



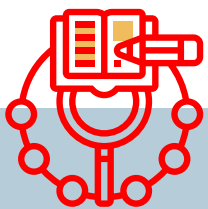
INTRODUCTION

HEADACHE IS ONE OF THE MOST COMMON NEUROLOGICAL COMPLAINTS IN CLINICAL PRACTICE, OFTEN DISMISSED AS BENIGN. HOWEVER, IN RESOURCE-LIMITED SETTINGS LIKE NEPAL, WHERE INFECTIOUS DISEASES REMAIN A SIGNIFICANT BURDEN, HEADACHE MAY BE THE FIRST INDICATOR OF A LIFE-THREATENING NEUROINFECTION. DELAYED RECOGNITION CAN LEAD TO SEVERE COMPLICATIONS, INCLUDING NEUROLOGICAL DEFICITS AND MORTALITY. THIS STUDY EXPLORES THE CLINICAL CHARACTERISTICS, DIAGNOSTIC CHALLENGES, AND OUTCOMES OF PATIENTS PRESENTING WITH HEADACHE AS THE INITIAL SYMPTOM OF NEUROINFECTION AT A TERTIARY HOSPITAL IN NEPAL.



OBJECTIVE

THIS STUDY AIMS TO ANALYZE THE CLINICAL CHARACTERISTICS OF PATIENTS PRESENTING WITH HEADACHE AS THE INITIAL SYMPTOM OF NEUROINFECTION IN A TERTIARY HOSPITAL IN NEPAL. ADDITIONALLY, THE STUDY EVALUATES DIAGNOSTIC CHALLENGES, INCLUDING DELAYS AND LIMITATIONS IN LABORATORY AND IMAGING RESOURCES, THAT CONTRIBUTE TO MISSED OR LATE DIAGNOSES.



METHODOLOGY

A RETROSPECTIVE REVIEW OF HOSPITAL RECORDS FROM JANUARY 2020 TO DECEMBER 2024 WAS CONDUCTED AT A MAJOR TERTIARY CARE CENTER IN NEPAL. PATIENTS WHO PRESENTED WITH HEADACHE AND WERE SUBSEQUENTLY DIAGNOSED WITH NEUROINFECTION (MENINGITIS, ENCEPHALITIS, CEREBRAL MALARIA, NEUROCYSTICERCOSIS, OR TUBERCULOUS MENINGITIS) WERE INCLUDED. DATA ON DEMOGRAPHIC DETAILS, CLINICAL PRESENTATION, LABORATORY FINDINGS, IMAGING, AND OUTCOMES WERE ANALYZED.



RESULTS

A TOTAL OF 267 PATIENTS (MEAN AGE: 37.2 ± 14.5 YEARS; 61% MALE) MET THE INCLUSION CRITERIA. AMONG THEM, 43% WERE DIAGNOSED WITH BACTERIAL OR VIRAL MENINGITIS, 22% WITH TUBERCULOUS MENINGITIS, 18% WITH NEUROCYSTICERCOSIS, 9% WITH CEREBRAL MALARIA, AND 8% WITH ENCEPHALITIS. HEADACHE WAS THE SOLE INITIAL SYMPTOM IN 31% OF CASES, OFTEN LEADING TO DELAYED DIAGNOSIS (MEAN DELAY: 6.4 DAYS). COMMON ASSOCIATED SYMPTOMS INCLUDED FEVER (74%), NAUSEA/VOMITING (58%), ALTERED SENSORIUM (36%), AND FOCAL NEUROLOGICAL DEFICITS (27%). (TABLE 1). CSF ANALYSIS AND MRI WERE THE MOST RELIABLE DIAGNOSTIC TOOLS, BUT LIMITED ACCESS TO MRI IN RURAL REFERRALS DELAYED TREATMENT. MORTALITY WAS HIGHEST IN TUBERCULOUS MENINGITIS (14%), FOLLOWED BY CEREBRAL MALARIA (11%). (TABLE 2)



CONCLUSION

IN NEPAL, WHERE INFECTIOUS DISEASES REMAIN PREVALENT, HEADACHE SHOULD NOT BE OVERLOOKED AS A BENIGN SYMPTOM. EARLY RECOGNITION OF HEADACHE AS A POTENTIAL MARKER OF NEUROINFECTION IS CRITICAL FOR TIMELY INTERVENTION. STRENGTHENING DIAGNOSTIC INFRASTRUCTURE AND CLINICIAN AWARENESS CAN IMPROVE OUTCOMES IN RESOURCE-LIMITED SETTINGS. FURTHER PROSPECTIVE STUDIES ARE NEEDED TO REFINE EARLY DIAGNOSTIC PROTOCOLS.

Table 1: Patient Characteristics and Neuroinfection Distribution

Characteristic	Value (n=267)
Mean Age (Years)	37.2 ± 14.5
Male (%)	61%
Headache as Initial Symptom (%)	31%
Common Symptoms	% Cases
- Fever	74%
- Nausea/Vomiting	58%
- Altered Sensorium	36%
- Focal Deficits	27%
Most Common Diagnoses	% Cases
- Meningitis (Bacterial/Viral)	43%
- Tuberculous Meningitis	22%

Table 2: Diagnostic Findings in Neuroinfection Patients

Test Type	Abnormal (%)
CSF Analysis	92%
- Elevated WBC	87%
- Low Glucose	69%
- High Protein	78%
MRI Findings	74%
- Meningeal Enhancement	58%
- Parenchymal Lesions (NCC)	21%
- Cerebral Edema	18%
PCR/Serology	55%

