



# “TO STUDY THE CLINICAL AND ETIOLOGICAL PROFILE IN CASES OF ACUTE MENINGOENCEPHALITISIN ADULTS”

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## ABSTRACT

**Introduction:** Meningitis is a clinical syndrome characterized by inflammation of meninges. The classic triad of meningitis consists of fever, headache and neck stiffness. Pneumococcal meningitis is the most common bacterial cause of meningitis. Most patients recover completely if appropriate antibiotic therapy is instituted promptly. Tubercular meningitis is a very critical disease in terms of fatal outcome and permanent sequelae, requiring rapid diagnosis and treatment. Death may occur as a result of missed diagnosis and delayed treatment. Encephalitis primarily involves the brain; it often involves the meninges as well (meningoencephalitis). There are no studies done till now showing the clinical, etiological profile and outcome in patients with meningitis and meningoencephalitis. This study is done to emphasize the importance of early diagnosis, so that prompt management is given at appropriate time.

**Aim:** This is a prospective observational, single center study done in Department of medicine NSCB medical college hospital Jabalpur in 93 patients of acute meningoencephalitis cases: March 2021 to August 2023. The main aim of this study is “TO STUDY THE CLINICAL AND ETIOLOGICAL PROFILE IN CASES OF ACUTE MENINGOENCEPHALITISIN ADULTS”

**Materials And Methods:** In the present study, we recruited 93 patients who presented with meningitis and meningoencephalitis who fulfilled the inclusion criteria. Proforma is used to collect data needed. Data are statistically analysed.

**Results:** Among the 93 patients with meningo-encephalitis in this study, the common initial presenting symptoms were fever (89%) and Vomiting (89%) >altered sensorium> headache and neck pain and stiffness>Focal neurological deficit> seizure. Fever was the most common initial presenting symptom. 86 patients (92.5%) had fever and headache (92.5%). Headache was associated with vomiting in some of the patients. 45 patients had both fever and headache. 58 patients had altered sensorium in the course of illness, varying from drowsiness to deep coma. Only 45 patients had all the three triad – headache, fever and altered sensorium.



**Conclusion:** In the present study we found that, most of the patients with meningoencephalitis were males and young adults. Surprisingly, tuberculous meningitis was the most common overall cause in our study. Both viral meningo-encephalitis and pyogenic meningitis constituted most of the cases of acute Meningoencephalitis. Tuberculous meningitis was the most common cause in patient with subacute meningitis. All patients with chronic presentation had tuberculous meningitis. We came across atypical presentation of cryptococcal meningitis in a non-HIV patient. 47 patients recovered well without neurological deficits.

**Keywords-** meningo-encephalitis, altered sensorium.

**DOI Number:** 10.48047/nq.2024.22.3.NQ24021

**NeuroQuantology 2024; 22(03): 191-198**

**Introduction:** Meningitis is a clinical syndrome characterized by inflammation of meninges. The classic triad of meningitis consists of fever, headache and neck stiffness. [1] Bacterial meningitis occurs in about 3 people per 100,000 annually in western countries. Population-wide studies have shown that viral meningitis is more common at 10.9 per 100,000 population. [2] Bacterial (pyogenic) meningitis is a pyogenic inflammation of meninges and subarachnoid cerebrospinal fluid (CSF) and is characterized by neutrophilic pleocytosis in CSF. [3] Pneumococcal meningitis is caused by streptococcus pneumonia, a gram-positive coccus and is the most common bacterial cause of meningitis. Meningococcal meningitis is caused by gram-negative diplococcus-Neisseria meningitidis. Most patients recover completely if appropriate antibiotic therapy is instituted promptly. Tubercular meningitis is a very critical disease in terms of fatal outcome and permanent sequelae, requiring rapid diagnosis and treatment. Tuberculous meningitis should be a strong consideration when a patient presents with clinical picture of meningoencephalitis, especially in high-risk groups, including persons with malnutrition, those with abuse alcohol or drugs and patients with known retroviral infection. Death may occur as a result of missed diagnosis and delayed treatment. [4]

