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Clinico-Epidemiological Profile Of Opportunistic Infections Among Hiv Infected Patients In Vss Institute Of Medical Science & Research (Vimsar), Burla, Dist. Sambalpur, Odisha

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Abstract: *The Human Immunodeficiency Virus (HIV) Destroys The CD4+ T Cells Progressively And Relentlessly Thus Making The HIV Infected Persons Susceptible To A Number Of Opportunistic Infections (Ois). It Was Also Noted That Certain Ois Manifest Below A Particular Threshold Of CD4+T Ce1l Count, Many Of These In A Advanced Stage Of The HIV Infection. The Study Was Conducted At Medicine Department And ART Centre, VIMSAR, Burla, Odisha, India. It Is A Observational Prospective Study From July 2016 To September 2017. The Aim Of The Study Is To Know Study The Epidemiological Profile Of HIV Infected Patients Having Different Ois,The Clinical Profile Of Various Ois In The Study Population And To Correlate The CD4+T Cell Count With Different Ois Present In The Patients. There Were 86 Patients Register, Detail History, Clinical Examination And Investigation Were Done And Then The Data Is Complying In Detail. Most Of The Patients Were Male (72%) Male Female Ratio Is 2.6:1. The Majority Of Patients Presented With Fever, Weight Loss And Anorexia Seen In More Than 73% Of The Study Population. A Significant Number Of Cases (42%) Belonged To The CD4+T Cell Count Range Of 101-200/µl , With A Median CD4+T Cell Count Of 183/µl,So There Is Increased Chance Of Hospitalization In Patients Having CD4+T Cell Count Below 200/µl.The Most Common OI Was Tuberculosis (51%) With Pleural Effusion As Its Commonest Manifestation. The Second Most Common OI Was Candidiasis (**43%**) With Most Cases Suffering From Oral Candidiasis Which Was Seen To Occur At Higher CD4+T Cell Counts Than Tuberculosis.*

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I. Introduction

The Human Immunodeficiency Virus (HIV) Destroys The CD4+ T Cells Progressively And Relentlessly Thus Making The HIV Infected Persons Susceptible To A Number Of Opportunistic Infections (Ois). It Was Also Noted That Certain Ois Manifest Below A Particular Threshold Of CD4+T Ce1l Count, Many Of These In A Advanced Stage Of The HIV Infection. Since The Beginning Of HIV Epidemic, Ols Have Been Recognized As Common Complications Of HIV Infection. Ois Cause Substantial Morbidity And Hospitalization And Expensive Therapies And Shorten The Survival Of PLHA Patients. The Right Diagnosis And Proper Treatment Will Improve The Quality Of Life And Survival In PLHA. The Relative Frequencies Of Specific Ois Vary In Different Countries And Even In Different Areas Within The Same Country. While Pnetunocystis Jiroveci Is The Commonest In The Western Part Of World, Tutberutlosis And Cancliciasis Are The Common Ois In India Supported By Various Studiest.

Large Number Of PLHA (People Living With HIV/AIDS) Were Visit The Art Centre And The Hospital. Some Of Them Get Hospital Alized When Complicated With Ois. We Took This Opportunity To Study Ois With The Following Aims And Objective.

Aim:

1. To Study The Epidemiological Profile Of HIV Infected Patients Having Different Ois.
2. To Study The Clinical Profile Of Various Ois In The Study Population
3. To Correlate The CD4+T Cell Count With Different Ois Present In The Patients.

II. Material And Method:

It Is A Observational, And Prospective Study. The Study Included All HIV Infected Patients Admitted To The Department Of Medicine, VIMSAR, Burla From July 2016 To September 2017 (A Period Of 12 Months In Total). Patient's With Known HIV Positive Status Having Suspected Ois Or Patients With Different Ois Admitted To The Hospital And Later Found To Have HIV Positive Status Were Included In The Study.

Diagnosis Of HIV Infection In The Included Cases Was Done At ICTC (Integrated Counseling And Testing Centre) As Per The NACO Guidelines By Three Different Methods Dot Blot (Combo Aids), Agglutination (Nova HIV) And Immunochromatographic Test (Retrochek).Those Having Reactive Test Results At Other Laboratories Were Sent To The ICTC For Confirmation. Informed Consent Was Taken In Each Case As Per NACO Ethical Guidelines.

Detailed History , Clinical Examination And Investigations Were Done As Necessary Like CD4+T Cell Count, CBC, ESR, Blood Culture & Sensitivity, Arterial Blood Gas Analysis, Hbsag, Anti-HCV Antibody, Urine Routine & Microscopy And Culture & Sensitivity, Stool Routine & Microscopy And Culture & Sensitivity, Mantoux Test, Sputum AFB & Microscopy, Chest X-Ray, USG Abdomen & Pelvis, CT Scan Brain , CT Sacn Of Thorax, MRI Of Brain, MRI Of Spine, Fundoscopy, Peritoneal Fluid/Pleural Fluid/CSF Analysis, CSF For Indian Ink Staining, CSF PCR, FNAC Of Lymphnode, ELISA For Toxoplasma Igg & Igm, Latex Agglutination For Cryptococcal Antigen, Oral Scraping For Microscopy Of Fungal Element With KOH Staining, UGI Endoscopy And Bronchoalveolar Lavage .

