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Epidemiological profile of HIV/AIDS at The Outpatient Treatment Centre, Nouakchott, Mauritania, 2010-2019

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Abstract

Introduction: *In response to the HIV/AIDS pandemic, many countries have established surveillance systems to collect data to monitor disease progression and the impact of control measures. In Mauritania, HIV/AIDS surveillance data are collected and stored at the Outpatient Treatment Centre in the AMNIR CHIVA database. We analyzed the database to establish the epidemiological profile of patients living with HIV/AIDS in Mauritania.*

Methods: *We conducted a descriptive study on secondary data from the AMNIR CHIVA database from 2010 to 2019 from May to November 2020. We calculated frequencies, ratios, rates, and measures of central tendency using Epi-Info 7.2.*

Results: *A total of 4863 patients living with HIV/AIDS were recorded with 584 (12%) deaths. Most cases were biologically confirmed at 96.05% (4671/4863). People living with HIV1 were the most represented 92.74% (4510/4671) followed by HIV2 with 2.04% (99/4671). The 15- to 49-year-olds were the most represented 3713 (76.35%). The sex ratio was 1.09 males to females. Therapeutic ARV coverage remained above 93% from 2012 to 2019 and between 60-65% from 2010 to 2011. The death rate was 0.89% in 2010, 0.16% in 2015 and 0.08% in 2019.*

Conclusion: *The analysis found that reporting of suspected HIV/AIDS cases took place in ATC from 2010 to 2019 Young male subjects were the most affected. (12%) HIV/AIDS-related deaths were reported during the period.*

Key Words: Epidemiological profile, HIV/AIDS, Nouakchott, 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 ribonucleic acid (RNA) virus of which two types are currently known, they are HIV 1 and HIV 2 [2]. According to the United Nations Program on HIV/AIDS (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. Among the 38 million people living with HIV, Sub-Saharan Africa is the most affected region, with 25.6 million cases in 2018, representing 70% of the People Living with HIV (PLHIV).[3]. In Mauritania, people affected by HIV is estimated at 5700 (4200-8300) with a prevalence of the virus among 15–49-year-olds of 0.2% (according to UNAIDS SPECTRUM 2020). 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) on 24 March 2003 [7]. Despite the measures taken, cases are still being reported there. Between 2010 and 2019, the activity of outpatient treatment center was the subject of numerous reports and parcel evaluations, and no significant long-term analysis was carried out. Among the difficulties described was 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. The objective of this study was to analyze national HIV/AIDS surveillance data from 2010 to 2020 at the CTA in Nouakchott, Mauritania, and to formulate recommendations for improving the performance of this program.

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 wilayas and each of them is

subdivided into moughataas (ie. departments, 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 through a collaboration 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). Treatment with antiretrovirals (ARVs) in Mauritania is free of charge in Diagnostic and treatment centers following WHO recommendations.

Type and period of study

A descriptive cross-sectional study was conducted in the Outpatient Treatment Center (CTA) of the National Hospital of Nouakchott from May to November 2020 using 2010 to 2019 HIV/AIDS surveillance data.

Study population and sampling

The CTA is the specific medical care structure for PLHIV offering a range of treatments, including ARVs. Patients who presented for treatment after testing positive at the various screening centers, were included in the study. Eligibility for ART is defined as a positive HIV serology regardless of the clinical stage of the patient according to the classification established by the Centers for Disease Control (CDC) in 1993. Exhaustive sampling, considering all cases recorded from 2010 to 2019 made it possible to collect cases on epidemiological surveillance support.

Data collection and processing

Our variables of interest were those already included in the database. These included sociodemographic characteristics and laboratory results. The data processing consisted of merging all the data from the ten years of study at the Nouakchott Outpatient Treatment Centre, from 2010 to 2019. It also involved identifying missing, aberrant, and inconsistent data, cleaning up the database, and excluding incomplete registrations.

Data analysis

Data analysis was performed using Epi Info software version 7.2.5.0. Frequencies, proportions and rates were calculated for descriptive analysis.

