22. The Profile of Brain Tumor Cases in RSUD Dr Soetomo, Surabaya

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The Profile of Brain Tumor Cases in RSUD Dr Soetomo, Surabaya

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ABSTRACT

Brain tumor is a condition affecting many people worldwide.Patients often had similar functional neurological symptoms even if the type of tumors diagnosed were entirely different at a later stage.Some of the neurological symptoms were tingling in the feet, changes in eyesight,tremors in the extremities, headaches or migraines and more. Patients who suffer from brain tumor go through a screening process to identify the cause of the problem. Factors such as age and gender was observed in this study which affected the data distribution of brain tumors. This study aimed to find the data distribution of the brain tumor cases in RSUD Dr Soetomo. The results obtained showed that the highest number of brain tumor found were meningiomas followed by unspecified brain neoplasms as the second highest and adenomas being the third highest tumor type found in RSUD Dr Soetomo. The total number of female patients with brain tumor were higher than that of males. The median age of the patients was found to be 45. The highest number of tumor cases were seen in the adult age group followed by teens, children and elderly. The benign tumor type is found to be higher in number as compared to malignant. The number of supratentorial tumors are also found to be higher than infratentorial overall.

Keywords: age; gender; brain tumor

INTRODUCTION

McKinney has stated "brain tumours are referred to a mixed group of neoplasms originating from intracranial tissues and the meninges with degrees of malignancy ranging from benign to aggressive"[(1).] Some patients may even experience silent symptoms such as a loss of balance,minor loss of vision, ringing in the ears(tinnitus) and more. When a brain tumor forms, this would lead to an increase in pressure in the head and this would cause side effects such as the headache and vomiting and several other symptoms stated above. This is in parallel to the Monro-Kellie doctrine which stated that "Monro–Kellie doctrine, or hypothesis, is that the sum of volumes of brain, CSF, and intracranial blood is constant.An increase in one should cause a decrease in one or both of the remaining two"[(2).]

This research which is conducted in Surabaya aims to observe the data distribution of various types of brain tumor that is prevalent in RSUD Dr Soetomo.A research conducted by Porter et al stated that "The female prevalence rate (264.8 per 100 000) was higher than that in males (158.7 per 100 000). The averaged prevalence rate for malignant tumors (42.5 per 100 000) was lower than the prevalence for nonmalignant tumors (166.5 per 100 000)"[(3)].

Gender and age could be factors that influence the distribution of brain tumor cases in the population.This topic was chosen because of the increasing incidence in the number cancer of the brain and CNS worldwide.The author Miranda-Filho et al has stated that "a marked annual increase was found in many South American countries: in Brazil, Colombia, and Ecuador with mean increases of 3.3%, 1.3%, and 1.1% per annum, respectively. Two countries in eastern Europe (Poland and the Russian Federation) and one in southern Europe (Slovenia) also exhibited increasing average annual rates, of 2.7%, 1.9%, and 2.6%, respectively"[(4)].

Therefore, there should be more research regarding the data distribution of brain tumor incidences in general.This research aims to provide data for students and health workers in the near future as a form of reference alongside obtaining the data distribution of brain tumor types found in the patients admitted to RSUD Dr Soetomo.

METHODS

This research was a descriptive cross-sectional study of brain tumors observed from the year 2015 to 2018 using medical records. The data obtained were from the Neurosurgery and Neurology departments. Ethical clearance was obtained from the "Pusat pengembangan dan penelitian"(Litbang) which is located within the hospital before proceeding with data collection. Total sampling was conducted in this research. However, only

307 of the data were used in this out of the 521 of the total records collected who met the inclusion criteria. The inclusion criteria involves the medical records of patients with brain tumor pertaining sufficient information for the purposes of this research. The exclusion criteria were medical records that were missing crucial data that was required for this research. Records of data of patients of all age groups and gender was used in this research.

