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Original Research Article

Frequency of opportunistic infection in PL HIV and its role in monitoring of ART 1 failure

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ABSTRACT

Background: There is so many opportunistic infection is present in PL HIV patient when patient immunity disturbed and their CD4 count decreased .this study was conducted for frequency of opportunistic infection in PL HIV and its role in monitoring of ART 1 failure. Aims and objective was to study the frequency of opportunistic infection in PL HIV and its role in monitoring of ART1 failure.
Methods: This study was conducted in ART plus centre K.P.S. Post Graduate Institute of Medicine (G.S.V.M. Medical College, Kanpur) tertiary care teaching hospital and is clinical (assessment with investigation) continuous longitudinal, prospective and retrospective, observational, single centre hospital based study at ART Centre, Kanpur and considered All the patient on 1st line ART treating attending in centre were screened for treatment failure decided by SACEP from 2016 to 2018.
Results: In this study there was opportunistic infection present that maximum in oral candidiasis but overall tuberculosis is maximum that is considered pulmonary tuberculosis, extra pulmonary tuberculosis, tubercular lymphadenitis and tubercular pericarditis, Abdominal knocks, TBM. LRTI and chronic diarrhea is also present. The male and rural area are more having opportunistic infections and all are have CD4 count 100 to 200 micrometer /Litre.
Conclusions: The opportunistic infection mostly are oral candidiasis and tuberculosis, present in CD4 count in the range of 100-200 /ml.it is the indication of ART failure during treatments.

Keywords: ART, CD4, Human immunodeficiency virus, LRTI, SACEP, TBM

INTRODUCTION

HIV is virus, cause of AIDS, it belong to the family of human retrovirus (retroviridae) and subfamily Lentiviruses. There are four retroviruses known to cause human disease belong to two distinct groups the human T lymphotropic virus (HTLV-1) and humanT lymphotropic virus-2 (HTLV-2) which are transforming retroviruses and human immunodeficiency virus HIV-1 and HIV-2. HIV-1 group is have different group as M,N,O and P and M group is having nine subtype A,B,C,D,F,G,H,I and k. There are about 60 recombinant form presents. CRFs range from highly prevalent form such as CRF01 that is common in Southeast Asia and CRF02AG from west and central Africa. HIV-1group M subtype C dominate the global pandemic and HIV-1 came from chimpazees and gorila. HIV-2 was first identified in 1986 in West Africa. HIV-2 came from SOOTY MANGABEYS. HIV-2 was

spread from West Africa. In India 95% of infection of HIV -1 and group C but in United States there are more infected population is from HIV-1 and group B. The current U.S. CDC classification system for HIV infection and AIDS categorised people on the basis of clinical conditions associated with HIV infection and CD4+T lymphocyte measurements. A confirmed HIV Case can be classified in five stages that are 0,1,2,3, and unknown.[1]

Table 1: Tabular representation of stages of HIV infection.

Stage	CD4 cell count (6year to adult)[cell/micro litre]	% of CD4 count
0	negative HIV in 6 month after HIV infection	
1	>500	>25
2	200-499	14-25
3	<200	<14
Unknown	If no criteria applied because of missing CD4 count	

Table 1 describe the staging of HIV infected patients with on basis of CD4 counts and it percentage. There is 4 stages in which the CD4 count is range from 500 to 200 and also unknown in which no CD4 count is not known.

This show that stage 3 is the CD4 less than 200 and less than 14% this stage is known as AIDS.[2]

The clinical feature of HIV infected patients appear when viral load load of patient is increase and CD 4 count decrease 'WHO categorise the clinical staging that are 4 stages. WHO stage 3 is recognized as AIDS. The staging are as below-

Clinical stage 1

- Asymptomatic
- Persistent generalized lymphadenopathy.

Clinical stage 2

- Unexplained moderate weight loss (<10%) of presumed or measured body weight).
- Recurrent respiratory tract infections (sinusitis, tonsillitis, Otitis media, pharyngitis).
- Herpes zoster
- Angular cheilitis.
- Papular pruritic eruptions.
- Seborrheoic dermatitis.
- Fungal nail infections

Clinical stage 3

- Unexplained 2 severe weight loss (<10% of presumed body weight).
- Unexplained chronic diarrhoea for longer than one month.
- Unexplained persistent fever (above 37.5°C intermittent or constant for longer than one month.
- Persistent oral candidiasis.
- Oral hairy leukoplakia.
- Severe bacterial infections (e.g. pneumonia, emphysema, bone or joint infections.
- Acute necrotizing ulcerative stomatitis, gingivitis, periodontitis.
- Unexplained anaemia (<8/dl), neutropenia (<0.5 *109/litre) and or chronic thrombocytopenia (<50*109/litre^3).

