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## Profile of meningioma patients at Prof. Dr. Margono Soekarjo General Hospital, Purwokerto, Banyumas, Central Java



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### ABSTRACT

**Introduction:** Meningiomas are the most common primary brain tumors with a percentage of 36.4% of all primary central nervous system tumors and 14.3 – 19% of all intracranial tumors. Meningiomas are benign and slow-growing tumors. Meningioma occurred in females more often than in males.

**Methods:** We collected data from medical records retrospectively from all meningioma patients who were operated on and examined with anatomical pathology in Prof. Dr. Margono Soekarjo General Hospital, from January 2020 to December 2021. Data collected were gender, age, place of origin, location of meningioma, and clinical manifestations.

**Results:** A total of 180 patients were diagnosed with meningioma from January 2020 – December 2021. Meningioma occurred in females more often than in males (female:male = 8.78:1). The peak incidence was in 41 to 50 years old (46.67%). The place of origin was mostly from Banyumas (25.56%). The location of tumors was mostly convexity (31.67%), followed by sphenoid (16.11%), and parasagittal (8.89%). The most common clinical manifestation was headache (93.33%), followed by visual impairment (49.44%), and motor paresis (26.11%).

**Conclusion:** Meningioma occurred in females more often than in males and the peak incidence was age 41 to 50 years old. Tumors were located mostly on convexity and the most common clinical manifestation was headache.

**Keywords:** brain, characteristic, meningioma, tumor.

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## INTRODUCTION

Meningiomas are the most common primary brain tumors accounting for 36.4% of all primary central nervous system tumors and 14.3 – 19% of all intracranial tumors.<sup>1-3</sup> Meningiomas are benign and slow-growing tumors. They occur more commonly in women than in men, with an incidence ratio of 1.8:1.<sup>1</sup> Meningiomas arise from the meningotheial cells of the arachnoid layer.<sup>1</sup> Meningioma-forming cells are thought to be cells that form arachnoid villi, namely arachnoid cap cells.<sup>2,4</sup> The radiological appearance is often obtained as a homogeneous mass on a dura mater basis.<sup>5</sup> In addition to meningiomas, the female sex is more at risk for the incidence of other primary brain tumors. In a study at Kariadi Hospital Semarang the ratio of women compared to men was 1.61:1.<sup>6</sup> Some of these tumors are characterized by dependence on the

hormones progesterone or estrogen, thus making their prevalence higher in women.<sup>7,8</sup> The risk of meningioma peaks at age 45 with a median at age 65 and the risk increases with age.<sup>1,9</sup> In the study at Kariadi Hospital Semarang, the age group with the highest incidence was in the 41 – 50 year age group, with as many as 24 of the total 43 cases of meningioma.<sup>6</sup> The incidence of meningiomas is higher in blacks than in whites and is more common in African-Americans.<sup>9,10</sup> The use of hormonal contraception is also a risk factor for the occurrence of meningiomas. Wahyuhadi *et al.* reported that 96 patients with meningiomas had a history of contraceptive use.<sup>11</sup>

## METHODS

The research was descriptive epidemiological research to describe the

characteristics of meningioma patients in Margono Soekarjo General Hospital, Purwokerto, Banyumas. Data were taken from inpatient medical records from January 1<sup>st</sup> 2020 to December 31<sup>st</sup> 2021. The participants were all inpatients who came from the emergency department and outpatient clinic and were diagnosed with meningioma with anatomical pathology examination. The data collected were gender, age, place of origin, tumor location, main symptoms, and additional symptoms. The collected data were analyzed descriptively to perceive the meningioma characteristics. Exclusion criteria were meningioma patients who did not undergo surgery. Data were collected by two persons no missing data was encountered during the period. The diagrams were created with a Google spreadsheet.

