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Quality of Life and Associated Factors in HIV-infected Adults Undergoing Antiretroviral Treatment at CHUD-Borgou

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Abstract: *Introduction*: Antiretrovirals have improved the life expectancy of people living with HIV (PLHIV). The evaluation of quality of life and its improvement is now an important element of care. The current study assessed the quality of life and identified associated factors with adults living with HIV who were followed at the CHUD Borgou. *Methods*: A case-control study was conducted from August to October 2018. Cases of PLHIV aged 15 years and older, were recruited through systematic sampling with steps equal to 2 based on the order of arrival of patients at the site. The controls were composed of apparently healthy, HIV-negative individuals recruited in the community in 10 neighborhoods selected at random out of 58 in the city of Parakou. A pen rotation was used to choose the direction to follow and households were selected with a step size of 4. Each PLHIV is associated with two HIV-negative respondents matched on age, sex, and average monthly income. The generic score composed of 36 questions "SF-36" was used to assess the quality of life of the participants. These questions are grouped into three categories exploring physical, mental, and self-perceived health changes, respectively. Respondents gave oral consent. The favorable opinion of the ethics committee for Biomedical research of the University of Parakou was obtained. Data were entered and analyzed using Epi-Info 7.2.2 software. The general linear regression model was used to identify independent factors associated with quality of life. *Results*: There were 222 PLHIV and 444 HIV-negative subjects. The mean quality of life score of PLHIV was higher than that of HIV-negative subjects in all dimensions: physical health (56.04 vs. 50.52; $p < 0.000$), mental health (40.15 vs. 35.16; $p < 0.000$), and perceived health (67.00 vs. 59.40; $p < 0.000$). PLHIV had a low vitality score compared with controls (53.67 vs 54.85; $p = 0.215$). Independent factors associated with quality of life were: age < 40 years (p=0.001), male gender (p=0.046), shared HIV status with spouse (p=0.045), existence of psychological support (p=0.026), length of time since testing (p=0.041), last CD4 $\geq$ 500 (p=0.025). *Conclusion*: Several factors contribute to a better quality of life for PLHIV compared to the community. The impact of free care in Benin on the quality of life of PLHIV deserves to be evaluated in the long term.

Keywords: Antiretrovirals, Associated Factors, Benin, PLHIV, Quality of Life

1. Introduction

Quality of life is defined by the World Health Organization (WHO) as an individual's perception of his or her place in life, in the context of the culture and value system in which he or she lives, in relation to his or her goals, expectations, norms and concerns [1]. It is a multidimensional concept that

can be influenced by the subject's physical health, psychological state, level of independence, social relationships, and relationship with the essential elements of their environment [2, 3].

In the context of human immunodeficiency virus (HIV) infection, it appears necessary to consider the quality of life by integrating the dimensions of the disease and treatments. It is important not to consider the patient only from a clinical point of view. It will also be necessary to consider the burden of treatment and the physical, psychological, and social repercussions of the disease [4].

Since 2006, Benin has opted for free HIV care. This free care covers a package of care activities, namely, screening, general and specialized medical consultations related to HIV infection, antiretroviral molecules, molecules for the prevention and treatment of opportunistic infections, initiation check-up, follow-up check-up of efficacy (CD4 count, viral load) and tolerance of the antiretroviral treatment (blood count, creatininemia, glycemia, transaminases, total and HDL cholesterol...), hospitalization costs, psychological, legal, social and nutritional support [5].

It is important to emphasize that this free comprehensive care of HIV infection is taking place in a context where health insurance is not universal for all citizens. People living with the human immunodeficiency virus (PLHIV) are therefore the only ones to benefit from health insurance while the rest of the population, under the same conditions, has to cover the costs of any disease situation themselves.

It is in this context that this work was initiated with the aim of studying the quality of life of PLHIV undergoing antiretroviral treatment (ART) and identifying the associated factors.

2. Patients and Methods

This was a case-control study that ran from July 1 to October 30, 2018. Cases consisted of PLHIV aged 15 years and older and on antiretroviral therapy.

They were recruited from the internal medicine department cohort through systematic stepwise sampling equal to 2. The order of arrival list of patients established each day of consultation was used as a basis for recruitment. The first patient to be surveyed was determined by a random draw from rank 1 to rank 2. Refusal of a respondent did not change the order of recruitment.