World-wide causes of viral meningitis include enterovirus, herpes, mumps, measles and HIV. Enterovirus is the most common cause of viral meningitis. A septic meningitis is an illness characterized by serious inflammation of the meninges, usually with an accompanying CSF lymphocyte pleocytosis. Clinical manifestations vary with headache and fever predominating. The illness is usually mild and runs its course without treatment, however some cases can be severe and life threatening. There are no studies done till now

showing the clinical, etiological and outcome in patients with meningitis and meningoencephalitis. There are some studies done in children but not in adults. Distinguishing the etiologies also helps in terms of both reducing antibiotic usage and hospital bed occupancy and reassuring contacts of cases and health care staff of a nonbacterial cause. As there are fewer developments in therapies for viral meningitis and there remain no effective therapies for most pathogens, this study is done to emphasize the importance of early diagnosis, so that prompt management is given at appropriate time.

#### **AIMS&OBJECTIVE**

This is a prospective observational, single center study done in Department of medicine NSCB medical college hospital Jabalpur in 93 patients of acute meningoencephalitis cases:: **March 2021 to August 2023**. The main aim of this study is **“TO STUDY THE CLINICAL AND ETIOLOGICAL PROFILE IN CASES OF ACUTE MENINGOENCEPHALITIS IN ADULTS”**

#### **INCLUSION CRITERIA:**

- Patients fulfilling the diagnostic criteria for meningoencephalitis
- People willing to give consent for CSF lumbar puncture
- Age more than 14 years

#### **EXCLUSION CRITERIA:**

- People not willing to give consent for CSF lumbar puncture
- Age criteria less than 14 years of age
- Known case of Rheumatic heart disease (According to modified Jones criteria)
- Patients with organic central nervous system disease, endocrine disorders, uremia, severe electrolyte disturbances, and drug reactions



**OBSERVATION AND RESULTS**

**TABLE NO.1**

**DISTRIBUTION OF THE PARTICIPANTS ACCORDING TO GENDER**

S.No.	Gender	Number Of Case (N=93)	Percent
1.	Male	47	50.5
2.	Female	46	49.5
	Total	93	100.0

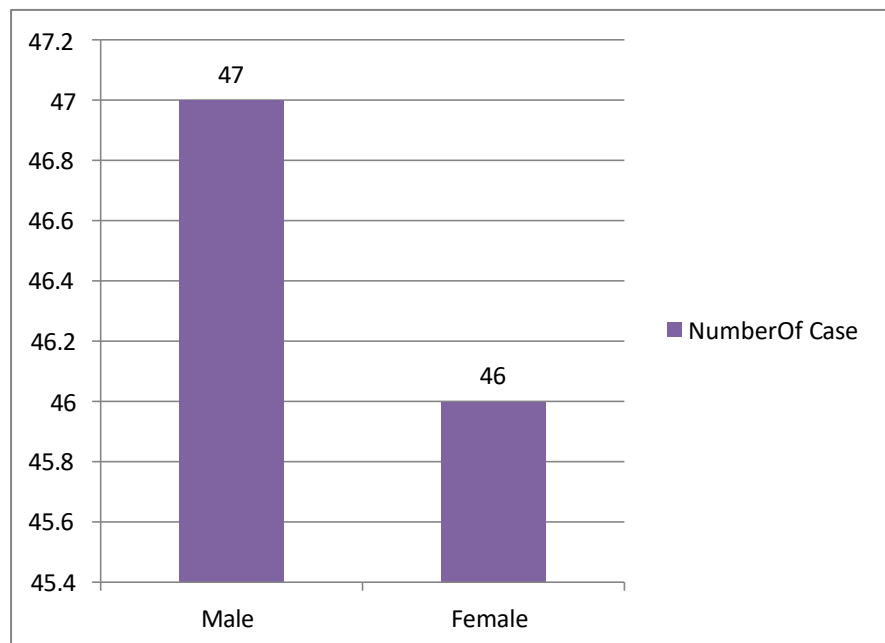
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- Out of the total 93 study participants, 47 (50.5%) were males and 46 (49.5%) are Females. Male to female ratio is 1:1.

