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A STUDY OF THE COGNITIVE DEFICITS IN HIV/AIDS PATIENTS

Clinical Psychology

Dr. Sameeta Ng* Assistant Professor, Department Of Clinical Psychology, Rims, Imphal.*Corresponding Author

Dr. Amool Ranjan Singh Professor, Department Of Clinical Psychology, Rinpas, Ranchi.

Dr. K. S. Sengar Additional Professor, Department Of Clinical Psychology, Rinpas, Ranchi.

ABSTRACT

Background and objectives: The aim of the study is to assess neurocognitive deficits among HIV/AIDS patients.
Methods: A total of 100 HIV seropositive individuals were selected from different NGO's of Manipur and another 100 matched HIV seronegative individuals were also selected for the purpose of the study. They were identified based on the subjective report and the information collected from friends and relatives. Separate semi structure proforma was used for collecting the socio-demographic variables for both the groups, General health questionnaire a screening device for identifying minor psychiatric disorder and NIMHANS Neuropsychological Battery was used for assessing the cognitive functions of both the groups.
Results: The findings of the study showed that there were no variation of age between HIV-positive and HIV-negative individuals but found variation in education, income, marital status and occupation between the two groups. The neuropsychological components such as visuo constructive ability and visual memory, verbal learning and memory, working memory, planning, motor speed, set shifting and verbal comprehension were found to be highly significant between the two groups.
Conclusion: The present study concluded that there is significant cognitive impairment in HIV positive in comparison to non HIV individuals. In addition, patients did not have any clinically identifiable functional impairment. They were maintaining well and were able to carry out daily routine activities. These findings will help in framing proper treatment strategies and for better management of the HIV-seropositive individuals and also could bring up awareness among the population of HIV-seropositve persons, the care givers and in the community too.

KEYWORDS

HIV-seropositive, HIV-seronegative, Neuropsychological Battery, Cognitive deficits.

INTRODUCTION

Acquired Immune Deficiency Syndrome (AIDS) is a disease caused by a virus named Human Immunodeficiency Virus (HIV) and is characterized by immunosuppression, which leads to a spectrum of clinical manifestations that include opportunistic infections, secondary neoplasms, and neurologic manifestations. The clinical features of HIV infection range from asymptomatic infection to severe clinical illness and AIDS. The time for the onset of symptoms varies from five to six months to few years, and may be influenced by the source of HIV infection, age, gender, drug habits, immunogenetics, and other factors.[1] Warning signs of infection with HIV include rapid weight loss; dry cough; recurring fever or profuse night sweats; profound and unexplained fatigue; swollen lymph glands in the armpits, groin, or neck; diarrhea that lasts for more than a week; white spots or unusual blemishes on the tongue, in the mouth, or in the throat; pneumonia; red, brown, pink, or purplish blotches on or under the skin or inside the mouth, nose, or eyelids; memory loss, depression, and other neurological disorders.[2] Symptoms are generally not seen until the CD4 cell count falls below 500cells/mm3. AIDS is diagnosed when the CD4 cell count falls below 200cells/mm. Eventually, the immune function ceases resulting in advanced HIV infection, characterized by a CD4 cell count<50 cells/mm3, overwhelming opportunistic infections, and death.[3]

According to UNAIDS, an estimated 33.2 million people worldwide are infected with HIV, as of December 2007. The first AIDS case in India was detected in 1986 and since then HIV infection has been reported in all states and union territories. The spread of HIV in India has been uneven. Although much of India has a low rate of infection, certain places have been more affected than others. HIV epidemics are more severe in the southern half of the country and the far north-east. The highest HIV prevalence rates are found in Andhra Pradesh, Maharashtra, Tamil Nadu and Karnataka in the south; and Manipur and Nagaland in the north-east. In the southern states, HIV is primarily spread through heterosexual contact. Infections in the north-east are mainly found amongst injecting drug users(IDUs) and sex workers.[4]

Manipur, the study population, is a tiny state having a population of 2,721,756 (2011 Census) in the North East India. The nearness of Manipur to Myanmar (Burma) and therefore to the Golden Triangle (Laos, Thailand and Burma) drug trade, has made it a major transit route for drug smuggling with drugs easily available. HIV prevalence among injecting drug users is above 20% and the virus is no longer confined to this group but has spread further to the female sex partners of the drug users and their children.[5] The latest surveillance report of HIV infection in Manipur indicates that as on January 2011, of the 3, 93,006 individuals screened for HIV infection 31,256 were found to be HIV positive.[6] In the North-Eastern region, particularly in Manipur, HIV infections are mainly found among injecting drug users.[7]

