Section: Medicine

Original Research Article

A STUDY OF SOCIO-DEMOGRAPHIC AND CLINICAL PROFILE OF ELDERLY HIV PATIENTS IN A TERTIARY CARE HOSPITAL

Nitajan Nongtdu[1], Telem Jeetenkumar Singh[2], Mayanglambam Bijoy[3], Thingbaijam Shanti Devi[4], Johnson Maibam[5], Ksh.Birendra Singh[6], Ningthoukhongjam Reema[7], Lumsing Gangmei[8]

[1]*Junior resident, Department of Medicine, Regional institute, of medical sciences (RIMS), Imphal, India.*
[2,6]*Professor, Department of Medicine, RIMS, Imphal, India.*
[3,4]*Associate Professor, Department of Medicine, RIMS, Imphal, India.*
[5]*Senior resident, Department of Medicine, RIMS, Imphal, India.*
[7]*Assistant Professor, Department of Medicine, RIMS, Imphal, India.*
[8]*Junior Resident, Department of Medicine, RIMS, Imphal, India.*

Received *: 20/07/2024*
Received in revised form *: 13/09/2024*
Accepted *: 29/09/2024*

Corresponding Author:
Dr. Ningthoukhongjam Reema, Assistant Professor, Department of Medicine, Regional institute, of medical sciences RIMS, Imphal, India. Email:thangjamreema@gmail.com

DOI: 10.70034/ijmedph.2024.3.189

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2024; 14 (3); 1053-1061

ABSTRACT

Background: Human immunodeficiency virus (HIV) is a virus that targets body's immune system reducing person's ability to fight off infections. More older people living with HIV (OPLHIV) are living beyond the age of 60 due to the significant extension of life expectancy resulting from HIV treatments. The highest percentage of OPLHIV is seen in low- and middle-income countries (LMIC), and by 2030, this percentage will have more than doubled. Multiple chronic diseases or conditions known to cause by HIV due to chronic inflammation, the use of multiple medications, changes in physical and cognitive abilities, increased vulnerability to stressors, substance abuse, depression, lower education line, financial barriers to treatment adherence pose a great challenge especially among elderly population. Late diagnosis and delay in starting the treatment among them lead to poorer prognoses and shorter survival even after an HIV diagnosis. Till date, there are no guidelines available to specifically address the needs of the elderly HIV infected patient. The present work was conducted to study the Socio demographic, Clinical, Immunological and Virological profile of Elderly HIV patients.

Materials and Methods: This hospital based cross-sectional study enrolled 130 HIV positive patients of 60 years and above, admitted in Medicine ward, attending Medicine OPD, Center of Excellence (Coe)ART Centre, Regional Institute of Medical Sciences (RIMS), Imphal, Manipur (RIMS) for a period of 2 years from May 2022 to July 2024 after informed consent. Routine investigations- Complete blood count, liver function test, kidney function test, urine routine examination, X ray chest, ECG were done as per NACO guidelines.CD4 count, and plasma viral load at baseline and at enrolment were documented for immunological monitoring. SPSS (Statistical Package for the Social Sciences software) V. 26 was used for statistical analysis. A P value of <0.05 was taken as significant.

Results: The participants in the present study exhibited an average age of 62.71 years (SD ± 4.79), with a majority being male (95,73.07%). Heterosexual transmission was predominant (53.85%).Most participants were Hindu (47.69%), married (73.08%), and predominantly from the lower-middle socio-economic class (46.15%). According to WHO Clinical stages, Stage 1 comprising the majority at 64.62%, followed by Stage 2 at 20.00%, Stage 3 at 10.77%, and Stage 4 at 4.62% in the study. After enrolment, there was statistically significant ($p<0.001$) increase in mean CD4 count from 92 cells/mm^3 at baseline to 639 cells/mm^3, suggesting ART efficacy and marked decrease in viral load from a mean of 126,235.61 copies/ml to 2018.39

copies/ml. Notable levels of abnormal SGOT (20%) and SGPT (15%) enzymes also seen in the present study. The study underscores ART's effectiveness in enhancing CD4 counts and reducing viral loads in older HIV patients.

Conclusion: The study concludes that there is significant improvement in CD4 count and viral load after ART initiation in older patients. Timely diagnosis and early treatment are critical because the immune response in older adults tends to be slower than in younger individuals. A policy integrating routine HIV testing with other medical tests could ensure timely diagnosis, allowing for the strategic use of multiple therapies to achieve successful treatment outcomes. Maintaining good adherence to treatment protocols can help forestall or avoid the onset of immunodeficiency.

Keywords: HIV/AIDS, ART, CD4 count, viral load, elderly.