The control group was composed of people from the community interviewed in households in the city of Parakou. They were people aged 15 years and older, in apparent good health and who had given oral consent. We conducted a two-stage sampling procedure, one for each neighborhood and one for each household. First, we randomly selected 10 neighborhoods out of 58 in the city of Parakou. The neighborhoods drawn were organized into strata with an equitable number of study population per neighborhood. In one neighborhood, the directions to be followed were chosen randomly using the direction of the tip of a pen after rotating the pen. Within the chosen direction, households were

identified from close to close with a step size of 4. HIV-negative status of controls was confirmed by a rapid serological test.

Socio-demographic data were collected using a predefined questionnaire. Quality of life was assessed using the generic short-form health survey (SF-36), which consists of 36 questions grouped into three categories (functional status, well-being, and global health assessment) [6]. The functional status is composed of 10 items on physical activity, 2 items on life and relationships with others, 4 items on limitations due to physical condition, and 3 items on limitations due to psychological condition. The well-being is composed of 5 items on the evaluation of psychological health, 4 on energy and vitality, and 2 on physical pain. The global health evaluation is based on 5 items on global health perception and one item describing the changes in health status during the past year. The response was binary (yes/no) or ordinal qualitative (3-6 possible responses). Scores on the various items were scored and then summed and transformed linearly on a scale from 0 to 100. Scores tending towards 100 indicate a better quality of life and those close to 0 indicate a poor quality of life. An average physical health score and an average mental health score were calculated.

Participants gave oral consent to participate in the study. The favorable opinion of the ethics committee for Biomedical research of the University of Parakou was obtained.

After data collection, we checked the data for completeness. Then, the data were coded, entered, and analyzed using Epi-Info software version 7.2.0.1. For categorical variables, frequencies and proportions were determined. The description of the patients' characteristics and their comparison were performed using the classical tests: Fisher's exact test or Chi-square test for comparison of percentages for qualitative variables and Student's t-test for comparison of means if the variable is quantitative. The general linear regression model was used to search for independent factors associated with better quality of life. The variables associated with quality of life in the univariate analysis with $p < 0.05$ were entered into the same general linear model to search for those that were independently associated with better quality of life. A difference was considered significant if $p < 0.05$.

3. Results

There were 222 PLHIV and 444 HIV-negative subjects. The mean age of the PLHIV was 41.22 ± 11.89 years and that of the HIV-negative subjects was 37.38 ± 12.69 years. In the HIV-positive group, there were 59 males and 163 females (sex ratio = 0.36), and in the HIV-negative group, 141 males and 303 females (sex ratio = 0.46). Table 1 presents the general characteristics of the study population.

3.1. Comparison of Quality of Life Between PLHIV and HIV-Negative Subjects

The mean quality of life score of PLHIV was higher than that of HIV-negative subjects in all dimensions: physical

health (56.04 vs. 50.52; p < 0.000), mental health (40.15 vs. 35.16; p < 0.000) and perceived health (67.00 vs. 59.40; p < 0.000). PLHIV had a low vitality score compared with controls (53.67 vs 54.85; p = 0.215) (Table 2).

3.2. Factors Associated with Quality of Life in PLHIV in Univariate Analysis

Factors independently associated with the quality of life of PLHIV in univariate analysis are presented in Table 3. For the physical score, these were: age < 40 years (p = 0.046), male sex (p = 0.046), length of time since testing (p = 0.037), sharing HIV+ status with spouse (p = 0.045), last CD4 count greater than 500 cells/mm^3 (p = 0.025). For the mental score

it was: age (p = 0.045), length of time since testing (p = 0.041), sharing HIV+ status with spouse (p = 0.047), last CD4 count greater than 500 (p = 0.043).

3.3. Factors Associated with Quality of Life in PLHIV in Multivariate Analysis

Table 4 shows the factors associated with quality of life in PHAs in multivariate analysis. For the physical score, age ≤ 40 years (p < 0.000), length of time since testing (p < 0.036), and last CD4 count ≥ 500 (p < 0.021) were noted. For the mental score, it was age ≤ 40 years (p < 0.044), length of time on the test (p < 0.011), shared HIV+ status with spouse (p < 0.001), and last CD4 count ≥ 500 (p < 0.033).