Diagnosis Of Ois In Our Study

Diagnosis Of Ois In Our Study Is Done By Following Methods.[8],[50]

Sl. No.	Ois	Diagnostic Method Adapted
1	Tuberculosis (PTB, Pleural Effusion, TB Lymphadenitis, TB Peritonitis, TBM, TB Spine)	Sputum AFB, Chest X-Ray, Mantoux Test, FNAC Of Lymphnode, Pleural Fluid/Ascitic Fluid/CSF Analysis, CT Scan Of Brain, MRI Of Spine, Blood Culture, TB ELISA [8]
2	Candidiasis (Oral & Esophageal Candidiasis)	Clinically, KOH Staining Of Oral Scrapping, UGI Endoscopy
3	Cryptosporidial Diarrhea	Stool Microscopic Examination
4	CNS Toxoplasmosis	CT Scan And MRI Of Brain, Toxoplasma Igg & Igm
5	P. Jiroveci Pneumonia	Chest X-Ray, Sputum Staining And Microscopy, Sr. LDH [18]
6	Herpes Simplex	Clinical Findings
7	Cryptococcal Meningitis	CT Scan Brain, CSF Analysis And Indian Ink Staining
8	Molluscum Contagiosum	Clinically
9	PML	CT Scan And MRI Of Brain

Observation

The Patients Were Mostly In The Age Group Of 31-45 Years 45case (52.3%) Of Total Number Of Cases), Followed By 24 Cases (28%) In The Age Group Of 15-30 Years And 17 Cases (19.7%) In The Age Group Of 46-65 Years.

Table 1. AGE DISTRIBUTION Of The Study Population

AGE GROUP	NUMBER	PERCENTAGE (%)
15-30 Years	24	28
31-45 Years	45	52.3
46-65 Years	17	19.7

Table 2. GENDER DISTRIBUTION Of The Study Population

GENDER	NUMBER	PERCENTAGE (%)
Male	62	72
Female	24	28

Out Of Eighty Six (86) HIV Infected Patients With Ois Were Studied 62 Cases (72%) Are Male And 24 Cases (28%) Are Female With Male: Female Ratio Of 2.6:1.

Table 3. OCCUPATION OF THE PATIENTS (N=86)

Occupation	***Male***(N = 62)		***Female***(N = 24)		***Total*** (N=86)	***Percentage*** %
	Number	Percentage	Number	Percentage		
Labourer	16	25.8	11	45.8	27	31.3
Driver	19	30.7	0	0	19	22.4
Farmer	14	22.5	4	16.6	18	21.0
Employee (Government)	6	9.6	3	12.5	9	10.0

Student (Upto Graduation)	2	3.4	0	0	2	2.5
Housewife	0	0	4	16.6	4	4.6
Others*	5	8.0	2	8.5	7	8.2

*Others Include Private Employees, Businessmen, Contractors, Shopkeepers, Commercial Sex Workers Etc.

Majority Of The Patients Were Labourers (31.3 %) Working In The Nearby Industries On A Daily Wage Basis.The Distribution Of Male Patients Was Noted To Be Almost Homogenous Amongst Labourers, Drivers And Farmers, Whereas Almost Half Of Female Patients Are Daily Labourers By Occupation. Most Of The Male Patients Were Drivers By Occupation (30.7%) And Had A Past History Of Emigration To Nearby States Like Andhra Pradesh, Chhattisgarh And West Bengal.

Table 4. MODES OF TRANSMISSION (N=86)

MODES OF TRANSMISSION	**MALE** (N= 62)		**FEMALE** (N=24)		**NUMBER** (N=86)	**PERCENTAGE**
	Number	Percentage	Number	Percentage		
Heterosexual	48	77.4%	15	62.5%	63	73.3%
Homosexual	0	0%	0	0%	0	0%
Blood Transfusion	1	1.6%	0	0%	1	1.2%
Injecting Drug Use	3	4.8%	0	0%	3	3.5%
Frequent Needle Prick	0	0%	0	0%	0	0%
Vertical Transmission	0	0%	0	0%	0	0%
Unknown Modes	10	16.2%	9	37.5%	19	22%

The Commonest Mode Of Transmission Is The Heterosexual Mode Of Transmission I.E., 73.3%. One Case Of Thalassemia With Repeated Blood Transfusion Is Reported To Have Possible Transmission By Blood. In Nineteen Cases (22%) Mode Of Transmission Remains Unknown.

Table 5.CLINICAL PRESENTATION Of The Study Population

COMPLAINTS	**NUMBER OF CASES**	**PERCENTAGE (%)**
Weight Loss	79	91
Fever	74	86
Anorexia	63	73.2
Fatigue/Weakness	57	66.2
Cough	33	38.3
Chest Pain/Discomfort	27	31.3
Dyspnea	21	24.4
Chronic Diarhhoea	18	21
Headache	16	18.6
Oral Lesions	12	14
Altered Sensorium	09	10.4
Lymphadenopathy	07	8.1
Rashes	04	4.6
Ascites	02	2.3
Paraplegia	01	1.2

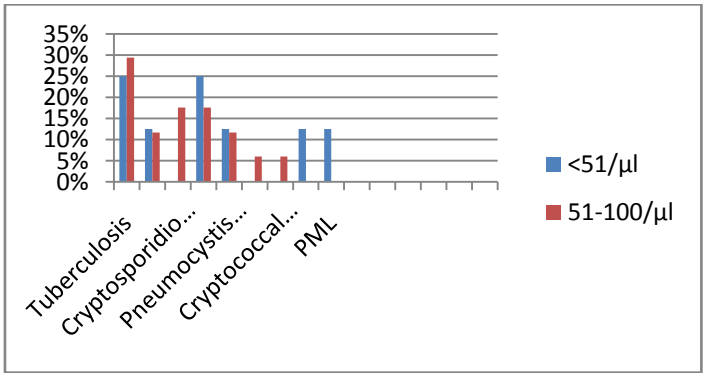


Table 5and Graph It Depicts The Clinical Presentation And Manifestations Of Various Patients At The Time Of Admission To The Hospital. The Most Common Symptom Was Noted To Be Weight Loss, Fever And Anorexia.