INTRODUCTION

Human immunodeficiency virus preferentially invades CD4 cells thereby weakening the body's immune system. By targeting CD4 cells, HIV weakens immunity, making individuals more vulnerable to tuberculosis, fungal infections, bacterial diseases, and cancers. It is estimated that around 37.9 million people were living with HIV (PLHIV)/ acquired immune deficiency syndrome (AIDS) globally by the end of 2018.[1] The number of PLHIV on treatment surged to 23.3 million by 2020, compared to 2010.[2]ART initiation and adherence are reshaping the demographics of the HIV epidemic. The AIDS-related death declined by around 55% since its peak in 2004 and with the increase in life expectancy, a rise in the proportion of older individuals is being reflected in total PLHIV size.[1,3] It has been predicted that by 2030, 73% of individuals infected with HIV will be aged 50 years or older.[3] India ranks third globally in HIV/AIDS prevalence, with approximately 2.14 million PLHIV. Scale-up of the ART has been a key component of priority under the National AIDS Control Programme (NACP).[4]

According to the WHO, elderly patients in developing nations are defined as those who are 60 years of age or older. In the era of advanced ART, patients starting treatment have excellent outcomes, typically achieving life expectancies comparable to those without HIV at their age. Older patients are usually diagnosed at advanced HIV infection stages, healthcare providers' lack of suspicion of the virus in this population, and the fact that infection symptoms are linked to a number of age-related diseases, have been implicated in this delayed diagnosis. People living with HIV (PLHIV) on HAART with suppressed viral load may encounter typical aging symptoms and multiple chronic conditions, alongside issues like taking multiple medications, changes in physical and cognitive abilities, and heightened susceptibility to stress. HIV infection is accompanied by immune activation and chronic inflammations, thereby increasing the risk of developing age-related conditions like cardiovascular diseases (ischemic heart disease), type 2 diabetes mellitus, lymphoma and certain cancers, lung diseases, osteoporosis, intracranial hemorrhage, HIV-associated neurocognitive disorders (HAND). Liver damage has also been observed including hepatitis B and C. These conditions are accelerated, accentuated and caused by various socio-economic and lifestyle factors. A current challenge has been adherence to antiretroviral system, defined as ensuring prescribed medications are taken correctly to prevent drug resistance and maintain treatment effectiveness. Non-adherence factors include complex drug schedules, patient-related issues (polypharmacy, substance use, depression), and healthcare system challenges. Older adults, despite some favourable trends, may struggle with adherence due to these factors, highlighting the need for tailored strategies to enhance treatment adherence. Regardless of age, HIV poses certain challenges. However, compared to their younger counter parts, older HIV-positive individuals may have various problems, such as increased social isolation and loneliness. Another issue that worries older HIV-positive individuals is stigma. Stigma has a negative impact on quality of life, people's behaviours and self-image. It can also keep people from disclosing their HIV status or from obtaining the social services or medical care that many older persons may need. For this reason, it is important that older HIV-positive individuals receive mental health services as well as other forms of assistance in order to maintain their health and continue receiving HIV care.

According to Manipur state AIDS control Organization, AIDS has emerged as a new and serious public health emergency in Manipur. Manipur is one of the six high prevalence states in India and HIV prevalence rate among pregnant women attending ANC being 1.4% (sentinel surveillance 2006). Manipur with hardly 0.2% of India’s population is contributing 8% of India’s total HIV positive cases.[5]

Information on the geriatric population living with HIV in India is sparse and a systematic description of the HIV geriatrics is required to change this. Seniors living with HIV encounter several obstacles because of their advanced age, poor health care, limited social security, and a faltering economy. There is no formalized care system for the elderly, despite the fact that they require special attention in

this situation. Several reasons contribute to this; earlier studies projected HIV/AIDS prevalence and transmission as a youth issue, this has inadvertently omitted elderly-care in the HIV-control program design. Being elderly is associated with sustaining risky behaviour like less condom use, higher preference for multiple sexual partners which predisposes to new infections.

The present work was conducted to study the Socio demographic, Clinical, Immunological and Virological profile of Elderly HIV patients.

MATERIALS AND METHODS

This hospital based cross-sectional study enrolled 130 HIV positive patients 60 years and above, admitted in Medicine ward, attending Medicine OPD, Center of Excellence (Coe)ART Centre, Regional Institute of Medical Sciences (RIMS), Imphal, Manipur (RIMS) for a period of 2 years from May 2022 to July 2024.

Inclusion criteria included patients ≥ 60 years of age with HIV infection and those willing to give written consent.

Exclusion criteria included HIV Patient likely to be transferred out and those not giving consent.

