



## ETIOLOGICAL PROFILE OF MENINGITIS

**Dr. P. Musakhan**

Associate Professor of General Medicine, Government Medical College, Nizamabad, Telangana State.

**Dr. Sapuri Sreevani\***

Associate Professor of General Medicine, Government Medical College, Siddipet, Telangana State. \*Corresponding Author

**Dr. Pitta Paramjyothi**

Professor and HOD of Physiology, Government Medical College, Siddipet, Telangana State.

**ABSTRACT** **AIM AND OBJECTIVE:** Meningitis is a devastating disease, a medical and neurological emergency and remains a major global public health challenge. It can be caused by Bacteria, Virus, fungi and parasites. The objective of present study is to know the etiology of meningitis and to help guide empirical therapy decisions.

**MATERIALS AND METHODS:** 70 patients of Meningitis who were above 12 years of age group admitted both in General wards and Acute Medical Care unit in a tertiary care center Telangana State included in the study.

**RESULTS:** Among 70 patients 56 were males and 14 females. Maximum cases of meningitis were between 12- 40 years and more common cause was Tuberculous meningitis seen in 26 patients next frequent cause was Viral meningitis which was noted in 23 patients. Bacterial meningitis noted in 20 patients and Cryptococcal meningitis was seen in one male patient.

**CONCLUSION:** Meningitis commonly present in young patients and Tuberculous meningitis was the most common cause.

**KEYWORDS :** Bacterial meningitis Tuberculous meningitis Viral meningitis Cryptococcal meningitis

**INTRODUCTION:**

Meningitis is an inflammation of the meninges and especially of the pia mater and arachnoid. It can be either a relatively mild illness caused by a virus such as Coxsackieviruses or a more severe usually life-threatening illness caused by a bacterium especially the meningococcus, *Neisseria meningitidis* or the serotype designated B of *Haemophilus influenzae*. Without treatment the case-fatality rate can be as high as 70 percent and one in five survivors of bacterial meningitis may be left with permanent sequelae including hearing loss, neurologic disability or loss of a limb.

Adult mortality may vary widely according to cause and setting with rates of 3–30% for bacterial meningitis depending on the organism<sup>1</sup>. Viral meningitis which includes encephalitis due to Herpes Simplex Virus (HSV) where mortality may be up to 70% without treatment and still as high as 28% with acyclovir therapy<sup>2</sup>. Tuberculous meningitis<sup>3</sup>(TBM) and Cryptococcal meningitis<sup>4</sup> carry high mortality rates of >50% in routine care.

Meningitis is a major cause of mortality and morbidity in developing countries, with mortality rates as high as 30% to 50%.<sup>5</sup> In 2015 meningitis occurred in about 8.7 million people worldwide<sup>6</sup>. Exact incidence of Meningitis in India is not available. In 1966, a case-fatality rate of 20 percent was recorded in India, with a total of 616 cases. Between 2014 and 2015, a total of 16, 217 cases and 300 deaths due to meningitis were recorded in India. Bihar has the highest number of meningitis in 2014 and 2015 with 1042 and 8871 cases respectively<sup>7</sup>.

The incidence rates for meningitis vary by region, country, pathogen, and age group. When the patient present to the hospital treatment has to be started empirically while CSF report is awaiting. If more frequent occurrence of a pathogen like Bacterial, viral, tuberculosis or fungal is known empirical treatment can be started accordingly.

**MATERIALS AND METHODS:**

This study includes 70 patients (56 males and 14 females) of Meningitis who were admitted both in general wards and acute medical care unit in a tertiary care center Telangana State. All patients of Meningitis who were above 12 years were included in the present study. Detailed history was taken, any co morbidities were noted. All the patients were subjected to lumbar puncture and Cerebrospinal Fluid (CSF) sent for analysis. The data was analysed and etiological profile studied.

**RESULTS:**

In the Present study population is 70 including 56 were males and 14 females. Patients between 12- 40 years age group are most affected in males and maximum cases occurred in females between 21- 40 age group.

In majority of the Patients who are less than 20 years of age are having Bacterial meningitis. Between 21-50 years TBM was common followed by Viral meningitis.

**AGE WISE DISTRIBUTION:**

Age group	Bacterial Meningitis	Tuberculous Meningitis	Viral Meningitis	Cryptococcal Meningitis	Total
12 – 20	10	6	1	0	17
21 – 30	1	9	7	1	18
31 – 40	2	5	10	0	17
41 – 50	1	5	4	0	10
51 – 60	5	1	1	0	7
61 – 70	1	0	0	0	1

In the etiological profile TBM was the most frequent cause which was seen in 26 patients including 18 male and 8 female. The next frequent cause is Viral meningitis which is noted in 23 patients, male 19 and female 4. Bacterial meningitis noted in 20 patients, male 18, female 2 and Cryptococcal meningitis was seen in one male patient.

**ETIOLOGY WISE DISTRIBUTION:**

ETIOLOGY	No. of Patients (%)
Tuberculous Meningitis	26 (37.14%)
Viral Meningitis	23(32.85%)
Bacterial Meningitis	20(28.57%)
Cryptococcal Meningitis	1(1.4%)

Retroviral disease is the most important co- morbidity which was present in 13 patients. Diabetes was noted in one patient.