Table 6. CD4+T CELL COUNT Of The Patients

CD4+ T CELL RANGE	NUMBER	PERCENTAGE (%)
≤50/µl	6	7
51-100/µl	15	18
101-200/µl	36	42
>200/µl	29	33

The Maximum CD4+ T Cell Count In The Patient Was 387/µl And Minimum CD4 Count Was 28/µl.

The Maximum Number Of Patients I.E., 42% Cases (N=36) Belonged To CD4+T Cell Count Of 101-200/µl, Followed By 33% Cases (N=29) Having A CD4+ T Cell Count Of > 200/µl. 18% Of Cases (N=15) Had A Count Between 51-100/µl And 7% Cases (N=6) Had A Very Low CD4+ T Cell Count Of ≤ 50/µl. Thus 57 Cases (66.2%) Had A CD4 Count Below 200/µl. The ***Median CD4 Count*** Of The Study Population Was Observed To Be ***183/µl***.

SINGLE OI Vs MULTIPLE Ois

In The Study Included 86 Cases Single OI Were Seen In 57 Cases (66%), While Multiple Ois Were Found In 29 Cases (34%). Table-3 Describes The Different Combinations Of Ois.

Table 7: DIFFERENT COMBINATIONS OF Ois (N=29)

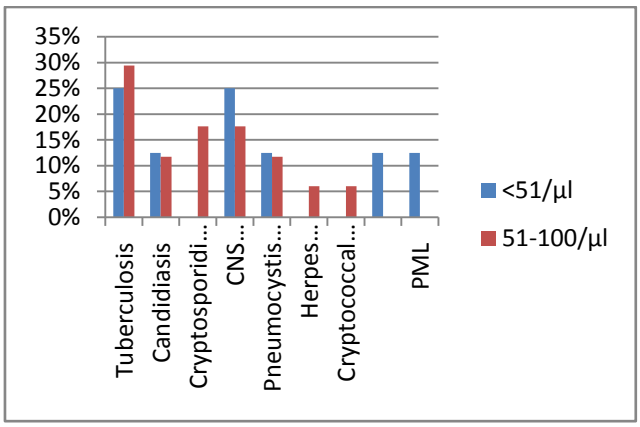
COMBINATIONS OF Ois	NO. OF CASES (%)
Tuberculosis And Candidiasis	21 (72.8%)
Cryptosporidiosis And Candidiasis	2 (6.8%)
Toxoplasmosis And Candidiasis	2 (6.8%)
PCP* And Candidiasis	1 (3.4%)
Molluscum Contagiosum And Candidiasis	1 (3.4%)
Cryptosporidiosis And Tuberculosis	1 (3.4%)
Herpes Simplex And Tuberculosis	1(3.4%)

* Pneumocystis Jiroveci Pneumonia (Formerly Called As Pneumocystis Carinii Pneumonia).

Tuberculosis With Candidiasis Was The Most Common Type Of Combination In Patients Admitted With Multiple Ois.

Table 8. PREVALENCE OF DIFFERENT Ois

TYPE OF OI	NUMBER	PERCENTAGE (%)
Tuberculosis	44	51
Candidiasis	37	43
Cryptosporidiosis	8	9.3
CNS Toxoplasmosis	6	6.9
Pneumocystis Jiroveci Pneumonia	5	5.8
Herpes Simplex Infection	4	4.6
Cryptococcal Meningitis	2	2.3
Molluscum Contagiosum	1	1.1
Progressive Multifocal Leukoencephalopathy*	1	1.1



*Suspected Case Of Progressive Multifocal Leukoencephalopathy As The Patient Expired Before Confirmatory Diagnosis.

From The Above Table And Graph, It Is Apparent That Tuberculosis Is The Most Common OI (51% Cases, N=44). Candidiasis Is The Second Most Common Infection Seen In 43% Cases (N=37), Followed By Cryptosporidial Diarrhea, CNS Toxoplasmosis, Pneumocystis Jiroveci Pneumonia, Herpes Simplex Infection, Cryptococcal Meningitis , Molluscum Contagiosum And Progressive Multifocal Leukoencephalopathy.

Table 9. Distribution Of TUBERCULAR MANIFESTATIONS Among Cases Of TB (N=44)

TUBERCULAR MANIFESTATIONS	**NUMBER OF CASES**	**PERCENTAGE OF CASES (%)**
Pleural Effusion	23	52.2
Pulmonary TB *Including Miliary TB*	18 (1 Case Of Military TB)	41.0
TB Lymphadenitis	7	16.0
TB Meningitis	4	9.0
TB Peritonitis	2	4.5
TB Spine	1	2.3
Disseminated TB	2	4.5

The Most Common Form Of TB In HIV Infected Patients Is Pleural Effusion Seen In 52.2% Cases (N=23) Followed By Pulmonary TB (Including A Case Of Military TB) Noted In 41% Cases (N=18). Among These, 6 Cases Presented With Both Pleural Effusion With Parenchymal Involvement Of TB. Tubercular Lymphadenitis, TB Meningitis, Peritoneal TB And TB Spine Were Seen In 31.8% Cases, Both As Isolated And Associated Entities In Cases Having Pulmonary TB And/Or Pleural Effusion. Two Cases Were Presented With Disseminated TB.