## RESULTS

There were 186 meningioma cases at Margono Soekarjo General Hospital from January 1<sup>st</sup> 2020 to December 31<sup>st</sup> 2021. Three participants were excluded due to residual cases, and three were excluded due to refusing surgical treatment. Therefore, 180 participants were included in this study.

The participants consisted of 158 women (87.78%), and 22 men (12.22%) with a ratio of (7.18:1) (Figure 1). Age variance ranged from the youngest 5 years to the oldest 70 years. Participants were divided according to age into eight groups, first less than equal to 20 years (n = 4; 2.22%), 21 – 30 years (n = 4; 2.22%), 31 – 40 years (n = 28; 15.56%), 41 – 50 years (n = 84; 46.67%), 51 – 60 years (n = 47; 26.11%), 61 – 70 years (n = 13; 7.22%), 71 – 85 years (n = 0, 0%), and more than 85 years (n = 0, 0%) (Figure 2).

Based on the place of origin patients come from 16 regions, mostly participants came from Banyumas (n = 46; 25.56%), followed by Cilacap (n = 29; 16.11%), and Brebes (n = 21; 11.67%) (Figure 3). Based on the location of the meningiomas, convexity was the most common location (n = 57; 31.67%), then followed by sphenoid (n = 29; 16.11%), and parasagittal (n = 16; 8.89%) (Figure 4). Most of the clinical symptoms were headache (93.33%), then followed by visual impairment (49.44%), and motor paresis (26.11%) (Figure 5).

## DISCUSSION

The diagnosis of meningioma is based on history, physical examination, and radiological investigations. Meningioma can be evaluated with magnetic resonance imaging (MRI) or contrast-enhanced computed tomography (CT) scan if patients are not fit for MRI. In a CT scan, the tumor can be visualized as hyperostosis and in contrast-enhanced head CT scan, most meningiomas appear as homogenous dense enhanced dural-based lesions with or without brain edema. The presence of tumor calcifications and hyperostosis, as seen in cases of ossified meningiomas and en plaque meningioma, is better assessed with head CT scans. While on non-contrast head CT scan appear as hyperdense or isodense dural-based lesions.<sup>12</sup>

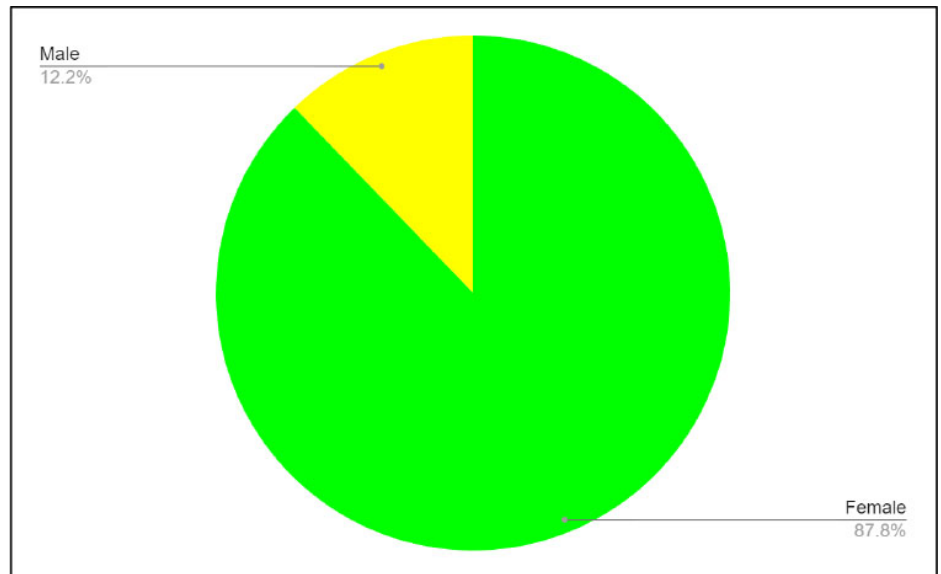


Figure 1. Gender of the meningioma patients.

