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Literature Review: The Characteristics Of Central Nervous System Tumors

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ABSTRACT

Brain tumors are one of the tumors that have poor progression and can develop into malignancies depending on the location of the tumor. Central nervous system (CNS) tumors include primary tumors and metastatic tumors located in the brain and spinal cord..This research method was conducted with a literature review through the collection of various research journals and obtained 10 samples of related research literature. The results showed that the characteristics of central nervous system tumors were predominantly male, aged ≥18 years, the most common type of primary SPP tumor was glioblastoma, the most common location of lesions was supratentorial and based on the most common complaints were headaches.

Keywords: Characteristics, Tumors, Central Nervous System, Brain, Spinal Cord

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INTRODUCTION

Brain tumors are one of the tumors that have poor progression and can develop into malignancies depending on the location of the tumor. Brain tumors are the result of uncontrolled cell proliferation originating from nerve tissue or supportive tissue (glial) in the brain. There are various types of brain tumors. Most of the growths are localized, but some can spread throughout the central nervous system, and in rare cases can also spread outside the central nervous system.[1]

Central nervous system (CNS) tumors include primary tumors and metastatic tumors located in the brain and spinal cord. The Central Brain Tumor Registry of the United States (CBTRUS) states that the incidence of all primary brain tumors and other central nervous system tumors (except brain lymphoma, pineal and pituitary gland tumors, and olfactory tumors of the nasal cavity) is 23.03 cases per 100,000. Meanwhile, worldwide, the incidence of primary malignant tumors and other CNS tumors in 2012 was 3.4 per 100,000, with a ratio of 3.9 per 100,000 for men and 3.0 per 100,000 for women.[2]

Differentiating metastatic brain tumors from primary brain tumors is essential, as different diagnostic and treatment approaches are required. Primary brain tumors often require immediate surgery for histopathological diagnosis, while the complexity of managing metastatic brain tumors requires a complicated diagnostic journey, especially when the primary tumor is not identified. Diagnostic tools, including imaging and tumor markers, are essential in finding the primary organ and potential metastases.[3]

The absence of routine screening for solid primary tumors without neurological deficits underscores the need to explore the characteristics of metastatic brain tumors. Despite having important implications for patient care and treatment strategies, detailed studies on clinical characteristics and diagnostic approaches are still limited in Indonesia. It is hoped that this literature review can provide useful information regarding the characteristics of central nervous system tumors.

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METHODS

Researchers choose the literature review method. Literature is obtained through scientific journals or articles downloaded from the PubMed-MEDLINE and Google Scholar databases. The next researcher screens articles by referring to the specified criteria, namely the year of publication between 2020-2025 and has relevance to the characteristics of central nervous system tumors. Researchers use several keywords to search for articles, namely "characteristics, tumors, central nervous system".

The data that has been successfully collected will be analyzed narratively in the results and data analysis section in order to find out the relationship between the characteristics of central nervous system tumors**.**

RESULTS

There are 10 research articles used as samples, with details:

1. Gender

7 articles that examine gender variables and 5 research articles that state the characteristics of central nervous system tumors according to gender are mostly male compared to female.

2. Age

6 articles examined the age variable and 6 research articles stated the characteristics of central nervous system tumors based on the largest age, namely >18 years.

3. Type of tumor

7 articles examined the variables of primary CNS tumor types and 5 research articles stated the characteristics of central nervous system tumors based on the most common tumor type, glioblastoma.

4. Location of lesion

4 articles examined the lesion location variable and 5 research articles stated the

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characteristics of central nervous system tumors based on the location of the most common lesion, namely supratentorial.

5. Complaint

2 articles examining complaint variables and 3 research articles stating the characteristics of central nervous system tumors based on the most common complaint, namely headaches.

