

## Original Research Article

## Brain Tumor Spectrum of Patient Attending at a Tertiary Care Hospital in Bangladesh

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**Abstract: Background:** Treatment of brain tumors is in needed of combined efforts by multiple specialists from neurosurgery, neuroradiology, neuropathology, oncology and radiotherapy. The outcome is worse in developing countries compared to developed countries because of deficiencies in proper registry, lack of awareness, timely diagnosis, availability and co-ordination of multiple specialist's comprehensive management and high abandonment rates. **Aim of the study:** The aim of this study was to assess the brain tumor spectrum of patient attending at a tertiary care hospital in Bangladesh. **Materials and Methods:** This observational prospective study was conducted in the Department of Radiology and Imaging, Enam Medical College & Hospital, Savar, Dhaka, Bangladesh during the period from January 2016 to December 2019. Ethical clearance was obtained from the mentioned hospital. In total 120 patients with brain tumors were finalized as the study population. The age of the participants was 20 years and above. Statistical analysis was performed using SPSS, version 20. **Results:** In this study male were dominating in number and the male-female ratio was 1.3:1. We found, the highest number participants 41-50 years, 31.67%(n=38) followed by 31-40 years of 27.50%(n=33) and 20-30 years of 17.50%(n=21). As clinical presentations, we observed, headache was associate in the highest number 59 in number, followed by seizure 41, vomiting 28, visual disturbances 9, gait disorder 7 and cranial nerve palsy were 4 participants respectively. In analyzing the spectrum of brain tumors we found, the frequencies of astrocytic tumor (42.50%), meningioma (14.17%) oligodendroglial tumor (10%) and embryonal tumor (7.50%) were noticeable besides other brain tumors. **Conclusion:** Males are dominating in number among the patients with brain tumors. Astrocytic tumors are most common subtype in Bangladesh. However, neoplasms of WHO grade 1 are more frequent brain tumors. Headache, seizure and vomiting are the most common clinical presentations among patients with brain tumor.

**Key words:** Brain, tumors, study, number, hospital, Bangladesh.

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### I. INTRODUCTION

Treatment of brain tumors is in needed of combined efforts by multiple specialists from neurosurgery, neuroradiology, neuropathology, oncology, and radiotherapy. The outcome is worse in developing countries compared to developed countries because of deficiencies in proper registry, lake of awareness of patients, failure of timely diagnosis, lack of availability and co-ordination of multiple specialists for comprehensive management and high abandonment rates. Brain tumors are the most common pediatric solid malignancy, second in overall cancer incidence only to leukemias, and represent between 16% and 23% of all pediatric malignancies [1]. Although the treatment of brain tumor is very challenging but the modern

improvement in diagnosis and therapy have now ensuring more survival rate. Cure rates in children with brain tumors are lower in low and middle income countries due to under-diagnosis, incorrect clinical assessment, and lack of availability of appropriate radiological, neurosurgical, and radiotherapy services [2]. In developing countries like India, complete registration of brain tumors and reliable data collection rarely occurs due to monetary constraints; hence, the exact burden of this disease is unnoticed [3]. Brain tumors are heterogeneous group of neoplasm, which include both benign and malignant cases [4]. Brain tumors constitute only <2% of all neoplasms [5]. Male patients are more affected than female cases except in meningioma. Brain tumors have bimodal age

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distribution with a peak at childhood and adult age group of 45–70 years [4]. Nearly 20% of childhood malignancies are brain tumors and 70% of primary brain tumors of childhood are infratentorial and involve cerebellum, midbrain, pons, and medulla [6]. Clinical presentation of brain tumors depends on the location, size of the tumors, and growth rate of the neoplasm [4]. There is a high morbidity and mortality in these tumors irrespective of their histological grade [7]. The primary brain tumors involve about two-third of all central nervous system (CNS) neoplasms [8]. As per the WHO classification, CNS tumors have extensive classification and subtypes. Glial tumors are the most common type of brain tumor and include astrocytoma, ependymoma, glioblastoma, oligodendroglioma, and others [9]. Nonglial tumors include embryonal tumors, choroid plexus tumors, pineal tumors, meningeal tumors, and nerve sheath tumors, tumors of sellar region, hematopoietic neoplasm, and metastatic tumors [9]. Among these extensive entities, meningiomas, gliomas, nerve sheath tumors, and pituitary tumors account more than 85% of all CNS tumors [9]. Accurate diagnosis of brain tumors requires sophisticated modern noninvasive and invasive techniques such as radiological imaging, intraoperative squash cytology, postsurgical biopsy, and histopathology of the tumors. In Bangladesh, in generally all these specialists are not available in one location, which presents considerable difficulty for clinicians and patients in treating brain tumors. Because of various reasons in Bangladesh a large number of patients did not begin treatment or were lost to follow-up after initiation of treatment. For those who continued with treatment, considerable inconvenience was caused because of multiple parallel doctor appointments and therapy sessions in various departments of a single hospital. Lack of collaboration was most evident in challenging cases and uncommon tumors that lacked uniformity in decision-making. An increased need existed for interaction and co-ordination between the treating specialists, especially to improve overall quality of service.