Clinical stage 4

- HIV wasting syndrome.
- Pneumocystic pneumonia.
- Recurrent severe bacterial pneumonia.
- Chronic herpes simplex infection (oralabial, genital or anorectal of more than one months duration or visceral at any site.
- Oesophageal candidiasis (or candidiasis of trachea, bronchi or lungs).
- Extrapulmonary tuberculosis.
- Kaposi sarcoma.
- Cytomegalovirus infection (retinitis or infection of other organs).
- Central nervous system Toxoplasmosis.
- HIV encephalopathy.
- Extrapulmonary Cryptococcosis.
- Lymphoma
- Atypical disseminated Leismaniasis.

HIV was first recognized in UNITED STATES in summer of 1981 when the U.S. Centres for disease control and prevention (CDC) reported the unexplained occurrence of Pneumocystis jiroveci in previously healthy homosexual men in Los Angeles And Kaposi sarcoma (KS) with and without P. jiroveci and other opportunistic infections in 26 previously healthy homosexual men in New York San Francisco and Los Angeles. First time in 1983 Human Immunodificiency Syndrome (HIV) was isolated from a patient of lymphadenopathy and by 1984 it was demonstrated clearly causative agent of AIDS. In 1985 A sensitive enzyme- linked immunosorbent assay (ELISA) was developed.[1] From that time scope and evolution of HIV among developing nations throughout world happened.[3] Person with positive HIV serology who have ever had a CD4 lymphocyte count below 200celles/microl and CD4lymphocyte percentage below 14% are considered to have AIDS. HIV is the cause of AIDS which attack on white blood cell called CD4 cell, that are the cell of body for immunity of body and suppose to protect the body from diseases. When HIV infect the CD4 cell and CD4 cell damage, when CD4 CELL damage the CD4 COUT decrease and immunity of body decrease. As the result there are so many infection occurred in the body that are called opportunistic infections. There are so many opportunistic infection.[4]

Table 2: Opportunistic infection and causes.

Opportunistic infection	Cause	Location
Candidiasis	Fungus	Mouth, throat, foot vagina
Cytomegalovirus	Virus	Eyes, lungs, brains and guts
Cryptococcosis	Fungus	Brain and spinal cord
Cryptospordiasis	Parasite	Gut
Mycobacterium avium complex	Bacterium	Gut lung, skin
Mycobacterium. tuberculosis	Bacteria	Lung, heart, liver and brain
PML	Virus	Brain
Toxoplasmosis	Parasite	Brain
Pneumocystis pneumonia	Fungus	Lung

Table 2 mention the diseases in PL HIV patient and the name of organism by which the disease is cause. There is also given the body organs in which the disease is cause. There are different type of organism that can infect to human being and cause disease in different part of organ but they infect when body immunity become very low and CD4 count very low so patient on different CD4 count have different infection.

Table 3: Opportunistic infection on the basis of CD4 count.

CD4 count	Opportunistic infection
<500	Tuberculosis, Bacterial pneumonia, Heroes zoster, Oropharyngeal, Candidiasis, Non Typhoid Salmonelosis, Kaposy sarcoma, Non Hodgkin lymphoma
<200	Pneumocystic Jirovecy Pneumonia, Cronic Herpes Simplex Ulcer, Oesophageal Candidiasis, Isospora Belli Diarrhea, HIV wasting syndrome, HIV Associated dementia
<100	Cerebral Toxoplamosis, Cryptococal meningitis, Cryptospordiasis, Microspordiasis, Cytomegalovirus infection and disseminated *Mycobacterium avium* complex Progressive multifocal leucoencephalopathy
<50	Cytomegalovirus infection, *Mycobacterium avium* complex (mac), Toxoplasmodium gondi

Table 3 is given the description about the opportunistic infection in PL HIV patient at the certain level of CD4 counts. Standard combination of antiretroviral regimens are two NRTI together with an NNRTI, Protease Inhibitor (PI) or integrase inhibitor. Starting regime of dual NRTIs combined with an NNRTI or a PI or an integrase inhibitor. These regimen should be monitored for resistant testing. If resistant testing is not available then PI in second line regimens are preferable.[5]

Monitoring of efficacy during art treatment[6]

A base line viral load should be measured prior to initiating treatment. Viral load should be repeated 4 to8 weeks after starting a new regimen when the count should show at least a tenfold decrease. After six month of ART. The viral load should be suppressed defined as below the detection of the assay (usually less than 50 copies /ml).

