FACTORS ASSOCIATED WITH ADHERENCE TO ANTIRETROVIRAL THERAPY AMONG PEOPLE LIVING WITH HIV IN BURKINA FASO.

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ABSTRACT

Poor adherence to antiretroviral therapy (ART) leads to increased risk of progression to HIV/AIDS. This study aims to determine the factors associated with adherence to antiretroviral therapy among people living with HIV (PLHIV) in Burkina Faso. We undertook a mixed method study that included 125 HIV public and private health centers from December, 2019 to March, 2020. A total of l,456 persons were included in the study. The prevalence of adherence to ART was estimated at 74% (95% confidence interval "CI": [71.6-76.2]). The probability of being adherent to ART was reduced for PLHIV followed up at the 2nd step in 1st level of care as compared to those treated at the 1st step of 1st level (adjusted odds ratio "aOR": 0.64; 95%CI: [0.45-0.92]). The patients with at least secondary education level were less adherent to ART as compared to those who were illiterate (aOR: 0.63; 95%CI: [0.47-0.87]). The qualitative study showed that forgetfulness, undesirable effects of ART and the patients' attitudes and beliefs regarding ART influence patients' adherence to ART. Patients' adherence to ART prevalence remains low, requiring further actions such as scaling up ARV dispensation at community level and promoting patient therapeutic education to fill the gap in patients' compliance.

Keywords: Factors associated; Adherence to ART; PLHIV; Burkina Faso

FACTEURS ASSOCIÉS À L'ADHÉSION DES PERSONNES VIVANT AVEC LE VIH AU TRAITEMENT ANTIRÉTROVIRAL AU BURKINA FASO.

RÉSUMÉ

Une mauvaise adhésion au traitement antirétroviral (TAR) entraîne un risque accru de progression vers le stade VIH/SIDA. Cette étude vise à déterminer les facteurs associés à l'adhésion au TAR chez les personnes vivant avec le VIH (PVVIH) au Burkina Faso. Nous avons conduit une étude à méthode mixte, qui a inclus 125 centres de santé publics et privés de prise en charge du VIH entre décembre 2019 et mars 2020. Un total de l 456 personnes a été inclus dans l'étude. Laprévalence de l'adhésion au TAR a été estimée à 74% (intervalle de confiance « IC « à 95% : [71,6-76,2]). La probabilité d'être adhérent au TAR était réduite pour les PVVIH suivies au 2ème échelon du 1erniveau de soins par rapport à celles traitées au 1er échelon du 1erniveau (odds ratio ajusté «ORa» : 0,64 ; IC95% : [0,45-0,92]). Les

PVVIH ayant au moins un niveau d'éducation du secondaire étaient moins adhérents au TAR que ceux qui étaient analphabètes (ORa : 0.63 ; IC95% : [0.47-0.87]). L'étude qualitative a montré que l'oubli, les effets indésirables du TAR et les attitudes et croyances des patients concernant le TAR influencent leur adhésion au TAR. Laprévalence de l'adhésion des patients au TAR reste faible, ce qui nécessite des actions supplémentaires telles que l'intensification de la dispensation du TAR au niveau communautaire et la promotion de l'éducation thérapeutique des patients pour améliorer l'adhésion de ces derniers au traitement.

Mots-clés: Facteurs associés ; Adhésion au TAR ; PVVIH ; Burkina Faso

INTRODUCTION

The advent and widespread use of antiretroviral therapy (ART) profoundly changed the paradigm of HIV infection, increasing remarkably the lifespan and quality of life amonginfectedpeople[Kameni et al., 2019]. In its strategic plan to reduce the burden of HIV/AIDS and to accelerating and strengthening ART provision to all people living with HIV (PLHIV), Burkina Faso has opted for different approaches, including the provision of ART in the community through community based organizations (CBOs)[Conseil national de lutte contre le VIH/Sida et les infections sexuellementtransmissibles, 2020]. The country set an ambitious goal to reach at least 95% of undetectable viral load among PLHIV under ART by the end of 2030[Conseil national de lutte contre le VIH/Sida et les infections sexuellementtransmissibles, 2021]. Therefore, it is essential to increase PLHIV adherence to ART. Poor adherence to ART leads to increased risk of disease progression[Bangsberg et al., 2001], drug resistance[Harrigan et al., 2005], high viral load and high risk of transmission[Lingappa et al., 2010; Martin et al., 2008] and death[Nachega et al., 2006; Hogg et al., 2002].