## II. OBJECTIVES

### General Objective

- To assess the brain tumor spectrum of patient attending at tertiary care hospital in Bangladesh.

### Specific Objective

- To assess the clinical presentations among the patient with brain tumor.

## III. METHODOLOGY & MATERIALS

This observational prospective study was conducted in the Department of Radiology and Imaging Department, Enam Medical College Hospital, Savar, Dhaka, Bangladesh during the period from January 2016 to December 2019. Ethical clearance was obtained from the mentioned institute. In total 120 patients with brain tumors with proper documents were finalized as the study population. Proper written consents were

taken from all the participants before starting data collection. A pre-designed questioner was used in patient data collection. Data on clinical presentation and radiological features of all cases were collected from the patients' records. Gross features in all cases were recorded during grossing of the resected tumors. The tissue sections were processed and stained as standard procedure. Squash cytology and immunohistochemistry were used in atypical cases and in the cases it was required. Histopathological diagnosis was done depending on the WHO classification and grading (2007). Statistical analysis was performed using Statistical Package for Social Science (SPSS, version 20). Relative frequency of different types of brain tumors and grading was analyzed. All presentable data were disseminated by several charts and tables of MS Office program.

## IV. RESULTS

In this study among total 120 participants 56.67% (n=68) were male and the rest 43.33% (n=52) were female. So male was dominating in number and the male-female ratio was 1.3:1. In analyzing the ages of the participants we found, the highest number of patients were found from 41-50 years' age group which was 31.67% (n=38). Then 27.50% (n=33), 17.50% (n=21), 15% (n=18) and the rest 8.33% (n=10) were from 31-40, 20-30, 51-60 and >60 years' age groups respectively. On the other hand, in analyzing the clinical presentations among the participants we observed, headache was associate in the highest number of patients which was 59 in number. Then in 41, 28, 9, 7, 4 patients- seizure, vomiting, visual disturbances, gait disorder and cranial nerve palsy were associated respectively as clinical presentations. In analyzing the spectrum of brain tumors we found, the frequencies of astrocytic tumor (42.50%), oligodendroglial tumor (10%), embryonal tumor (7.50%), and meningioma (14.17%) were noticeable besides other brain tumors. The other subtypes of brain tumors found among the study people were ependymal tumor (4.17%), choroid plexus tumor (1.67%), neuronal tumor (0.83%), neuroblastic tumor (5.83%), pineoblastoma (0.83%), schwannoma (5.83%), neurofibroma (0.83%), primary central nervous (0.83%), germinoma (0.83%), craniopharyngioma (1.67%), pituitary adenoma (1.67%), adenocarcinoma (0.83%).

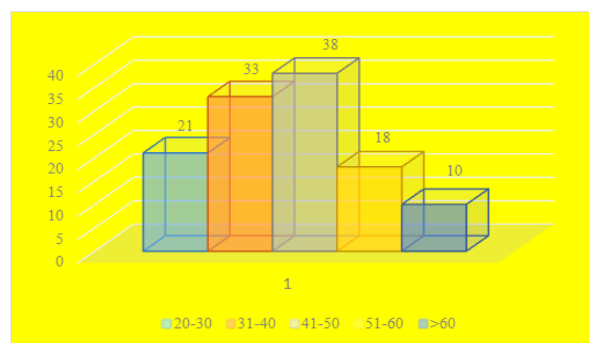
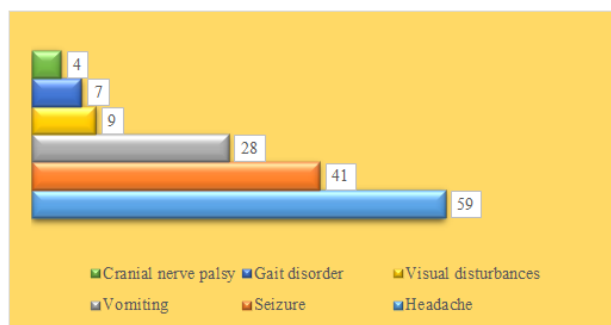