WHO defined immunological failure as fall in CD 4 count to base line or a 50% fall from peak on ART or persistent count below 100cell/mm.

Failure of art is defined as viral load become detectable after suppression typically more than 400 or more than 1000 copies/ml).

First time ART should consists of two nucleoside reverse transcriptase inhibitor (NRTI) +A Non-nucleoside reverse transcriptase.[7]

India ranks third among the countries having most number of HIV - infected patients and HIV related deaths in the world. In India, ART at public sector hospital is provided free of charge under the National AIDs Control Organization (NACO). The second line ART regimens comprised of zidovudine (ZDV), lamivudine (3TC), tenofovir (TDF), and boosted Lopinavir/ritonavir (LPV/r) have been introduced recently in a phase wise manner at limited centres. The criteria to switch on second line ART includes clinical and/or immunological and/or virologic failure in a patient who had received 6 months or more of standard first-line ART. The patient qualify for second line ART if they demonstrate CD4 decline to pre-ART values, CD4 drop to less than 50% of peak on-treatment value, failure to achieve CD4 greater than 100 c/mm^3 (immunologic failure), or develop a new WHO stage III/IV AIDS-defining illness (clinical failure) or those with HIV RNA 10,000 c/ml or greater (virological failure).

The Second line treatment programme is still relatively new with little experience in India population. Without resistance testing and 6 monthly virological monitoring the consequences of second line therapy outcomes are unclear. It is therefore, critical to assess the clinical, virological and immunological effectiveness and treatment outcome over the first year of follow-up in the patients switched to second line therapy at public sector tertiary care centre.

Aims and objectives was to study the frequency of opportunistic infection in PL HIV and its role in monitoring of ART1 failure.

METHODS

This study was a single centre hospital based study conducted in ART plus centre K.P.S. Post Graduate Institute of Medicine (G.S.V.M. Medical College, Kanpur) tertiary care teaching hospital (G.S.V.M. Medical College, Kanpur) from Dec 2016 to Dec 2018. This is a clinical (assessment with investigation) continuous longitudinal, prospective and retrospective, observational, single center hospital based study at ART Centre, Kanpur. Study subject includes all the patient on 1st line ART treating attending in the centre will be screen for treatment failure of based on clinical, immunological and virological criterias as decided by SACEP.

Inclusion criteria

- Patient over the age of 18 years at pre-inclusion and monitored under outpatient condition.
- Documented HIV-1 (group m) infection regardless of clinical stage and CD4 lymphocyto-count (taken in 6 months).
- Patient with treatment failure after first-line antiretroviral treatment with a combination including a non-nucleoside reverse transcriptase inhibitor and two nucleoside reverse transcriptase inhibitors, failure.
- Adherence (>80%) to first-line antiretroviral treatment (questionnaire) at pre inclusion.
- Patient agrees not to take any concomitant medication during the trial without informing the investigator.
- Informed consent
- For women in childbearing age: negative pregnancy test at inclusion, with no plan of pregnancy in the coming 12 months and agreeing to use mechanical contraception (with or without hormonal contraception) during the study.

Exclusion criteria

- Infection with HIV-2 or HIV-1 groups O or N or HIV 1+2.
- Adherence (<80%) to first-line antiretroviral treatment at pre inclusion.
- Participation in any other clinical trial.
- Presence of an uncontrolled, ongoing opportunistic infection or of any severe of progressive disease.
- First-time treatment with a protease inhibitor, Abacavir.
- Not interested to participate in study.
- Severe hepatic insufficiency.
- Creatinine clearance calculated by Cockcroft-Gault formula <50 ml/min.
- Hb ≤8 g/dl
- Platelets <50,000 cells / mm^3
- Neutrophiles <500 cells / mm^3
- Pregnancy or lactation.