Determinants of PLHIV adherence to ART have been identified and classified as individual, interpersonal, community and structural factors[Hodgson et al., 2014]. To address these determinants, many effective interventions such as adherence counselling, text messages, and use of reminder devices have been found effective[Kanters et al., 2017] and therefore recommended by WHO[World Health Organization, 2021].In 2014, in Burkina Faso, PLHIV adherence to ART prevalence was estimated at 63.6%[Ouedraogo et al., 2014], below the target goal of 95% required to ensure the effectiveness of ART and reduce treatment dropouts [Ministère de la santé, 2018]. In the same period, a cross-sectional study carried-out in Ouagadougou, the capital city of Burkina Faso, showed a non-adherence prevalence of 38.2% and the presence of opportunistic infections. Factors associated with non-adherence included perceived lack of clinical improvement, lack of knowledge, and taking ART secretly [Guira et al., 2016]. This study aims to determine the prevalence of adherence to ART and the factors influencing adherence to ART among PLHIV in Burkina Faso.

METHODS

Study design

This was a mixed method study combining qualitative and quantitative strands carried out from December 22, 2019 to March 15, 2020. The quantitative study was a cross sectional survey.

Study site

The study took place in Burkina Faso. In 2020, Burkina Faso had 21,510,181 inhabitants, 51.7% of whom were women and a large majority were young people [Institut national de la statistique et de la démographie, 2020]. The population growth rate is 3.1%. According to the Demographic and Health Module Survey (EMDS), the total fertility rate was 5.4 children per woman in 2015. HIV prevalence in the general population in Burkina Faso varies by gender. It was 1.2% among women and 0.8% among men [Institut national de la statistique et de la démographie-Burkina Faso, 2010]. According to the place of residence in 2018, HIV prevalence was higher among women 15-49 years living in urban areas (1.7%) than in rural areas (0.9%).

The study took place in public, private, and community health centers that provide prevention, treatment, care, and protection services to HIV-infected people. In 2021, the country counts 125 HIV care centers, including 95 public and 30 private centers. Among the private centers, there are 9 faith-based centers and 7 for-profit centers [Conseil national de lutte contre le VIH/Sida et les infections sexuellement transmissibles, 2021]. The country has many CBOs involved in the care of PLHIV. In 2020, Burkina Faso's health authorities opted for the dispensation of ARVs at the community level by CBOs. Similarly, the country is in the process of implementing the differentiated approach to HIV services.

QUALITATIVE STRAND

Participants and sampling

PLHIV were recruited from the prevention of mother-to-child transmission of HIV program (PMTCT) and from the cohort of the Health Program for the Fight against HIV (No-PMTCT). Key informants were gradually and purposely selected from HIV care facilities, traditional healers, religious leaders and persons accompanying PLHIV. Purposive and gradual sampling was done to ensure maximum variation and representativity.

DATA COLLECTION AND ANALYSIS

In-depth interviews and focus group discussions were conducted. Key informants included PLHIV and seven traditional healers, eight religious leaders (two pastors, two priests, four imams), 35 therapeutic educators, 36 HIV care facilities managers, 75 ART prescribers and 86 persons accompanying PLHIV. The focus of the interviews was to determine adherence to ARV by reviewing compliance/observance to ARV prescription and barriers to compliance/observance. All interviews were recorded and transcribed for analysis using Nvivo Qualitative Analysis Software. An in-depth reading of the verbatim was carried out to proceed with a thematic content analysis.

Quantitative strand

Participants and sampling

We assume the proportion of PLHIV adherence to ART at 63.6% [Ouedraogo et al., 2014]. With a precision of 2.3% and a confidence level of 95%, 1,682 PLHIV were required to show a proportion of adherence to ART of 63,6% using Schwartz's formula.

