

## A study to assess the relationship between opportunistic infections among the autoimmunocompromised patients with their CD4 count

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**Abstract:** *Background:* Majority of the AIDS patients will get opportunistic infections due to their low immune system and as result, these opportunistic infections incurs sever health issue among the HIV patients. *Methods:* The study was conducted on 370 immunocompromised patients selected from government civil hospital ART centre, Vijayapur district Karnataka. *Results:* majority 302(81.6%) had CD4 count less than 500 cell/ mm<sup>3</sup>. Metabolic disorder, PPD and Photosend were considered to be significant opportunist infections and were significant correlation with CD4 count of the patients. *Conclusion:* It was concluded that some of the opportunistic infections such as metabolic disorder, PPD and photosend was highly correlated with CD4 count among the autoimmunocompromised patients.

**Keywords:** Route of Transmission (ROT), Adverse Drug Reaction (ADR), Antiretroviral Therapy (ART), Pruritic Popular Dermatoses (PPD).

### Introduction

Human immunodeficiency virus (HIV) pandemic is among the greatest health crises ever faced by humanity. Morbidity and mortality in HIV disease is due to immune suppression leading to life-threatening opportunistic infections (OIs) during the natural course of the disease [1]. Human Immunodeficiency Virus (HIV) infection is a global problem, which get special attention widely in the world. In 2017 World Health Organization (WHO) announced that 36.9 million people in the world were infected by HIV with the highest prevalence in Africa. Asia was in the third with 3.5 million people got HIV after America [2].

India is country with low HIV prevalence, it was 3<sup>rd</sup> largest number of people living life with HIV/AIDS [3]. So it is important to improve antiretroviral medications in order to develop optimal strategies to manage the retroviral therapies [4]. The WHO recommends a range of medical interventions in reducing the severity of

OIs among HIV patients which includes early initiation of ART [5].

*Definition:* Acquired immune deficiency syndrome is one of the most severe stages of human immune Virus. Patients with AIDS will have badly damaged immune system [6]. Getting damaged immune system, AIDS patients will get other severe illness, usually called as opportunistic infections [7]. Opportunistic infections (OIs) are illnesses that occur more frequently and incur infections among autoimmunocomprised patients [8-10]. In spite of having advancement in medical field in diagnosis and treatment, OIs remained as one of the major cause for morbidity and mortality among autoimmunocomprised patients [11-13].

Human immune virus weakens immune system, as result patients will have risk of developing opportunistic infections [14-16]. This is because they have damaged immune

systems. Different studies have shown that, different opportunistic infection that occur to HIV patients and for the medical field practitioners, it is necessary to know that expected opportunistic infections that are likely to get by HIV patients.

*Aims and objectives of the study:* The study was conducted to assess the CD4 count of the immune compromised patients and it was also proposed to study the relationship between opportunistic infection with CD4 count of the patients

**Material and Methods**

An observational cross sectional study was conducted in government civil hospital ART centre, Vijayapur, Karnataka. An approval is taken by institutional ethical committee. Clinical diagnostic and laboratory evaluations were used to evaluate the OI status of the patients. The CD4 count was calculated using the flow cytometry method. Interviews and the medical records of the patients were used to gather sociodemographic and clinical information. Correlation analysis was done using statistical software SPSS version 21. Correlation coefficient was used as measure analysis and less p-value (<0.05) indicates statistical significant.

*Inclusive criteria:*

- 1) Study included autoimmunocompromised patients
- 2) The patients who were willing to participate
- 3) The patients who were available at selected ART centre

*Exclusive criteria:* Autoimmunocompromised patients with severe condition

*Sample size and techniques:* Sample size for the present study determined using single sample proportion formula.360 HIV-positive patients in all were included in the trial, which took into account a 10% non-response (drop out) rate. HIV-positive individuals who visited government civil hospital ART centre Vijayapur, Karnataka during the study period were chosen as study participants using a rigorous non random sampling procedure.

*Data processing and analysis:* The data that were collected from government civil hospital ART centre were properly verified for completeness

and consistency and entered in SPSS version 21 for the complete analysis as per objectives of the study.

*Statistical techniques used:* Descriptive and correlation techniques were used to identify the distribution of opportunistic infection among the immune compromised patients and its correlation with their respective CD4 count.

**Results**

*Socio-demographic variables of immune compromised patients:* Out of 370, majority 190 (51.4%) of the immune compromised patients were between the age groups 21-39 years of age, majority 217 (58.6%) were females, 190 (51.4%) were belongs to Upper lower class SES, and 176 (47.6%) were married,

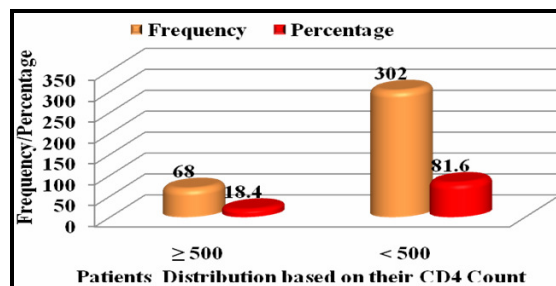
Opportunistic infection	Sub Division	Frequency	%
ART	YES	259	70.0
	NO	111	30.0
PSD	XEROSIS	48	13.0
	SD	26	7.0
	KP	1	.3
PPD	EF	8	2.2
	PU	17	4.6
	PPE	35	9.5
Metabolic Disorder	Lipodystrophy	31	8.4
	Malnutrition	25	6.8
	AN	6	1.6
	Erythroderma	4	1.1
Pigmentorry Disorder	Vitiligo	8	2.2
	GH	7	1.9
	Melasma	3	.8
	LH	4	1.1
Photosend	PLE	18	4.9
	CAD	2	.5