Blood sample collection

On admission, 10 ml of peripheral venous blood was collected from the antecubital vein by an autoclaved syringe using 20 gauze needles. The blood was allowed to clot at room temperature for at least half an hour. The glass tube with clotted blood was centrifuged at 2000 rpm for 20 minutes and the centrifugation was repeated once more to remove the red cells completely. The supernatant serum, devoid of cellular elements, was separated from the clot and placed in two acid cleaned small test tubes.

Viral load testing

Patient of HIV suspecting first line ART failure send to BHU Vanaras Department of Microbiology, IMS BHU Banaras. In BHU viral load is tested quantitatively real time PCR from HIV RNA by PCR machine.

Measuring

Viral load is typically reported as copies of HIV in a milliliter (mL) of blood. Changes in viral load are usually reported as a log change (in powers of 10). For example, a three log increase in viral load (3 Log10) is an increase of 103 or 1000 times the previously reported level, while a drop from 500,000 to 500 copies would be a three-log-drop (also 3 Log10). CD4 count is done by BD facts flow machine by kit and report is analysed and given same day.

RESULTS

Magnitude of opportunistic infection in study subject this study show that oral candidiasis is maximum in no of subject 23% and then second maximum is pulmonary tuberculosis 23% (but overall total no of subject of pulmonary tuberculosis 23%, tuberculosis of pericardium 0.8%, extra pulmonary tuberculosis 11% and pulmonary kocks 1%, tubercular meningitis 1% and tubercular lymphadenitis 2%) is 36% that is maximum. LRTI was 8% and chronic diarrhea is 4% (Table 4).

Table 4: Opportunistic infections in study subjects.

Opportunistic infection	No. of subjects	Percentage
Oral candidiasis	28	23%
LRTI	10	8%
Pulmonary tuberculosis	27	23%
Chronic diarrhea	5	4%
TBL	3	2%
Tuberculosis of pericardium	1	0.8%
TBM	3	1%
Extra pulmonary tuberculosis	14	11%
Abdominal kocks	2	1%
No infection	25	21%

Table 5: Opportunistic infection and CD4 count.

Opportunistic infection	Mean CD4 count (micro/L)
Tuberculosis	188
Oral candidiasis	161
LRTI	180
Tubercular meningitis	179
Chronic diarrhea	186
Tubercular pericarditis	156

Table 5 show the opportunistic infections that are tuberculosis, oral candidiasis, LRTI, tubercular, meningitis, chronic diarrhea and tubercular pericarditis and all are occurred in the range of cd4 count in 150 to 200.

Table 6 show that most opportunistic infections are occurred in male dominant and rural area in geographic area.

Table 6: Opportunistic infection and its distribution in sex and geographic distributions.

OP infection/ variability	OC	TB	TBM	LRTI	CD
Male/Female	15/13	16/11	3/0	8/2	2/3
Rural/ Urban	16/12	10/8	2/1	6/4	2/3

Table 7: Opportunistic infection and it distribution in age.

OPP inf/age distribution (yr)	OC	TB	LRTI	TBM	CD
20-30 year	5	3	1	0	3
30-40 year	6	13	4	1	1
40-59 year	2	5	3	2	1
50 to 60 year	2	3	2	0	0

Table 7 show that most of opportunistic infections are occurred in 30 to 40 year of the age group but in TBM it occurred in 40 to 50 year of age groups and in chronic diarrhea it occurred in 20 to 30 year of age group.

Table 8 shows there is ART1 regime is taking as TLE and ZLN in which 765 is taking TLE and ZLN regime is taking 23%.

Table 8: Regimes of ART 1.

Treatment regimen	No. of patients	Percentage
TLE	90	76%
ZLN	28	23%

In this study anti-retroviral drugs included was TLATV/R - Tenofovir+Lamivudine+Atanzanavir+Ritonivir there are 35 patients are given treatment i.e 63%, ZLATV/R - Zaduvidine+Lamivudibne+Atanzanavir+Ritonivir there are 74 patients are given treatment 30%, TLLP/R - Tenofovir+Lamivudine+Lopinavir+Ritonavir there are 5 patients are given treatment 4%, ZLLP/R- Zaduvudine+Lamivudine+Lopinavir+Ritonavir there are 4 patients are given treatment of 3%. More number of patients are then TLATV/R (Table 9).

Table 9: Regime of second line art in study subjects.

Regimens	No. of subjects	Percentage
TLATV/R	35	63%
ZLATV/R	74	30%
TLLP/R	5	4%
ZLLP/R	4	3%

Table 10: Base line characteristics of the patients in study.