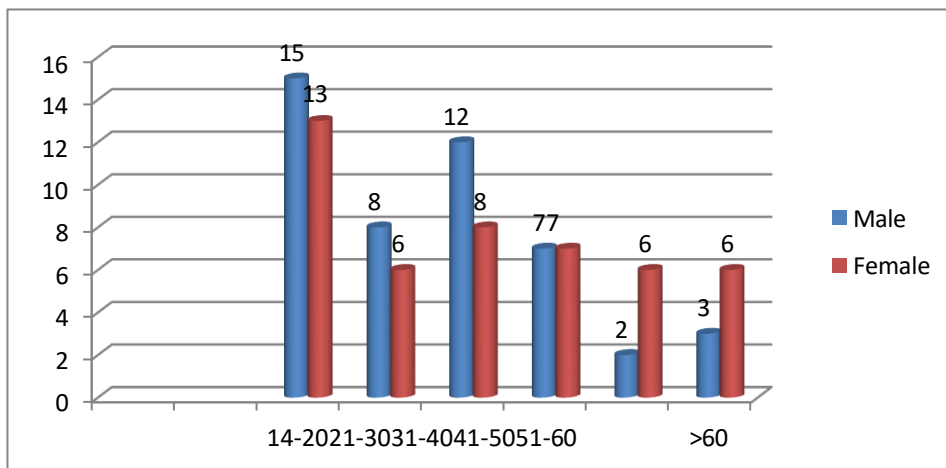
**GRAPH NO.1**

**Distribution of the participants according to gender**

193

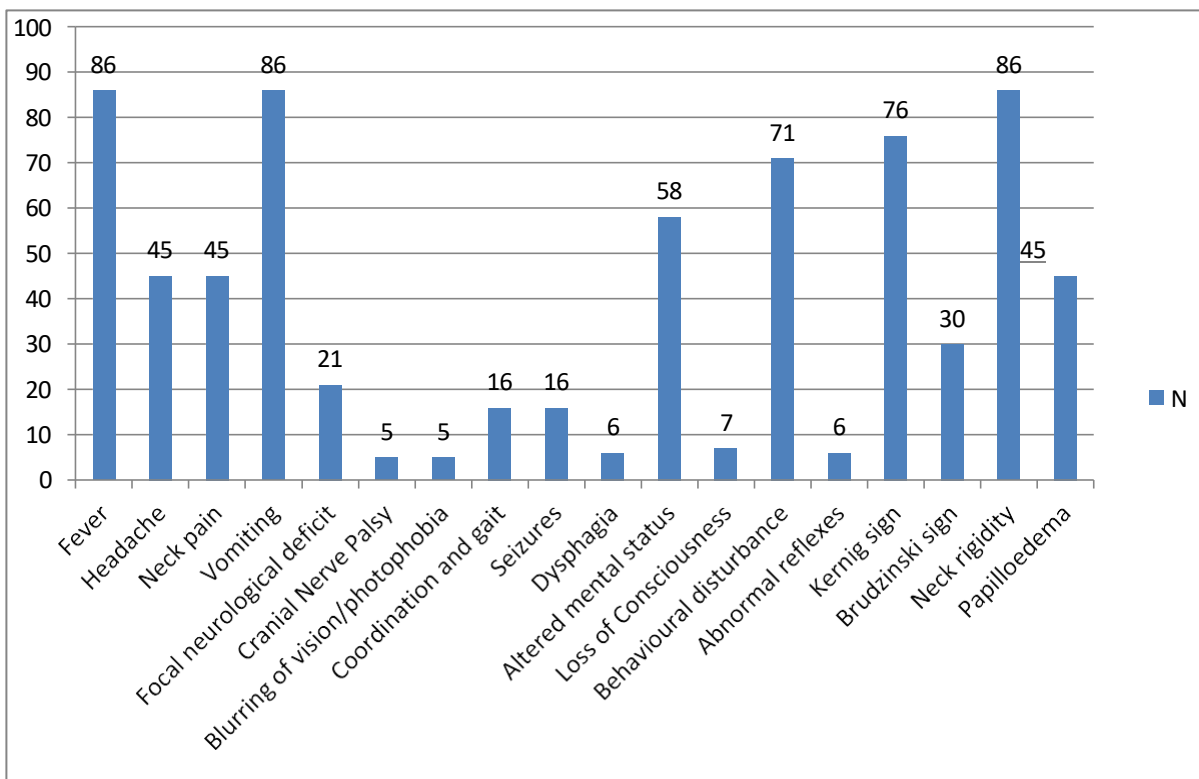


**GRAPH NO.2 -Distribution of the participants according to age group**



-Age wise distribution of the study participants in the above table shows most of the patients were of young adults <50 yr of age group.8 patients wereinthegroupof51-60,9patientswereelderlyadults>60yragegroup. This younger age predominance was also found in the study of the Tamil Nadu Dr. M.G.R Medical University,Chennai,and in thejournal of the royal 2019 where a prospective study was done in the south Indian tertiary care center.

**GRAPHNO.3  
 PREVALENCE OF POSITIVE CLINICAL PRESENTATION**



-Among the 93 patients with meningo-encephalitis in this study, the common initial presenting symptoms were fever (89%) and Vomiting (89%) > altered sensorium > headache and neck pain and stiffness> Focal neurological deficit> seizure.Fever was the most common initial presenting symptom. 