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Original Research Article

Study the body mass index (BMI) of HIV patients at tertiary centre, Madhya Pradesh, India

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ABSTRACT

Background: Individuals at all stages of HIV disease are at risk of nutritional deficiency, and nutritional status is a strong predictor of disease progression, survival, and functional status during the course of the disease.
Methods: It was an observational study including 269 HIV positive patients who were willing to be a part of the study. HIV individuals not willing to undergo above study were excluded from the study. The aim of our study was to assess the of body mass index in HIV patients at tertiary centre, Madhya Pradesh. Nutritional status was evaluated by using internationally accepted BMI guidelines given by World Health Organisation.
Results: In this study, mean age of male HIV patients was 37.21±10.59 and mean age of female HIV patients was 34.27±8.46. Out of the 269 HIV patients, majority of 138 (51.30%) HIV patients have BMI 18.50-24.99 and 122 (45.35%) HIV patients having BMI less than 18.50. Prevalence of undernutrition in male HIV patients was 50 (36.76%) out of 136 male HIV patients and female HIV patients was 72 (54.14%) out of 133 female HIV patients. Out of 261 HIV patients, 225 (86.2%) patients have CD4 count more than 200. Patients having CD4 count less than 200, majority of patients had undernutrition that is 20 (55.56%) out of 36 HIV patients.
Conclusions: The regular measurement of Body Mass Index (BMI) in centre with limited resource may therefore be useful to clinicians in monitoring patient's response to antiretroviral therapy and predicting the stage of the disease.

Keywords: ART, BMI, HIV

INTRODUCTION

Human Immunodeficiency Virus or shortly HIV is a virus that gradually attacks immune system cells of Human beings. As HIV progressively damages these cells, the body becomes more vulnerable to infections, resulting in difficulty in fighting off. It is at the point of very advanced HIV infection that a person is said to have AIDS (Acquired Immuno Deficiency Syndrome). If left untreated, it can take around ten years before HIV has damaged the immune system enough for AIDS to develop.[1] AIDS is a disorder in which the immune system loses its effectiveness, leaving the body defenseless against bacterial, viral, fungal, parasitic, and cancerous and other opportunitistic disorder.[2] Inflammation associated with HIV infection results from replication of HIV, replication of comorbid viral infections (e.g. cytomegalovirus and Epstein Barr virus), loss of regulatory immune cells and microbial translocation across damaged gut mucosa.[3,4] In obesity, the visceral adipose tissue releases increased concentrations of pro-inflammatory adipokines (e.g. TNF-α, IL-6) and decreased concentrations of anti-inflammatory adipokines (e.g. adiponectin). Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health. HIV/AIDS is a major health problem linked to malnutrition and micronutrient deficiency. Individuals at all stages of HIV

disease are at risk of nutritional deficiency, and nutritional status is a strong predictor of disease progression, survival, and functional status during the course of the disease.[5,6] Adequate nutrition cannot cure HIV infection but is essential to maintain a person's immune system to sustain healthy levels of physical activity and for optimal quality of life. Malnutrition is associated with repeated opportunistic infections, rapid disease progression, and increase in the incidence of HIV-related mortality.[7] Rates of HIV disease progression and mortality are higher in the presence of severe malnutrition.[6,8]

Furthermore, malnourished patients have a higher risk of death and suboptimal response to treatment when ART is initiated.[9] Counseling and supporting them to take simple actions to improve their nutrition can really improve their health. Attainment of good nutrition will contribute to the adoption of a positive attitude, which normally improves the quality of life for adults with HIV/AIDS.[10]

METHODS

Study centre

ART Centre, Netaji Subhash Chandra Bose Medical College and Hospital, Jabalpur, (Madhya Pradesh), India.

Duration of study

18 Months

Study design

Hospital based observational study.

Sample size

269 diagnosed HIV Patients.

Inclusion criteria

HIV Patients registered under ART centre, Jabalpur and who are willing to be a part of the study.

Exclusion criteria

HIV individuals not willing to undergo above study.

All the subjects were informed about the study protocol and written informed consent was obtained. The study was approved by the Ethics Committee of Madhya Pradesh Medical Science University (MPMSU). Body Mass Index (BMI) was calculated using the following standard equation: BMI (Kg/m^2) = Weight (kg)/Height (m^2) Nutritional status was evaluated by using internationally accepted BMI guidelines given by World Health Organisation. The following cut off points were used Undernutrition: <18.50.

