIs and PSs in the region. The profile of the interviewees is made up of doctors, nurses, data managers, laboratory technicians (Figure 2).

All stakeholders involved in surveillance stated that HIV/AIDS is officially classified as a notifiable disease (MDO) and that a case definition is currently in place.

For the results of the evaluation, a mean level of usefulness of 52% was noted, with a 95% confidence interval (CI) [16 – 85%]. Mean simplicity was 64%, CI [33-94%]. The level of performance in terms of flexibility was 47%, CI [16 - 77%]. Similarly, the level of performance with respect to acceptability was 47%, CI [21 – 70%]. The mean responsiveness was 65%, CI [39 – 89%] (Table I). An analysis of data from the Nouakchott CTA for the period 2019 to 2020 revealed a positive predictive value (PPV) of 96.24% for HIV/AIDS, with a CI [56 - 99].

Table I: Assessment of HIV/AIDS surveillance characteristics from 2019 to 2020

Characteristics	Average (%)	IC95%
Overall Utility	52	[16- 85]
Simplicity	64	[33 - 94]
Flexibility	47	[16– 77]
Acceptability	47	[21 – 70]
Reactivity	65	[39– 89]

Regarding the monthly distribution of HIV/AIDS cases tested from 2019 to 2020 in the Nouakchott region, the data indicate that the month of July (Fig. 3) recorded the highest number of cases, with a notable peak during the months of April and September.

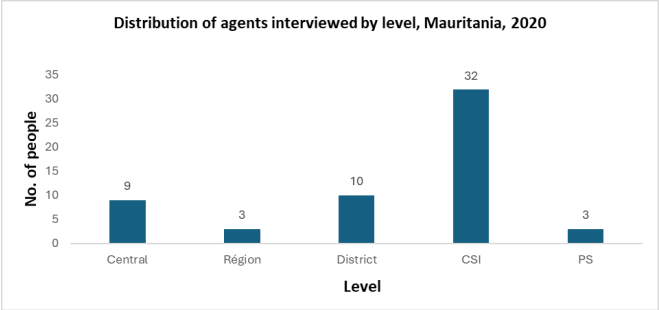

Figure 2: Distribution of officers interviewed by level, Mauritania, 2020

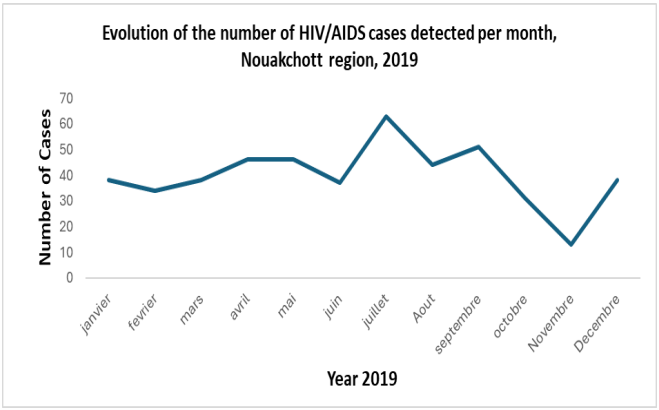

Figure 3: Evolution of the number of HIV/AIDS cases tested by month, Nouakchott Region, 2019

Discussion

The results of this study indicated some strengths of the FHV surveillance system in the wilaya of Assaba. These include the usefulness, simplicity, and responsiveness of the system. However, acceptability and flexibility need to be improved. Notification has been regular on all notification sites. We believe that our study is representative of the Nouakchott region alone, as 95% of the staff assigned to this surveillance activity in the region participated in this survey. However, the study also showed major shortcomings in the proper functioning of HIV/AIDS surveillance. We observed problems with the quality and validity of data with suspected HIV/AIDS cases, as well as problems with inadequate staff resources and training. The weaker features of the system, such as data quality, could be due to inadequate training of surveillance offic-

ers on data collection and management, resulting in the lack of completeness and validity found in this evaluation. This, in turn, could be attributed in part to the above-mentioned financial constraints in the face of competing priorities so common in developing countries[12]. The data generated by the system, resulting from detection and reporting by healthcare professionals or healthcare facilities, is generally reliable and complies with specific objectives, procedures and constraints. The evaluation we conducted allowed us to analyze secondary data that may not be of optimal quality. Similar studies conducted in Haiti and Mali on HIV/AIDS surveillance have also found that poor data quality, availability and validity are major problems that have contributed to the HIV/AIDS pandemic in West Africa and Caribbean countries[13,14].

The public health response to outbreaks is affected by the completeness and accuracy of the information available[15]. The earlier cases are detected, the more likely it is that an intervention will prevent further cases, especially if it takes place before the logarithmic growth phase of the epidemic, hence the importance of an effective surveillance system.

