International Journal of Health Sciences and Research
[Indexed, Peer-Reviewed Journal]
Volume 16; Issue: 6; June 2026
Website: www.ijhsr.org
Original Research Article *ISSN: 2249-9571*

Demographic, Anatomical, and Histopathological Characteristics of Central Nervous System Tumors: A Retrospective Observational Study

Waseem Ahmad Shah[1], Mir Iffat Khurshid[2], Shazia[3]

[1]Assistant Professor, Department of ENT (Otorhinolaryngology), Kashmir Medical College & Hospital, Sempora Medicity, Srinagar, J&K-191101
[2]Senior Resident, Department of Anatomy, GMC Udhampur
[3]PG Scholar, Department of Anatomy, GMC Jammu

Corresponding Author: Dr. Shazia

DOI: https://doi.org/10.52403/ijhsr.20260623

ABSTRACT

Background: Central nervous system (CNS) tumors embody a diverse group of neoplasms with scattered histopathological characteristics and clinical behavior. Understanding their demographic profile, anatomical distribution and histological spectrum is important for accurate diagnosis and targeted efficient patient management. With this in mind, the present study was undertaken to evaluate the clinicopathological profile of CNS tumors diagnosed at a tertiary care teaching hospital.
Methods: We conducted a retrospective descriptive study on 200 histopathologically confirmed cases of CNS tumors retrieved from available pathology reports, referral documents, and patient case files maintained in the medical record department. Archived data relating to demographic characteristics and tumour location and histopathological diagnosis were obtained. Tumors were classified according to World Health Organization (WHO) Classification of Tumors of the Central Nervous System and gliomas were further classified on World Health Organization (WHO) grading. Results: The highest proportion of cases was observed in the 41–50-year age group (23.0%), followed by the 31–40-year (19.0%) and 51–60-year (17.5%) age groups. The male cases outnumbered the females with a ratio of 1.33: 1. The most common location was the frontal lobe (19.0%), followed by the meninges/falx/convexity (15.0%), temporal lobe (13.0%), and sellar/suprasellar region (12.0%). The majority of tumors were supratentorial (74.0%). Diffuse astrocytic and oligodendroglial tumors represented the most common types of neoplasms (28.0%), followed by meningiomas (26.0%), pituitary adenomas (11.0%) and glioblastomas (9.0%) and schwannomas (9.0%). Gliomas were divided into four grades, with Grade IV being the largest group (37.9%), followed by Grade II (27.0%), Grade III (21.6%) and Grade I (13.5%).
Conclusions: CNS tumors were highly heterogeneous in terms of demographics, anatomical location and histopathology. Most were found in middle aged adults with a male predominance. The findings provide useful regional information on the clinicopathological spectrum of CNS tumors and can help to optimise the diagnosis and management of these tumours.

Keywords: Central nervous system tumors; Glioma; Meningioma; Histopathology; WHO grading; Brain tumors

INTRODUCTION

Central nervous system (CNS) tumors are a heterogeneous group of complex tumors that arise from the brain, spinal cord, meninges, cranial nerves and other structures of the CNS. While they represent only approximately 2% of all malignancies, their morbidity, mortality, neurological function and impact on quality of life is much greater. [1] These tumors are known to affect individuals across all age groups and exhibit remarkable dispersion with respect to histogenesis, anatomical location, biological behavior and clinical outcome. Over the past 20 years, there have been significant improvements in the diagnosis and management of CNS tumors, driven by the introduction of new neuroimaging and neurosurgical methods, along with molecular diagnostics and neuropathological classification of tumors.[2] The current World Health Organisation (WHO) classification combines histological and molecular features and includes many distinct tumour entities with different prognostic and therapeutic significance.[3] For the reasons stated above, accurate histological diagnosis, grading, treatment planning and prognosis still remain a cornerstone of diagnosis. The incidence of CNS tumors is highly variable between different geographic locations. Studies in India have consistently shown that the largest group of primary CNS neoplasms consists of astrocytomas, gliomas and meningiomas, with varying proportions in different institutions and regions. The clinical presentation, surgical accessibility, therapeutic approach and prognosis also depend on anatomical location. Different histological tumor types reflect characteristic predilections for specific intracranial and spinal locations with most of the studies reporting the frontal lobe as the frequently involved cerebral region, followed by the temporal and parietal lobes while tumors such as; meningiomas and schwannomas demonstrate distinct site-specific distributions.[4,5] Regional differences in tumor distribution may be due to differences in demographic characteristics, environment, referral patterns and access to healthcare. Despite the growing body of literature, comprehensive clinicopathological data from many regions of India remain limited. Consequently, institution-based studies continue to play a vital role in documenting local disease patterns and expanding the national database on CNS neoplasms. The present study was undertaken to evaluate the clinicopathological spectrum of central nervous system tumors with particular emphasis on their histological patterns and anatomical distribution in an Indian population.