Study Procedure: All the eligible consecutive patients after informed written consent were subjected to comprehensive questionnaire/ history taking/ thorough detailed examination. All the routine examinations were done including clinical staging, as per NACO recommendation. A proper proforma was designed which includes socio-demographic details, ART drug history, diabetes, hypertension; tuberculosis and obstructive airway diseases. Clinical staging of the patient were done as per WHO guidelines for every patients. Routine investigations- Complete blood count, liver function test, kidney function test, urine routine examination, X ray chest, ECG were done as per NACO guidelines.CD4 count, and plasma viral load at baseline and at enrolment were documented for immunological monitoring. All eligible patients were included, during the study period.

Study tools

1.WHO Clinical staging and clinical monitoring,[6]

Stages	Stage I	Stage II	Stage III	Stage IV
Signs and symptoms	Asymptomatic, persistent generalised lymphadenopathy (PGL)	Moderate unexplained weight loss (<10% of presumed or measured body weight)recurrent respiratory tract infections, sinusitis,bronchitis,otitis media,pharyngitis. Herpes zoster Angular cheilitis Recurrent oral ulcerations Popular pruritc eruptions Seborrhoeic dermatitis Fungal nail infections of fingers	Severe weight loss(>10% of presumed or measured body weight) Unexplained chronic diarrhoea >1 month Unexplained perisistent fever >1month Oral candidiasis Oral hairy leukoplakia Pulmonary tuberculosis (TB) diagnosed in last 2 years Severe presumed bacterial infections(pneumonia, empyema, pyomyosistis, bone or joint infections, meningitis, bacteraemia) Acute necrotising ulcerative stomatitis, gingivitis or periodontitis Unexplained anaemia (<8 g/dl), neutropaenia (<0.5 × 10^9/L) and/or chronic thrombocytopaenia (<50 × 10^9/L)	Conditions where a presumptive diagnosis can be made on the basis of clinical signs or simple investigations HIV wasting syndrome Pneumocystis pneumonia Recurrent severe or radiological bacterial pneumonia Chronic herpes simplex infection (oro labial, genital, anorectal >1 month) Esophageal candidiasis Extrapulmonary TB Kaposi's sarcoma Central nervous system toxoplasmosis HIV encephalopathy Extrapulmonary cryptococcosis, including meningitis Disseminated non-tuberculous mycobacterial infection Progressive multifocal leukoencephalopathy Chronic cryptosporidiosis Chronic isosporiasis Disseminated mycosis (extrapulmonary histoplasmosis, coccidioidomycosis) Lymphoma (cerebral or B-cell non-Hodgkin) Symptomatic HIV-associated nephropathy or cardiomyopathy Recurrent septicaemia (including non typhoidal *Salmonella)* Invasive cervical carcinoma Atypical disseminated leishmaniasis

2. Updated Modified Kuppuswamy SES (Socio-economic status),[7]

Occupation of the Head of the family	Score
Legislators, Senior Officials & Managers	10
Professionals	9

Technicians and Associate Professionals	8
Clerks	7
Skilled Workers and Shop & Market Sales Workers	6
Skilled Agricultural & Fishery Workers	5
Craft & Related Trade Workers	4
Plant & Machine Operators and Assemblers	3
Elementary Occupation	2
Unemployed	1
Education of the Head	**Score**
Profession or Honours	7
Graduate	6
Intermediate or diploma	5
High school certificate	4
Middle school certificate	3
Primary school certificate	2
Illiterate	1

Total monthly income of the family

Updated Monthly Family Income in Rupees(2012)	Updated Monthly Family Income in Rupees(2018)	Updated Monthly Family Income in Rupees(2020)	Updated Monthly Family Income in Rupees(2021)	Score
≥ 30,375	≥ 126,360	≥ 199,862	≥123,322	12
15,188–30,374	63,182–126,359	99,931–199,861	61,663-123,321	10
11,362–15,187	47,266–63,181	74,755 –99,930	46129-61,662	6
7594–11,361	31,591–47,265	49,962–74,755	30,831-46,128	4
4556–7593	18,953–31,590	29,973– 49,961	18,497-30,830	3
1521–4555	6327–18,952	10,002–29,972	6,175-18,496	2
≤ 1520	≤ 6326	≤ 10,001	≤ 6174	1

Kuppuswamy socio-economic status scale 2021	
Socio-economic status	**Total score**
I- Upper	26-29
II – Upper middle	16-25
III-Lower middle	11-15
IV-Upper lower	5-10
V-Lower	<5

Statistical Analysis: Collected data were tabulated and analyzed by using SPSS (Statistical Package for the Social Sciences software) V. 26. Mean, median, SD, frequency, percentage, Chi-Square or Paired t test were used for analysis. A P value of <0.05 was taken as significant.