We conducted a multi-stage sampling strategy. First, a stratified sampling of health facilities (private vs public) where PLVIH were included in a proportional to size manner. However, key population (men having sex with men, sex workers, prisoners) were systematically included. The second stage was a systematic random selection of PLHIV in selected health care facilities. The sampling frame was the list of PLHIV who met the inclusion criteria in each health care facility.

Patients included in the study were PLHIV treated with ART at the time of the study and aged ≥18 years old. Patients who were outside the country within the 3 months before the start of the study were not included.

Data collection, management, and analysis

The adherence to ART was assessed by interviews with the patient which consist of reviewing the treatment prescribed and determining whether there is any problem of regularity or any difficulty in taking the medication. Adherence to ART was considered good if the patient declared that he was observant and did not declare any difficulty in taking the medication, and not good if the patient declared that he was not observant or had difficulty in taking the medication. Adherence prevalence was calculated as the proportion of good adherent PLHIV to ART.

A standard questionnaire was administered to all the study participants to collect general characteristics (Area of residence, Type of health center, level of health center, screening location, age, sex, marital status, religion, education, occupation, sexual orientation), clinical and therapeutic information (WHO clinical stage of the disease, treatment status, presence of comorbidities, presence of other medications, body mass index, therapeutic patient education activities, therapeutic group support, home visit, assistance in taking medications, sensitization, difficulty enforcing the rules prescribed by health agents). Questionnaires were developed using the Open Data Kit (ODK).

Collected data were extracted from ODK, verified, cleaned, and analysed using SPSS 20 software. Descriptive statistics were presented for the data and the factors associated with adherence were analysed using univariate and multivariate stepwise logistic regressions model. All variables with p-value ≤ 20% were included in the multivariate analysis and the final model included only variables with a p-value ≤ 5%.

Ethical considerations

The study protocol was approved by the Institutional Review Board of Centre MURAZ, Ministry of Health, Burkina Faso (N° 2019-17/MS/SG/INSP/DG/CEI). All study participants provided written informed consent and confidentiality was maintained.

RESULTS

General characteristics of study participants

A total of 1,456 PLHIV were included in the study (7.7% were recruited from the PMTCT and 92.3% from the No-PMTCT) of which 1.9% (26/1456) were key populations. About half of the study participants, 47% (684/1456) were young adults between 30 and 44 years old and 55.6% (810/1456) were married. Much of the study participants were female, 78.0% (1136/1456) and live predominantly in urban areas, 77.7% (1132/1456) (Table I).

Prière séparer les différents items par un espace

Characteristic		No-PMTCT* n (%)	PMTCT** n (%)	All N (%)
Area of residence	Urban	1020 (75.9)	112 (100)	1132 (77.7)
	Rural	324 (24.1)	0 (0)	324 (22.3)
Type of health center	Public	942 (70.1)	71 (63.4)	1013 (69.6)
	Private	200 (14.9)	41 (36.6)	241 (16.5)
	Others***	202 (15.0)	0 (0)	202 (13.9)
Level of care	1st level	722 (53.7)	83 (74.1)	805 (55.3)
	2nd level	283 (21.1)	29 (25.9)	312 (21.4)
	3rd level	339 (25.2)	0 (0)	339 (23.3)
Screened at a screening center	Yes	1133 (84.3)		1133 (84.3)
	No	211 (15.7)		211 (15.7)
Sex	Male	320 (23.8)	-	320 (22.0)
	Female	1024 (76.2)	112 (100)	1136(78.0)
Age (years)	< 30	107 (8.0)	37 (33.1)	144 (9.9)
	30 – 44	611 (45.5)	73 (65.2)	684 (47.0)
	≥ 45	626 (46.5)	2 (1.8)	628 (43.1)
Marital status	Married	728 (54.1)	82 (73.2)	810 (55.6)
	Divorced	107 (8.0)	5 (4.5)	112 (7.7)
	Single	212 (15.8)	21(18.8)	233 (16.0)
	Widow	297 (22.1)	4 (3.6)	301(20.7)
Education	None	736 (54.8)	49 (43.8)	785 (53.9)
	Primary	333 (24.8)	24 (21.4)	357 (24.5)
	≥ Secondary	275 (20.5)	39 (34.8)	314 (21.6)
Religion	Christian	499 (37.1)	36 (32.1)	535 (36.7)
	Muslim	767 (57.1)	62 (55.4)	829 (56.9)
	Others	78 (5.8)	14 (12.5)	92 (6.3)
Occupation	Unemployed	285 (21.2)	0 (0)	285 (21.2)
	Student	28 (2.1)	11(9.8)	39 (2.1)
	Employee	100 (7.4)	7 (6.3)	107 (7.4)
	Trader	210 (15.6)	16 (14.3)	226 (15.6)
	Farmer	231 (17.2)	42 (37.5)	273 (17.2)
	Housewife	255 (19.0)	28 (25.0)	283 (19.0)
	Other	235 (17.5)	8 (7.1)	243 (17.5)
Key population****	Yes	26 (1.9)		26 (1.9)
	No	1318 (98.1)		1318 (98.1)