Manipur shares a 358 km long very porous international border with Myanmar, the world's largest producer of heroin. Since the late 1970s, it has become a transit area of illegal heroin trafficking from the "Golden Triangle" to the metropolis of India. Most of the heroin use has been found along National Highway 39, a heroin transit route originating at Myanmar border and running north to Nagaland State. The trend of injecting drug use emerged in 1980 in Manipur, Nagaland and Mizoram. In Manipur, a good quality, cheap, easily available, pure form of injectable heroin (locally known as No.4) became the drug of choice among the youths. [8]

Neuropsychological assessment is an important noninvasive technique used to evaluate the impact of HIV infection on the CNS hardly done elsewhere in the country.[9] The early detection of neuropsychological impairment is important as subclinical changes have been associated with poor quality of life, work disability and mortality. Early treatment could reduce, minimize or possibly reverse the cognitive deficits associated with HIV infection.[10] In Manipur there is paucity of studies on the detection of cognitive deficits in HIV infected individuals. Hence, the present study is taken up to examine cognitive functioning of the HIV-seropositive and negative individuals.

Objectives

The objective of the present study was to study the cognitive deficits among HIV infected individuals and to compare with the non-infected individuals.

MATERIALS AND METHODS

A cross-sectional study design was used in the present study. The study was conducted in the Department of Clinical Psychology, RIMS, Imphal. The data was collected from few NGO's of Imphal through purposive sampling technique. The sample consists of 200 individuals

100 HIV positive cases and 100 negative cases. Only male Individuals within the age group of 20-45 years with no history of head injury, neurological or psychiatric disorders and secondary infections or bed ridden and who were able to give the assent for participating in the study were selected for the present study. Separate semi-structure proforma was used for collecting the socio-demographic profiles of the participants, General health questionnaire[11] a screening device for identifying minor psychiatric disorder and NIMHANS Neuropsychological Battery[12] was used to assess the cognitive deficits among HIV/AIDS patients.

Procedures

In the present study, the researcher approached the NGO'S situated in Imphal. Necessary permissions were taken from the concerned authorities and thoroughly explained about the purpose of the study. An assent was taken from each participant. Once the assent was obtained, a semi-structure proforma for collecting the socio-demographic details and NIMHANS Neuropsychological Battery were administered.

RESULT

Table-1 deals with the socio-demographic scenario of the study samples.

Table-1 (a) Age-wise comparison

Group		Age (years)				Total
		20-30	31-35	36-40	41-45	
	Case	19	33	35	13	100
	Control	15	32	36	17	100
Total		34	65	71	30	200

x^2=1.033; d.f.=3; P=.793

Table-1 (a): It is observed from the table that there is insignificant relationship between the two groups with respect to their age as evident by P-value =0.793. Thus it is proved that age is matched in the present experimental study.

Table-1 (b) Educational level-wise comparison

Group		Educational level				Total
		Below matric	Matric	Intermediate	Graduate	
	Case	29	27	26	18	100
	Control	12	29	43	16	100
Total		41	56	69	34	200

x^2=11.426; d.f.=3; P=.010

Table-1 (b): It may be observed that HIV infected individuals are maximally having educational level of below matric while non-infected individuals are having intermediate maximally. However, the variation is found to be statistically significant i.e., P-value = .010. It implies that the overall educational level of the infected individuals is significantly lower than that of the non-infected individuals in the study sample.

Table-1 (c) Marital status- wise comparison

Group		Marital status		Total
		Unmarried, divorce, separated	Married	
	Case	52	48	100
	Control	31	69	100
Total		83	117	200

x^2=9.082; d.f.=1; P=.003

Table-1 ©: The table shows that the number of married cases (48%) for case group is very much less than that of control group (69%) and at the same time the numbers of either unmarried, divorce or separated for the former group (52%) is higher than that for latter group (31%). There is highly significant difference between the two groups with respect to marital status as evident by P-value =.003. It further indicates that marital status of individuals is differed according to their status in terms of HIV.