Approval of Research Ethics Board and Informed Consent: The study was approved by Research Ethics Board Regional Institute of Medical Sciences, Imphal (REB No: A/206/REB – Comm(SP)/RIMS/2015/863/201/2022).Privacy and confidentiality was maintained by nondisclosure of identity, documents and by using codes.

RESULTS

The study investigated 130 HIV-positive adults aged 60 years and above with the mean age of 62.71 years (SD ± 4.79), with a majority being male (95, 73.07%). The baseline characteristics of the study subjects were given in table 1. Heterosexual transmission was predominant (53.85%), while intravenous drug users (IVDU) accounted for 30.77%. Most participants were Hindu (47.69%), married (73.08%), and predominantly from the lower-middle socio-economic class (46.15%). The most of the study subjects, 61.54%, are "Alive on ART," with majority belonging to Stage1 (64.62%).

The data as given in figure 1, illustrates changes in ART regimen frequencies from baseline to at the time of enrolment in the study. Number of participants taking TDF+3TC+DTG decreased from 92% to 86%, while on TDF+3TC+LPV/r increased from 0 to 16%. Number of participants takingTDF+3TC+ATV/r remained constant at 12%. While those who took TDF+3TC+EFV decreased from 26% to 10%, and ABC+3TC+DTG increased from 0 to 5%. Further regimens there were no significant alterations. Mean difference in BMI, CD4 count and viral load at baseline and after enrolment were given in table 2. Mean CD4 count significantly increased from 92 cells/mm³ at baseline to 639 cells/mm³ after enrolment ($p < 0.001$), reflecting ART efficacy. At the beginning viral load was measured for 130 patients, and 32 of them tested as "target not detected" (TND) at enrolment. Viral load decreased markedly from a mean of 126,235.61 copies/ml to 2018.39 copies/ml ($p < 0.001$).

The blood parameters of the study participants as given in table 3, revealed important insights into their health status. Haemoglobin levels averaged 12.46 g/dl (±2.73). Fifteen patients had haemoglobin levels above 16 g/dl, while 27 fell below 12 g/dl. Blood sugar levels averaged 131.38 mg/dl (±46.73). Most patients fell within the normal blood sugar

range (80 - 140 mg/dl), but 25 were categorized as prediabetic and 6 as diabetic. Creatinine levels, indicating kidney function, showed a mean of 1.55 g/dl (±0.45) and 45 patients had high creatinine, indicating a deterioration in kidney function for some individuals. Liver enzymes, including SGOT, SGPT, and ALP, showed mean values of 105.85 U/L (±49.24), 99.34 U/L (±45.81), and 99.25 U/L (±65.25) respectively. Median values and IQRs varied, suggesting some variability in liver function among participants.

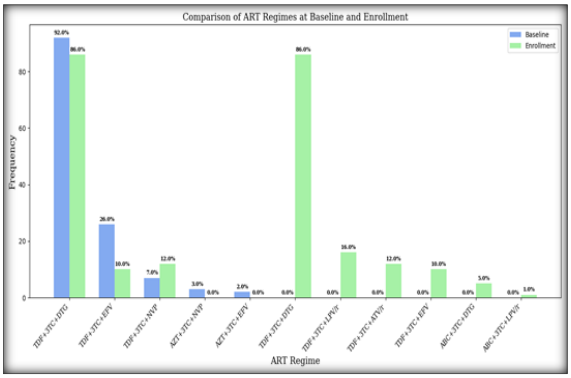

Figure 1: Type of treatment at baseline and at enrollment of the study subjects (N = 130)

Abbrevations -TDF- tenofovir, 3TC- lamivudine, DTG- dolutegravir, ABC- abacavir, AZT- zidovudine, EFV-efavirenz, NVP- nevirapine, LPV – lopinavir, r - ritonavir

Table 1: Baseline characteristics of the study subjects (N = 130)

