Frequency of Common Neurological Manifestations among Patients Presenting with Human Immunodeficiency Virus Positivity

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ABSTRACT

Background: Unsafe injection practices and injection drug use have been linked to multiple HIV outbreaks in Pakistan since 2003. HIV/AIDS has a wide range of clinical manifestations, and it affects a variety of organ systems. It is neuro-invasive, neurotropic and neurovirulent, and can directly induce nervous system diseases due to its preference for the nervous system.

Objective: To determine the frequency of common neurological symptoms in patients who have tested positive for the human immunodeficiency virus.

Material and Methods: This descriptive cross-sectional study was conducted on 131 patients for 6 months in the Department of Medicine, Lady Reading Hospital, Peshawar (9/7/2019 to 8/1/2020). Routine examinations, CSF cultures, monofilament tests, detailed histories, and ICD-9 criteria inspection were performed on all patients to detect the existence of common neurological symptoms such as TBM, cryptococcal meningitis, peripheral neuropathy, headache, seizures, and dementia. A pre-designed proforma was used to record the data. The data was analyzed us SPSS version 20.

Results: The current study showed that 66% of the patients were men and 34% were women with a mean age of 36±10.51 years. Mean duration of the disease was 1±7.33 years. TBM (45%), cryptococcal meningitis (15%), peripheral neuropathy (16%), headache (26%), seizures (28%), and dementia were the most common neurological symptoms (5%).

Conclusion: Tuberculous meningitis, cryptococcal meningitis, peripheral neuropathy, headache, seizures, and dementia were the most prevalent neurological symptoms in patients with human immunodeficiency virus positive, according to our findings.

Key Words: Neurological manifestations, HIV /AIDS infection.

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INTRODUCTION

In 2016, the global burden of the Human Immunodeficiency Virus (HIV) was 0.8% among adults, with roughly 30% of those infected were unaware of their infection.[1,2] HIV/AIDS has a wide range of clinical manifestations, and it affects a variety of organ systems. It is neuro-invasive, can penetrate the central nervous system (CNS), is neurotropic, can dwell in neural tissues, and is neurovirulent, and can directly induce nervous system diseases due to its preference for the nervous system.[3,4] As a result of the complicated HIV-nervous-system interplay, neurological symptoms are a common consequence of HIV.[5] In 1020% of cases, nervous system disease is the primary presenting symptom, and more than half of AIDS patients develop neurological disease during their illness. It's also been discovered that 75-90% of HIV individuals exhibit neuropathologic abnormalities at autopsy.[6] Neurological problems in HIV are stage specific, and this stage specificity is largely due to the dominant influence of altered immunological responses, particularly cell-mediated defenses, which define later stages of systemic infections.[7,8]

The frequency of HIV-associated CNS illness has declined in high-income countries since the advent of highly active antiretroviral therapy (HAART), however mortality remains high.[9] Most patients still have significant immune-depression in resource-constrained situations where HAART scale-up is delayed. Furthermore, in resource-constrained areas, appropriate diagnostic and treatment techniques for HIV-related CNS illness are lacking.[10]

In one study, 43.9% of participants had tuberculous meningitis, 14.2% had cryptococcal meningitis, 6.6% had dementia, 16.4% had peripheral neuropathy, 25% had headaches, and 25% had seizures.[11] TBM was found in 49% of cases, cryptococcal meningitis in 16%, dementia in 5%, peripheral neuropathy in 17%, headache in 42%, and seizures in 35% of cases, according to another study.[12]

The purpose of this study is to investigate the prevalence of common neurological symptoms in HIV patients. As previously stated, CNS involvement occurs early in HIV patients due to

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significant immune system depression, and despite HAART, these consequences remain a major problem in impoverished nations. Furthermore, early detection and intervention can help these already socially and immunocompromised patients improve their quality of life by delaying morbidity and improving their quality of life. Because there are few studies on neurological symptoms in HIV patients in this area, we decided to undertake this study to generate local data on the problem, and based on the findings, further research and policy recommendations maybe developed.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted for 6 months in Lady Reading Hospital, Medicine Dept. Peshawar. The WHO sample size calculator was used to calculate the sample size of 131 patients (keeping 14.2% proportion of Cryptococcal meningitis among HIV patients[11], 95% confidence level and 6% margin of error). The study employed a consecutive (non-probability) sampling technique.

All HIV patients of either gender between the ages of 18 and 60 who presented for a routine checkup and had been HIV positive for at least 18 months were included in the study, while those who had previously been diagnosed with CNS disorders (on history) or had a space-occupying lesion in the brain (on medical records) were excluded.