Table 10. TYPES OF CANDIDIAL INFECTIONS Noted In Study Population (N=37)

TYPES OF CANDIDIASIS	**NUMBER OF PATIENTS**	**PERCENTAGE (%)**
Oropharyngeal Candidiasis	31	83.8
Oroesophageal Candidiasis	4	10.8
Vulvovaginal Candidiasis	2	5.4

Among The Patients Suffering From Candidiasis (43% Cases, N=37), Oropharyngeal Candidiasis Was Noted To Be The Most Common Type Seen In 83.8% Cases (N=31), Followed By Oroesophageal Candidiasis Seen In 10.8% Cases (N=4), And Vulvovaginal Candidiasis In 5.4% Cases (N=2).

Table 11. MEDIAN CD4 COUNT FOR DIFFERENT Ois In Study Population

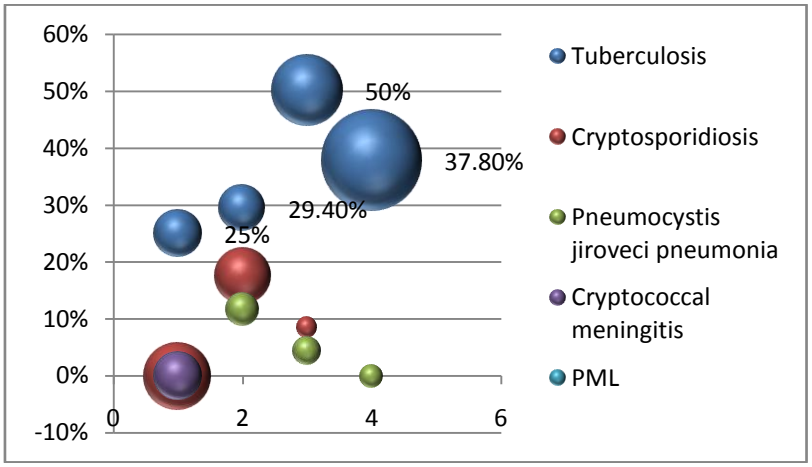
OIS	**NUMBER OF CASES**	**PERCENTAGE (%)**	**MEDIAN CD4 COUNT(/µl)** In Descending Order
Candidiasis	37	43	272
Tuberculosis	44	51	218
Cryptosporidiasis	8	9.3	142
Pneumocystis Jiroveci Pneumonia	5	5.8	123
Herpes Simplex Infection	4	4.6	103
Cryptococcal Meningitis	2	2.3	92
CNS Toxoplasmosis	6	6.9	76
Molluscum Contagiosum	1	1.1	35
PML	1	1.1	28

From The Above Mentioned Table, It Is Quite Evident That Candidiasis Can Occur At Higher CD4+T Cell Counts Than Tuberculosis. It Is Observed That , Oroesophageal Candidiasis Was Seen With Median CD4+T Cell Count Of 115 /µl And Vulvovaginal Candidiasis Found With Median CD+4T Cell Count Of 181/µl Thus Showing Lower CD4+T Cell Counts Than Cases With Oral Candidiasis Which Were Noted With Median CD4 Count Of 286/µl . Similarly The Cases Affected With TB Exhibited A Higher Median CD4+T Cell Count (227/µl) In Cases With Pulmonary TB, While Pleural Effusion Displayed A Relatively Lower Median CD4+T Cell Count I.E., 193/µl And Other Cases Of Extra Pulmonary TB Showed A Still Lower Median CD4+T Cell Count In The Range Of 109/µl-178/µl.

Table 12. PREVALENCE OF DIFFERENT Ois Of The Study Population With Respect To CD4+ T Cell Range

TYPE OF OI	**<51/µl**	**51-100/µl**	**101-200/µl**	**>200/µl**
Tuberculosis	25%	29.4%	50%	37.8%
Candidiasis	12.5%	11.7%	28.2%	56.8%

Cryptosporidiosis	0	17.6%	8.6%	2.7%
CNS Toxoplasmosis	25%	17.6%	2.3%	0
Pneumocystis Jiroveci Pneumonia	12.5%	11.7%	4.3%	0
Herpes Simplex Infection	0	6%	4.3%	2.7%
Cryptococcal Meningitis	0	6%	2.3%	0
Molluscum Contagiosum	12.5%	0	0	0
PML	12.5%	0	0	0



From The Above Mentioned Table And Graph It Can Be Inferred That The Prevalence Of Various Ois As Diagnosed In The Study Population Was Almost Similar In CD4 + T Cell Range Of < 51/µl And 51-100/µl. Though In CD4+ T Cell Range Of 101-200/µl, Tuberculosis Was Almost Affecting Half Of The Population Followed By Candidiasis, But In Cases With CD4+ T Cell Counts Of >200/µl , Candidiasis Was The Commonest OI Affecting 56.8% Cases With Tuberculosis Lagging Behind With 37.8 % Of Cases.

III. Discussion:

HIV/AIDS Is Becoming A Large Burden To The Society. The Opportunistic Infections (Ois) In HIV/AIDS Are Responsible For Considerable Morbidity And Mortality. Although Their Presence Has Become A Challenge For Diagnosis And Management There Are Not Too Many Studies Accordingly In Our Country And State. There Are Less Number Of Studies Conducted In India For Prevalence Of Different Ois Including Those Of NACO.

In The Present Study Spanning Over A Period Of 12 Months, 86 Hospitalized Patients Were Included. The Study Evaluated The Epidemiological Profile Of The Patients, The Clinical Presentations, And The CD4 Count Of The Hospitalized Patients, The Prevalence Of Ois And Their Correlation To CD4 Count. The Present Study Is Compared To The Other Indian Studies Stepwise.