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Table 1. Characteristics of Literature Review Articles

No	Researcher	Research title	Year of publication	Research methods	Number of samples	Place study
1.	**Yunni Diansari, Hediaty Syafiera, et al.**	"Characteristics of Central Nervous System Tumors at Dr. Mohammad Hoesin General Hospital, Palembang"	2022	Descriptive study	289	Palembang, Indonesia
2.	**Henry Sugiharto, Yunni Diansari, Sheila Stephanie Chandra.**	"Pain Characteristics of Central Nervous System Tumor in Mohammad Hoesin General Hospital"	2020	Descriptive study	99	Palembang, Indonesia

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No	Researcher	Research title	Year of publication	Research methods	Number of samples	Place study
3.	**Chuanwei Wang, Jian Chen, Yanzhao Wang, et al.**	"Genetics and clinical characteristics of genetic tumor syndromes in the central nervous system cancers: Implications for clinical practice"	2024	*Retrospective Study*	258	China
4.	**Ali Amini Harandi, Elham Zarifi, Mohammad Reza Shahmohamadi**	"Prevalence of primary central nervous system tumors in Iran: a retrospective study"	2022	*Retrospective cross-sectional study*	1113	Tehran, Iran

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No	Researcher	Research title	Year of publication	Research methods	Number of samples	Place study
5.	**The authors of this study are:**	"Clinicopathological characteristics of pediatric patients suffering from brain and spinal cord tumors at Sanglah General Hospital, Denpasar, 2014-2018"	2021	Descriptive study	53	Denpasar, Bali
6.	**Maysa Al-Hussaini, Abdallah Al-Ani, Justin Z. Amarin, et al.**	"Epidemiology and Outcome of Primary Central Nervous System Tumors Treated at King Hussein Cancer Center"	2025	*Retrospective cross-sectional study*	2094	Amman 11941, Jordan
7.	**Zahra Tolou Ghamari**	"Preliminary study of central nervous system tumors' prevalence and incidence in *Isfahan Province Iran*"	2020	*Retrospective cross-sectional study*	1043	Isfahan, Iran

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No	Researcher	Research title	Year of publication	Research methods	Number of samples	Place study
8.	**The President of the Republic of Indonesia, I Gusti Ayu Sri Mahendra Dewi, Urged Made Cittarasmi Saraswati Seputra, Ni Putu Sriwidyani.**	"Central Nervous System tumor at "Prof. Dr. IGNG Ngoerah "General Hospital, Denpasar: An epidemiological study between 2020-2022"	2023	*Descriptive study with cross sectional*	221	Bali, Indonesia
9.	**Maher Kurdi, Nadeem Shafique Butt, Saleh Baeesa,**	"Epidemiological distribution of primary central nervous system tumors in the Western Province of Saudi Arabia: a local registry	2021	*Descriptive study with cross sectional*	663	Rabigh, Kingdom of Saudi Arabia

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No	Researcher	Research title	Year of publication	Research methods	Number of samples	Place study
	et al	from neuroscience-affiliated centers”				

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Table 2. Literature Review Results

Researcher	Research title	Results	
Yunni Diansari, Hediaty Syafiera, et al. (2022)	**"Characteristics of Central Nervous System Tumors at Dr. Mohammad Hoesin General Hospital, Palembang"**	Type	Astrocytoma (13.1%)
		Location of tumor	Not listed in the journal
		Age	Not listed in the journal
		Symptom	Headache (36%
		Gender	Female (73%)
Henry Sugiharto, Yunni Diansari, Sheila Stephanie Chandra. (2020)	**"Pain Characteristics of Central Nervous System Tumor in Mohammad Hoesin General Hospital"**	type	Not Listed In Journal
		Location of tumor	Not Listed In Journal
		Age	<45 Years (56.8%)
		Symptom	Headache (56.8%)
		Gender	Female (76.5%)

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Researcher	Research title	Results	
Chuanwei Wang, Jian Chen, Yanzhao Wang., et al. (2024)	**"Genetics and clinical characteristics of genetic tumor syndromes in the central nervous system cancers: Implications for clinical practice"**	type	Glioblastomas (52%)
		Location of tumor	Cerebral hemispheres / Supratentorial (44.96%)
		Age	Not listed in the journal
		Symptom	Not listed in the journal
		Gender	Male (57.36%)
Ali Amini Harandi, Elham Zarifi, Mohammad Reza Shahmohamadi (2022)	***"Prevalence of primary central nervous system tumors in Iran: a retrospective study"***	Type	Glioblastomas (29.6%)
		Location of tumor	Hemisphere (49.5%)
		Age	<20 years
		Symptom	Not listed in the journal
		Gender	Male (63.6%)
(2021).	**"Clinicopathological**	Type	Astrocytoma (22.6%)