Characteristic		No. of patient	Percentage
Gender	Male	47	39%
	Female	71	61%
Age	20 -30years	23	19%
	30 -40 years	54	45%
	40 -50 years	29	25%
	50 -60 years	11	9%
	60-70 years	1	0.001%
Geographical area	Urban	65	55%
	Rural	53	45%
Habit	Smoking	13	11%
	Alcohol	53	45%
	Tobacco	8	7%
Regime I	TLE	90	76%
	ZLN	28	24%
Regime 2	TLATV/R	35	30%
	ZLATV/R	74	59%
	TLLP/R	5	4%
	ZLLP/R	4	3%
Clinical symptoms	Weight loss	105	Cumulative data
	Fever	34	
	Diarrhea	56	
	Cough	24	

This study consider the basic characteristic and also the data are taken as age, sex geographical area habit regime and clinical symptoms in base line study. This study was conducted in ART plus center KPS PG Institute of Medicine (G.S.V/M/ medical college Kanpur). In this study total number of subjects was taken 118. All 118 subject went Laboratory investigation. In 118 subject all the subject analysed and in all there was 94 subject have opportunistic infection and 25 was not having infection. In which Oral Candidiasis was found about 28 subject and Pulmonary Tuberculosis was found in 27 subjects Overall in subjects there was 50 subjects have Tuberculosis in which Pulmonary Tuberculosis was 27

Tubercular Lymphadenitis in 3 subjects, TBM IN 3 subjects, Abdominal Kocks in 2 subjects and Extrapulmonary Tuberculosis in 14 subjects, SO Individualy Oral Candidiasis (28) is most common and Pulmonary Tuberculosis (27) is second most common but all kind of tuberculosis is most common about 50 subjects (Table 4).

The CD4 count was taken at time of opportunistic infection was happen and the mean are taken that is analysed and there is Tuberculosis, Oral Candidiasis, LRTI Tubercular Mennigitis, chronic Diarrhea and Tubercular Pericarditis was occurred in the range of 150 to 200 CD4 count. Tubercular Pericarditis was occured at 156 CD4 Count, and Oral Candidiasis was occurred at 188 CD4 count (Table 5)

The opportunistic infection are analysed in this study on the basis of gender and geographical area and found that most opportunistic infection occurred in male and rural area predominance in comparison of female and urban area but in the case of chronic Diarrhea there was opposite result are found (Table 6).

The opportunistic infections are analysed on the basis of age distribution and found that most opportunistic infection OC, TB, LRTI chronic diarrhea was occurred in age groups of 30 to 40 year of age but in TBM, 2 subject was occurred in the 40-50 year of age group as 1 subject in the 30-40 year of age groups (Table 7)

This study was considered as TLE AND ZLN regime in first line regime and TLATV/R, ZLATV/R, TLLP/R/ and ZLLP/R in second line of ART (Table 8 and Table 9).