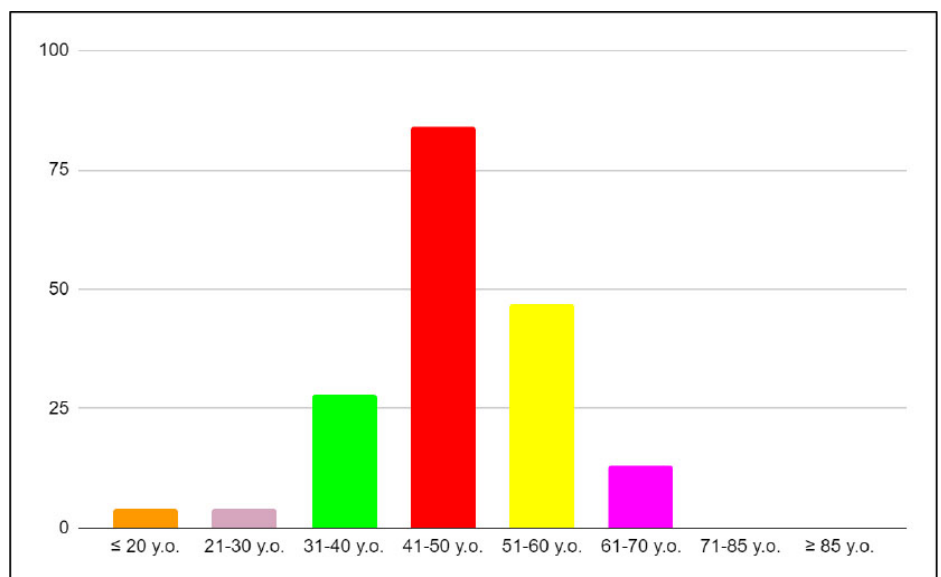
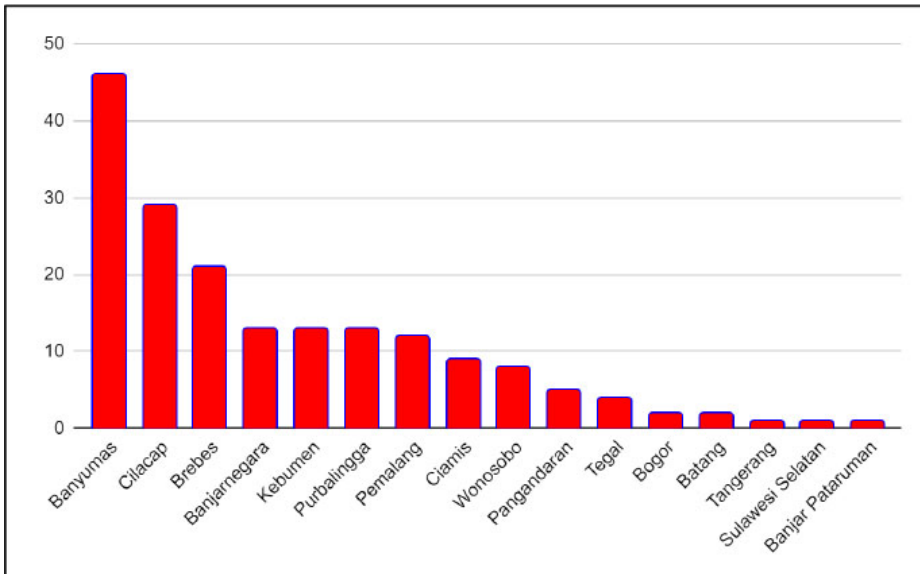


Figure 2. The age group of meningioma patients.