Table 1. *General characteristics of the two HIV+ and HIV- groups surveyed (Borgou. 2018).*

	VIH+ n (%)	95% CI	VIH- n (%)	95% CI
Number of meals per day				
≤ 2 meals	41 (18.47)	[13.57-24.69]	104 (23.42)	[19.72-27.58]
3 meals	179 (80.63)	[75.19-85.98]	275 (61.94)	[57.34-77.33]
> 3 meals	2 (0.90)	[0.03-2.95]	65 (14.64)	[11.65-18.23]
Marital status				
Married	115 (51.80)	[40.81-60.85]	152 (34.23)	[26.53-45.81]
Single	107 (48.20)	[33.57-65.62]	292 (65.77)	[55.68-78.39]
Resource type				
Personal	154 (69.37)	[62.85-75.36]	190 (42.89)	[38.36-47.54]
Third party support	68 (30.63)	[22.16-42.64]	253 (57.11)	[49.91-65.90]
Main needs experienced				
Financial	101 (45.50)	[38.82-52.29]	181 (40.77)	[36.29-45.40]
Schooling for children	47 (21.17)	[15.99-27.14]	45 (10.14)	[7.66-13.29]
Free care	35 (15.77)	[11.23-21.24]	77 (17.34)	[14.10-21.14]
Psychological support	34 (15.32)	[10.85-20.74]	61 (13.74)	[10.85-17.25]
Food	1 (0.45)	[0.01-2.48]	4 (0.90)	[0.35-2.29]
Access to care	0 (0.00)	[-]	66 (14.86)	[11.86-18.47]
Other	4 (1.80)	[0.49-4.55]	10 (2.25)	[1.23-4.10]
Profession				
Civil servant	14 (6.31)	[3.49-10.35]	36 (8.11)	[5.91-11.02]
Students / pupils	4 (1.80)	[0.49-4.55]	124 (27.93)	[23.96-32.28]
Craftsman/trade	119 (53.60)	[42.26-66.21]	179 (40.31)	[33.39-48.26]
Unemployed	9 (4.05)	[1.23-9.73]	21 (4.73)	[2.68-8.42]
Other	76 (34.23)	[28.02-40.88]	84 (18.24)	[15.55-22.82]
Level of education				
None	36 (16.22)	[9.65-23.47]	46 (10.36)	[3.72-18.94]
Primary	97 (43.69)	[30.07-51.49]	93 (20.95)	[12.26-30.96]
Secondary	58 (26.13)	[20.48-32.43]	140 (31.53)	[27.38-36.00]
University	31 (13.96)	[4.50-25.69]	165 (37.16)	[25.59-48.85]

Table 2. *Comparison of quality of life between HIV+ and HIV- groups in terms of mental and physical health (Borgou. 2018).*

	HIV+ Group	HIV- Group	p
	Average score	Average score	
Physical Health	56.03	50.51	<0.001
Physical activity	87.92	75.36	<0.001
Physical limitation	86.03	70.88	<0.001
Physical pain	94.85	76.60	<0.001
General health	76.21	66.65	<0.001
Mental health	40.14	35.16	<0.001
Vitality	53.67	54.85	0.215
Social Functioning	84.90	75.98	<0.001
Psychic Limitation	89.48	68.61	<0.001
Psychological health	66.97	62.08	<0.001
Perceived health evolution	67.00	59.40	<0.001

Table 3. *Factors associated with quality of life for (CHUD-B. 2018) in univariate analysis.*

	PHYSICAL HEALTH	P	MENTAL HEALTH	P
	Average score		Average score	
Age				
≤ 40 years	57.81	0.001	41.35	0.045
>40 years old	53.97		38.78	
Gender				
Male	56.73	0.046	39.36	0.993
Female	55.78		40.43	
Average monthly income in FCFA (€)				
<50000 (76) /month	55.71	0.478	40.13	0.46
≥50000 (76) /month	57.43		40.24	
Year of screening (years)				
<1	36.41		38.71	
[1-2]	53.92		41.5	
[2-5]	57.87	0.037	40.44	0.041
[5-10]	59.23		40.4	
≥ 10	61.36		37.71	
Have shared HIV+ status				
Yes	56.4	0.224	39.4	0.408
No	55.56		41.11	
Relationship to person with knowledge of HIV+ status				
Spouse	63.27		59.02	
Ascendant	56.23	0.045	41.05	0.047
Descendant	49.24		38.53	
Parent	57.1		41.21	
Attitude of person with knowledge of HIV+ status				
Psycho. support	65.25		69.5	
Indifference	57.97	0.705	39.77	0.026
Rejection/isolation	55.04		25.46	
Other	59.07		42.11	
Initial CD4				
< 200	56.2		39.21	
200 - 499	56	0.739	38.8	0.229
≥ 500	55.35		43.93	
CD4 < 6 months				
< 200	45.37		33.93	
200 - 499	53.32	0.025	48.65	0.043
≥ 500	66.13		59.26	
Viral load				
Undetectable	55.23		55.23	
Detectable	53.67	0.631	53.67	0.631
Not done	56.7		56.7	