Operational definitions of therapeutic coverage

Considering that HIV replicates extensively upon entering the body, is consistently harmful and leads to progressive immune deficiency, its transmission is closely tied to its replication level, and there is no spontaneous cure for the infection. The only way to halt its lethal process is through antiretroviral (ARV) treatment, which blocks its replication cycle. The goal of ARV treatment (ARTV) is to control viral replication until it is no longer detectable by Polymerase Chain Reaction (PCR) techniques, with values below 50 copies/ml.

Ethical considerations

Our study was carried out with the authorization of the health authorities of Mauritania for the acquisition and analysis of the database. Since we worked on secondary data collected by the Nouakchott Outpatient Treatment Center as part of their routine activities, we did not need approval from an ethics committee. The names and surnames of the cases were anonymized to guarantee confidentiality.

Results

General description of the study participants

In total, we included 4863 cases of HIV/AIDS. The male sex was the most represented **(Table 1)** with a sex ratio of 1.09 men to women. The median age was 38 years, ranging from 1 to 105 years. Peaks were recorded in 2010, 2012 and 2016 with 556, 483 and 499 cases respectively **(Figure 1).** The distribution of HIV/AIDS cases by age group was 75 cases for 0-4 years, 128 for 5-9 years, 67 for 10-14 years, 3713 for 15-49 years (the most represented at 76.35%) and 880 for those over 49 years of age **(Table 1).** Of the 4863 total cases recorded during the period, 4279 (87.99%) were alive. 584 HIV/AIDS-related deaths were reported during this period. The mortality rate was 0.89% in 2010, 0.16% in 2015 and 0.08% in 2019.

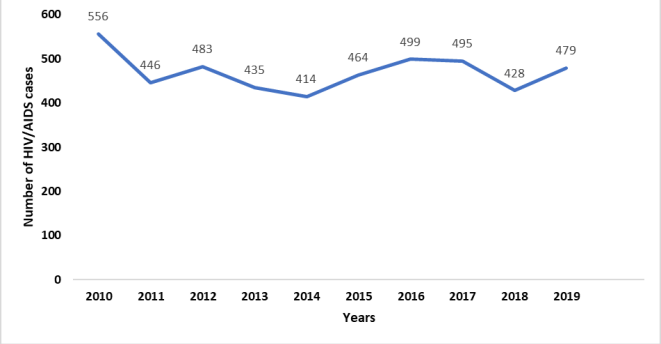

Figure 1: Evolution of HIV/AIDS cases in terms of time, CTA Nouakchott, 2010-2019

Description of HIV/AIDS cases according to virological profile

A total of 4863 cases were collected, including 4510 (92.74%) HIV type 1 laboratory confirmation, 99 (2.04%) HIV type 2 laboratory confirmation, and 62 (1.27%) HIV type 1 and 2 laboratory confirmations. There are 24 cases (0.49%) with unspecified results and 168 cases (3.45%) with results that have not been made available **(Table 1).**

Table 1: Socio-demographic and biological characteristics of HIV cases at CTA Nouakchott, 2010-2019, N=4863

Variables	Frequency	Proportion (%)	[95% Confidence Interval]
Sex			
Male	2539	52,21	(50,81-53,61)
Female	2324	47,79	(46,39-49,19)
Age range (years)			
0-4	75	1,54	(1,10-3,31)
5-9	128	2,63	(1,41-5,13)
10-14	67	1,38	(1,05-3,96)
15-49	3713	76,35	(74,12-77,49)
> 49	880	18,09	(16,41-21,33)
HIV Profile			
HIV1	4510	92,74	(91,98-93,44)
HIV2	99	2,04	(1,68- 2,47)
HIV1/HIV2	62	1 ,27	(1,00 -1,63)
Not inquiring	168	3,45	(2,98 -4,01)
No details	24	0,49	(0,33 - 0,73)

Abbreviations: HIV: human immunodeficiency virus

Table 1: Descriptions of socio-demographic and biological characteristics, CTA Nouakchott 2010-2019

Description of ARV Therapeutic Coverage

From 2010 to 2019, ARV treatment coverage at the Nouakchott CTA remained above 93% from 2012 to 2019 and between 60-65% from 2010 to 2011 **(Figure 2).** The combination of TDF+3TC+EFV was the most common with a frequency of 70.6%.