AGE AND SEX DISTRIBUTION *(Table 1 And 2)*

Among 86 Hospitalized 72% Were Male And 28% Were Female, Which Is Comparable With Other Studies (75% Male), [73] (80.8% Male), [77] (68% Male) [80] And (83.58% Male). [84]

Most Of The Patient Belonged To The Age Group 31-45 Yr (52.3%) As Compared To (55% Were In 31-40 Yr) [81] And (54% Were In 31-40 Yr) [82]. But The Study (76.11%) [84] And (77.9%)[77] Shows A Substantial Number Of Patients Were In Younger Age Group I.E., 20-39 Yr. The Study Shows Involvement Of Still Younger Age Group I.E., 20-29 Yr In 61%.[73]

OCCUPATION OF THE PATIENTS *(Table-3)*

Majority Of The Studied Population Were Labourers By Occupation Which Is Comparable To That Reported (Majority Were Migrant Worker) [77]. In The Studymost Of The Patients Were From Low Socioeconomic Status[82], Staying Away From Family And Gone In Search Of Job To Metropolitan Cities Mainly To Mumbai. They Were Working As Hotel Waiters, Taxi Drivers, Panwallahs And Mechanics. This Could Be Due To Illiteracy And Low Level Of Awareness About Mode Of Transmission Of HIV Amongst Them. In Our Study The Distribution Of Male Patients Was Noted To Be Almost Homogenous Amongst Labourers, Drivers And Farmers, Whereas Almost Half Of Female Patients Were Daily Labourers By Occupation. Most Of The Male Patients Were Drivers By Occupation (30.7%) And Had A Past History Of Emigration To Nearby States Like Andhra Pradesh, Chhattisgarh, Jharkhand, Bihar And West Bengal.

MODES OF TRANSMISSION (*Table-4)*

The Commonest Mode Of Transmission As Depicted In Table-2 Is Heterosexual Mode Of Transmission (73.3% In This Study) Like That Of (80.4%)[77], (90%)[80], (80%)[81], (86%)[85], (94%)[73] As Well As The Annual Report In 2010-11 (87.4%)[18].

Possible Transmission By Blood And Blood Products Although Less Common But It Is Seen In 1.2% Of Cases In Our Study Which Is Similar To That Of (1%)[18]. But Other Indian Studies Show A Higher Percentage Of Transmission By Blood Transfusion Like (7%)[85], (3%)[73] And (2.5%)[77].

Vertical Transmission Was Not Observed In Our Study. But Other Studies (2%)[73] And (1.8%)[77] Show A Significant Percentage Of Transmission From Mother To Child. The National Rate Of Vertical Transmission Reported In 5.4%. [18] This Could Be Due To Exclusion Of Pediatric Population From This Study.

Mode Of Transmission Could Not Be Ascertained In A Significant Number Of Cases (22%) Like That Reported In [77] And [85] In Which Risk Factor For HIV Transmission Could Not Be Elicited In 14.1% And 12% Respectively. This Could Be Ascribed To Various Reasons Like Insufficient History And Embarssment Or Unwillingness Of The Patient To Come Clear About Their Sexual Behaviour.

CLINICAL PRESENTATION *(Table-5)*

At The Time Of Hospitalization Majority Of Patients Presented With More Than One Symptom Like Weight Loss (91%), Fever (86%) And Anorexia (73.2%) Which Is Similar To The Study Done That Showed Most Common Presentation Was Fever (71%) And Weight Loss (65%)[79]. Although The Mode Of Presentation Is Almost Similar In All Studies The Frequency Of Various Presentations Varies.Showed That Common Presentation Was Fever (70.6%), Weight Loss (53.3%) And Chronic Diarrhea (43.9%). [85] Reported Fever (82.2%), Weight Loss (65.5%) And Cough (45.5%) Was The Common Presentation Of Hospitalized Patients[85] Study Showed That Fever (56%), Cough (50%) And Oral Lesions (50%) Were The Common Presentation Of The Patients Attending The ART Centre[86]. The Higher Frequency Of Weight Loss And Fever In Our Study Could Be Due To Inclusion Of PLHA Who Needed Hospitalization And Were In WHO Clinical Stage 3 Or 4.

CD4+T CELL COUNT OF THE PATIENTS *(Table-6)*

A Significant Number Of Cases (42%) Belonged To The CD4+ T Cell Count Range Of 101-200/µl And 66.2% Cases Had CD4 Count Less Than 200/µl; With A Median CD4 Count Of 183/µl Which Is Almost Comparable To Other Indian Studies. In The Studyit Was Observed That 82.6% Had CD4 Count <200/µl From Which 46% Had CD4 Count <50/µl. In The Present Study Only 7% Cases Had CD4+T Cell Count Below 50/µl[79]. In Another Study It Was Noted That 51% Patients Had CD4count Less Than 200/µl[85]. But The Study Showed 36.8% Belonged To CD4 Range Of 101-200/µl, With Lower Median CD4 Count I.E., 120/µl[81]. The Study Reported A Different Scenario, In Which The Mean CD4 Count In Male Was 179±9.3/µl Whereas CD4 Count In Female Was 323±28.26/µl[77]. The Variability In Observations Made By Different Authors Could Be Due To Different Patient Population With Different Ois Studied By Them.

SINGLE OI AND MULTIPLE Ois *(Table-7)*

In Our Study Single OI Was Found In 66% And Multiple Ois In 34% Cases. The Study Reported Multiple Ois In 30% Cases[73], But Studyobserved Multiple Ois In 50% Cases[86]. Hence It Must Be Appreciated That Presence Of One OI Does Not Rule Out Presence Of Other Ois. In All Of These Studies, Including Our Study The Most Common Type Of OI Combination Is Tuberculosis And Candidiasis.