METHODOLOGY

This retrospective observational study was conducted in the Department of Anatomy, GMC Jammu. Data were collected retrospectively from available pathology reports, referral documents, and patient case files maintained in the medical record department. Information regarding age, sex, anatomical site of the tumor, and histopathological diagnosis was retrieved and entered into a predesigned proforma. Histopathological diagnoses recorded in the pathology reports were reviewed and categorized according to standard histological classifications of CNS tumors. Cases with incomplete demographic or histopathological information were excluded from the study. All data were extracted from existing records and entered into a structured data collection proforma. Patient identifiers were removed prior to analysis to ensure confidentiality.

Data were compiled and analyzed using appropriate statistical methods. Categorical variables were expressed as frequencies and percentages, and the results were presented in tabular form.

RESULTS

Table 1: Showing age distribution of CNS tumors

Age Group (Years)	Cases (n)	Percentage (%)
0–10	8	4.0
11–20	18	9.0
21–30	28	14.0
31–40	38	19.0
41–50	46	23.0
51–60	35	17.5
>60	27	13.5
Total	200	100

Evidently, majority of CNS tumors (23%) were prevalent in 41-50 years of patients, followed by 19% patiets with age 31-40 years, 17.5% were aging between 51-60 years, 14% were 21-30 years of age as shown in table 1

Table 2: Showing gender distribution of CNS tumors

Gender	Cases	Percentage (%)
Male	114	57.0
Female	86	43.0
Total	200	100

Table 2 shows the gender distribution of CNS tumours, among 200 studies patients, 57% were male and 43% were females

Table 3: Anatomical distribution of CNS tumors

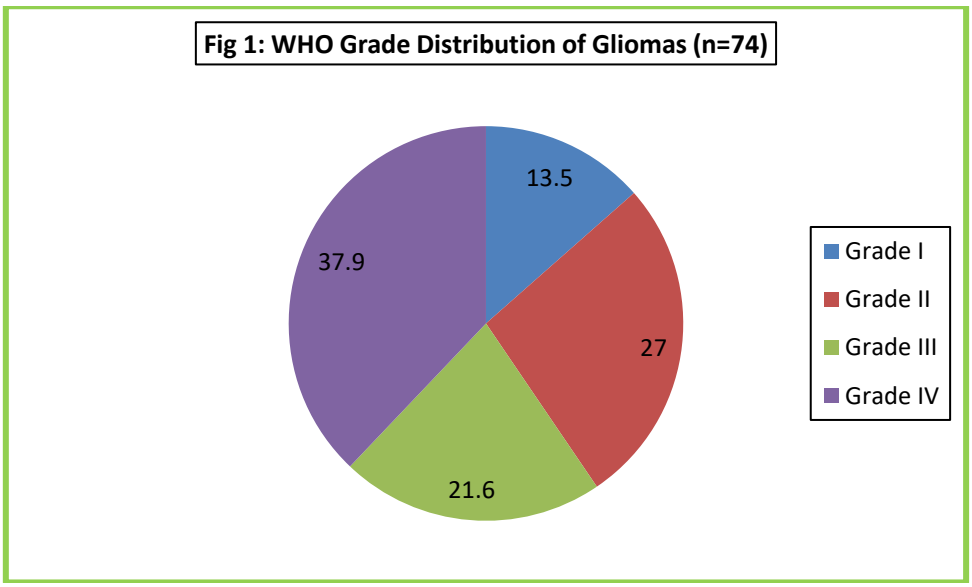
Site	Cases	Percentage (%)
Frontal lobe	38	19.0
Temporal lobe	26	13.0
Parietal lobe	22	11.0
Occipital lobe	10	5.0
Sellar/Suprasellar region	24	12.0
Cerebellum	18	9.0
Cerebellopontine angle	16	8.0
Ventricular system	8	4.0
Meninges/Falx/Convexity	30	15.0
Spinal cord	8	4.0
Total	200	100