RESULTS

Gender Distribution of the Brain Tumor Patients

The data distribution depicts females to males are at a ratio of 1.98:1 which shows that female patients are almost double the amount of male patients admitted.

Table 1. The gender distribution of brain tumor patients

Gender	Frequency	Percent
Male	103	33.6%
Female	204	66.4%

Age Distribution of the Brain Tumor Patients

The total sampling of data provided of the patients being admitted for brain tumor indicates that from a total of 307 patients, the median age is is 45 and the mode is the age 50.The highest age being 85 which was the maximum and the lowest age being 4 which was the minimum age were also obtained.The bar chart indicates that the highest number of brain tumor patients admitted were from the adults with a number of 240(78.2%) followed by teens with a number of 29(9.4%),children with a number of 24(7.8%) and elderly with 14(4.6%) in order of highest to lowest patient count.Children are those from the ages of 2-11.Teens are from the ages of 12-17.Adults are anyone above the age of 18 till 64.Elderly are those from the age of 65 onwards..

Table 2. The age distribution of brain tumor patients

Age group	Frequency	Percent
Children	24	7.8%
Teen	29	9.4%
Adult	240	78.2%
Elderly	14	4.6%

Data of distribution of crosstabulation between gender and final diagnosis

The total number of brain tumor cases involving females was higher than males in the data recorded.Females in general have shown a higher number of cases of meningioma which was 87 patients where as 25 patients in males in comparison.The number of tumors recorded was found to be higher in males than females in certain exceptions such as cases of astrocytoma,cysts, glioblastoma and glioma.

Table 3. The crosstabulation between gender and final diagnosis

Final Diagnosis	Female	Male	Total
Adenoma	14	5	19
Astrocytoma	2	7	9
chondroma	1	1	2
Craniopharyngioma	8	4	12
Cyst	0	4	4
Glioblastoma	0	1	1
Glioma	5	9	14
Hemangioblastoma	1	0	1
Hemangioma	1	0	1
Hemangiopericytoma	1	0	1
Medullablastoma	6	5	11
Melanoma	1	0	1
Meningioma	87	25	112
Neuroblastoma	0	1	1
Neurocytoma	0	1	1
Oligodendroglioma	0	1	1
Osteoma	4	1	5
Pseudotumor	2	2	4
Retinoblastoma	0	1	1
Schwanomma	7	3	10
Unspecified	64	32	96

Crosstabulation Between Gender and Tumor Type

Based on the data above from the table, it is evident that the number of cases for benign tumor appeared to be higher than malignant tumor cases in both genders.The number of benign number appeared to be almost 6 times higher than the malignant number in females.The difference between benign and malignant tumors in males

do not appear to be as significant as those observed in females as there was a clear disparity between the values.Benign tumor was mainly contributed by the female population of 129 (71.3%) patients as compared to the malignant tumor type which was mainly contributed by the male gender 29(56.9%) based on the percentage within the tumor type.

Table 4. The crosstabulation between gender and tumor type

		Tumor type			Total
		Benign	Malignant	Unspecific	
Gender	Female	129	22	53	204
	Male	52	29	22	103

Crosstabulation Between Gender and Tumor Region

The highest number of tumor occurs in the supratentorial region which was about 190(61.9%) of the total of 307.The cases of infratentorial(49) tumors which was about 79% and supratentorial(126) tumors which makes up about 66.3% is found to be higher in females than males within the respective regions compared.