86 patients (92.5%) had fever and headache (92.5%).

- Headache was associated with vomiting in some of the patients. 45 patients had both fever and headache. 58 patients had altered sensorium in the course of illness, varying from drowsiness to deep coma.
- Only45 patients had all the three triad–headache, fever and altered sensorium.

**TABLENO.2**  
**DISTRIBUTION OF THE PARTICIPANTS AS PER AGE GROUP AND ETIOLOGY**

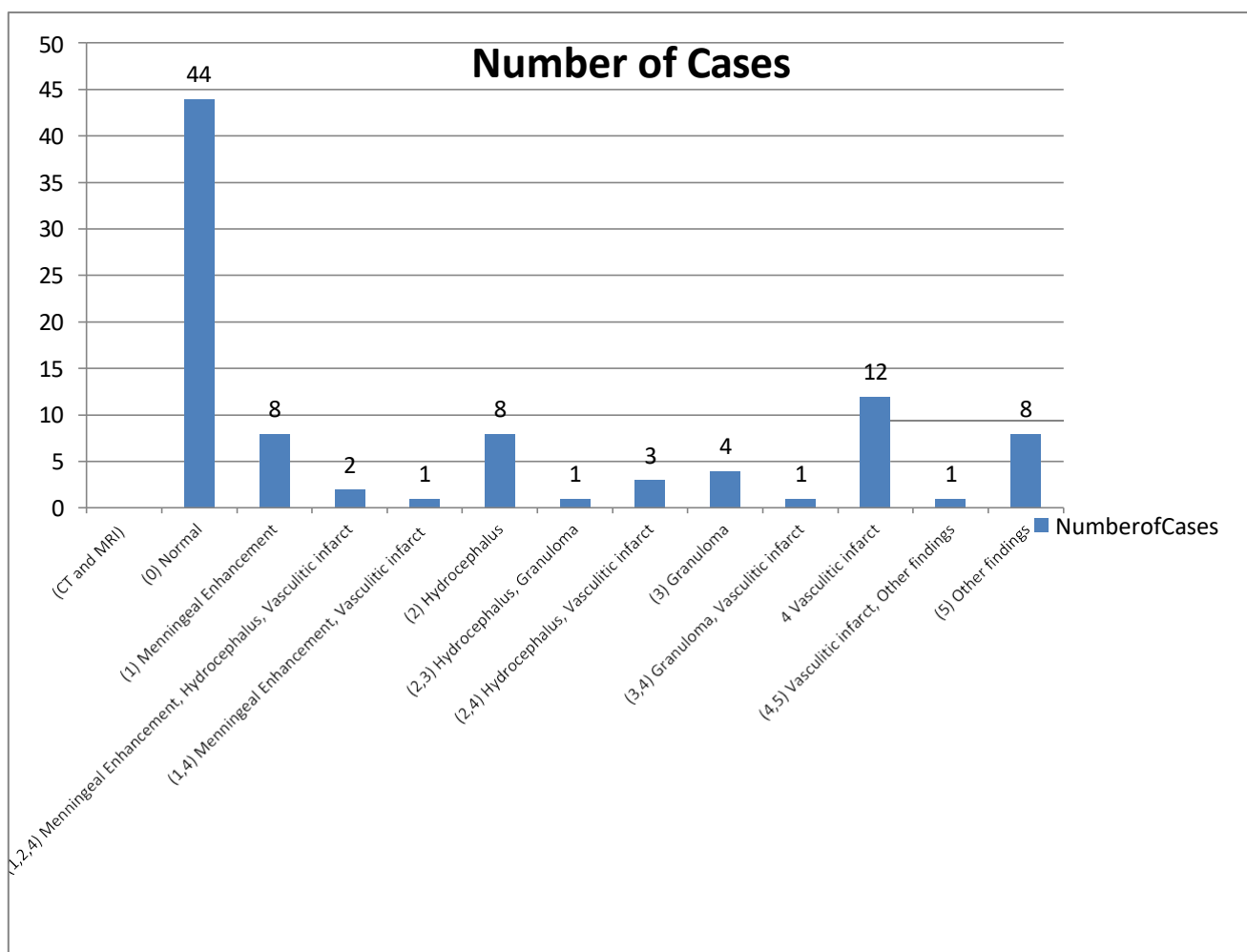
AgeGroup	CSF analysis					
	BacterialM		ViralM		TubercularM	
	N	%	N	%	N	%
<b>15-20</b>	8	25.81%	10	40.00%	10	27.03%
<b>21-30</b>	8	25.81%	3	12.00%	4	10.81%
<b>31-40</b>	5	16.13%	7	28.00%	7	18.92%
<b>41-50</b>	3	9.68%	2	8.00%	9	24.32%
<b>51-60</b>	3	9.68%	2	8.00%	3	8.11%
<b>61-70</b>	3	9.68%	1	4.00%	3	8.11%
<b>&gt;70</b>	1	3.23%	0	0.00%	1	2.70%
<b>Total</b>	31	100%	25	100%	37	100%