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Researcher	Research title	Results	
	characteristics of pediatric patients suffering from brain and spinal cord tumors at Sanglah General Hospital, Denpasar, 2014-2018"	Location of tumor	Not listed in the journal
		Age	10-14 years (28.3%)
		Symptom	Not listed in the journal
		Gender	Male (50.9%)
Maysa Al-Hussaini, Abdallah Al-Ani, Justin Z. Amarin, et al. (2025)	**“Epidemiology and Outcome of Primary Central Nervous System Tumors Treated at King Hussein Cancer Center”**	Type	Glioblastomas (61.9%)
		Location of tumor	Supratentorium (59.3%)
		Age	71-80 years (70%)
		Symptom	Not listed in the journal
		Gender	Male (55%)
Zahra Tolou Ghamari	**“Preliminary study of central nervous system**	Type	Not listed in the journal
		Location of tumor	Not listed in the journal

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Researcher	Research title	Results	
(2020)	**tumors' prevalence and incidence in Isfahan Province, Iran"**	Age	20 and 70 years (71%)
		Symptom	Not listed in the journal
		Gender	Male (59.4%)
I Gusti Ayu Sri Mahendra Dewi, Urged Made Cittarasmi Saraswati Seputra, Ni Putu Sriwidyani (2023)	**"Central Nervous System tumor at "Prof. Dr. IGNG Ngoerah "General Hospital, Denpasar: An epidemiological study between 2020-2022"**	Type	Glioblastomas (20.4%)
		Location of tumor	Supratentorial 29%
		Age	50-59 years (31.5%)
		Symptom	Not listed in the journal
		Gender	Woman
Maher Kurdi, Nadeem	**"Epidemiological distribution of primary**	Type	Glioblastoma (35.3%)
		Location of tumor	Supratentorium (26.4%).

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Researcher	Research title	Results	
Shafique Butt, Saleh Baeesa, et al (2021)	**central nervous system tumors in the Western Province of Saudi Arabia: a local registry from neuroscience-affiliated centers”**	Age	≥18 years (73.7%)
		Symptom	Headache (44.9%)
		Gender	male (53.8%)

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DISCUSSION

From several literatures on the characteristics of central nervous system tumors according to gender, the most common are men with 6 literatures compared to women with 2 literatures. In a study conducted byChuanwei Wang et al. (2024), found that the most common gender was male (57.36%).[5] Zahra et al. (2020), in a retrospective cross-sectional study of central nervous system tumors, stated that the incidence of CNS tumors was high in men (59.4%).[6] Maher et al. (2021) in a study of the epidemiology and distribution of CNS tumors, the incidence of CNS tumors was found in men (53%).[7] In contrast to Yunni et al. (2022) where the incidence of CNS tumors was higher in women than in men.[2] Differences in chromosome composition and sex hormones between the sexes affect the immune response, resulting in a stronger immune response in women than in men.[8]

The incidence of CNS tumors is more common in adults (> 18 years) than in children. Maher et al. (2021) inEpidemiology and distribution of CNS tumors state that the highest incidence is > 18 years.[7] Henry et al (2020) found that the incidence of central nervous system tumors occurred at the age of 41-60 years.[9] This is different from the research conducted by Ali et al (2022) where the highest age occurred at the age of <20 years.[10]

Headache is one of the early and most common symptoms in brain tumor patients. Henry et al (2020), in a descriptive study found that headaches are the most common complaint in CNS tumors.[9] This is in line with research conducted by Maher et al (2021), complaints in CNS tumors are headaches.[7] The pathogenesis of pain associated with brain tumors includes traction processes on vascular and cranial structures, cervical nerve compression, peripheral sensitization processes with neurogenic inflammation, and central sensitization through trigeminovascular afferent fibers in the meninges and cranial blood vessels. Almost all brain tumors produce pain in the same location as the tumor.[7]

In the literature, the most common brain tumor is Glioblastoma. In a study conducted by Masya et al (2025), it was found that the most common CNS tumor is glioblastoma (61.9%). [11]