Table-1 (d) Income -wise comparison

Group		Income (Rs.)				Total
		Nil	up to 5000	5001-10000	10001 & above	
	Case	32	47	18	3	100
	Control	12	26	45	17	100
Total		44	73	63	20	200

x^2=36.503; d.f.=3; P=.000

Table-1 (d): It is observed from the table that there is a highly significant P-value= .000 which shows that the monthly income between HIV and non HIV infected group is varied enough in the sense that the former one has less income than that of latter group. In other words, less income is associated with more prone to infection among the risk category.

Table-1 (e) Occupational level-wise comparison

Group		Occupational level					Total
		Unemployed	Self-employed	Business	Non-govt. employee	Govt. employee	
	Case	32	39	16	10	3	100
	Control	12	37	13	2	36	100
Total		44	76	29	12	39	200

x^2=42.710; d.f.=4; P=.000

Table-1 (e): The table shows that there is a highly significant difference between the two groups in terms of their occupational level as manifest by P-value= .000 which shows that self-employed and unemployed are the most common occupation for the case group while government employed and self-employed are the most common for control group. Only 3% cases for government employee in former group shows the less common occupation and for latter group non-government employed is found to be less common (2%).

Table-2 deals with comparison of Neuropsychological test scores between case and control group.

Comparison of mean and standard deviation of Neuropsychological Findings of NIMHANS Neuropsychological Battery

	Group	Mean±SD	t-value	d.f.	P-value
Copy Score complex figure test	Case	33.05±4.54	5.222	198	.000
	Control	35.45±.67			
Immediate recall Score	Case	17.70±6.76	16.006	198	.000
	Control	29.67±3.18			
Delayed Recall Score	Case	17.24±6.86	15.017	198	.000
	Control	28.73±3.38			
Trail 1 Score (Auditory verbal learning test)	Case	5.62±1.73	11.807	198	.000
	Control	8.03±1.07			
Trail 2 Score	Case	7.66±2.27	10.704	198	.000
	Control	10.35±1.06			
Trail 3 Score	Case	9.09±2.37	11.630	198	.000
	Control	12.17±1.16			
Trail 4 Score	Case	9.60±2.36	14.181	198	.000
	Control	13.24±.99			
Trail 5 Score	Case	10.53±2.14	15.163	198	.000
	Control	14.06±.90			

Total NC Score	Case	42.50±8.95	15.435	198	.000
	Control	57.75±4.16			
List B Score	Case	4.69±1.84	9.494	198	.000
	Control	6.75±1.14			
Immediate recall A Score	Case	9.20±2.59	14.707	198	.000
	Control	13.25±.92			
Delayed recall A Score	Case	9.44±2.64	14.689	198	.000
	Control	13.66±1.13			
Long term percentage retention Score	Case	90.09±19.06	3.554	198	.000
	Control	97.18±5.89			
Recognition hits Score	Case	12.55±2.35	8.581	198	.000
	Control	14.61±.49			
Omission Score	Case	2.48±2.39	8.541	198	.000
	Control	.39±.49			
Commission_Score	Case	1.47±1.50	6.130	198	.000
	Control	.50±.50			
Verbal working memory 1Back_Score	Case	7.94±1.28	5.098	198	.000
	Control	8.64±.48			
Error_Score	Case	1.63±1.79	2.603	198	.010
	Control	1.10±.96			
@2Back_Score	Case	4.80±1.83	11.842	198	.000
	Control	7.09±.60			
@2Error_Score	Case	5.22±2.33	7.725	198	.000
	Control	3.25±1.02			
@2MT_Score	Case	9.10±11.70	3.533	198	.001
	Control	4.93±1.53			
@2MM_Score	Case	3.36±4.23	3.215	198	.002
	Control	2.00±.00			
@3MT_Score	Case	10.78±9.51	2.158	198	.032
	Control	8.44±5.20			
@3MM_Score	Case	3.94±1.57	3.458	198	.001
	Control	3.37±.48			
@4MT_Score	Case	20.96±14.41	4.024	198	.000
	Control	14.70±5.85			
@4MM_Score	Case	7.55±2.45	5.893	198	.000
	Control	5.96±1.11			
@5MT_Score	Case	20.58±13.23	2.973	198	.003
	Control	16.10±7.20			
@5MM_Score	Case	8.57±2.43	6.466	198	.000
	Control	6.82±1.19			
TNMM_Score	Case	8.36±1.97	.972	198	.332
	Control	8.60±1.48			
Right_hand_Score	Case	57.65±7.75	2.979	198	.003
	Control	60.52±5.71			
Left_hand_Score	Case	54.25±7.26	3.774	198	.000
	Control	57.70±5.55			
No_trial_adm_Score	Case	120.29±14.72	.692	198	.490
	Control	118.85±14.68			
No_Correct_Score	Case	68.01±14.78	5.645	198	.000
	Control	77.44±7.77			
No_Error_Score	Case	52.05±22.16	4.092	198	.000
	Control	41.33±13.96			
Score	Case	41.93±15.62	4.439	198	.000
	Control	33.90±9.11			
Perseverative_Responses_Score	Case	27.59±17.97	3.107	198	.002
	Control	21.32±9.17			
Percent_Perseverative_Responses_Score	Case	22.11±13.53	3.091	198	.002
	Control	17.43±6.78			
Perseverative_Error_Score	Case	24.53±14.17	2.956	198	.003
	Control	19.71±8.06			
Percent_Perseverative_Error_Score	Case	19.71±10.56	2.945	198	.004
	Control	16.14±5.94			
NonPerseverative_Error_Score	Case	27.52±15.12	4.765	198	.000
	Control	19.64±6.68			
Percent_NonPerseverative_Error_Score	Case	22.23±11.24	4.915	198	.000
	Control	16.29±4.43			
Conceptual_level_responses_Score	Case	51.82±20.06	5.925	198	.000
	Control	65.18±10.27			