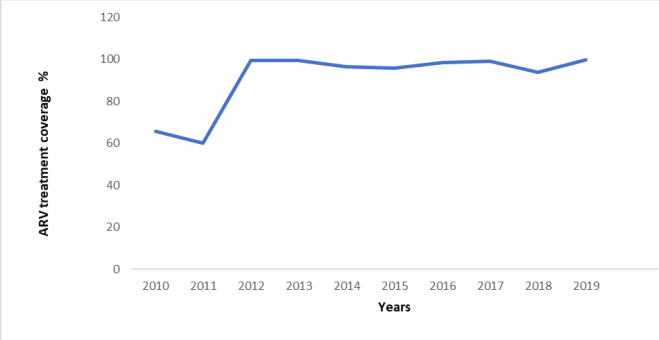

Figure 2: Therapeutic coverage of ARVs, CTA Nouakchott, 2010-2019

Data quality

The data collection tools for HIV/AIDS were designed to include a minimal set of variables concerning the sociodemographic characteristics of patients. For a set of 126 randomly selected patient records at the CTA, we retained 11 key variables (name and surname, age, gender, date of registration, current ARV protocol, type of serology, viral load, etc.) to analyze the proportion of missing data. We found 130 unfilled items out of a total of 1,386 items to be completed for all the analyzed records, resulting in a 9.37% proportion of missing data.

Discussion

This is the first study in Mauritania using the national SNLS database from 2010 to 2019. The data is considered exhaustive for patients who have received care. In our study, we found a male predominance of HIV infection in 52% of cases, compared to 48% in women with a sex ratio of 1.09. **Meli (Bamako)** in 2014 had found similar results [8].Unlike **Mariko (Bamako)** in 2020, which found a slight majority female population, accounting for 50.3% of cases [9].

The observation that HIV/AIDS disproportionately affects men can be attributed to a combination of interconnected factors. Firstly, a lack of consistent awareness and practice regarding safer sex measures, particularly the correct and consistent use of condoms, contributes significantly to HIV transmission. Secondly, disparities in health outcomes may lead to earlier mortality among women living with HIV compared to men, potentially skewing the prevalence data towards men in older age groups. Additionally, delayed diagnosis of HIV in men could mean that infections go unmanaged for longer periods, increasing the likelihood of onward transmission and potentially affecting the observed prevalence. Finally, the possibility of sustained sexual activity into older ages among some men might lead to HIV acquisition later in life, contributing to a higher prevalence in older male populations. Further research is needed to fully understand the complex interplay of these factors and to develop targeted interventions to address the gender disparities in the HIV/AIDS epidemic.The median age of our patients was 38 years with extremes ranging from 1 to 105 years.

The most represented age group was 15-49 years old with 76.35% of cases. This result is close to that of **Hama** [10] which returned 70.8%, though **Saliou** [11] found 46% for the same bracket. This difference would be related to the size of our samples.

This result could be explained by the fact that this period corresponds to that of maximum sexual activity exposing them to higher transmission risk of sexually transmitted infections. The age group be-

tween 0 and 4 years old was the least represented with 1.54%. This is lower than that found by **Dolo** (8%) [12].

Peaks were recorded in 2010, 2012 and 2016. This situation is explained by the increase in the number of consultants at the CTA, a wave of recruitment of qualified staff, the delegation of tasks in the context of the care of PLHIV in certain localities, the existence of Technical and financial partners accompanying the processes of caring for people living with HIV, the massive influx of displaced people from Mali following the security crisis. We have seen the continued evolution of the occurrence of HIV/AIDS cases between 2010 and 2019. In view of this continuous evolution; the decrease in notifications in April 2011, June 2013 and November 2019; could be justified by the decrease in vigilance of the agents in charge of surveillance, the inadequacy in the archiving of epidemiological surveillance materials and the movement of personnel leading to the loss of agents trained at the operational level.