After receiving approval from the hospital's ethical and scientific council, the study was carried out. The study included all HIV positive patients who met the inclusion criteria (i.e., those who had been on PCR for at least 18 months). All patients were informed about the study's goal and advantages, as well as the risks and rewards involved, and a written informed permission was acquired.

All of the patients had a thorough history and clinical examination. They had routine examinations, CSF cultures, monofilament tests, comprehensive histories, and ICD-9 criteria inspection to rule out common neurological symptoms such TBM, cryptococcal meningitis, peripheral neuropathy, headache, seizures, and dementia. A pre-designed proforma was used to record all of the above information, including name, age, and address. Exclusion criteria were employed to control for confounders and bias in the study outcomes.

Data was entered and analyzed using SPSS version 20 (SPSS Inc. Chicago, IL, USA).and the descriptive measures for the quantitative and qualitative variable were reported. For categorical variables like gender and common neurological symptoms like TBM, cryptococcal meningitis, peripheral neuropathy, headache, seizures, and dementia, frequencies and percentages were determined. Continuous variables like age and HIV positivity duration were given a mean and standard deviation. Using the chi square test, common neurological signs were stratified by age, gender, and HIV duration to the impact modifiers, with a p value of 0.05 considered significant. Tables and graphs were used to present all of the findings.

RESULTS

In this study, age distribution among 131 patients revealed that 34(26%) patients were between the ages of 18 and 30, 39(30%) patients were between the ages of 31 and 40, 30(23%) patients were between the ages of 41 and 50, and 28(21%) patients were between the ages of 51 and 60. The average age was 36 years, with a standard deviation of 10.51 years. The gender breakdown revealed that 86 (66%) of the patients were male and 45 (34%) were female. Patients with a disease duration of less than one year made up 51 (39%) of the total, whereas patients with a disease duration of more than one year made up 80 (61%) of the total. The sickness lasted a year on average, with a standard deviation of 2.33.

TBM was found in 59 (45%) of the patients, while cryptococcal meningitis was found in 20 (15%), peripheral neuropathy in 21 (16%), headache in 34 (26%), seizures in 37 (28%), and dementia was found in 7 (5%). (Table No. 1) Stratification of date was done with age, gender and disease duration. (Table No 2-4)

Table 1. Common Neurological Manifestations

Neurological Manifestations	Frequency	Percentage (%)
TBM	59	45
Cryptococcal meningitis	20	15
Peripheral Neuropathy	21	16
Headache	34	26
Seizures	37	28
Dementia	7	5

Table 2. Stratification of Common Neurological Manifestations with Respect to Age

Neurological Manifestations		18-30 years	31-40 Years	41-50 years	51-60 years	Total	P-value
TBM	Yes	15	18	14	12	59	0.9896
	No	19	21	16	16	72	
Total		**34**	**39**	**30**	**28**	**131**	
Cryptococcal Meningitis	Yes	5	6	5	4	20	0.9946
	No	29	33	25	24	111	
Total		**34**	**39**	**30**	**28**	**131**	
Peripheral neuropathy	Yes	5	6	5	5	21	0.9873
	No	29	33	25	23	110	
Total		**34**	**39**	**30**	**28**	**131**	
Headache	Yes	9	10	8	7	34	0.9987
	No	25	29	22	21	97	
Total		**34**	**39**	**30**	**28**	**131**	
Seizures	Yes	10	11	9	7	37	0.9753
	No	24	28	21	21	94	
Total		**34**	**39**	**30**	**28**	**131**	
Dementia	Yes	2	2	2	1	7	0.9598
	No	32	37	28	27	124	
Total		**34**	**39**	**30**	**28**	**131**	

Table 3. Stratification of Common Neurological Manifestations with Respect to Gender

Neurological Manifestations		Male	Female	Total	P-value
TBM	Yes	39	20	59	0.9212
	No	47	25	72	
Total		**86**	**45**	**131**	
Cryptococcal Meningitis	Yes	13	7	20	0.9470
	No	73	38	111	
Total		**86**	**45**	**131**	
Peripheral neuropathy	Yes	14	7	21	0.9146
	No	72	38	110	
Total		**86**	**45**	**131**	
Headache	Yes	22	12	34	0.8929
	No	64	33	97	
Total		**86**	**45**	**131**	
Seizures	Yes	24	13	37	0.9056
	No	62	32	94	
Total		**86**	**45**	**131**	
Dementia	Yes	5	2	7	0.7406
	No	81	43	124	
Total		**86**	**45**	**131**	