Co-morbidity	Tuberculous Meningitis	Bacterial Meningitis	Viral Meningitis	Cryptococcal Meningitis	Total
Retroviral	5	2	5	1	13
Diabetes	0	1	0	0	1

**DISCUSSION:**

The epidemiology of meningitis in developing countries differs from that of the developed world in many important ways. 74% of our patients were less than 40 years. Maximum Cases occurred in between 12 and 40 years<sup>8</sup> in males and 21 – 40 years in females with the mean age of 32.8.

In the present study TBM was the most frequent cause seen in 26 (37.1%) patients. Tuberculosis is a rare condition in many high-income countries (35 cases per 100,000 persons in the WHO American region) 9 but higher rates in regions in south-east Asian regions 10 (271 cases per 100,000).

Viral meningitis is observed in 23 (32.85%) patients. Bacterial meningitis is the next common cause seen in 20 (28.57%). In other Indian studies 11 Bacterial meningitis was the common cause followed by Viral and Tuberculous.

Bacterial meningitis is most frequently observed in young adults who are less than 20 years of age whereas Tuberculous and Viral meningitis was commonly observed in 21-50 years of age group.

In the present study Immuno suppression was noted in 14 patients out of which 13 patients were having Retroviral disease and one patient with Diabetes Mellitus. Individuals with Tuberculosis and Human Immuno deficiency virus (HIV) co-infection have a higher rate of TBM than persons without HIV 12 which was also depicted in the present study. Viral meningitis is equally observed in the present study followed by Bacterial.

In HIV-infected population Cryptococcus 13 is more common than all causes of bacterial meningitis combined. In the present study one patient was having Cryptococcal meningitis.

#### CONCLUSION:

The knowledge about the etiological spectrum of Meningitis across different geographic regions as well as for different age groups is a necessity for protocol development at the regional level. The current study demonstrated high proportion of Tuberculous meningitis followed by Viral and Bacterial. Bacterial Meningitis very commonly observed in young adults. As the study population is small there is a limitation to give recommendations for the empirical treatment. A larger study will be needed.

#### REFERENCES:

1. Brouwer MC, Tunkel AR, van de Beek D. Epidemiology, diagnosis, and antimicrobial treatment of acute bacterial meningitis. *Clin Microbiol Rev.* 2010;23(3):467–492.
2. James SH, Kimberlin DW, Whitley RJ. Antiviral therapy for herpesvirus central nervous system infections: neonatal herpes simplex virus infection, herpes simplex encephalitis, and congenital cytomegalovirus infection. *Antiviral Res.* 2009;83(3):207–213.
3. Thwaites GE, van Toorn R, Schoeman J. Tuberculous meningitis: more questions, still too few answers. *Lancet Neurol.* 2013;12(10):999–1010. [PubMed]
4. Rajasingham R, Rolfes MA, Birkenkamp KE, Meya DB, Boulware DR. Cryptococcal meningitis treatment strategies in resource-limited settings: a cost-effectiveness analysis. *PLoS Med.* 2012;9(9):e1001316.
5. Peltola H. Burden of meningitis and other severe bacterial infections of children in Africa: implications for prevention. *Clin Infect Dis.* 2001;32:64–75.
6. GBD 2015 Disease Injury Incidence Prevalence Collaborators (October 2016). "Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015". *Lancet.* 388(10053): 1545–1602.
7. Meningococcal Meningitis - Prevalence and Deaths in India. *Medindia* [https:// www.medindia.net/health\\_statistics/diseases/meningococcal\\_meningitis-India](https://www.medindia.net/health_statistics/diseases/meningococcal_meningitis-India).
8. Bacteriological profile of community acquired acute bacterial meningitis: A ten-year retrospective study in a tertiary neurocare centre in South India :R Mani, S. Pradhan, S Nagarathna, R Wasiulla, A Chandramuki Department of Neuromicrobiology, NIMHANS, Bangalore, Year : 2007 | Volume : 25 | Issue : 2 | Page : 108-114. 9. Methods of rapid diagnosis for the etiology of meningitis in adults : Nathan C Bahr 1,2,\* and David R Boulware *Biomark Med.* 2014; 8(9): 1085–1103.
10. World Health Organization. *Global Tuberculosis Report – 2012.* 2012. pp. 1–6.
11. Waghdhare S., Kalantri A., Joshi R., Kalantri S. Accuracy of physical signs for detecting meningitis: a hospital-based diagnostic accuracy study. *Clinical Neurology and Neurosurgery.* 2010;112(9):752–757. doi: 10.1016/j.clineuro.2010.06.003.
12. Thwaites GE, van Toorn R, Schoeman J. Tuberculous meningitis: more questions, still too few answers. *Lancet Neurol.* 2013;12(10):999–1010.
13. Bekondi C, Bernede C, Passone N, et al. Primary and opportunistic pathogens associated with meningitis in adults in Bangui, Central African Republic, in relation to human immunodeficiency virus serostatus. *Int J Infect Dis.* 2006;10(5):387–395