PREVALENCE OF DIFFERENT Ois (*Table-8*)

The Most Common OI Was Tuberculosis (*51%*) With Pleural Effusion As Its Commonest Manifestation. The Second Most Common OI Was Candidiasis (*43%*) With Most Cases Suffering From Oral Candidiasis Which Was Seen To Occur At Higher CD4 Counts Than Tuberculosis. The Other Ois Found In Descending Order Of Their Prevalence Were Cryptosporidiosis, CNS Toxoplasmosis, Pneumocystis Jiroveci Pneumonia, Mucocutaneous Herpes Simplex Infection, Cryptococcal Meningitis, Molluscum Contagiosum And Progressive Multifocal Leucoencephalopathy Due To JC Virus Infection (Table-8). The Prevalence Of Different Ois Varied In Different Studies. The Following Table **(Table-13)** Shows A Comparative Analysis Of Prevalence Of Ois In Different Indian Studies Including The Present Study.

Most Of The Studies Show That Tuberculosis Contributes To About Half Of All Cases Presenting With Ois Except That Reported [84], [73][86].

The Relatively Low Prevalence Of Candidiasis In Present Study Could Be Described To The Exclusion Of HIV Infected Persons Who Were Not Hospitalized. Tuberculosis, Candidiasis And Crypyosporidiosis Emerged To Be Three Most Common Ois In Most Studies With Variable Frequencies Depending Upon The Type Of Study (Whether Hospitalized Patients Or Patients Attending OPD And ART Centre). But Study Showed That None Of Patient Presented With Diarrhea Out Of 135 Cases[79].

Among Other Ois, Bacterial Pneumonias (*Klebsiella Pneumonae, Pseudomonas Aeruginosa, Staphylococcus Aureus And Escherichia Coli*) Were Seen In 4.3% To 12.6% Of Patients In The Studies [85] [86] [50], Which Is Not Consistent With Our Study. Bacterial Pneumonias Occur At A Higher CD4+T Cell Count And Screening Of HIV Status Is Not A Usual Practice. This Could Be The Reason Of Exclusion Of Cases From Our Study. Inclusion Of Larger Patients With Ois May Represent Bacterial Pneumonia. Similarly Apart From *Cryptosporidium Parvum,* Enteric Parasites Like *Isospora Belli, Microsporidium, Giardia Lambia, Entamoeba Histolytica, Vibrio Cholera, And Entamoeba Coli* Were Found In Many Stool Samples Of Patients Presenting With Diarrhea In The Studies [81] [86], Which Were Not Found In Our Study. Herpes Zoster Was Seen In Most Patients In Other Studies But Not Seen In Our Study.

Table-13: **COMPARISON OF PREVALENCE OF Ois IN DIFFERENT STUDIES**

Different Ois	Chakraborti N. Et Al[81] (2006-07), ICMR, Kolkata	Sharma SK Et Al[79] (2004), AIIMS, New Delhi	Chakravarty J. Et Al[77] (1999-2004) BHU, Varanasi	Vajpayee M. Et Al[78] (2003), AIIMS, New Delhi	Singh A. Et Al[82] (1999-2001), KMC, Manipal	Takalkar A. Et Al[85](2008-09), KIMS,Andhra Pradesh	Mulla SA Et Al[84] (2007), Govt. Medical College,Surat	Sangeeta D Patel[73] (2006-07), S.S.G. Hospital, Vadodara	Aggarwal A. Et Al[86] (2005), Govt Medical College, Amritsar	NACO[50], 2007-2008	Present Study, (2016-17), Burla, Odisha
Tuberculosis	57%	71%	38.8%	47%	56%	52.3%	13.8%	22.7%	15.2%	65%	51%
Candidiasis	88%	39.3%	20.3%	25.2%	59%	39.0%	26.4%	32.7%	24.3%	57.5%	43%
Cryptosporidiasis	43%	-	12.7%	43.5%	43%	30.1%	12.5%	19.8%	13.6%	36%	9.3%
CNS Toxoplasmosis	-	3.7%	0.7%	-	4%	-	-	-	-	3.8%	6.9%
PCP	-	7.4%	3.2%	-	7%	14.2%	-	-	-	13%	5.8%
Bacterial Pneumonia *(Klebsiella)*			4.3%			12.6%	-	6%	11.3%	9%	-
Herpes Simplex Infection	7.2%	-	1.6%	-	-	-	-	-	-	-	4.6%
Cryptococcal Meningitis	-	3.7%	1.4%	-	7%	-	2.9%	2%	1.5%	9%	2.3%
Molluscum Contagiosum	-	-	1.8%	-	-	-	-	-	-	-	1.1%
PML	-	-	-	-	-	-	-	-	-	-	1.1%
CMV Retinitis	45%	-	-	-	-	-	-	-	-	-	-
Enteric Bacteria *(Vibrio Cholera)*	47%	-	-	-	-	-	-	-	2.5%	-	-
Scabies			6.1%			6.3%	-	-	-	-	-
Herpes Zoster	-	-	3.8%	-	-	4.7%	-	-	-	14%	
Visceral Leishmaniasis	-		1.1%	-	-	-	-	-	-		

Common Ois In This Study Are Individually Described Below.

TUBERCULOSIS (*Table-9*)

TB Was Diagnosed Based Upon Sputum AFB, Chest X- Ray, Mantoux Test, TB ELISA And Other Body Fluid And Tissue Specimen Examination [68]. Tuberculosis Was The Commonest Observed Infection In Our Study And It Matches With The Findings By Other Authors. This Is Because Tuberculosis Is Endemic In India And Patients With HIV And TB Rapidly Downgrade With High Mortality And Multidrug Resistance [90].