Table 4. Stratification of Common Neurological Manifestations with Respect to Duration of Disease

Neurological Manifestations		≥1 year	>1 year	Total	P-value
TBM	Yes	23	36	59	0.9912
	No	28	44	72	
Total		**51**	**80**	**131**	
Cryptococcal Meningitis	Yes	8	12	20	0.9151
	No	43	68	111	
Total		**51**	**80**	**131**	
Peripheral neuropathy	Yes	8	13	21	0.9316
	No	43	67	110	
Total		**51**	**80**	**131**	
Headache	Yes	13	21	34	0.9229
	No	38	59	97	
Total		**51**	**80**	**131**	
Seizures	Yes	14	23	37	0.8720
	No	37	57	94	
Total		**51**	**80**	**131**	
Dementia	Yes	3	4	7	0.8266
	No	48	76	124	
Total		**51**	**80**	**131**	

DISCUSSION

Pakistan is home to 180 million people comprising of 61.7% rural residents. The estimated literacy rate is 54.7% in the overall population.[13] The first case of HIV in Pakistan was reported in 1987 in a Pakistani man who worked in Gulf and returned home land.[14] The HIV epidemic trend in Pakistan is comparable to other Asian countries, having moved from low prevalence, high risk to concentrated epidemic in the early to mid-2000s. The most vulnerable high-risk groups in Pakistan are injecting drug users and commercial sex workers.[15]

According to the current study, the average age was 36 years old, with a standard deviation of 10.51 years. Most of the patients were men 66% while women were 34%. The sickness lasted a year on average, with a standard deviation of 7.33. TBM (45%), cryptococcal meningitis (15%), peripheral neuropathy (16%), headache (26%), seizures (28%), and dementia were the most common neurological symptoms (5%). Similar findings were found in another study by Sharma SR et al,[11] which found that tuberculous meningitis was the most prevalent secondary CNS illness (43.9%), trailed by cryptococcal meningitis (14.2%), and cerebrovascular accidents (5.49%). Furthermore, 6.59% of the patients had neurosyphilis, 6.59% had AIDS-related dementia, and 16.4% of the patients had peripheral neuropathy. In 25% of the patients, the most prevalent neurological symptom was headache. Seizures were observed in 25% of the patients. When compared to other neurological symptoms, CD4 was notably low in most individuals with increasing multifocal leukoencephalopathy, HIV associated encephalopathy (HAD), and cryptococcal meningitis. In tuberculous meningitis and HAD, CD4 levels were 110.3/µl and 95/µl, respectively. TBM was found in 49% of patients, headache in 42%, seizures in 35% peripheral neuropathy in 17%, cryptococcal meningitis in 16%, and dementia in 5%, in another study conducted by Khan Y et al.[12]

Another study by Sonkar SK et al found that 43 (40.9%) of the 105 patients involved in the trial had neurological symptoms. Fever was the most prevalent presenting symptom among HIV-positive individuals with neurological symptoms (83.7%), trailed by headache (67.4%), coma or disorientation (58.1%), and seizure (14.0%). Two patients reported with blurred vision and were later

diagnosed with cytomegalovirus (CMV) retinitis.[16]

Another study by Jowi JO et al[17] found that headache (83%), focal symptoms (40.6%), and fever (37.7%) were the most common clinical manifestations. In 32.3% and 25% of patients, respectively, toxoplasma encephalitis and cryptococcal meningitis were the major causes of HIV-associated CNS illness. The overall mortality rate was 49%. The greatest case fatality rates were one hundred percent for primary central nervous system lymphoma (PCNSL) and bacterial meningitis, followed by tuberculous meningitis (79.8%). Low CD4 count was found to be an individual predictor of death (AOR: 3.2, 95% confidence interval: 2.05.2). In Douala, HIV-related CNS illness is widespread. Because of their link to diseases with a high case fatality rate, CNS manifestations in HIV patients require immediate study.

CONCLUSION

The current study concludes that the most common neurological manifestations in HIV positive patients was TBM followed by cryptococcal meningitis, peripheral neuropathy, headache, seizures and dementia.

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AUTHOR'S CONTRIBUTION

The following authors full fill authorship criteria as per ICMJE guidelines;

Asad P M:	Idea conception, drafting the work, final approval, agreed to be accountable for all the work.
Bilal M:	Design of the work, data acquisition, critical revision, final approval, agreed to be accountable for all the work.
Khan Y:	Data analysis, Data interpretation, drafting of the work, final approval, agreed to be accountable for all the work.