Table 4. *Distribution of factors associated with quality of life among PHAs. multivariate analysis.*

	β	RR	P
Physical health			
Age	-0.292	0.75	< 0.000
Sex	0.716	2.05	0.625
Age of screening	-2.165	0.11	< 0.036
Shared status with spouse	-0.253	0.78	0.911
Last CD4 ≥ 500	2.703	14.92	< 0.021
Mental health			
Age	-0.136	0.87	< 0.044
Sex	0.159	2.33	0.608
Length of time tested	0.318	3.83	< 0.011
Shared status with spouse	-0.727	0.48	< 0.001
Last CD4 ≥ 500	0.005	1.01	< 0.033

4. Discussion

The purpose of this study was to compare the quality of life of people living with HIV with that of HIV-negative people in the dimensions of physical and mental health and to identify factors associated with their quality of life.

In the literature, many studies have compared the quality of life of PLHIV with that of HIV-negative people and have explored the factors associated with the quality of life of these patients. In the majority of cases, quality of life scores are higher in the HIV-negative group compared with the HIV-positive

group. This is the result found by Miners et al. in the UK [7] and Josevânia et al. in Brazil [8]. This is justified by the stigma and discrimination associated with the disease, the loss of productivity or employment, the late diagnosis with the presence of many opportunistic infections, the social consequences (divorce, abandonment), the short-, medium- and long-term side effects of antiretroviral and the chronicity of the disease. Thus, it may seem paradoxical to note that PLHIV have a better quality of life than the general population. However, this was the case in the present study, where the quality of life scores of PLHIV were higher than those of HIV-negative subjects in most dimensions. Two studies obtained similar results in Cameroon [9], South Africa [10] and Nigeria [11]. This finding in these countries could be explained by, among other things, the similarity in the approach to the management of PLHIV in these countries with free care, psychosocial care, and sometimes even nutritional care.

Indeed, Benin has adopted a policy of free care for PLHIV. This free care covers not only antiretroviral drugs, but also the preventive and curative treatment of certain opportunistic infections. In addition, consultations, hospitalizations, and a certain number of paraclinical examinations are free of charge as part of the free minimum package. Many programs have also facilitated and strengthened nutritional, psychological, legal, and social care for PLHIV. HIV-positive status offers a health and social insurance system that does not say its name to PLHIV in a context where no universal health insurance policy exists for the general population. PLHIV are thus privileged compared to the non-HIV infected population. The latter have to deal with health care expenses on their own, in addition to the daily socio-economic difficulties.

Active social support by the health care team and some members of the community can also be an effective way to improve the mental health of infected people. Ease of access to health services could also be cited as a factor contributing to a better quality of life for PHAs.

If one of the main goals of health care is to improve quality of life, then it is important to understand not only the state of quality of life, but also the factors that influence it. In the present study, PHAs under the age of 40 had better physical and mental quality of life scores. Indeed, old age has been associated with decreased mental health in a cohort study conducted by Murri et al in Italy in 2003 [12]. Older age has also been associated in other studies with a lower physical health score and with a greater deterioration of physical health over time, most likely due to physical senescence but also to the long-term side effects of antiretrovirals [13]. Apart from young age, the length of time since testing, a final CD4 cell count greater than 500 cells/mm^3 and sharing HIV status with one's spouse were found to be factors associated with the quality of life of PLHIV. Some studies have found other factors, including gender, family status, and socioeconomic status (education, employment, income) [14]. Nojomi et al. found that a recent CD4 cell count above 200 cells/mm^3 was associated with better physical and mental health. A low viral load was also correlated with a better quality of life [15].

The negative effect of comorbidities and opportunistic infections on the quality of life of PLHIV is well documented in the literature [16]. These results highlight the importance of early diagnosis and treatment to improve their quality of life. Indeed, antiretroviral treatment associated with good compliance ensures a better physical and mental quality of life for PLHIV according to the study of Carrieri et al. in France [17]. The study by Mannheimer et al. in 2005 also shows that patients with good adherence have better quality of life scores which are maintained over time [18].

5. Conclusion

The present study has shown that people living with HIV followed in Parakou have a better quality of life in the dimensions explored compared to HIV-uninfected subjects recruited from the general population. Free medical, psychological, social, legal, and sometimes nutritional care for these patients seems to have a positive impact on their quality of life and would improve the experience of their HIV positive status. A national evaluation of the impact of the policy of free care for PLHIV in Benin is therefore necessary.

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