Among All The Patients With Tuberculosis Infection, 27.2% Cases Had Only Pulmonary Tuberculosis (PTB), 13.8% Cases Had Both Pulmonary And Extra Pulmonary Tuberculosis And 59% Cases Had Only Extra Pulmonary Tuberculosis (EPTB) With Pleural Effusion Or Pleural TB Being The Commonest Tubercular Manifestation Seen In 52.2% Cases. Two Cases Presented With Disseminated TB. There Is A Lot Of Variation Regarding The Incidence Of PTB And EPTB In HIV Infected Persons. In Our Study EPTB Is More Common Than PTB Like That Of The Study Which Showed That 47.6% Had EPTB And 41.8% Had PTB[77]. But Most Of The Indian Studies Show A Different Scenario With PTB Commoner Than EPTB Reported [82] (35% PTB Vs 21% EPTB), [91] (70% PTB Vs 30% EPTB With 18% CNS TB, 6% Pleural TB And 6% Abdominal TB), (40% PTB Vs 10% EPTB) [92] Majority Of The Patients (I.E., 64%) Presented With Disseminated TB Which Was Seen In Only 4.5% Cases In Our Study. [79]

CANDIDIASIS (*Table-10*)

This Was The Second Most Common OI In Our Study Like Other Indian Studies. But Some Of The Studies Reported That Candidiasis Was The Commonest OI. Oral Candidiasis Was The Commonest Manifestation Seen In 83.8% Cases Like All Other Indian Studies.

Among The 37 Isolates *Candida Albicans* Was Seen In Ll The Studied Cases. But In The Study *Candida Albicans* Was Isolated In 62.5% Cases [86] Which Was Well Comparable With The Study Of Other Workers [93]. Non-Albicans Candida Isolates Were Found In 37.5% Cases Which Has Also Been Reported By Others [55]. In This Study The Isolation Of *Candida Dubiliniensis* (9.37%) Was Also Noted, A New Species, Which Was Consistent With The Findings Of Other Study[54].

CRYPTOSPORIDIOSIS

In Our Study All The Stool Specimens Examined Showed The Presence Of Only *Cryptosporidium*. Other Enteric Parasites Were Not Found. The Study Noted That Intestinal Parasitic Pathogens Were Detected In 44% Patients[95], And The Major Pathogens Included C*ryptosporidium Parvum* (20%), The Most Common, Followed By *Isospora Belli* (10%), *Entamoeba Histolytica* (8%). The Study Statedthat C*ryptosporidium Parvum* (13.6%)Was The Most Common Enteric Parasite Followed By *Giardia Lambia* (3.8%) And *Entamoeba Histolytica* (2.3%)[86]. In The Study It Was Observed That The Most Common Pathogen In Stool Specimen Was Enteropathogenic *Vibrio* (47%) Followed By C*ryptosporidium Parvum* (43%) And *Eischerichia Coli* (42%)[81]. The Study Showed That The Commonest Organism In HIV Infected Persons With Diarrhea Was C*ryptosporidium Parvum* (36.7%) Followed By *Entamoeba Histolytica* (13.3%) And *Strongylodes Stercoralis* (3.3%).[101]

Low Socioeconomic Status, Poor Hygiene, Unavailability Of Safe Drinking Water And Frequent Contact With Livestock May Be Responsible For The High Percentage Of Cryptosporidiosis. Provision Of Safe Drinking Water And Maintaining Good Hygiene Is Important In Prevention [82].

TOXOPLASMOSIS

CNS Toxoplasmosis Was Seen In 6.9% Cases In Our Study Which Is Comparatively Higher Than Other Indian Studies.

PNEUMOCYSTIS CARINII PNEUMONIA (PCP)

Five Of The HIV Seropositive Patients (5.8%) Were Co-Infected With *Pneumocystis Carinii* Pneumonia (PCP) In The Present Study. It Is Now Established That PCP Is One Of The Common Opportunistic Infections In HIV But The Cases Are Relatively Less Documented, May Be Due To The Lack Of Routine Testing Facility [70]. But Relatively Higher Prevalence Was Seen In Following Two Studies. The Study Reported PCP In 14.2% Cases And In The Study [50] It Was Seen In 13% Cases[85].

Even Though Pneumonia Due To *Pneumocystis Carinii* Is One Of The Most Common Opportunistic Infection In AIDS Patients, The Frequency With Which It Is Recognized Among HIV Patients In Tropical And Developing Countries Is Generally Much Lower Than That In Industrialized Nations [82],[96]. Nowadays The Incidence Has Decreased In Part Due To Cotrimoxazole Prophylaxis. It Has Often Been The AIDS Defining Illness, With Up To 80% Of Patients Noted Prior To The Use Of Prophylactic Therapy.

CRYPTOCOCCOSIS

Cryptococcal Meningitis Was Confirmed By Clinical Symptoms And Signs As Well As The Detection Of Cryptococcal Capsular Antigen (Cryptococcus Antigen Latex Agglutination Test) And Indian Ink Staining Of CSF [63]. Cryptococcal Meningitis Was Seen In 2.3% Cases In Our Study, Which Was Comparatively Lower Than The Studies(7%)[82] (9%)[50].

HERPES SIMPLEX AND HERPES ZOSTER

It Was Seen In 4.6% Cases In Our Study. But Prevalence Of Herpes Simplex Was Very Rare In Other Indian Studies [64],[69],[79] Except That Of Study (7.2%)[81]. Rather Herpes Zoster Was Seen In A Significant Number Of Patients In Other Indian Studies [77],[85] Including Report (14%).[50]

MOLLUSCUM CONTAGIOSUM AND
PROGRESSIVE MULTIFOCAL LEUKOENCEPHALOPATHY (PML)

Molluscum Contagiosum And PML Both Were Seen, One Case Each. Molluscum Contagiosum Were Also Found In 8 Cases In The Study [77].But PML Was Seen In None Of The Indian Studies[50]. The Above Patient Was Probable Case Of PML Because The Patient Died Before Complete Evaluation (CSF PCR Study).