DISCUSSION

In this study there was opportunistic infection present that maximum in oral candidiasis that is 28 subject (23%) but overall tuberculosis is maximum in 49 (42%) that is maximum in which pulmonary tuberculosis is 27 subject (23%), extra pulmonary tuberculosis 14 subjects (11%) tubercular lymphadenitis 3 (2%) subjects and tubercular pericarditis 1(0.008%) subjects, Abdominal kocks 2 (1%) subjects, TBM 2 (1%) subjects. One patient is also reported tubercular pericarditis in this study. LRTI is having 10 subject (12%) and chronic diarrhea 5 (4%). But 25 subject is having no any opportunistic infections. Anant A. et al. Study of Opportunistic Infections In HIV Seropositive Patients Admitted to Community Care centre (CCC), 1 Opportunistic infections Number Percentage Pulmonary tuberculosis 33 52.3 Oral candidiasis 24 39.0 Cryptosporidial diarrhoea 19 30.1 Pneumocystis Carinii Pneumonia (PCP) 09 14.2 Bacterial infection 08 12.6 Scabies 04 6.3 Dermatitis 04 6.3 Herpes zoster 03 4.7 Remaining 20% did not respond to the question on pattern risk behaviour followed. Pattern of the opportunistic infections is given in table 3 and its comparison with various other studies in table 4. One or more opportunistic infections were observed in 63 patients (57%). Commonly observed opportunistic infections were pulmonary tuberculosis (52.3%), candidiasis (39%), cryptosporidial diarrhea (30.1%) and PCP (14.2%). In 46.4% cases CD4 count was less than 200. Association between opportunistic infection and level of CD4 count was found to be statistically significant ($p<0.05$). In this study The CD4 count was taken at time of opportunistic infection was happen and the mean are taken that is analysed and there is Tuberculosis, Oral Candidiasis, LRTI, Tubercular Mennigitis, chronic Diarrhea and Tubercular Pericarditis was occurred in the range of 100 to 200 CD4 count. Tubercular Pericarditis was occurred at 156 CD4 Count, and Oral Candidiasis was occurred at 188 CD4 count. Anant A. Takalkar, GS Saiprasad, VG Prasad, Narendra S. Madhekar Study of Opportunistic Infections In HIV Seropositive Patients Admitted to Community Care centre (CCC), 1 Opportunistic infections Number Percentage Pulmonary tuberculosis 33 52.3 Oral candidiasis 24 39.0 Cryptosporidial diarrhoea 19 30.1 Pneumocystis Carinii Pneumonia (PCP) 09 14.2 Bacterial infection 08 12.6 Scabies 04 6.3 Dermatitis 04 6.3 Herpes zoster 03 4.7 Remaining 20% did not respond to the question on pattern risk behavior followed. One or more opportunistic infections were observed in 63 patients (57%).Commonly observed opportunistic infections were pulmonary tuberculosis (52.3%), candidiasis (39%), cryptosporidial diarrhea (30.1%) and PCP (14.2%). In 46.4% cases CD4 count was less than 200. Association between opportunistic infection and level of CD4 count was found to be statistically significant ($p<0.05$). In this study was having more pulmonary tuberculosis and oral candidiasis and also LRTI is also present the opportunistic infection was seen in the subjects who was having low CD4 count about 100 to 200 micro /liter in range. Pandharpurkar D et al. 2 Spectrum of Opportunistic infection in relation to CD4 count in HIV/AIDS patients admitted in the department of general medicine of tertiary care hospital; This study was considered as 132 subject and found that pulmonary tuberculosis and oral candidiasis is the most opportunistic infection and was in the range of CD4 count less than 200. In this study The opportunistic infections are analysed on the basis of age distribution and found that most opportunistic infection OC, TB, LRTI chronic diarrhea was occurred in age groups of 30 to 40 year of age but in TBM, 2 subject was occurred in the 40-50 year of age group as 1 subject in the 30-40 year of age groups. Inamdar SA, et al. Age and Opportunistic Infection: Prevalence and Predictors among Older people with HIV; This study concluded as among older PL HIV more than fifty year of age prevalence of opportunistic infection and Tuberculosis is most common infections.[3] Iroezindu MO et al, Prevelance and Risk Factor s Opportunistic infections in HIV Patient Recieving Antiretroviral Therapy in a Resource - Limited setting in Nigeria; This study is concluded that the pulmonary tuberculosis and oral candidiasis is the most prevalence of opportunistic infection in PL HIV.[4] This study also concluded that over all tuberculosis is most prevalent but pulmonary

tuberculosis is second most prevalence and oral candidiasis is most prevalence of opportunistic infection. Dereje N, et al, prelance and predictor of Opportunistic infection among HIV Positive Adult On Antiretroviral Therapy (On-ART) Versus Pre ART in Addis Ababa Ethopia: A Comparative Cross- Sectional study This study show that the prevalence of opportunistic infection in pre ART is more common than post ART time Pulmonary tuberculosis is most common in both time and also oral candidiasis is also present in this study the oral candidiasis and pulmonary tuberculosis is most commn and present in during ART taking period.[5] Teklu Weldegebrea T et al. Magnitude of opportunistic disease and their predictor among adult people living with HIV enrolled in care :this study considered the medical record of 7826 adult PL HIV who had at least one follow up visit at public health facilities concluded that the prevalence of female more common in opportunistic infection and CD4 count when OIs occur was less than 200.[6] In this study the prevelance of opportunistic infection is more when CD4 count is less than 200 but more common in male population. Solomon FB et al.[7] Spectrum of opportunistic infections and associated factors among people living with HIV/AIDS in the era of highly active anti-retroviral treatment in Dawro Zone hospital ;A retrospective study- This study concluded the overall prevalence of OIs in the era of HAART is higher as compare with previous studies in the country. Significance level of AIDS defining illness was noticed and WHO staging 2 and 3, CD4 level. This study is also have the opportunistic infection that are during ART treatment and have also indication of presence of decrease CD4 count and may be ART failure. Dishank Patel, Mira Desai, A. N. Shah, and R. K. Dikshit Early outcome of second line antiretroviral therapy in treatment-experienced human immunodeficiency virus positive patients.[8] This study was considering 126 patient in which 82 received regimen v (zidovudine +lamivudine +tenofovir bosted lopinavir/r and 44 receive regimen Va 3TC (Lamivudine)+TDF (Tenofovir) +LPV /r a significant body weight increase and marked reduction in number of patients categorized as WHO stage ¾ was observed. This study also considered 118 patients and in which TLATV/R regime was taking that was by 35 subject and ZLATV/R was taking by 74 subjects rest TLLP/R Regime by 5 Subject and ZLLP/R regime was taken by 4 subject. Mahy M et al, Increasing trends in HIV prevalence among people aged 50 years and older: evidence from estimates and survey data.[9] This study concluded that the prevalence of HIV infected patient is increasing in trend but during present era the having effective HAART the trend is decreasing and opportunistic infection is the good guide for presence of decreasing ACD4 count and result of ART failure.