Table 5. The crosstabulation between gender and tumor region

		Tumor Region			Total
		Infratentorial	Supratentorial	Unspecific	
Gender	Female	49	126	29	204
	Male	13	64	26	103

Data distribution of Age Groups Against Final Diagnosis of Brain Tumor Patients

Based on the results obtained , the breakdown indicates cyst, medullablastoma and retinoblastoma were the only diagnosis of brain tumors that had higher numbers in other age groups apart from adults.Medullablastoma has recorded 5 patients in teens, 4 patients in children and 2 patients in adults.Cysts are an inclusive of the several different type of cysts such as porenchepalic cyst,arachnoid cyst,lateral cyst and external cyst.3 patients were from the children age group where as 1 was from the adult age group for cysts.Retinoblastoma was found in only 1 patient that came from the children age group.Adenoma was primarily contributed by adults with a number of 18 patients followed by the elderly age group with only 1 patient.All 9 patients for astrocytoma came from the adult age group.Chondroma had only 2 patients and both were from the adult age group.Meningioma which was the highest tumor type found, had a breakdown of 96 patients from the adult age group followed by 8 patients from the elderly age group,teen age group with 6 patients and children with only 2 patients.The remainder of the tumor cases are more profound in the adult age group compared to the rest.

Table 6. The crosstabulation between age groups and final diagnosis

	Age groups				
Final Diagnosis	Children	Teen	Adult	Elderly	Total
Adenoma	0	0	18	1	19
Astrocytoma	0	0	9	0	9
Chondroma	0	0	2	0	2
Craniopharyngioma	3	6	3	0	12
Cyst	3	0	1	0	4
Glioblastoma	0	0	1	0	1
Glioma	1	3	10	0	14
Hemangioblastoma	0	0	1	0	1
Hemangioma	0	0	1	0	1
Hemangiopericytoma	0	0	1	0	1
Medullablastoma	4	5	2	0	11
Melanoma	0	0	1	0	1
Meningioma	2	6	96	8	112
Neuroblastoma	0	0	1	0	1
Neurocytoma	0	0	1	0	1
Oligodendroglioma	0	0	1	0	1
Osteoma	1	0	4	0	5
Pseudotumor	0	0	4	0	4
Retinoblastoma	1	0	0	0	1
Schwanomma	0	0	10	0	10
Unspecified	9	9	73	5	96

Crosstabulation Between Age Groups Against Region of Brain Tumor

It is evident that all the tumor that has been found happens to be the highest in the adult age group which recorded about 240(78.2%).It is observable that the number of infratentorial and supratentorial tumors were the same in the children age group which was at 10 respectively.The number for the unspecific or unclear tumor is

4.The number of supratentorial tumors(48.3%) appeared to be higher in the infratentorial tumor(37.9%) in the teen age group.The number of supratentorial tumor was found to be significantly higher than infratentorial in the adult age group at a ratio of 4:1.The number of supratentorial tumors(64.3%) were also found to be higher than the infratentorial tumors(14.3%) in the elderly age group.

Table 7. The crosstabulation between age groups and region of brain tumor

Age group	Tumor region			Total
	Infratentorial	Supratentorial	Unspecific clear	
Children	10	10	4	24
Teen	11	14	4	29
Adult	39	157	44	240
Elderly	2	9	3	14

Crosstabulation Between Age Groups Against Tumor Type

The number of benign tumor appeared to be the highest in the adult age group with a value of 148 patients which made up about 81.8% of the total benign tumor type.The number of malignant tumors appeared to be the highest in adult age groups as well, with 37 patients which made up about 72.5% of the total malignant tumor type.Adult age group appeared to have the highest number for all tumor types found.Benign was found to be higher than malignant tumor type overall for all age groups.

Table 8. The crosstabulation between age groups and tumor type

Age group	Tumor type			Total
	Benign	Malignant	Unspecific	
Children	10	6	8	24
Teen	13	8	8	29
Adult	148	37	55	240
Elderly	10	0	4	14

Final Diagnosis Distribution of the Patients with Brain Tumor

The data obtained indicated that the mode number was 112(36.5%) which was meningioma as the diagnosis with the highest frequency followed by unspecified brain neoplasm which had a value of 96(31.3%) and adenoma as the third highest diagnosis with a value of 19(6.2%) patients based on 307 patients data.