A total of 200 cases of central nervous system tumors were evaluated for anatomical distribution. The frontal lobe was the most frequently involved site, accounting for 38 cases (19.0%), followed by the meninges/falx/convexity with 30 cases (15.0%). Temporal lobe tumors constituted 26 cases (13.0%), while lesions arising in the sellar/suprasellar region accounted for 24 cases (12.0%). Parietal lobe involvement was observed in 22 cases (11.0%). The cerebellum and cerebellopontine angle were affected in 18 (9.0%) and 16 (8.0%) cases, respectively. Occipital lobe tumors comprised 10 cases (5.0%). The ventricular system and spinal cord were the least common sites, with 8 cases each, representing 4.0% of the total study population. Overall, supratentorial locations constituted the majority of cases, with the frontal lobe emerging as the predominant anatomical site of involvement. With respect to compartment anatomy, supratentorial constituted 148 tumours and infratentorial made up to 22% CNS tumours as shown in table 3.

Table 4: Distribution of CNS tumors as per Histological Spectrum

Histological Type	Cases	Percentage (%)
Diffuse astrocytic and oligodendroglial tumors	56	28.0
Glioblastoma	18	9.0
Meningioma	52	26.0
Pituitary adenoma	22	11.0
Schwannoma	18	9.0
Medulloblastoma	8	4.0
Ependymoma	6	3.0
Craniopharyngioma	5	2.5
Metastatic tumors	5	2.5
Others	10	5.0
Total	200	100

With respect to the histological distribution of central nervous system tumors, diffuse astrocytic and oligodendroglial tumors accounted for the largest histological group, constituting 56 cases (28.0%) as reflected in table 4. This was followed by meningiomas comprising 52 cases (26.0%), Glioblastomas represented 18 cases (9.0%), while schwannomas were encountered in an equal proportion, accounting for 18 cases (9.0%). Pituitary adenomas constituted 22 cases (11.0%) of the study population. Medulloblastomas and ependymomas accounted for 8 (4.0%) and 6 (3.0%) cases, respectively, followed by craniopharyngiomas and metastatic tumors observed in 5 cases each, representing 2.5% of the total cases. A heterogeneous group of less common neoplasms categorized as "others" comprised 10 cases (5.0%). Clearly, neuroepithelial tumors, including diffuse astrocytic and oligodendroglial tumors, glioblastomas, ependymomas, and medulloblastomas, constituted the predominant category of CNS neoplasms, while meningiomas represented the most common non-neuroepithelial tumor.



The distribution of gliomas according to WHO grade classification demonstrated that Grade IV gliomas constituted the largest proportion, accounting for 37.9% of all glioma cases, which was followed by Grade II tumors representing 27.0%. And Grade III gliomas made upto 21.6% of cases, while Grade I tumors were the least frequent, accounting for 13.5% as shown in Fig 1

