

ABSTRACT NO:09  
RESEARCH ARTICLE**Age and Sex-Specific Provincial Patterns of Brain and CNS Cancer Mortality in Pakistan: A Global Burden of Disease Study**Usama Yaseen<sup>1</sup>, Syed Mubeen Ahmed<sup>2</sup>**Abstract**

**Objective:** Brain and central nervous system (CNS) cancers represent a major cause of cancer-related mortality worldwide, with limited evidence describing subnational variation in Pakistan. This study aimed to evaluate age- and sex-specific provincial patterns of brain and CNS cancer mortality in Pakistan using Global Burden of Disease (GBD) 2023 estimates, spanning 1990 to 2023.

**Methods:** This ecological study used Global Burden of Disease (GBD) 2023 estimates of brain and central nervous system (CNS) cancer mortality in Pakistan from 1990 to 2023. Age-standardized mortality rates were analyzed by province (Punjab, Sindh, Khyber Pakhtunkhwa, Balochistan, Gilgit-Baltistan, Islamabad Capital Territory, and Azad Jammu & Kashmir), sex, and standard GBD age groups. Descriptive analyses were conducted to compare age-standardized mortality rates across provinces, sexes and age groups.

**Results:** Substantial geographic variation in CNS cancer mortality was observed across Pakistan. The highest mortality rate was recorded in Gilgit-Baltistan (0.154, 95% UI: -0.359 to 1.006), followed by Punjab (0.146, 95% UI: -0.276 to 0.701), while the lowest rates were observed in Azad Jammu & Kashmir (0.021, 95% UI: -0.405 to 0.627) and Sindh (0.025, 95% UI: -0.374 to 0.572) representing a more than 7-fold provincial difference. Females demonstrated higher modelled mortality rates than males across most provinces, particularly in Punjab (0.192 [95% UI: -0.360 to 1.119] vs. 0.092 [95% UI: -0.406 to 0.883]). Age-specific analysis revealed peak mortality in the 20–39-year age group, with a decline in older age groups. Marked spatial heterogeneity was observed across provinces, with higher burden in northern regions.

**Conclusion:** Brain and CNS cancer mortality in Pakistan exhibits marked provincial, age-specific and sex-based disparities with higher burden among young adults, females and northern provinces. These findings underscore the need for targeted cancer surveillance, equitable resource allocation and region specific prevention and healthcare planning to address geographic disparities.

**Key words:** Brain and central nervous system cancer; Mortality ;Pakistan;Global Burden of Disease ;Provincial disparities ;Sex differences ;Age-specific mortality

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