*Cohort of the Health Program for the Fight against HIV
**Prevention of mother-to-child transmission of HIV program
***Community based organisations health centers and military health centers
****Sex workers, men having sex with men and prisoners

Clinical and therapeutic characteristics of the study participants

Study participants at WHO clinical stage 1 were 47.7% (694/1456) and 24.5% (357/1456) of the patients have changed their ART medications. A total of 12% (161/1344) of the study participants had developed co-morbidities (Table II).

Table II: Clinical and therapeutic characteristics of people living with HIV in Burkina Faso, 2020.

Characteristic		No-PMTCT* n (%)	PMTCT** n (%)	All N (%)
4Body Mass Index	Normal	859 (63.9)	68 (60.7)	927 (63.7)
	Underweight	193 (14.4)	13 (11.6)	206 (14.1)
	Overweight	221 (16.4)	27 (24.1)	248 (17.0)
	Obesity	71 (5.3)	4 (3.6)	75 (5.2)
WHO clinical stage	Stage 1	600 (44.6)	94 (83.9)	694 (47.7)
	Stage 2	363 (27.1)	13 (11.6)	376 (25.8)
	Stage 3	336 (25.0)	5 (4.5)	341 (23.4)
	Stage 4	45 (3.3)	0 (0)	45 (3.1)
Change of treatment	Yes	347 (25.8)	10 (8.9)	357 (24.5)
	No	997 (74.2)	102 (91.1)	1099 (75.5)
Other medications	Yes	348 (25.9)	41 (36.6)	389 (26.7)
	No	996 (74.1)	71 (63.4)	1067 (73.3)
Comorbidities	Yes	161 (12.0)		161 (12.0)
	No	1183 (88.0)		1183 (88.0)

*Cohort of the Health Program for the Fight against HIV

**Prevention of mother-to-child transmission of HIV program

Proportion of adherence to ART among PLHIV

The prevalence of adherence to ART was estimated at 74% (95% confidence interval "95%CI": [71.6-76.2]). There was no difference in the prevalence of adherence between patients followed up in public (75.1%; 95%CI: [72.3-77.7]) and those followed up in private health facilities (71.4%; 95%CI: [66.8-75.5]). However, the patients included in the PMTCT were more adherent to ART (86.6%; 95%CI: [78.6-92.1]) compared with those followed up in the active file (72.9%; 95%CI: [70.4-75.3]). From the point of view of the caregivers, adherence to ART is good and not good in 40% and 60% of cases respectively. Specifically, 97% of prescribers consider the PLHIV adherence to ART is good.

Fifty-six-point two percent of patients reported receiving patient therapeutic education

(PTE) and 30.5% reported participating in a therapeutic support group. Twenty-one-point seven percent of PLHIV received a home visit and 36.6% received assistance in taking medications (Table III). Fifty-one-point nine percent of the accompanying persons have not received any sensitization from the health center agents. Twenty-five-point three percent of accompanying persons had difficulty enforcing the rules prescribed by health workers to their patients.

Table III: Distribution of patients by participation in adherence support activities in Burkina Faso, 2020.