DISCUSSION

Age distribution provides important details into the epidemiology of central nervous system (CNS) tumors, as different tumor types exhibit distinct age predilections. In the present study, the highest frequency of tumors was observed in the 41–50 years age group (23.0%), followed by 31–40 years (19.0%) and 51–60 years (17.5%). Thus, the majority of cases occurred between 31 and 60 years of age, indicating a predominance of CNS tumors among middle-aged adults. Our findings are comparable to those reported by Kadaru et al., who observed the highest incidence of CNS tumors in the 41–50 years age group in their clinicopathological analysis.[6] Similarly, Gupta and Goyal reported in their study on 168 histologically confirmed CNS tumors, reported a median age of 41.3 years, with the majority of tumors occurring in adulthood, likewise Thakur et al., demonstrated a nearly identical age pattern, with the maximum number of tumors occurring in the 41–50 years age group (21.1%), followed by the 31–40 years age

group (19.7%).[7,8] The similarity between their findings and the present study suggests that the age distribution of CNS tumors remains relatively consistent across different regions of India. The predominance of middle-aged individuals in the present series may be explained by the histological composition of the cohort.

In the present study, males constituted 57.0% of cases, while females accounted for 43.0%, resulting in a male-to-female ratio of 1.33:1. This finding indicates a modest male predominance among patients with CNS tumors. The results of the present study are comparable to those reported by Kadaru et al., who observed an overall male predominance with a male-to-female ratio of 1.2:1 in their clinicopathological analysis of CNS tumors, similarly, Kumar et al reported that 62.5% of patients with CNS tumors were male and 37.5% were female, yielding a male-to-female ratio of 1.66:1.[6,9] The slightly higher male predominance in that series may be attributed to the greater proportion of malignant gliomas and other high-grade neuroepithelial tumors, which are known to occur more frequently in males. Likewise, Bhattacharya S et al. reported that 54.76% of CNS tumor patients were male and 45.24% were female, producing a male-to-female ratio of 1.21:1.[10] In contrast, Thambi R et al., in a seven-year study from South India involving 510 brain tumors, reported a male-to-female ratio of 0.9:1, indicating a slightly higher proportion of female patients.[11] The authors attributed this finding largely to the high frequency of meningiomas, which represented the most common tumor type among female patients. The male predominance observed in the present study may be explained by the substantial contribution of diffuse astrocytic and oligodendroglial tumors and glioblastomas, both of which have been consistently reported to occur more frequently in males.

The anatomical distribution of central nervous system (CNS) tumors is an important clinicopathological parameter because the location of a tumor often influences its clinical presentation, surgical accessibility, histological type, and prognosis. In the present study, the frontal lobe was the most frequently involved site, accounting for 19.0% of all tumors, followed by the meninges/falx/convexity (15.0%), temporal lobe (13.0%), sellar/suprasellar region (12.0%), and parietal lobe (11.0%). Collectively, supratentorial locations constituted the majority of cases. The predominance of frontal lobe tumors observed in the present study is in agreement with the findings of Kadaru et al., who reported the frontal lobe as the most common site, accounting for 39.8% of all CNS tumors, Masoodi T et al., Andrews et al., and Jalali et al., also reported predominance of frontal lobe tumors in their study.[6,12,13,14] Similar findings have been reported by Larjavaara et al., who observed frontal lobe involvement in 40% of gliomas, followed by temporal (29%), parietal (14%), and occipital (3%) locations.[15] Although the proportion observed in our study (19%) was lower than that reported by Larjavaara et al., the ranking of the frontal lobe as the commonest site remained similar. This difference is likely attributable to the inclusion of all CNS tumors in the present study, whereas Larjavaara et al. evaluated gliomas specifically, which are known to show a marked frontal lobe predilection.[15] Likewise, Abuawad et al., reported the frontal lobe as the most common site for malignant primary brain tumors, accounting for 32.2% of cases.[16] Although the percentage in our study was lower, the frontal lobe remained the predominant location across all studies, suggesting a consistent anatomical predisposition of CNS tumors toward anterior cerebral regions. Temporal lobe tumors accounted for 13% of cases in our series, which was comparable to the 14.2% reported among malignant brain tumors in Abuawad et al., study, although lower than the 29% reported by Larjavaara et al. for gliomas.[15,16] Similarly, parietal lobe tumors constituted 11% of