- Among93 patients,37 patientswerediagnosedasTuberculousmeningitis.31 patients were diagnosed as pyogenic meningitis; 25 patients were diagnosed as viral meningoencephalitis.



- In the study out of 93 patients, 31 patients were found to have bacterial meningitis which had S-CRP value mostly ranging between >24 mg/l, out of them 19 patients had s-crp value >48 mg/l (61.29%). Most of them had poor prognosis and presented with altered sensorium and high-grade fever and other focal neurological deficit and had radiological findings in the form of leptomeningeal enhancement and hydrocephalus followed by infarct in 3 cases. These 3 patients even died after a few days of admission despite of giving empirical treatment. **This shows Bacterial etiology is associated with high serum CRP level in comparison to viral meningitis, where out of 25 cases of viral meningitis 19 patients had significantly CRP value < 6 mg/l and 3 patients had between 6 – 12 mg/l which concludes that serum CRP level estimation can be very helpful in differentiating viral meningitis from bacterial.**

**GRAPH NO.4**  
**TABLE SHOWING POSITIVE MRI FINDINGS IN DIFFERENT ETIOLOGICAL MENINGITIS**



-The most common radiological finding noticed in the study was vasculitis infarct followed by hydrocephalus followed by meningeal enhancement, granuloma and the other findings including (Thrombosis, Sinusitis, ICSOL, Gliosis). Though they are not useful in the usual viral meningitis but may help to exclude other diagnosis. These Imaging is particularly helpful in later stage of TBM which shows basal enhancement and hydrocephalus.

### DISCUSSION-

The present study entitled "to study the clinical and etiological profile and its correlation to laboratory parameters in cases of acute meningoencephalitis" was carried out in the Department of General Medicine, Netaji Subash Chandra Bose Medical College & Hospital, Jabalpur (M.P) after taking ethical clearance from Institutional Ethics Committee. The study duration was *March 2021 to August 2023*.