Opportunistic infection	Sub Division	Frequency	%
ADR	MPR	25	6.8
	SJS	8	2.2
	EMF	4	1.1
	FDE	7	1.9
	Urticaria	5	1.4
	TEN	3	.8
Hair	DA	39	10.5
	Hypertrichosis	15	4.1
	SS	5	1.4
	AA	4	1.1
Nail	BD	4	1.1
	LM	61	16.5
	Koilonychia	4	1.1
	Beau's lines	7	1.9
	Dystrophy	5	1.4
	Leukonychia	7	1.9
	Yellow nails	1	.3
	Paronychia	4	1.1
	Onychorrhexis	2	.5
Oral	Aphthae	8	2.2
	Pigmentation	31	8.4
	Geographic tongue	3	.8
	3gular stomatitis	7	1.9

Out of 370 patients, majority 291(78.6%) ROT was Sexual. majority 259(70.0%) had ART, majority 295(79.7%) had no PSD issue and remaining 13.0%, 7.0%, and 0.3% had xerosis, SD & KP respectively.310(83.8%) had no PPD

related complications and remaining 16.2% had PPD complications. Majority 304 (82.4%) had no metabolic disorder. Only 17.8% had metabolic disorder, off these 8.4% had lipodystrophy, 6.8% had malnutrition, 1.6% had acanthosis nigricans and 1.1% had erythroderma. Majority 348(94.1%) had no pigmentary disorder. Only 5.9% had pigmentary disorder, off these 2.2%, 1.9%, 1.1% and 0.8% had vitiligo, Generalized hyper pigmentation, LH and Melasma respectively. 4.5% had Poly morpic light erptions and only 0.5% had CAD. Off the 370 patients, 63 (17.0%) had issue related to hair, 95 (25.7%) related to nail, and 49 (13.2%) related to oral health.

**Fig-1:** Frequency and percentage distribution of immune compromised patients according to their CD4 count.



From the above figure 1, It observed that , out of 370 immunocompromised patients, majority 302(81.6%) had CD4 count less than 500 cell/ mm<sup>3</sup> and remaining 68(18.4%) patients had more than or equal to 500 cell/ mm<sup>3</sup>. Research investigator concluded that majority of then requires antiretroviral therapy to avoid further complications.

Opportunistic infection	Measure of correlation	CD4 Count	P-value	Result
PSD	Karl pearson's Correlation coefficient	0.107	0.362	Not Significant
PPD		-0.421	0.0011	Highly Significant
Metabolic Disorder		-0.487(**)	< 0.0001	Highly Significant
Pigmentorry Disorder		0.02	0.931	Not Significant
Photosend		-0.311	0.035	Significant
Hair		0.226	0.075	Not Significant
Nail		0.117	0.372	Not Significant
Oral		-0.135	0.355	Not Significant

From table no 2, it was clear that opportunistic infection among the immune compromised patients such as PPD, Photosend and metabolic disorder were highly correlated with their CD4 with very small p-value less than 0.05 and all parameters were negatively correlated with their CD4 Counts. The other opportunistic infections such as papilla squamous disorder (PSD), Pigmentorry Disorder, Hair, Nail, and oral do not show any significant relationships with their CD4 counts. Research investigator concluded patients requires immediate attention and should be given ART.

### Discussion

HIV is the primary cause of AIDS, OIs that prey on the patient's weakened cellular and humoral defence account for the majority of morbidity and mortality in immune compromised individuals. In this study, it was discovered that HIV-infected individuals with CD4 counts lesser than 500 cell/mm<sup>3</sup> had a 5.2-times-higher risk of developing OIs than those in the reference group, who had CD4 counts greater than 500 cell/mm<sup>3</sup>. The significant opportunistic infection was found to be metabolic disorder, PPD and

photosend and it was found to be significantly negatively correlated with CD4 count. 17.8% of the patients had metabolic disorder and it was significantly negative correlated with CD4 count. PPD and Photosend were correlated with CD4 count. Similar results were found in the study conducted by Refet Gojak et al [16] with regard to metabolic disorder and CD4 count. The findings of this investigation should be regarded as preliminary, more prospective epidemiological studies with stronger statistical power and follow-up of a larger variety of potential metabolic syndrome-influencing factors are needed to confirm these findings.

### Conclusion

The high number of patients had CD4 count less than 500 cell/ mm<sup>3</sup> and it was highly correlated with metabolic disorder, PPD & PSD. Research investigator concluded that among the patients who had CD4 count less than 500 cell/ mm<sup>3</sup> should be correlated with opportunistic infection such as metabolic disorder, PPD and Photosend.

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