cases in our cohort, closely approximating the 10.4–14% range reported in large glioma registries and population-based studies.[15] These similarities indicate that the temporal and parietal lobes consistently rank among the major intracerebral locations for CNS tumors. Occipital lobe tumors represented only 5% of cases in the present study. This finding is in agreement with previous reports where occipital involvement ranged from 0.9% of all CNS tumors in the CBTRUS database to 3.5% of CNS tumors in the study by Larjavaara et al., and Kadaru et al study.[6,15] The uniformly low occurrence across studies suggests that the occipital lobe remains one of the least commonly affected cerebral regions.[6,15]Meningeal, falcine, and convexity tumors accounted for 15% of cases in the present study, reflecting the contribution of meningiomas, which commonly arise at these sites. Hosainey et al., reported that 24.7% of meningiomas occurred on the cerebral convexity, 16.1% in parasagittal regions, and 11.4% along the falx.[17] The lower frequency observed in our study compared with the 39.2–40.2% reported by the CBTRUS registry may be due to the higher proportion of intra-axial tumors in our cohort.[18] Sellar and suprasellar tumors constituted 12% of cases, which is consistent with reports indicating that sellar lesions account for approximately 10–15% of intracranial neoplasms. Comparable frequencies have been reported by Abuawad et al. (17.7%) and the CBTRUS registry (18.1–18.2%), with minor differences likely reflecting variations in case mix and referral patterns.[16,18] The cerebellum and cerebellopontine angle accounted for 9% and 8% of tumors, respectively, which are higher than the 1.5% cerebellar involvement reported by Larjavaara et al., likely because our study included a wider range of tumor types, including medulloblastomas, vestibular schwannomas, ependymomas, and posterior fossa meningiomas.[15] Ventricular tumors represented 4% of cases compared with 2.2% reported by Larjavaara et al.[15] Similarly, spinal cord tumors accounted for 4% of cases, slightly higher than the 2.8% reported by the CBTRUS registry.18 These differences may be related to institutional referral patterns and the inclusion of both pediatric and adult patients in the present study.

The histological distribution of central nervous system (CNS) tumors in the present study reveals important patterns when compared with global and regional epidemiological data. Among 200 CNS tumor cases, diffuse astrocytic and oligodendroglial tumors emerged as the most common histological group (28.0%), followed closely by meningioma (26.0%), pituitary adenoma (11.0%), and glioblastoma (9.0%) [Table 4]. The global meta-analysis by Salari et al. (2023), which synthesized data from 80 studies, reported that meningiomas constitute approximately 24.1% of all primary CNS tumors, a figure remarkably similar to our finding of 26.0%.[5] This close alignment suggests that our cohort reflects typical global epidemiological patterns for this tumor type. However, Walsh K et al. from United States, reported higher meningioma proportions (36% of primary CNS tumors), likely due to increased incidental detection through advanced neuroimaging.[19] The 48% meningioma prevalence reported by Sen et al., further demonstrates the substantial regional variation in CNS tumor distribution.[20]

Interestingly, our glioblastoma frequency (9.0%) is notably lower than the global prevalence of 17.7% reported in the meta-analysis by Salari et al., and 14.5 % reported by Grochans S et al.,.[5,21] This lower glioblastoma prevalence in our study could reflect several factors: differences in age distribution within our cohort (glioblastoma incidence peaks between 45-70 years), variations in environmental risk factors, genetic predisposition in our population, or differential access to diagnostic facilities affecting case detection. The combined category of diffuse astrocytic and oligodendroglial tumors (28.0%) in our