- Normal: 18.50-24.99
- Overweight: ≥25.00
- Pre-obese: 25.00-29.99
- Obese class I: 30.00-34.99
- Obese class II: 35.00-39.99
- Obese class III: ≥40.00.

RESULTS

It was observed that mean age of male HIV patients was 37.21±10.59 which was statistically significant ($p<0.05$) as compared with the mean age of female HIV patients (34.27±8.46).

It was observed that mean age of PRE ART and ON ART patients was 33.67±9.83, 35.99±9.67 respectively. In this study also found that mean BMI of male and female HIV patients was 19.47±3.13, 18.78±3.05 respectively. The mean BMI of PRE ART patients (18.87±2.89) was lesser than mean BMI of ON ART patients (19.16±3.13) (Table 1).

Table 1: Mean and SD of parameter.

Parameter		Mean	SD	
Age (years)	Total	35.76	9.69	t=2.51; p<0.05
	Male	37.21	10.59	
	Female	34.27	8.46	
	PRE ART	33.67	9.83	t=1.18; P>0.05
	On art	35.99	9.67	
BMI (kg/m^2)	Total	19.13	3.10	t=1.84; P>0.05
	Male	19.47	3.13	
	Female	18.78	3.05	
	PRE ART	18.87	2.89	t=0.45; P>0.05
	On art	19.16	3.13	

In this study found that out of 269 HIV patients, majority of 138 (51.30%) HIV patients have BMI 18.50-24.99 and 122 (45.35%) HIV patients having BMI less than 18.50 (Table 2).

Table 2: Frequency of BMI.

BMI	Number	Percentage
<18.50	122	45.35%
18.50-24.99	138	51.30%
≥25.00	9	3.35%
Total	269	100.00%

In this study found that prevalence of undernutrition in male and female HIV patients was 36.76%, 54.14% respectively (Table 3).

It was observed that out of 261 HIV patients, majority of HIV patients have CD4 count more than 200 that is 225 (86.2%) HIV patients. Patients having CD4 count less than 200, majority of patients had undernutrition i.e. 20 (55.56%) out of 36 HIV patients (Table 4).

Table 3: BMI V/S sex.

BMI	Male		Female		Total		
	N	%	N	%	N	%	
<18.50	50	36.76%	72	54.14%	122	45.35%	χ^2=8.22; p<0.05
18.50-24.99	81	59.56%	57	42.86%	138	51.30%	
≥25.00	5	3.68%	4	3.00%	9	3.35%	
Total	136	100.00%	133	100.00%	269	100.00%	

Table 4: BMI V/S CD4 count.

BMI	CD4 count <200		CD4 count >200		Total		
	N (36)	% (13.8)	N (225)	% (86.2)	N (261)	%	
<18.50	20	55.56%	96	42.67%	116	44.44%	χ^2= 3.07; P>0.05
18.50-24.99	16	44.44%	120	53.33%	136	52.11%	
≥25.00	0	0%	9	4.00%	9	3.45%	
Total	36	100%	225	100%	261	100%	

DISCUSSION

It was observed that Mean age of HIV patients was 35.76±9.69. The mean age of male HIV patients was 37.21±10.59 which was statistically significant (p<0.05) as compared with the mean age of female HIV patients (34.27±8.46) (Table 1). Koel Mukherjee et al, study suggested that mean age of HIV patients was 48.13±16.42 and mean age of male HIV patients was 50.39±16.64 and mean age of female HIV patients was 45.92±16.00.[11] Daniel Getacher Feleke et al, study suggested that mean age of HIV patients was 39.1±10.15.[12]

It was observed that mean age of PRE ART patients was 33.67±9.83 and mean age of ON ART patients was 35.99±9.67 (statistically insignificant) (Table 1). KB Mustapha et al, study suggested that mean age of PRE ART patients was 30.95±1.65 and mean age of ON ART patients was 34.86±0.84.[13]