Characteristics	Study patients (N = 130), n (%)
Age (in years)	
Mean Age (±SD)	62.71 (±4.79)
Median (IQR)	63(65-60)
Range	60 - 80
Gender	
Male	95 (73.07%)
female	35 (26.92%)
Education	
Graduate	(18.3%)
Secondary school	(30.5%)
Primary school	(36%)
Illiterate	(15.2%)
Occupation	
Govt employee	11(8.46%)
Retired govt employee	12(9.23%)
Shopkeeper	14(10.77%)
Housewife	33(25.38%)
Unemployed	43(33.08%)
Others	17(13.08%)
Religion	
Hinduism	62(47.69%)
Christianity	32(24.62%)
Islam	24(18.46%)
Others	12(9.23%)
Marital status	
Married	95(73.08%)
separate/divorced	3(2.3%)
Widow	24(18.46%)
Unmarried	8(6.15%)
HIV status of the spouse	
Positive	64(37.69%)
Negative	14(10.77%)
Not known	37(28.64%)
Not applicable	30(23.08%)
Kuppuswamy socio-economic status scale 2021	
Upper	5(3.85%)
Upper middle	16(12.31%)
Lower middle	60(46.15%)
Upper lower	43(33.08%)
Lower	6(4.62%)
Distribution across various districts	
Imphal west	38(29.2%)
Imphal east	35(26.9%)
Thoubal	12(9.2%)
Churachandpur	12(9.2%)
Bishnupur	10(7.69%)
Senapati	10(7.69%)
Chandel	5(3.8%)

Tamenlong’	3(2.3%)
Ukhrul	2(1.5%)
Kakching	1(0.76%)
Kangpokpi	1(0.76%)
Tengnoupal	1(0.76%)
Routes of transmission	
IVDU	40(30.77%)
Heterosexual	70(53.85%)
Blood transfusion	18(13.85%)
Homosexual men	1(0.77%)
WHO clinical stage	
Stage 1	84(64.62%)
Stage 2	26(20%)
Stage 3	14(10.77%)
Stage 4	6(4.62%)
Status of participants	
Alive on ART	80 (61.54%)
Died	13 (10%)
LFU /lost to follow up	9 (6.92%)
MIS/missed	7 (5.38%)
Opted	6 (4.62%)
Stopped	2 (1.54%)
Transfer Out	13 (10%)
Cause of Death	
Chronic liver disease	37(28.57%)
Cryptococcal meningitis	18(14.29%)
Tubercular meningitis	21(16.2%)
Chronic kidney disease	9(6.9%)
Covid -19	8(6.2%)
Acute coronary syndrome	14(10.7%)
Severe dengue	12(9.2%)
Scrub typhus	11(8.5%)

*SD: Standard Deviation; IQR: Inter-Quartile Range

Table 2: Mean difference between Body Mass Index (BMI), CD4 and viral load at baseline and after enrolment in the study of treatment with ART (N = 130)

BMI	**BMI at Baseline (n = 130)**	**BMI at enrolment(n = 130)**	**Wilcoxon signed-rank test p- value**
Mean	21.79 (±1.51)	22.05 (±1.49)	<0.05
Median	21.8 (±1.97)	22.02 (±1.98)	
Range	25.53-16.38	25.44-16.64	
CD4	**CD4 count at Baseline** (n = 130)	**CD4 count at enrolment (n = 130)**	<0.0001
Mean	92 (±19.63) cells/mm3	639 (±78.56) cells/mm3	
Median	94 (±39.75) cells/mm3	651 (±131.75) cells/mm3	
Range	11.63-172.13 cells/mm3	334.13-861.63cells/mm3	
Viral load	**Viral load at Baseline** (n = 80)(copies/ml)	**Viral load at enrolment**(n = 80) (copies/ml)	<0.0001
Mean	126,235.61 (±24,736.93)	2018.39 (±625.31)	
Median	128,426 (44,524)	2010 (740.75)	
Range	36,207-213,705	651.62-3781.62	

Table 3: Blood parameters of the study participants (N = 130)

Blood Parameters	**Mean (±SD)**	**Median (IQR)**	**Range**
Haemoglobin	12.46 (±2.73)	12.42(10.32-13.83)	17.93-7.28
Low	27 (33.75%)		
Normal	38 (29.23%)		
Higher than normal range	15 (18.75%)		
Random Blood Sugar	131.38 (±46.73)	128 (97-159)	80-250
Normal blood sugar level	49 (61.25%)		
Prediabetic	25 (31.25%)		
Diabetic	6 (0.075%)		
Serum creatinine	1.55 (±0.45)	1.48 (1.0-2.03)	0.70-3.00
Normal	45 (56.25%)		
High	35 (43.75%)		
Serum Glutamic-oxalate transaminase (SGOT) (u/lt)	105.85 (±49.24)	103.00 (69.50)	24-209
Normal	64 (80%)		
High	16 (20%)		
Serum Glutamic Pyruvic Transaminase (SGPT) (u/lt)	99.34 (±45.81)	104.50 (86.75)	18-198

Normal	68 (85%)		
High	12 (15%)		
Alkaline Phosphatase (ALP) (IU/dl)	99.25 (±65.25)	95.25(65.25)	45 – 184
Normal	72 (90%)		
High	08 (20%)		