study slightly exceeds the global astrocytic tumor prevalence of 20.3% reported by Salari et al.[5] Maurya et al reported that 31.3% of their patients had astrocytic tumors, which is compatible with our study.[22] The predominance of astrocytic tumors in our cohort is consistent with epidemiological observations that tumors involving neuroepithelial cells are more common than other CNS tumor types globally as also reported by Shah et al.[23]Our pituitary adenoma frequency (11.0%) closely mirrors the global prevalence of 12.2%, reported by Salari et al., indicating typical representation of this common CNS neoplasm.[5] Pituitary adenomas are known to have high prevalence in the general population, with epidemiologic studies showing increased detection up to 16.7% following widespread MRI availability (Ezzat s et al).[24] The 1.1 per 100,000 per year incidence rate for acoustic neuroma (vestibular schwannoma) reported in the literature provides context for our schwannoma finding of 9.0%, which is is consistent with the global schwannoma prevalence of 6.7%.[5] Slight elevated schwannoma rate may reflect our facility's particular expertise in skull base tumor management or referral patterns. Medulloblastoma, the most common malignant pediatric brain tumor, accounted for 4.0% of cases in our study, which is slightly is lower than the global medulloblastoma prevalence of 7.7% reported by Salari et al.[5] The lower percentage in our cohort suggests either a smaller proportion of pediatric patients or that our facility serves a predominantly adult population. Our study documented ependymoma (3.0%), craniopharyngioma (2.5%), and metastatic tumors (2.5%) at frequencies consistent with global expectations. The ependymoma rate of 3.0% closely matches the global prevalence of 3.2% reported by Salari et al, demonstrating typical representation of this neuroepithelial tumor.[5] Metastatic tumors comprised a small but significant proportion (2.5%) of CNS tumors in our cohort, consistent with the understanding that CNS metastases represent approximately 10-20% of all intracranial tumors, with variation based on systemic cancer prevalence and diagnostic practices.[5] These findings indicate that the overall histological spectrum in our study broadly parallels international trends, while reflecting the influence of local referral patterns and institutional case composition.

The WHO grade distribution of gliomas in the present study demonstrated that Grade IV gliomas constituted the largest proportion (37.9%), followed by Grade II gliomas (27.0%) and Grade III gliomas. This predominance of high-grade tumors is consistent with findings reported by Anand N et al., in a study of adult diffuse gliomas classified according to the WHO 2016 criteria, observed that Grade IV tumors accounted for 52.7% of cases, followed by Grade III (25.0%) and Grade II tumors (22.3%).[25] Although the proportion of Grade IV gliomas in our study was lower, both studies identified Grade IV gliomas as the most frequent category. Similarly, population-based data from Germany by Weidl D et al., reported that Grade IV gliomas constituted the majority of newly diagnosed gliomas (68.3%), whereas Grade II and Grade III tumors accounted for only 9.0% and 9.2% of cases, respectively.[26] Compared with these findings, our study demonstrated a relatively higher proportion of lower-grade gliomas, particularly Grade II tumors (27.0%), which may reflect differences in referral patterns, patient demographics, and institutional case composition. The predominance of Grade IV tumors in the present study is biologically expected, as glioblastoma and other Grade IV gliomas are characterized by rapid growth, marked infiltrative potential, and earlier clinical presentation.

CONCLUSION

The present study revealed the diverse clinicopathological spectrum of central nervous system tumors, reflecting a wide age range, with a predominance of middle-aged adults and a modest male

preponderance. Anatomically, supratentorial tumors constituted the majority of cases, with cerebral hemispheric locations being more frequently involved than infratentorial regions. Histologically, neuroepithelial tumors formed the largest category of neoplasms, while meningiomas represented the most common non-neuroepithelial tumors. Among gliomas, higher-grade lesions predominated, emphasizing the substantial burden of aggressive glioma subtypes in routine neuropathological practice. We suggest larger multicentric studies with incorporation of molecular classification for comprehensive characterization of the evolving nature of CNS tumors.