Characteristics		No-PMTCT* n (%)	PMTCT** n (%)	N (%)
Previously participated in a therapeutic support group	Yes	764 (56.8)	55 (49.1)	819 (56.2)
	No	580 (43.2)	57 (50.9)	637 (43.8)
Currently participating in a therapeutic support group	Yes	404 (30.1)	40 (35.7)	444 (30.5)
	No	940 (69.9)	72 (64.3)	1012 (69.5)
Already received a home visit	Yes	292 (21.7)		292 (21.7)
	No	1052 (78.3)		1052 (78.3)
Help in taking medication	Yes	495 (36.8)	38 (33.9)	533 (36.6)
	No	849 (63.2)	74 (66.1)	923 (63.4)

*Cohort of the Health Program for the Fight against HIV

**Prevention of mother-to-child transmission of HIV program

Factors influencing the adherence to ART

After adjustment, the probability of being adherent to ART was significantly reduced for PLHIV followed up at the 2nd step in 1st level of care as compared to those treated at the 1st step of 1st level (adjusted odds ratio "aOR": 0.64; 95%CI: [0.45-0.92]). The patients with at least secondary education level were less adherent to ART as compared to those who were illiterate (aOR: 0.63; CI: [0.47-0.87]). Patients whose HIV status was discovered during an episode of illness were more compliant than those for which the status was known during a screening (aOR: 1.29; CI: [1.01-1.66]). Sharing HIV status with someone else reduces the likelihood of being adherent (aOR: 0.75; CI: [0.54-1.03]), but the association was not significant. The adherence to ART was lower among patients who received household visits as compared to those who did not (aOR: 0.58; CI: [0.44-0.78]) (Table IV).

Table IV: Factors associated with adherence to HIV antiretroviral therapy in Burkina Faso, 2020 (Univariate and multivariate logistic regressions).

Characteristics	Univariate logistic regression			Multivariate logistic regression, N = 1456		
	OR*	95% CI	*p-value*	OR*	95% CI**	*p-value*

Level of care	1st level, 1st step	1			1		
	1st level, 2nd step	0.58	0.41- 0.82	0.002	0.64	0.45 - 0.92	0.016
	2nd level	0.76	0.51-1.12	0.16	0.76	0.51 - 1.13	0.175
	3rd level	0.93	0.63 -1.37	0.72	0.97	0.66 - 1.43	0.874
Education	None	1			1		
	Primary	0.81	0.61-1.08	0.16	0.82	0.61 - 1.11	0.197
	≥ Secondary	0.66	0.49 - 0.88	0.005	0.63	0.47 - 0.87	0.004
HIV status during medical consultation	No	1			1		
	Yes	1.26	0.98 -1.60	0.066	1.29	1.01 - 1.66	0.044
Sharing HIV status with others	No	1			1		
	Yes	0.73	0.53 - 0.99	0.045	0.75	0.54 - 1.03	0.076
Household visit	No	1			1		
	Yes	0.58	0.41- 0.71	< 0.001	0.58	0.44 - 0.78	< 0.001

*Odds ratio

**95% confidence interval

The qualitative study identified other factors that influence patients' adherence to ART. These factors included forgetfulness, side effects or undesirable effects of ART and the patients' attitudes and beliefs regarding ART. As a result, some patients sought other treatments such as traditional medicine, divination and prayers. Psychological conditions (depression, denial of the disease, addictions), environmental and occupational factors were also found to have a negative effect on patients' adherence to ART: As Hassan, a 52-year-old patient, said « *Some people work in companies where sometimes the schedules for taking medication coincide with working hours, making it difficult to take them. By trying to wait for the right time to take the medication, you end up forgetting* » A psychosocial counsellor at a community based organisation in Ouagadougou stated: « Poor *socio-economic conditions, denial, self-stigmatization, non-sharing of HIV status, abandonment or slackening, unemployment, difficulties in feeding, lack of housing are limiting factors to treatment adherence. Some patients, for fear of being recognized by an acquaintance, do not come to the hospital for consultation and fall into situations of treatment breakdown* ». Alimata, a 35 years-old married woman, added: « *The gaze of others stresses us and the need to hide to take the treatment makes it difficult to comply with; we are treated as less than nothing, we are stigmatized/ discriminated against and even often rejected by society* ».