DISCUSSION

The present study provides a comprehensive overview of various aspects related to elderly HIV-positive participants, including demographics, socio-economic status, disease profile, treatment outcomes, CD4 count, viral load and laboratory parameters. Among 130 individuals aged 60 years and above who were HIV-positive, males (73.07%, n = 95) were the predominant gender. Their average age was 62.71 years (SD = 4.79). Comparatively, Daniel K. Nomah etal,[8] and David J. Brennan etal,[9] reported higher proportions of males (82.5% and 89.4%, respectively), while Joshua O. Akinyemi et al,[10] found a female predominance (52.9%). These findings underscore the variability in gender representation among older adults living with HIV.A considerable proportion had completed primary education (36%) or secondary education (30.5%), highlighting the need for tailored health education programs. Predominant occupations included housewives (25.38%) and unemployed individuals (33.08%), indicating potential economic challenges in healthcare access. Socioeconomic status predominantly fell within the lower middle class (46.15%). In contrast, Matthew ChibunnaIgwe et al,[11] reported higher rates of secondary education (57.7%) in their study, with fewer retirees (2.42%) and unemployed persons (9.2%), offering a comparative perspective on educational attainment and employment status.

The geographical distribution of participants showed that Imphal West and Imphal East had the largest population shares, highlighting the necessity for targeted healthcare resource allocation in these regions. Marital status analysis revealed that a significant majority of participants were married (73.08%) as compared to the studies done by O. Akinyemi et al,[10](59.1%) and Mohammadi FirouzehM et al,[12](60%) married. Housewives comprised a significant portion (25.38%), suggesting gender disparities in economic opportunities and healthcare access.

It also highlighted a diverse religious distribution among participants, with Hinduism (47.69%), Christianity (24.62%), and Islam (18.46%) being the predominant faiths, influencing cultural perspectives on healthcare delivery. Heterosexual transmission emerged as the primary mode of HIV acquisition (53.85%) which was similar to the study by Mukaddas A et al,[13] hence necessitating targeted prevention strategies. Notably, 37.69% of spouses were HIV-positive, underscoring the critical need for couple testing and counseling to mitigate transmission risks within marital relationships reported similar findings regarding heterosexual transmission predominance. The majority of participants belonged to the lower-middle socio-economic class (46.15%), indicating potential financial barriers to treatment adherence.

In the present scenario, chronic liver disease emerged as the primary cause of death (28.57%), underscoring the importance of robust liver health management strategies in HIV care. Cryptococcal meningitis and TB meningitis each accounted for 14.29% of mortality cases, highlighting their significant impact on disease progression. The distribution of WHO Clinical Stages indicates a majority of patients in Stage 1 (64.62%), with Stage 2 (20.00%) and Stage 3 (10.77%) representing smaller proportions. Stage 4 was the least prevalent at 4.62%. Patient follow-up outcomes showed that 61.54% are "Alive on ART," while 10.00% (13 participants) have died, 10% were transferred out, and 6.92% are lost to follow-up (LTFU). Shamu et al[14] cohort study follows 420 participants initiating ART, revealing that 40% had advanced WHO stage 3 or 4 conditions at baseline. Over a median follow-up of 5.6 years, 300 participants remained in care, while 88 died, 17 were lost to follow-up, and 15 were transferred out. Agaba et al,[15] findings add insights into factors influencing LTFU among HIV patients, identifying older age, virological suppression, and high adherence rates (>95%) as protective factors against LTFU. Conversely, male sex, lower education levels, advanced WHO clinical stages, low BMI, and gaps in care independently predict higher rates of LTFU. A significant proportion of deaths in the present study (38%) occurred within the first six months, highlighting the critical period post-ART initiation where intensive monitoring and support are crucial to prevent early mortality.

Haemoglobin levels averaged 12.46 g/dl, with 33.75% having low levels. Mean random blood sugar was 131.38 mg/dl, with 31.25% categorized as prediabetic or diabetic. Serum creatinine levels indicated kidney function decline in some participants. Liver enzymes showed varied levels: SGOT (mean 105.85 U/L), SGPT (mean 99.34 U/L), and ALP (mean 99.25 U/L).A significant proportion had elevated liver enzymes (20% for SGOT, 15% for SGPT, and 20% for ALP).

In the present study, there was a statistically significant increase in CD4 count and viral load among HIV-infected patients after receiving ART which was consistent with the studies conducted by Dias et al,[16]and Mukaddas et al,[13] thereby underscoring ART's pivotal role in restoring immune function. Notably, a subgroup of 32

patients had "target not detected" (TND) viral load at enrolment, underscoring the potency of the therapy in achieving viral suppression across the study population. The findings of this study align with previous research highlighting the benefits of ART in improving clinical outcomes for HIV patients. Greenbaum et al,[17]further reinforced ART's universal effectiveness, noting higher virologic suppression rates among older patients compared to younger ones (96% vs. 92%). Meanwhile, Emmanuel Bahemana et al[18]and Sylvester Yao Lokpo et al,[19]found no significant age-related differences in CD4 recovery or viral suppression rates over time.