HIV-1 has been widely encountered with a frequency of 92.74% of cases, against 2.04 **%** and 1.27 **%** respectively for the **HIV 2** and for the association **HIV 1+2**. Results similar to ours have been reported by **E.Karakodjo** [13]**,** GAO and **R.Karf** [14] in Burkina Faso in their respective studies with 95.1% and 80,9% of cases.

This predominance of HIV-1 is explained by the fact that it is the most widespread virus in the world. The prevalence of HIV1 is consistent with the data in the literature: 70-90% in sub-Saharan Africa [15].

The treatment combination **TDF+3TC+EFV** was the most common with a frequency of 70.6 %. This result is comparable to that of **Mariko** whose 73.10% of patients were under the association **TDF+3TC+EFV** [9]**.**

The status, and type of HIV serology, without precision, appears in 0.49%, followed by the unknown 3.45%. This could be explained by a lack of archiving and filling in data collection media and communication around cases. This lack of feedback on laboratory results can jeopardize the early detection of epidemics and the taking of measures to control HIV/AIDS-related morbidity and mortality.

One of the limitations of this study is its retrospective nature, which only reports cases reported by the SNLS. To remedy this, consideration should be given to a prospective study of newly diagnosed cases, which would then provide all important clinical and biological parameters for a detailed and accurate comparative analysis. To conclude, we recommend revitalizing SNLS services at all levels. Communication strategies must be developed with the population to obtain buy-in and collaboration in the fight against HIV/AIDS.

Conclusion

The analysis made it possible to understand that the notification of suspected cases of HIV/AIDS took place in the CTA of Nouakchott from 2010 to 2019 and this is continuous. Young male subjects were also the most affected with a case fatality rate of 12% throughout the period. Nouakchott's ARV treatment coverage in CTA remained above 93% from 2012 to 2019. The major challenge remains the improvement of the quality of filling, the archiving of data on collection media and the improvement of the feedback of laboratory results for suspected cases of HIV/AIDS collected.

Recommendations

To the National AIDS Control Program (PNLS)

- **Enhance Community Outreach Programs:** Health agencies can collaborate with local community leaders and organizations to raise awareness about the importance of ARV adherence and the availability of treatment options. This can include organizing workshops, distributing educational materials, and conducting door-to-door campaigns.
- **Implement Mobile Health Clinics:** Establish mobile health clinics to reach remote and underserved areas. These clinics can provide ARV treatment, regular check-ups, and counseling services, making it easier for patients to access care and adhere to their treatment regimen.
- **Strengthen Health Worker Training:** Provide comprehensive training for healthcare workers on the latest ARV treatment protocols, patient counseling techniques, and strategies to address barriers to adherence. This will ensure that healthcare providers are well-equipped to support patients effectively.
- **Introducing Peer Support Programs:** Develop peer support programs where individuals living with HIV can share their experiences and provide emotional and practical support to others. Peer support can help patients feel less isolated and more motivated to adhere to their treatment.
- **Expand Access to Mental Health Services:** Many patients face mental health challenges that can affect their adherence to ARV treatment. Health agencies should integrate mental health services into HIV care programs to address issues such as depression, anxiety, and stigma.
- **Utilize Digital Health Tools:** Implement digital health tools such as SMS reminders, mobile apps, and telemedicine services to remind patients to take their medication, schedule appointments, and provide virtual support.
- **Enhance Data Monitoring and Evaluation:** Strengthen data collection and monitoring systems to track ARV adherence rates and patient outcomes. This data can help identify gaps in care and inform targeted interventions to improve adherence and reduce mortality.
- **Collaborate with International Organizations:** Partner with international organizations such as UNAIDS and the World Health Organization to secure funding, technical support, and best practices for improving ARV adherence and reducing HIV mortality.

Authors' contribution

Mohamedou HMEIED MAHAM: literature review, manuscript writing. Abdarrahmane BAYE, Boushab Mohamed BOUSHAB, Ousmane Boua TOGOLA, Pauline Kiswendsida YANOGO, Herman YODA, 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.

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