Factors related to the organization of health services such as poor reception and derogatory behavior of some health workers negatively influence patient' adherence to ART: Pascaline, a 33-year-old divorced woman, said: « *Look, I have problems with my husband who doesn't want to feel me anymore, my parents who have no consideration for me because I am sick. I also lost my job. When I go to my appointment and the health workers who are supposed to understand my suffering scold me, don't give me the opportunity to ask questions, tell me to comeback another day because the doctor isn't there or the one who is supposed to draw my blood or give me the medication is absent. What do I do?* ». Like Pascaline, Adama, a married man of 43 years old testified: « *The unavailability of health personnel and the bad attitudes of some of them (poor reception, lack of consideration), the long waiting times during appointments are things that we notice in this center* ». Absence of organisation of services, loss of patient files, long waiting times and appointments without care are common in this center. On the other

hand, some of the caregivers acknowledged these problems as related to shortcomings in their training. A doctor working in a community health center in Ouagadougou said: « *The lack of financial and human resources to carry out adherence support activities, the lack of training of the actors are serious problems to be addressed. In the past, we used to train community workers regularly, but now this is not the case. In the structure where I work, there are four people trained in patient therapeutic education (PTE) but this dates back several years. The workload is very heavy for the health staff of this center, they have to follow about 1,800 people. These are the same people who manage patients' expectations, moods and records. There is also the fact we receive the results of the viral load late, sometimes three months later, the lack of financial means to support the activities to help for observance, the wrong addresses given by some patients, make our work very difficult...* ». The high cost of some biological tests and the geographical inaccessibility of health centers were also mentioned. Oumarou, a peer educator who has been working for an association for two years. *"The distance between our houses and the health centers is very far. The lack of financial means to carry out biological tests and the multiple travels to each appointment exhaust us* ».

DISCUSSION

This study, which investigated PLHIV adherence to ART and factors that affect adherence, showed that overall adherence prevalence to ART was 74% in Burkina Faso. However, adherence to ART is greater among patients included in the PMTCT program (86.6%) compared to No-PMTCT (72.9%). Our results also showed that five factors were associated with PLHIV adherence to ART: level of health care facility, education, circumstance of HIV status diagnostic, sharing HIV status with someone else, and home visits.

Although there has been an increase in the prevalence of adherence to ART over time, passing from 63% [Ouedraogo et al., 2014] to 74% we observed in this study, this improvement is still below the desired threshold of at least 95% [Conseil national de lutte contre le VIH/Sida et les infections sexuellement transmissibles, 2021] and could jeopardize the achievement of the AIDS elimination target in 2030. The trend observed in our study has been reported in several other surveys. In South Africa, Kenya, Senegal and Cameroon adherence prevalences of 62.5%, 68.8%, 70.5% and 77.5% have been found, respectively [Ramlagan et al., 2018; Bhat et al., 2010; Mouala et al., 2006]. The most salient factors associated with adherence are patient and their environment-related factors i.e. patient characteristics and behaviours, and ART- related factors specifically the side effects of the drugs and care support related factors.

With regard to the characteristics of the patients and their environment, our findings unexpectedly indicated that most educated patients are less likely to be compliant to treatment which is in line with studies that showed poor adherence prevalences in people who had tertiary education (60%) [Wang et al., 2019; Bhat et al., 2010]. These unexpected results could be explained by the lack of appropriate work environment enabling ARV uptake/medication while maintaining discretion as reported by key informants. Work environment is a barrier to compliance among patients indicating the need for creating office space where patients could discreetly access their medication and strengthening therapeutic education regardless of the patient's level of education. On the other hand, these unexpected findings could be attributed to a better self-reporting among the most

educated patients.