Table 9. The final diagnosis distribution of patients with brain tumor

Final diagnosis	Frequency
Adenoma	19
Astrocytoma	9
Chondroma	2
Craniopharyngioma	12
Cyst	4
Glioblastoma	1
Glioma	14
Hemangioblastoma	1
Hemangioma	1
Hemangiopericytoma	1
Medullablastoma	11
Melanoma	1
Meningioma	112
Neuroblastoma	1
Neurocytoma	1
Oligodendroglioma	1
Osteoma	5
Pseudotumor	4
Retinoblastoma	1
Schwanomma	10
Unspecified	96

Distribution of the Brain Tumor Based on the Region

About 190(61.9%) of the total number of the patients had tumors located in the supratentorial region of the brain.About 62(20.2%) of them had tumors located in the infratentorial region.There were 55(17.9%) of the patients who had tumors that have unspecific or uncertain region of tumor.

Table 10. The brain tumor distribution based on region.

Tumor type	Frequency	Percent
Infratentorial	62	20.2%
Supratentorial	190	61.9%
Unspecific	55	17.9%

Distribution of the Brain Tumor Type

The highest frequency of brain tumor type was benign at 181(59.0%)patients followed by 51(16.6%) patients with malignant tumors and the remainder of 75(24.4%) with an unspecified type.

Table 11. The type of brain tumor distribution

Tumor type	Frequency	Percentage
Benign	181	59.0%
Malignant	51	16.6%
Unspecific	75	24.4%

DISCUSSION

Gender Distribution of Brain Tumor Patients

The data distribution of gender encompasses both male and female sex. The distribution showed that females numbers were two times higher than males at a ratio of 2:1. This result was not in parallel to the studies that have been conducted widely prior and accepted by many, which indicates that the likeliness of a male developing brain tumor is higher than a female.Observing the breakdown of the data obtained,the tumor type with the highest incidence frequency was meningioma in RSUD Dr Soetomo.Meningioma has a higher probability of occuring in females than males. In support of this study,Wiemels, Wrensch and Claus, has stated that "An association between hormones and meningioma risk has been suggested by a number of findings including the increased incidence of post-pubertal disease in women versus men (2:1) with the highest ratio of 3.15:1 during the peak reproductive years, the presence of estrogen, progesterone, and androgen receptors on some meningiomas, an association between breast cancer and meningiomas , indications that meningiomas change in size during the luteal phase of the menstrual cycle and pregnancy, and the regression of multiple meningiomas in a patient following cessation of estrogen agonist therapy"[4].

Age Distribution of Brain Tumor Patients

The data distribution indicated that the mode age was 50. The median age was 45. The median age of brain tumor was 59 based on studies conducted worldwide which indicated that the target age group affected were adults. Adults had the highest number of cases as compared to other age groups like children, teens and elderly. Benign tumors were more in number than malignant tumors overall. This was because benign tumors were much more common than malignant tumors. The number of supratentorial and infratentorial tumor were the same in the children age group where as the number of supratentorial was higher than infratentorial in the teen, adult and elderly age group. The results of this study which states that the number of supratentorial was overall higher than infratentorial is in parallel to a study conducted by Saha et al. which also found that "In the present study supratentorial involvement (97.2%) was much more commoner than infratentorial involvement (2.8%) and of which parietal lobe was the commonest site of involvement constituting 48% of all lesion"[5]. The occurance of brain tumor is generally found to increase with age as well. This suggests that the results obtained which indicates that the supratentorial lesions are much more common than infratentorial lesions is supportive of some studies which have already been conducted in the past.

Data Distribution of Final Diagnosis of Brain Tumor Patients

The highest specific tumor type happens to be meningioma. This was in relation to the gender distribution of data which showed that there are more female patient data found and used than males. This was highly linked to the fact that more women have a higher tendency to be diagnosed with meningioma as compared to males in studies conducted worldwide. This was also linked to the fact that most of the patients admitted during the span of 2015-2018 are women in RSUD Dr Soetomo, which made meningioma the highest tumor type found in this study.For example, a study conducted by Baldi I, Engelhardt J, Bonnet C, Bauchet L, Berteaud E, Grüber A et al indicated that "Female incidence is about three-fold the male incidence, with the largest difference observed between 30 and 59 years (up to 3.6 fold)"[6].This goes to show that likeliness of meningioma occuring in women is higher than men.