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Chuanwei et al (2024) found that Glioblastoma is the most common CNS tumor. [5] Kurdi et al (2021) also found that the most common CNS tumor is Glioblastoma. [7] In contrast to the study by Yunni et al (2022), the most common tumor was astrocytoma (13.1%). [2] Putu et al (2021) found that the most common tumor was astrocytoma (22.6%). [1]

The most common tumor location is in the supratentorium. Kurdi et al. (2021) found the most common tumor location was the supratentorium (35.3%).[7] Likewise, in the study by Masya et al. (2025), the most common tumor location was found in the supratentorium (59.3%).[11]

In the literature, glioblastoma tumors are found in adulthood. Many studies confirm that age significantly affects the incidence of glioblastoma (GBM), where most cases occur in individuals over 40 years of age. [12] In the study of I Gusti et al. (2023), patients diagnosed with glioblastoma were found to be 50-59 years old. [4] Masya et al. (2025) found 71-80 years old with glioblastoma. [11] In contrast to the study conducted by Putu et al. (2021), it was found that astrocytoma tumors were most commonly found in children aged 10-14 years.[1]

CONCLUSION

Based on the data from the review of research literature, the characteristics of central nervous system tumors based on gender are mostly male, based on age, mostly ≥18 years, based on the type of primary SPP tumor, mostly glioblastoma, based on the location of the lesion, mostly supratentorial and based on the most complaints, mostly headache.

NOTE

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REFERENCE

1. Pertiwi, PF, Sriwidyani, NP et al. (2021). Clinicopathological Characteristics of Pediatric Patients Suffering from Brain and Spinal Cord Tumors at Sanglah General Hospital, Denpasar in 2014–2018. Udayana Medical Journal.
2. Diansari, Y., Syafiera, H. et al. (2022). Characteristics of Central Nervous System Tumors at Dr. Mohammad Hoesin General Hospital, Palembang. Journal of Medicine and Health: Scientific Publication of the Faculty of Medicine, Sriwijaya University.
3. Sari, RN, Aninditha, T., Rachman, A. et al. (2024). Characteristics of Brain Tumor Metastases at dr. Cipto Mangunkusumo National Referral Hospital. Indonesian Medical eJournal.
4. Dewi, IG, Seputra, DM, Sriwidyani, NP (2023). Central Nervous System tumor at "Prof. Dr. IGNG Ngoerah" General Hospital, Denpasar: An epidemiological study between 2020-2022. Romanian Journal of Neurology
5. Wang, C., Chen, J., Wang, Y. et al. (2024). Genetic and clinical characteristics of genetic tumor syndromes in the central nervous system cancers: Implications for clinical practice. iScience.
6. Tolou-Ghamari, Z. (20200Preliminary study of central nervous system tumors' prevalence and incidence in Isfahan Province Iran. Journal of the Egyptian National Cancer Institute.
7. Kurdi, M., Butt, N.S., Baeesa, S. et al. (2021). Epidemiological distribution of primary central nervous system tumors in the Western Province of Saudi Arabia: a local registry from neuroscience-affiliated centers. Epidemiology and Health.
8. Carrano A, Juarez JJ, Incontri D, Ibarra A, Guerrero Cazares H. Sex-Specific Differences in Glioblastoma. Cells. 2021 Jul 14;10(7):1783. doi: 10.3390/cells10071783. PMID:

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34359952; PMCID: PMC8303471.

9. Sugiharto, H., Diansari, Y., Chandra, SS (2020). Pain Characteristics of Central Nervous System Tumor in Mohammad Hoesin General Hospital. Journal of Medicine and Health: Scientific Publication of the Faculty of Medicine, Sriwijaya University.
10. Harandi, A.A., Zarifi, E., Shahmohammadi, M.R. (2022). Prevalence of primary central nervous system tumors in Iran: a retrospective study. Universa Medicina.
11. Al-Hussaini, M., Al-Ani, A., Amarin, J. Z (2025). Epidemiology and Outcome of Primary Central Nervous System Tumors Treated at King Hussein Cancer Center. Cancers.
12. rochans 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. PMID: 35626018; PMCID: PMC9139611.

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