HIV-positive individuals face immune dysregulation, heightening susceptibility to infections, autoimmune conditions, and cancer risks. Overall, people living with HIV are more prone to disordered T-lymphocyte and B-lymphocyte, and cytokine–interferon responses, and polyclonal (yet ineffective) antibody production, and are more commonly affected by non-communicable diseases, including diabetes and cardiovascular diseases.

Factors like polypharmacy, substance abuse, and depression are prevalent among older patients, affecting medication adherence despite some initially positive indicators.[20] OPLHIV have been shown to have better virologic outcomes and adherence to ART than younger people, but have higher mortality and slower immune recovery.[14]

A multidisciplinary team approach is necessary for the management of OPLHIV, taking into account the emergence of non-communicable illnesses, early aging, and a higher risk of drug-to-drug interactions and drug toxicities as a result of polypharmacy. Polypharmacy complicates ART regimen choices, as the burden of chronic pill-taking may exhaust patients. Targeted interventions are needed to address socio-economic disparities and gender-specific healthcare needs. Emphasize the importance of early diagnosis, couple testing, and adherence to ART for improved treatment outcomes and strengthening healthcare infrastructure and access to comprehensive care, especially in rural areas, is crucial.

CONCLUSION

The present study provides valuable insights into the demographics, clinical profiles, and treatment outcomes of elderly HIV-positive individuals in Manipur The mean age of the participants was 62.71 years (SD ± 4.79), majority being males, most of them were unemployed, completed primary education, belonging to lower middle class of Imphal district, mostly Hindu by religion, married and transmission maximum by heterosexual route. There was statistically significant improvement in mean CD4 count and viral load after enrolment, reflecting ART's effectiveness in enhancing CD4 counts and reducing viral loads in older HIV patients. Chronic liver disease was noted to be the primary cause of death among the subjects with abnormal SGOT (20%) and SGPT (15%) enzymes was found among them. The present study emphasized the importance of early diagnosis, couple testing, and adherence to ART for improved treatment outcomes and strengthening healthcare infrastructure and access to comprehensive care, especially in rural areas, is crucial.

Limitations: The study's cross-sectional nature limits the ability to establish causality between variables. To gain a deeper understanding of the temporal linkages and effects throughout time, longitudinal studies would be necessary. Variability in measurement techniques or equipment for health parameters (e.g., CD4 count, viral load, liver function tests) across different settings or time points could affect data consistency and interpretation. Further studies are required to understand how aging impacts the course of HIV infection, to develop and implement effective HIV education and prevention measures, and to assess the safety and effectiveness of ART in older adults living with HIV. This is a promising positive step to combat with the HIV/AIDS disease in community.

REFERENCES

1. Joint United Nations Programme on HIV/AIDS (UNAIDS). UNAIDS Data 2019. Geneva: UNAIDS; 2019.Availablefrom: https://www. unaids.org/sites/default/files/media_asset/2019-UNAIDS-data_ en.pdf.
2. Joint United Nations Programme on HIV/AIDS (UNAIDS). Communities at the Centre: Defending Rights Breaking Barriers Reaching People with HIV Services. Global AIDS Update2019.Geneva: UNAIDS; 2019.Availablefrom: https://www.unaids.org/sites/default/files/media_asset/2019 global AIDS update_en.pdf.
3. Smit M, Brinkman K, Geerlings S, Smit C, Thyagarajan K, Sighem Av, et al. Future challenges for clinical care of an ageing population infected with HIV: A modelling study. Lancet Infect Dis 2015; 15:810-8.
4. Okuno MF, Gosuen GC, Campanharo CR, Fram DS, Batista RE, Belasco AG. I7Quality of life, socioeconomic profile, knowledge and attitude toward sexuality from the perspectives of individuals living with Human Immunodeficiency Virus. Revista Latino-Americana de Enfermagem. 2015 Apr 14; 23:192-9.
5. National AIDS control organization, ICMR and National Institute of Medical Statistics. IndiaHIVestimates;2019. 72p.Availablefrom: http://www.naco. gov. in / sites / default / files /India%20HIV%estimates.pdf.
6. Consolidated Guidelines on the Use of Antiretroviral Drugs for Treating and Preventing HIV Infection: Recommendations for a Public Health Approach. 2nd edition. Geneva: World Health Organization; 2016. ANNEX 10, WHO clinical staging of HIV disease in adults, adolescents and children.
7. Saleem SM, Jan SS. Modified Kuppuswamy socioeconomic scale updated for the year 2021. Indian J Forensic Community Med 2021;8(1):1-3.
8. Nomah DK, Reyes-Urueña J, Díaz Y, Moreno S, Aceiton J, Bruguera A, Vivanco-Hidalgo RM, Llibre JM, Domingo P, Falco V, Imaz A. Sociodemographic, clinical, and immunological factors associated with SARS-CoV-2 diagnosis and severe COVID-19 outcomes in people living with HIV: a retrospective cohort study. The Lancet HIV. 2021 Nov 1;8(11): e701-10