It was observed that mean BMI of HIV patients was 19.13±3.10 and mean BMI of male HIV patients was 19.47±3.13 and mean BMI of female HIV patients was 18.78±3.05 (statistically insignificant) (Table 1). Koel Mukherjee et al, study suggested that mean BMI of HIV patients was 21.35±3.78 and mean BMI of male HIV patients was 21.18±4.00 and mean BMI of female HIV patients was 21.52±3.57.[11] Soumya Swaminathan et al, study suggested that mean BMI of male HIV patients was 20.5±3.7 and mean BMI of female HIV patients was 21.1±4.0.[14] Daniel Getacher Feleke et al, study suggested that mean BMI of HIV patients was 22.88±4.17.[12]

It was observed that mean BMI of PRE ART patients was 18.87±2.89 and mean BMI of ON ART patients was 19.16±3.13 (statistically insignificant) (Table 1). KB Mustapha et al, study suggested that mean BMI of PRE ART patients was 22.25±0.97 and mean BMI of ON ART patients was 23.20±0.50.[13]

It was observed that out of 269 HIV patients, majority of 138 (51.30%) patients have BMI 18.50-24.99 and 122 (45.35%) patients having BMI less than 18.50 (Table 2). Aishwarya R et al, study suggested that 48% HIV patients have BMI 20-25 and 24% HIV patients having BMI less than 18.[15] Daniel Getacher Feleke et al, study suggested that out of 395 HIV patients, 225 (57%) HIV patients have BMI 18.5-25 and 60 (15.2%) HIV patients having BMI less than 18.5.[12] Andrea Francis Kroll et al study suggested that out of 345 HIV patients, 180 (52.2%) HIV patients have BMI 18.5-24.9 and 18 (5.2%) HIV patients having BMI less than 18.5.[16]

In this study, out of 269 HIV patients, 122 (45.35%) patients were undernutrition. Prevalence of undernutrition in male HIV patients was 50 (36.76%) out of 136 patients and female HIV patients was 72 (54.14%) out of 133 patients. Around half of HIV patients had normal nutrition that is 138 (51.30%) out of 269 HIV patients. Most of male HIV patients had normal nutrition that is 81 (59.56%) out of 136 male HIV patients and amongs female HIV patients normal nutrition was present in 57 (42.86%) out of 133 female HIV patients (statistically significant) (Table 3). Koel Mukherjee et al, study suggested that out of 176 HIV patients, 39 (22.2%) patients were undernutrition and prevalence of undernutrition in male HIV patients was 23 (26.4%) out of 87 male HIV patients and female HIV patients was 16 (18.0%) out of 89 female HIV patients. Most of HIV patients was normal nutrition that is 112 (63.6%) out of 176 HIV patients. Most of male HIV patients had normal nutrition that is 51 (58.6%) out of 87 male HIV patients

and Most of female HIV patients had normal nutrition that is 61 (68.5%) out of 89 female HIV patients.[11]

In this study, out of 261 HIV patients, majority patients have CD4 count more than 200 i.e. 225 (86.2%) HIV patients. Majority of patients have undernutrition i.e. 20 (55.56%) out of 36 patients who have CD4 count less than 200. Patients having CD4 counts more than 200, majority of HIV patients had normal nutrition that is 120 (53.33%) out of 225 HIV patients and 96 (42.67%) out of 225 HIV patients had undernutrition (statistically insignificant) (Table 4). Daniel Getacher Feleke et al, study suggested that out of 395 HIV patients, 336 (85%) patients have CD4 count more than 200.[12]

CONCLUSION

Male HIV patients were (statistically significant) older as compared to female HIV patients. Health Status of the Male HIV patients was (statistically significant) far better than the Female HIV patients. The regular measurement of Body Mass Index (BMI) in centre with limited resource may therefore be useful to clinicians in monitoring patient's response to antiretroviral therapy and predicting the stage of the disease. The main advantage of the study is that the BMI can be used as an overtly index in the monitoring and evaluation of people living with HIV, amongst other diagnostic indices, most especially in developing countries. A higher frequency of HIV patients fell within the normal BMI than those that were underweight, overweight. HIV Patients not placed on ART regimen showed lower nutritional status as compare to HIV patients on ART regimen. Since the goal of ART is to reduce morbidity rate and consequently mortality rate, it therefore follows that ensuring a BMI normal weight status per patient in clinical settings is pertinent.

In this study, although there was no statistically significant association between nutritional status and CD4 cell counts, malnutrition is continued as a problem in HIV patients taking ART. So, regular follow-up of ART taking HIV patients is necessary. Mainly frequent nutritional and opportunistic infections assessment is required.

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