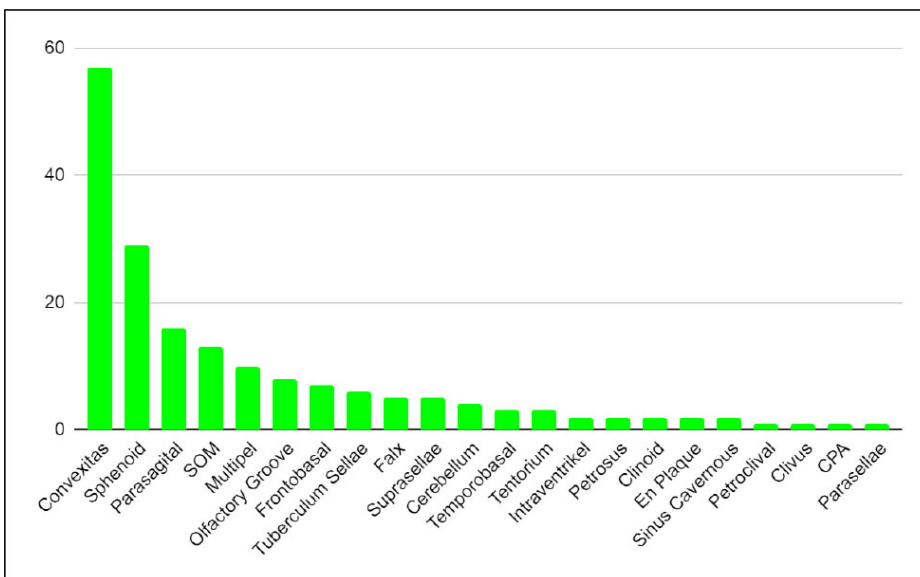
In this study, the incidence of meningioma was more frequent in women than in men, with a ratio of women: men = 7.18:1. This result is consistent with the literature that reported the tumor was more commonly occurred in women than in men with an incidence ratio of 1.8:1. Meningioma commonly occurred in the age group of 31 – 40-year-old. Other literature reported that the occurrence of meningiomas was more frequent in 41 – 50-year-old groups. In this study, we found that age groups 41 – 50 years old were the second most common. The place of origin was mostly from Banyumas, which may relate to the location of the hospital. As far

as we know, no similar research has been done before in Banyumas.

In this study, we found that most meningiomas were located in skull convexity. This result is consistent with other literature that reports a similar result.<sup>13</sup> Most intracranial meningiomas are located supratentorial. They are commonly seen in the parasagittal, brain convexity, sphenoid ridge, anterior and posterior parafalcine areas, and olfactory grooves. Other reported locations of intracranial meningiomas include suprasellar, posterior fossa (cerebellopontine), intraventricular, and intraorbital areas.<sup>14</sup> Another study reported that the majority



**Figure 3.** Place of origin of the meningioma patients.



**Figure 4.** Location of meningioma.

of intracranial meningiomas were found in the cerebral convexity (20.8%), parasagittal (16.1%), and falx (11.4%).<sup>13</sup> Most spinal meningiomas are located in the thoracic spine.<sup>15</sup> In this study, we found that meningioma patients mostly complained of headaches.

The limitation of this study is the lack of time for sampling from medical record data, so data only can be taken from January 1<sup>st</sup> 2020 until December 31<sup>th</sup> 2021. The next research should be done over a longer period. The data was also obtained from medical records that can be biased due to history taking.

## CONCLUSION

In this study, the incidence of meningioma was more frequent in women than in men which age group mostly in young adults. The most frequent location was convexity and most patients complained of headache.

## CONFLICT OF INTEREST

No conflict of interest to declare.

## AUTHOR CONTRIBUTION

Authors took part in the case report, contributed to data collection, participated in writing the manuscript and all agree to

accept equal responsibility for the accuracy of the content of this case report.