Percent_Conceptual_level_responses_Score	Case	44.79±20.40	4.669	198	.000
	Control	55.97±12.52			
Categ_completed_Score	Case	3.61±1.97	5.376	198	.000
	Control	4.81±1.04			
First_Categ_completed_Score	Case	23.95±22.59	4.479	198	.000
	Control	13.80±1.72			
Failure_Maintain_Set_Score	Case	1.18±1.18	1.501	198	.135
	Control	.97±.74			
Token_Test_Score	Case	29.99±3.91	.11046	198	.000
	Control	34.41±.85			

Table-2: The above table shows the comparison of various neuropsychological test scores between case and control groups in terms of their cognitive deficits. The scores are expressed in mean and standard deviation and independent t-test is used as test of significance. It may be observed from the findings that almost all the scores are found significant between the two groups. However, insignificant test scores are found in 3MT Score, TNMM Score, No. of trial administered Score and Failure to Maintain Set Score. When look at minutely one may notice that the mean score for some tests are higher for case group while other are less than that of control group.

DISCUSSION

The present study was carried out to find out the cognitive deficits among HIV/AIDS patients. The result of the findings revealed that there is no significant difference in age between HIV-Positive and HIV-Negative individuals but found significant differences in education, income, marital status and occupation between the two groups. The findings of the Neuropsychological tests revealed the significant cognitive impairment in HIV-Positive cases in comparison to non HIV individuals. The predominant cognitive deficits present in HIV-Positive are in the areas of Visuo constructive ability, Visual memory, Verbal learning, Verbal memory, Working memory, Planning, Executive functions, Motor speed, Most of the parameters of Set shifting ability and Verbal comprehension were found impaired however insignificant test scores were found in 3MT score, TNMM score, number of trial administered score and Failure to maintain set score. Result is supported by the study done by John et al (1997) [13] examined symptomatic HIV seropositive participants solved significantly fewer problems compared to seronegative controls.

CONCLUSION

The findings of the study reveal the significant cognitive impairment in HIV+ve cases in comparison to non HIV individuals. The predominant cognitive deficits present in seropositive are in the area of visuo constructive ability and visual memory, verbal learning and memory, working memory, planning, motor speed, set shifting and verbal comprehension. Findings of the present study may be helpful in early detection of cognitive deficits in HIV sero-positive individuals, advantages for the treatment of opportunistic infections and also it may be useful in planning of rehabilitation of the cases with HIV having cognitive impairments. We would have certain difficulties for generalization of the study due to limited sample size and absence of female subjects. Inspite of the limitations, it is observed that the same study may be carried out with both genders among large HIV infected population in order to find out impact of HIV infection in gender basis.

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