Declaration by Authors

Ethical Approval: The study complied with the principles of the Declaration of Helsinki regarding the ethical use of human data and maintenance of patient confidentiality

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Dasgupta A, Gupta T, Jalali R. Indian data on central nervous tumors: A summary of published work. South Asian J Cancer. 2016 Jul-Sep;5(3):147-53. doi: 10.4103/2278-330X.187589.
2. Vadhavekar NH, Sabzvari T, Laguardia S, Sheik T, Prakash V, Gupta A, Umesh ID, Singla A, Koradia I, Ramirez Patiño BB, Siddiqui HF. Advancements in Imaging and Neurosurgical Techniques for Brain Tumor Resection: A Comprehensive Review. Cureus. 2024 Oct 31;16(10):e72745. doi: 10.7759/cureus.72745.
3. Louis DN, Perry A, Wesseling P, Brat DJ, Cree IA, Figarella-Branger D, Hawkins C, Ng HK, Pfister SM, Reifenberger G, Soffietti R, von Deimling A, Ellison DW. The 2021 WHO Classification of Tumors of the Central Nervous System: a summary. Neuro Oncol. 2021 Aug 2;23(8):1231-1251. doi: 10.1093/neuonc/noab106.
4. Jat KC, Vyas SP, Bihari NA, Mehra K. Central nervous system tumors: a histopathological study. Int J Res Med Sci [Internet]. 2016 Dec. 30 [cited 2026 Jun. 23];4(5):1539-45. Available from: https://www.msjonline.org/index.php/ijrms/article/view/757
5. Salari N, Ghasemi H, Fatahian R, Mansouri K, Dokaneheifard S, Shiri MH, Hemmati M, Mohammadi M. The global prevalence of primary central nervous system tumors: a systematic review and meta-analysis. Eur J Med Res. 2023 Jan 20;28(1):39. doi: 10.1186/s40001-023-01011-y.
6. Kadaru MR. Clinico-pathological study of central nervous system tumors [Internet]. Indian J Pathol Oncol. 2019 [cited 2026 Jun 23];6(3):393-399. Available from: https://doi.org/10.18231/j.ijpo.2019.076
7. Gupta PP, Goyal RP. Descriptive epidemiology of central nervous system tumors in rural hospital of central India: 5-year experience [Internet]. IP Indian J Neurosci. 2019 [cited 2026 Jun 06];5(3):150-154. Available from: https://doi.org/10.18231/j.ijn.2019.023
8. Thakur AS, Gahine R, Kulkarni V. A study on morphologic and histological pattern of the central nervous system tumors. Int J Res Med Sci. 2018;6(12):3879-82.
9. Kumar P, Sinha S, Azhar T, Rebba E, Peshattiwar A, Adari B, Gautam G, More S, Sivamoorthy A, Zala J. Retrospective Analysis of Epidemiology of Intracranial and Spinal Tumor in North Western Part of India: 5-Year Observational Study of 1315 Cases. Cureus. 2026 Jan 26;18(1): e102353. doi: 10.7759/cureus.102353.
10. Bhattacharya S, Maiti B, Konar K. Histopathological Profile of Central Nervous System Tumors in a Peripheral Tertiary Care Centre of West Bengal. J Lab Physicians. 2022 Aug 17;15(1):38-44. doi: 10.1055/s-0042-1750067.
11. Thambi R, Kandamuthan S, Sainulabdeen S, Vilasiniamma L, Abraham TR, Balakrishnan PK. Histopathological Analysis of Brain Tumours- A Seven Year Study from a Tertiary Care Centre in South India. J Clin Diagn Res. 2017 Jun;11(6): EC05-EC08. doi: 10.7860/JCDR/2017/25623.9990.
12. Masoodi T, Gupta RK, Singh JP, Khajuria A. Pattern of central nervous system