Data Distribution of Brain Tumor Based on Region of Tumor

According to the data found, 61.9% of the total tumor is focused on the supratentorial region where as only 20.2% is focused on the infratentorial region. The incidence of supratentorial tumor is known to be more common than infratentorial and as a result it contributes to more of the total tumor percentage. The supratentorial region which is anything above the tentorium cerebelli happens to have a bigger volume in comparison to the volume of the region below the tentorium which is the infratentorial region.

Data Distribution of Brain Tumor Based on Tumor Type

The data shows that there are more benign tumors than malignant tumors overall. Benign tumors contributes to almost 59.0% of the total tumor type which indicates that it is much more common than its

cancerous counterpart with a ratio of 3.55:1.This is further supported by the statement from the results obtained through an incidence study. The results obtained this study involving the record of 307 patients is still not far off in comparison to some studies conducted. Unspecific refers to neoplasm of the brain which could either be benign or malignant.Unspecified could belong to either C71 or D33 based on the ICD classification.[7]

CONCLUSION

In an attempt to reduce and monitor the number of individual brain tumor cases,multidisciplinary actions have to be taken by the responsible groups.The lack of health awareness could also be a potential contributor to a rise the number of cases not just in Surabaya but also worldwide.The incidence of brain tumor is widely affected by numerous factors such as age and gender.Studying the effects of behaviour and many other factors on the tumor distributions could be done.Based on the results obtained, it is important for institutions such as schools,colleges and universities to emphasize on the importance of identifying signs and symptoms of the most common types of brain tumors such as meningioma which has recorded the highest frequency within the span of 3 years especially among women as early as possible to ensure a better quality of life for the general public and to create awareness in all age groups regardless of gender.The caretakers or parents could play a role in instilling proper values especially when it comes to stressing the importance of knowing the early sign and symptoms of brain tumors as this could ensure a proper up bringing and a better future for the upcoming generations as this could potentially save more lives.Synergistic efforts are necessary to ensure that the brain tumor cases are well handled and well identified among the general public.The adults have the highest tumor frequency observed which may indicate a necessity in giving more exposure regarding brain tumors to this age group as a medium to educate and expand their knowledge regarding brain tumors.More studies regarding age and gender related brain tumors should be done in the future for the betterment of the human kind.

REFERENCES

1. McKinney P. Brain tumours: incidence, survival, and aetiology. Journal of Neurology, Neurosurgery & Psychiatry. 2004;75(suppl_2):ii12-ii17.
2. Mokri B. The Monro-Kellie hypothesis: Applications in CSF volume depletion. Neurology. 2001;56(12):1746-1748.
3. Porter K, McCarthy B, Freels S, Kim Y, Davis F. Prevalence estimates for primary brain tumors in the United States by age, gender, behavior, and histology. Neuro-Oncology. 2010;12(6):520-527.
4. Miranda-Filho A, Piñeros M, Soerjomataram I, Deltour I, Bray F. Cancers of the brain and CNS: global patterns and trends in incidence. Neuro-Oncology. 2016:166.
5. Wiemels J, Wrensch M, Claus E. Epidemiology and etiology of meningioma. Journal of Neuro-Oncology. 2010;99(3):307-314.
6. Saha A, Ghosh S, Roy C, Choudhury K, Chakrabarty B, Sarkar R. Demographic and clinical profile of patients with brain metastases: A retrospective study. Asian Journal of Neurosurgery. 2013;8(3):157.
7. Baldi I, Engelhardt J, Bonnet C, Bauchet L, Berteaud E, Grüber A et al. Epidemiology of meningiomas. Neurochirurgie. 2018;64(1):5-14.

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