The mean age of the study participants was 35.37 years with maximum study participants i.e. 14 to 50 years of age and the most of the patient were male and young adults which is similar to the findings found in The Tamil Nadu Dr. MGR Medical University 14 (prospective observational study) done in June 2014 – 2015. In our present study on the basis of Etiology Tubercular Meningitis was found most common over all causes, which was followed by Bacterial and viral Meningitis which is similar to the findings found in The Tamil Nadu Dr. MGR Medical University (prospective observational study) done in June 2014 – 2015. [14]

Among 93 patients, 37 patients were diagnosed as Tuberculous meningitis. 31 patients were diagnosed as pyogenic meningitis; 25 patients were diagnosed as viral meningoencephalitis. Thus, in comparison to the study done Tamil Nadu Dr. M.G.R Medical University, Chennai, and in the journal of the royal 2019 where a prospective study was done in the south Indian tertiary care center, my study also has male and young predominance and Tubercular meningitis was the most common cause found which was followed by Bacterial meningitis and

then Viral meningitis. [14]

In case of clinical of profile. Among the 93 patients with meningo-encephalitis in this study, the common initial presenting symptoms were fever (89%) and Vomiting (89%) > altered sensorium > headache and neck pain and stiffness > Focal neurological deficit > seizure. Fever was the most common initial presenting symptom. 86 patients (92.5%) had fever and headache (92.5%). Headache was associated with vomiting in some of the patients. 45 patients had both fever and headache. 58 patients had altered sensorium in the course of illness, varying from drowsiness to deep coma. Only 45 patients had all the three triad – headache, fever and altered sensorium. The similar finding was also found Tamil Nadu Dr. M.G.R Medical University, Chennai, and in the journal of the royal 2019 where a prospective study was done in the south Indian tertiary care center. [14]

Showing positive MRI and CT findings also added major contribution in differentiating the type of meningitis as well as prognosis of the disease. The most common radiological finding noticed in the study was vasculitic infarct followed by hydrocephalus followed by meningeal enhancement, granuloma and the other findings including (Thrombosis, Sinusitis, ICSOL, Gliosis). Though they are not useful in the usual viral meningitis but may help to exclude other diagnosis. These Imaging is particularly helpful in later stage of TBM which shows basal enhancement and hydrocephalus. The similar findings were also noticed in the study done in Tamil Nadu Dr. M.G.R Medical University, Chennai, and in the journal of the royal 2019 where a prospective study was done in the south Indian tertiary care center. [14] (Hydrocephalus caused by tuberculous meningitis: clinical picture, CT findings and results of shunt surgery) and a study done by K. Fatema 2020, by K H Chan 2005 (TBM – CT study 1992). In our present study on the basis of Etiology Tubercular Meningitis was found most common over all cause, which was followed by Bacterial and viral Meningitis.

In case of bacterial meningitis. In my study out of 93



patient, 31 patient was found as bacterial meningitis which had s-crp value mostly ranging between >24 mg/l, out of them 19 patient had s-crp value >48 mg/l (61.29%). Most of them had poor prognosis and presented with altered sensorium and high-grade fever and other focal neurological deficit and had radiological finding in the form of leptomeningeal enhancement and hydrocephalus followed by infarct in 3 cases. These 3 patients even died after few days of admission despite of giving empirical treatment. This shows Bacterial etiology is associated with high serum CRP level in comparison to viral meningitis.

**CONCLUSION-** In this study, most of the patients with meningoencephalitis were males and young adults. Surprisingly, Tuberculous meningitis was the most common overall cause in this study. This observation is in contrast to the Western literature. Viral etiology is the most common one in western population. Both viral meningo-encephalitis and pyogenic meningitis constituted most of the cases of acute Meningoencephalitis. Tuberculous meningitis was the most common cause in patient with sub-acute meningitis. Diagnosis of tuberculous meningitis was challenging; clinical presentation, CSF studies and brain imaging features helped to make a diagnosis of tuberculous meningitis. Estimation of C-reactive protein in serum is the cheapest, sensitive and specific test to differentiate bacterial from viral infections. It is a simple qualitative as well as quantitative test and can be done as a bed side investigation. With serum C-reactive protein, a definite aetiological diagnosis can be made rapidly at the time of admission itself. Meningeal infections have a definite male predominance. Altered level of consciousness at the time of admission is associated with bad prognosis and high case fatality rate.

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