9. Brennan DJ, Emlet CA, Brennenstuhl S, Rueda S. Socio-demographic profile of older adults with HIV/AIDS: gender and sexual orientation differences. Canadian Journal on Aging/La Revue canadienne du vieillissement. 2013 Mar;32(1):31-43.
10. Akinyemi JO, Ogunbosi BO, Fayemiwo AS, Adesina OA, Obaro M, Kuti MA, Awolude OA, Olaleye DO, Adewole IF. Demographic and epidemiological characteristics of HIV opportunistic infections among older adults in Nigeria. African health sciences. 2017 Jul 13;17(2):315-21.
11. Igwe MC, Obeagu EI, Ogbuabor AO, Eze GC, Ikpenwa JN, Eze-Steven PE. Socio-Demographic Variables of People Living with HIV/AIDS Initiated on ART in 2014 at Tertiary Health Institution in Enugu State. Asian Journal of Research in Infectious Diseases. 2022 Aug 1;10(4):1-7.
12. MohammadiFirouzeh M, Moradbeigi M, Ahmad SeyedAlinaghi S, Khodaei S, Sadrpour P, Bayanolhagh S, Ahsani-Nasab S, Sadeghi L, Mohraz M. Demographic, clinical and laboratory profiles of HIV infected patients admitted into Imam Khomeini Hospital of Tehran, Iran. Infectious Disorders-Drug Targets (Formerly Current Drug Targets-Infectious Disorders). 2016 Jun 1;16(2):113-20.
13. Mukaddas A, Faustine I, Pilanto PA, Adnan N. The Socio-demographics and Clinical Characteristics and CD4 Profile of HIV/AIDS Patients Receiving First Line Antiretroviral Therapy at a Public Hospital in Palu. Nusantara Science and Technology Proceedings. 2023 Nov 21:67-72.
14. Shamu T, Chimbetete C, Egger M, Mudzviti T. Treatment outcomes in HIV infected patients older than 50 years attending an HIV clinic in Harare, Zimbabwe: a cohort study. PLoS One. 2021 Jun 9;16(6): e0253000.
15. Agaba PA, Meloni ST, Sule HM, Agbaji OO, Sagay AS, Okonkwo P, Idoko JA, Kanki PJ. Treatment outcomes among older human immunodeficiency virus-infected adults in Nigeria. InOpen Forum Infectious Diseases 2017 (Vol. 4, No. 2, p. ofx031). US: Oxford University Press.
16. Dias RF, Bento LO, Tavares C, Ranes Filho H, Silva MA, Moraes LC, Freitas-Vilela AA, Moreli ML, Cardoso LP. Epidemiological and clinical profile of HIV-infected patients from Southwestern Goias State, Brazil. Revista do Instituto de Medicina Tropical de São Paulo. 2018 Jul 19;60: e34.
17. Greenbaum AH, Wilson LE, Keruly JC, Moore RD, Gebo KA. Effect of age and HAART regimen on clinical response in an urban cohort of HIV-infected individuals. AIDS (London, England). 2008 Nov 11;22(17):2331.
18. Collazos J, Asensi V, Carton JA. Association of HIV transmission categories with sociodemographic, viroimmunological and clinical parameters of HIV-infected patients. Epidemiology & Infection. 2010 Jul;138(7):1016-24
19. Lokpo, S.Y., Ofori-Attah, P.J., Ameke, L.S., Obirikorang, C., Orish, V.N., Kpene, G.E., Agboli, E., Kye-Duodu, G., Deku, J.G., Awadzi, B.K. and Noagbe, M., 2020. Viral suppression and its associated factors in HIV patients on highly active antiretroviral therapy (HAART): a retrospective study in the HO municipality, Ghana. AIDS Research and Treatment, 2020(1), p.9247451.
20. Ferreira CMSD, Leite ICG. Epidemiological characteristics and adherence of a cohort of elderly people with HIV/AIDS in the Public Health System. Einstein (Sao Paulo). 2022 Mar 25;20: eAO6474.