## FUNDING

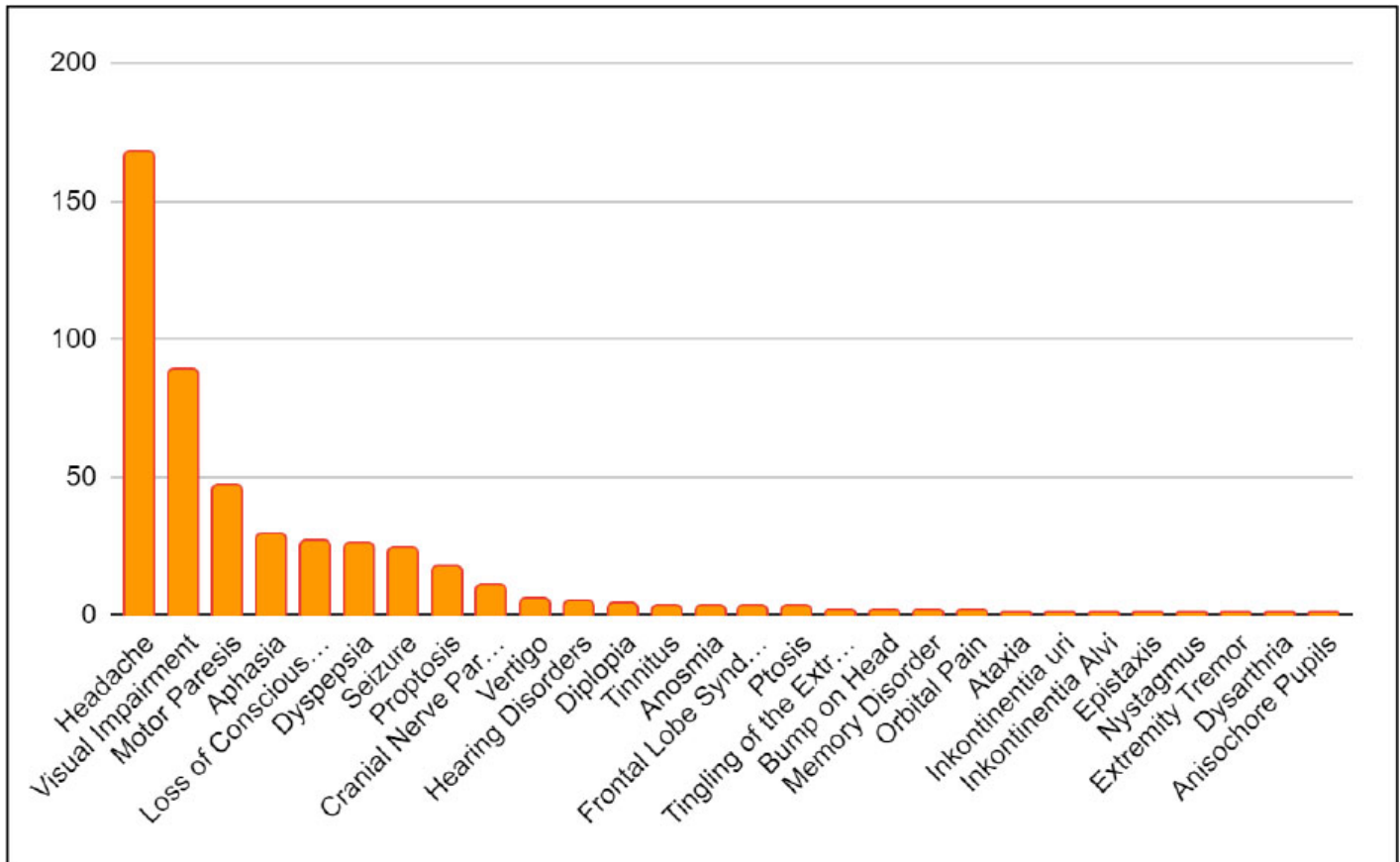
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## ETHICAL APPROVAL

This study has received ethical approval from Margono Soekarjo General Hospital with ethical approval number 420/00833, based on WHO-CIOMS 2016.

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**Figure 5.** Clinical symptoms of meningioma patients.

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