neoplasms: a study of 106 cases. JK Practitioner. 2012;17(4):42-46.
13. Jalali R, Datta D. Prospective analysis of incidence of central nervous tumors presenting in a tertiary cancer hospital from India. J Neurooncol. 2008 Mar;87(1):111-4. doi: 10.1007/s11060-007-9487-z.
14. Andrews NB, Ramesh R, Odjidja T. Preliminary survey of central nervous system tumors in Tema, Ghana. West Afr J Med 2003 Jun; 22(2):167-72. doi: 10.4314/wajm. v22i2.27942.
15. Larjavaara S, Mäntylä R, Salminen T, Haapasalo H, Raitanen J, Jääskeläinen J, Auvinen A. Incidence of gliomas by anatomic location. Neuro Oncol. 2007 Jul;9(3):319-25. doi: 10.1215/15228517-2007-016.
16. Abuawad M, Daqour A, Alkaiyat A, Rjoub A, Zahra WA, Issa N, Dumaidi Y, Nasser S. Epidemiology of primary brain tumor among adolescents and adults in Palestine: a retrospective study from 2018 to 2023. BMC neurology. 2024 May 23;24(1):168. doi: 10.1186/s12883-024-03677-1.
17. Hosainey SAM, Bouget D, Reinertsen I, Sagberg LM, Torp SH, Jakola AS, Solheim O. Are there predilection sites for intracranial meningioma? A population-based atlas. Neurosurg Rev. 2022 Apr;45(2):1543-1552. doi: 10.1007/s10143-021-01652-9.
18. Price M, Ballard C, Benedetti J, Neff C, Cioffi G, Waite KA, Kruchko C, Barnholtz-Sloan JS, Ostrom QT. CBTRUS Statistical Report: Primary Brain and Other Central Nervous System Tumors Diagnosed in the United States in 2017-2021. Neuro Oncol. 2024 Oct 6;26(Supplement_6):vi1-vi85. doi: 10.1093/neuonc/noae145.
19. Walsh KM. Epidemiology of meningiomas. Handb Clin Neurol. 2020; 169:3-15. doi: 10.1016/B978-0-12-804280-9.00001-9.
20. Sen D, Sarkar P, Banerjee A, Datta A. Histopathological spectrum of CNS tumors: an observational study in a tertiary care centre of North-East India. International Journal of Medical Reviews and Case Reports. 2022 May 6;6(3):1-6. DOI:10.5455/IJMRCR.HistopathologicalSpectrumofCNSTumors
21. Grochans S, Cybulska AM, Simińska D, Korbecki J, Kojder K, Chlubek D, Baranowska-Bosiacka I. Epidemiology of Glioblastoma Multiforme-Literature Review. Cancers (Basel). 2022 May 13;14(10):2412. doi: 10.3390/cancers14102412.
22. Maurya G, Kannaujia SK, Rashmi R, Singh SK, Omhare A, Aggarwal R. The Spectrum of Central Nervous System Tumors at a Tertiary Care Center Primarily Serving a Rural Population. Cureus. 2024 Mar 31;16(3):e57335. doi: 10.7759/cureus.57335.
23. Shah HK, Dongre S, Karle R. Histomorphological spectrum of central nervous system lesions in a tertiary care hospital. Int J Res Med Sci [Internet]. 2021 Dec. 28 [cited 2026 Jun. 23];10(1):86-91. Available from: https://www.msjonline.org/index.php/ijrms/article/view/10430
24. Ezzat S, Asa SL, Couldwell WT, Barr CE, Dodge WE, Vance ML, McCutcheon IE. The prevalence of pituitary adenomas: a systematic review. Cancer. 2004 Aug 1;101(3):613-9. doi: 10.1002/cncr.20412.
25. Anand N, Husain N, Varshney R, Malhotra KP, Kaif M. Molecular classification and stratification of adult diffuse gliomas: A tertiary care center study. J Carcinog. 2021 Oct 11; 20:20. doi: 10.4103/jcar.jcar_17_21.
26. Weidl D, Capper D, Onken J, Liu I, Glaser D, Orben F, Eberle K, Coburger J, Bullinger L. Epidemiology of WHO grade 2 and grade 3 gliomas from 2009 to 2021 in Germany. Journal of Neuro-oncology. 2025 Sep;174(2):391-400. doi: 10.1007/s11060-025-05068-z.

How to cite this article: Waseem Ahmad Shah, Mir Iffat Khurshid, Shazia. Demographic, anatomical, and histopathological characteristics of central nervous system tumors: a retrospective observational study. *Int J Health Sci Res.* 2026; 16(6):202-210. DOI: *https://doi.org/10.52403/ijhsr.20260623*

******