Recommendations

As a result of this study, several suggestions have emerged to improve the management of HIV/AIDS cases in the Nouakchott region. At the DRS, it is recommended to regularly supervise surveillance activities in the districts, to organize quarterly health trainings. For the CTA of Nouakchott, it is advisable to strengthen collaboration with the DRS and the INRSP for the detection of suspected cases of HIV/AIDS in non-hospitalized patients. Finally, health facility managers in the region are encouraged to integrate HIV/AIDS surveillance as an ongoing activity to ensure early detection of cases, with immediate reporting of suspected cases at the senior level.

Authors' contribution

Mohamedou HMEIED MAHAM: literature review, manuscript writing. Abdarrahmane BAYE, Pauline Kiswendsida YANOGO, Yoda HERMAN, Djibril BARRY, Nicolas MEDA: critical contribution, correction of the manuscript and approval of the final version to be published.

Declaration of Interests

The authors declare that they have no links of interest.

References

1. Saindou, Maoulide. Prevalence and determinants of sexually transmitted infections among pregnant women in Mayotte: an epidemiological study concerning the human immunodeficiency virus, the hepatitis B virus and the Treponema pallidum virus [Internet] [phdthesis]. Claude Bernard University - Lyon I; 2013 [cited 2020 Mar 10]. Available from: https://theses.hal.science/tel-01174741
2. Karakodjo, Dene Edith. Monitoring of the biological parameters of PLHIV on ARV treatment at the EPH in Gao. Pharmacy thesis, Faculty of Medicine, Pharmacy and Odontostomatology, USTTB. 2011 P6 [Internet]. University of Science, Technology and Technology of Bamako; 2011 [cited 2023 May 10]. Available from: https://www.bibliosante.ml/handle/123456789/1846
3. UNAIDS 2020. AIDS World Update Report 2020 [Internet]. 2020 [cited 2020 Mar 5]. Available from: https://www.google.com/search?q=ONUSIDA+2020

4. UNAIDS 2020. National Progress Reports - Mauritania, Global AIDS Progress Report 2020).pdf [Internet]. [cited 2020 Mar 10]. Available from: https://www.unaids.org/sites/default/files/country/documents/MRT_2020_countryreport.pdf
5. Werle JE, Teston EF, Rossi RM, Frota OP, Ferreira Júnior MA, Cunha GH da, Marcon SS, Sato DM. Factors associated with death due to HIV/AIDS. Acta paul enferm. 2022 Dec 12; 35:eAPE02837.
6. Sabapathy K, Hensen B, Varsaneux O, Floyd S, Fidler S, Hayes R. The cascade of care following community-based detection of HIV in sub-Saharan Africa – A systematic review with 90-90-90 targets in sight. PLOS ONE. 2018 Jul 27; 13(7):e0200737.
7. Mauritania - Decree No. 027-2003 of 24 March 2003 establishing the National Committee to Combat HIV/AIDS and the Regional Committees to Combat HIV/AIDS. [Internet]. [cited 2020 Mar 10]. Available from: http://ilo.org/dyn/natlex/natlex4.detail?p_lang=fr&p_isn=66056
8. Technical Guide for Integrated Disease Surveillance and Response in the African Region: Third Edition | WHO | Regional Office for Africa [Internet]. 2024 [cited 2024 Dec 11]. Available from: https://www.afro.who.int/fr/publications/guide-technique-pour-la-surveillance-integree-de-la-maladie-et-la-riposte-dans-la
9. Yang L, Weston C, Cude C, Kincl L. Evaluating Oregon's occupational public health surveillance system based on the CDC updated guidelines. Am J Ind Med. 2020 Aug; 63 (8):713–25.
10. Groseclose SL, Buckeridge DL. Public Health Surveillance Systems: Recent Advances in Their Use and Evaluation. Annu Rev Public Health. 2017 Mar 20; 38:57–79.
11. George J, Häsler B, Mremi I, Sindato C, Mboera L, Rweyemamu M, Mlangwa J. A systematic review on integration mechanisms in human and animal health surveillance systems with a view to addressing global health security threats. One Health Outlook. 2020 Jun 8; 2 (1):11.
12. Desclaux A. Emergency, precariousness and the fight against HIV/AIDS in Africa. 1997; 1–166.
13. Bulletin de Surveillance Epidémiologique VIHSida No 5.pdf [Internet]. [cited 2024 Dec 11]. Available from: https://www.mspp.gouv.ht/site/downloads/Bulletin%20de%20Surveillance%20Epid%C3%A9miologique%20VIHSida%20No%205.pdf
14. Epidemiological surveillance of HIV/AIDS [Internet]. [cited 2024 Dec 11]. Available from: https://bibliosante.ml/bitstream/handle/123456789/6785/04P19.pdf?sequence=1
15. Awini EA, Bonney JHK, Frimpong JA, Ampofo WK, Koram KA. Information gaps in surveillance data and effects on the Ghanaian response to the Ebola outbreak in West Africa. Ghana Med J. 2017 Sep; 51(3):115–9.