In addition to factors related to work environment, attitudes and beliefs are drivers for health seeking towards traditional medicine or group of prayer. Depression, denial of the disease and alcohol addiction are also factors that negatively impact the patients' adherence to ART. Health anthropologist have established that the behaviours of patients considered irrational from a biomedical point of view obey logics [Erlen et al., 2002]. It is then important to research the origin of these behaviours and the symbols that underlie them. In view of the analysis of the comments made by the persons interviewed, the motivating factors for good compliance are multiple, but the most frequently mentioned is the desire to prolong life. Drug-related factors deserve mention. Actually, many patients find that the side effects or undesirable effects of ART drugs lead them to palliative treatments such as those proposed by traditional medicine and prayers and divinations.

With regard to the ARV support system, it should be noted that the probability of being compliant was low in centers with care capacities above the first level. This situation could be explained by easier access to care offered in the first level structures of our health system, i.e., medical centers and health and social promotion centers. More decentralization of ART could then improve adherence to treatment. But beyond the staggered structuring of the health system, which seems to make access to care more difficult, other limitations include the lack of financial means to organize adherence clubs, home visits and discussion in focus groups, and the unavailability of suitable premises for PTE, the lack of staff trained in adherence assistance, the management of patients and their waiting time, the lack of pharmacists in certain centers, the shortage of ARVs for patients, the high costs associated with access to certain examinations and the geographical inaccessibility of certain health care centers. Less than 60% of the patients were benefiting from PTE and around 30% were participating in a therapeutic support group discussion. Also, one patient out of five had benefited from a home visit and only 36% received assistance in taking medication. In addition to these relatively insufficient patients' compliance support actions, findings also show that PTE and home visits do not have a significant positive impact on the compliance to ART. Even if this could be attributed to the fact that these activities are much more relevant to patients who encounter difficulties in adherence, it cannot be ruled out that the low level of financial and technical capacity building (lack of premises, training of actors and motivation) could be the cause, as attested to by certain actors in the care chain.

Actors on the bangs of the system, but important to take into account, are the patients accompanying and community leaders such as religious leaders. It appears that almost half of the accompanying persons have not received any sensitization from the health centers. Almost 40% of the accompanying persons have not been sensitized on the prevention of infections. Thus, more than 25% had difficulty enforcing the rules prescribed by health workers to their patients. As it appears from the results, there is little interaction between community leaders and the care and compliance support system, on one hand, and between caregivers and the care system, on the other hand. Similarly, the training of these actors remains a challenge in many cases. Hence the need to maintain and strengthen interactions between the different actors of the adherence support system and to work on strengthening their skills.

The study has some limitations. First, some of the data were collected retrospectively

and on the basis of patient self-report, which exposes memory bias and some subjectivity in the responses. Indeed, the measurement of the variable of interest (ART adherence) was based on patient self-reporting, which may lead to measurement bias. However, our findings remained similar to those obtained by other authors who used strategies based on patient self-reporting to measure the adherence of patients to ART [Mbengue et al., 2019; Ramlagan et al., 2018]there is a lack of data regarding adherence to antiretroviral treatment and only a few studies have looked at the determinants. The ai m of this study is to assess the prevalence and determinants contributing to antiretroviral (ARV. Second, data on some key variables could not be collected from the majority of patients included in the study because of the investigators' limited access to some sources of information. Nevertheless, the study has some strengths: it included a large sample spread throughout the country, considered the different levels of the health system, certain specificities of PLHIV (key populations) and the perception of most of the actors in patient care.

CONCLUSION

Despite the remarkable improvement observed between 2016 and 2020, the PLHIV adherence to ART prevalence remains low and far from the desirable gaol of 95% which is required to achieve the therapeutic objectives of prolonging life, reducing the frequency of opportunistic infections, rapidly and sustainably stopping or slowing viral replication, and restoring or improving patients' immunity. Efforts should be reinforced to fill the gap in patients' adherence prevalence and some cost-effective solutions may be scaling up ARV dispensation at community level, training caregivers and patients' accompanying persons and promoting patient therapeutic education.

Declarations

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Authors' contributions

SO, ID: manuscript design and finalization; ED, MS, OA, BPCY: data collection and analysis; CO, NM, LO: critical reading of manuscript.

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Competing interests

The authors declare that they have no competing interests.

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