CYTOMEGALOVIRUS (CMV)

Cytomegalovirus Infection Was Seen In Significant Number Of Patients Which Was Not Seen In Our Study. In The Study [61], CMV Retinitis Was Seen In 45% Cases. 18.7% Cases Presented With CMV Retinitis In The Study [97].

MEDIAN CD4 COUNT OF DIFFERENT Ois (*Table-11)*

The Median CD4+T Cell Count For Different Ois In This Study Was Observed To Be 272/µl For Candidiasis, 218/µl For Tuberculosis And 142/µl For Cryptosporidiosis. But This Observation Was Different Than The Study [78] Which Stated That Median CD4+T Cell Count For Candidiasis Was 189/µl, For Tuberculosis Was Also 189/µl And For Cryptosporidiosis Was 227/µl. In The Present Study The CD4+T Cell Count Was Found To Be Below 100/µl In Cases Of Cryptococcal Meningitis And CNS Toxoplasmosis Whereas It Is Below 50/µl In Each Case Of Molluscum Contagiosum And Progressive Multifocal Leucoencephalopathy.

The Median CD4+T Cell Count Of The Patients Who Presented With Pleural Effusion (193/µl) Was Lower Than That Of Patients With Pulmonary Tuberculosis (227/µl). Among Others Median CD4+T Cell Count For Tubercular Lymphadenitis, Tubercular Meningitis, Peritoneal Tuberculosis And Spinal Tuberculosis Were 178/µl, 134/µl, 109/µl And 117/µl Respectively.

The Median CD4+T Cell Count For Esophageal Candidiasis (115/µl) Was Lower Than That Of Oral Candidiasis (286/µl), Which Was Lower Than That Of Vulvovaginal Candidiasis [100] (312/µl).

IV. Conclusion:

Among The Studied 86 Cases Of Ois In HIV Infected Patients Most Cases Were Male ***(72%)*** With A Male: Female Ratio Of ***2.6:1.*** Most Affected Cases Belonged To The Age Group Of ***31-45 Yrs (52.3%).*** Most Of Them Were Driver Or Labourer By Occupation. The Commonest Mode Of Transmission Was Noted To Be The Heterosexual Mode Of Transmission. The Majority Of Patients Presented With Fever, Weight Loss And Anorexia Seen In More Than 73% Of The Study Population. A Significant Number Of Cases (42%) Belonged To The CD4+T Cell Count Range Of 101-200/µl , With A Median CD4+T Cell Count Of 183/µl. So There Is Increased Chance Of Hospitalization In Patients Having CD4+T Cell Count Below 200/µl.

The Most Common OI Was Tuberculosis (51***%***) With Pleural Effusion As Its Commonest Manifestation. The Second Most Common OI Was Candidiasis (***43%***) With Most Cases Suffering From Oral Candidiasis Which Was Seen To Occur At Higher CD4+T Cell Counts Than Tuberculosis. The Other Ois Found Were Cryptosporidiosis, CNS Toxoplasmosis, Pneumocystis Jiroveci Pneumonia, Mucocutaneous Herpes Simplex Infection, Crptococcal Meningitis, Molluscum Contagiosum And Progressive Multifocal Leucoencephalopathy Due To JC Virus Infection. The Study Is Limited By The Fact That Many Cases Of Ois Treated As Outpatients Might Not Have Been Represented.

There Are Still Lots Of Controversies Regarding The Most Common OI In HIV Infected Patients. Some Studies Say That Tuberculosis Is More Common Than Candidiasis And Other Studies Tell That Candidiasis Is More Common Than Tuberculosis. But Actually It Depends Upon The Type Of Study, Place Of Study And The Patients Included In The Study. Overall If We Study Only Hospitalized Patients Tuberculosis Is The Commonest And If We Study All Patients Infected With HIV Whether Hospitalized Or Not, Candidiasis Is The Commonest.

Among The Other Ois The Prevalence Is Nearly Equal In Most Of The Studies As Well As Our Study Except CMV Retinitis And Herpes Zoster Which Is Found In Significant Number Of Patients In Other Studies But Not Seen In Our Study.

Outcome Of The Patients

Tuberculosis And Candidiasis Had Good Prognosis Except That Of Disseminated TB. The Patients With Cryptosporidial Diarrhea Responded Well To Nitazoxanide And Diarrhea Was Subsided After 5 Days Of Therapy. Out 6 Cases Of CNS Toxoplasmosis, One Patient Died After Third Day Of Hospitalization And Another Died After 7 Days. In Three Patients' Sensorium Improved With Some Residual Neurological Deficit With 4 Weeks Therapy Of TMP-SMX (BACTRIM DS). One Patient Was Lost To Follow Up. Two Patients Of PCP Died Within 48 Hours Of Hospitalization, Another Patient Died After 5 Days, Remaining Two Patients Responded Well To 3 Weeks Of Trimethoprim And Sulfamethoxazole Therapy With Complete Subsidence Of Cough, Dyspnea And Fever. Out Of Two Cases Of Cryptococcal Meningitis, One Patient Died On Third Day Of Hospitalization And Another Patient Was Lost To Follow Up. Herpes Simplex Skin Lesions Completely Subsided After 14 Days Of Oral Acyclovir Medication. In The Patient With Molluscum Contagiosum, The Skin Lesions Didnot Disappear After 1 Month And Then The Patient Was Lost To Follow Up. Unfortunately One Case Of PML Remained Stuporus Till 12th Day Of Hospitalization And Then Died.

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