CONCLUSION

In this study there was opportunistic infection present that maximum in oral candidiasis but overall tuberculosis is maximum in which pulmonary tuberculosis, extra pulmonary tuberculosis, tubercular lymphadenitis and tubercular pericarditis, Abdominal Koch,s and TBM are included LRTI and Chronic Diarrhea is also present.

In this study more common opportunistic infection are in male population and in rural area. The most opportunistic infection are present the ART treated subject and the y have CD4 countless 100 to 200 in the range.

In this study the opportunistic infection mostly oral candidiasis that occur when subject come for visit and it can justified that the patient have decrease CD4 count and check for ART failure so it is good for monitoring of ART failure.

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REFERENCES

1. Takalkar AA, Saiprasad GS, Prasad VG, Madhekar NS. Study of opportunistic infections in HIV seropositive patients admitted to Community Care Centre (CCC), KIMS Narketpally. Biomed Res. 2012;23(1):139-42.
2. Pandharpurkar D, Devulpally N, Gouthami B, Krishna G. Spectrum of Opportunistic infection in relation to CD4 -count in HIV/AIDS patients admitted in the department of general medicine of tertiary care hospital. Int J Adv Med. 2019;6(3)845-50
3. Inamdar SA, Kosambiya JK, Modi A, Gohil A, Mehta A, Patel T. Age and Opportunistic Infection: Prevelance and Predictors among Older people with HIV. Nat J Commu Med. 2018;9(8).
4. Iroezindu MO, Ofondu EO, Hausler H, Van Wyk B. Prevelance and Risk Factors Opportunistic infections in HIV Patient Recieving Antiretroviral Therapy in a Resource - Limited setting in Nigeria. J AIDS Clini Res. 2013;3:002.
5. Dereje N, Moges K, Nigatu Y, Holland R. Prevalence and Predictors Of Opportunistic Infections Among HIV Positive Adults On Antiretroviral Therapy (On-ART) Versus Pre-ART In Addis Ababa, Ethiopia: A Comparative Cross-Sectional Study. HIV/AIDS (Auckland, NZ). 2019;11:229.
6. Weldegebreal T, Ahmad I, Abiyou Muhiye Belete S, Bekele A, Kaba M. Magnitute of opportunistic disease and their predictor among adult people living with HIV enrolled in care national levelcross sectional study Ethopia. BMC Public Health. 2018;18(1):820.
7. Solomon FB, Angore BN, Koyra HC, Tufa EG, Berheto TM, Admasu A. Spectrum of opportunistic infections and associated factors among people living with HIV/AIDS in the era of highly active

anti-retroviral treatment in Dawro Zone hospital ;A retrospective study. BMC Res Notes. 2018;11:604.
8. Patel D, Desai M, Shah AN, Dikshit RK. Early outcome of second line antiretroviral therapy in treatment-experienced human immunodeficiency virus positive patients. Perspe Clini Res. 2013;4(4):215.
9. Mahy M, Autenrieth CS, Stanecki K, Wynd S. Increasing trends in HIV prevalence among people aged 50 years and older: evidence from estimates and survey data. AIDS (London, England). 2014;28(4):S453.

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