Fig-I: Age distribution in years of participants (n=120)



**Fig-II: Clinical presentations among participants (n=120)**

**Table-I: Spectrum of brain tumors distribution among participants (n=120)**

Types	n	%
Astrocytic tumor	51	42.50
Oligodendroglial tumor	12	10.00
Ependymal tumor	5	4.17
Choroid plexus tumor	2	1.67
Neuronal tumor	1	0.83
Neuroblastic tumor	7	5.83
Pineoblastoma	1	0.83
Embryonal tumor	9	7.50
Schwannoma	7	5.83
Neurofibroma	1	0.83
Meningioma	17	14.17
Primary central nervous	1	0.83
Germinoma	1	0.83
Craniopharyngioma	2	1.67
Pituitary adenoma	2	1.67
Adenocarcinoma	1	0.83

## V. DISCUSSION

The aim of this study was to assess the brain tumor spectrum of patient attending at tertiary care hospital in Bangladesh. Among the 130 cases of brain tumor in our study, we found 65(50%) cases in the group of 31–50 years. Peak age group in our study was 40–50 years, accounting 38(29.23%) cases. In our study in analyzing the ages of the participants we found, the highest number of patients were found from 41-50 years' age group which was 31.67%(n=38). Then 27.50% (n=33), 17.50% (n=21), 15% (n=18) and the rest 8.33% (n=10) were from 31-40, 20-30, 51-60 and >60 years' age groups respectively. Our finding was similar to the finding of Masoodi *et al.* and Dhar *et al.* [4] In our study among total 120 participants 56.67% (n=68) were male and the rest 43.33% (n=52) were female. So male was dominating in number and the male-female ratio was 1.3:1. In a study, male versus female ratio in the present study was 1.28:1. Masoodi *et al.*, Ghanghoria *et al.*, and Yeole found similar sex ratio in their studies [10]. Lee *et al.* found six types of brain tumors occurred more frequently in females than males (Female: male - 1.43:1) [11]. We found frontal lobe as most common site of brain tumors in our study, similar to the finding of Masoodi *et al.*, Jamal *et al.*, and Jalali

*et al.* [12] Most common symptom in the patients in our study was headache 49.17% (n=59). Headache was also found to be the most common complaint in previous studies [13]. In this study, astrocytoma was the most common subtype (51 cases, 42.50%) in the present study, supporting the previous studies by Aryal, Masoodi *et al.*, Jalali and Datta, and Ahmed *et al.* [9] However, Dhar *et al.* found glioblastoma as the most common subtype in their series [13]. Meningiomas (20 cases, 15.3%) were the second common type CNS tumor in our series, similar to the findings of other previous studies [14]. However, Ghanghoria *et al.*, Das *et al.*, and Lee *et al.* found meningioma as the most common lesion in their study group [11]. Among the astrocytic tumors, most common type was WHO Grade IV (glioblastoma). Dhar *et al.*, Ghanghoria *et al.*, and Ahmed *et al.* also found similar findings in their series [15]. Aryal found eight cases of metastatic brain tumor and 87.5% (seven cases) of these were adenocarcinoma [9]. We diagnosed 4 cases of pituitary adenoma (3.3%) in the present study whereas Das *et al.* and Masoodi *et al.* found higher incidence [16]. We found higher incidence of oligodendroglial tumor (8.46%) and medulloblastoma (7.69%) in our series than others [17]. We found only one (0.76%) case of primary CNS lymphoma in the present study. Previous studies found incidence of CNS lymphoma from 0.8% to 1.5% in different series [18].

## VI. CONCLUSION AND RECOMMENDATIONS

Males are dominating in number among the patients with brain tumors. Astrocytic tumors are most common subtype in Bangladesh. However, neoplasms the grade I, are more frequent brain tumors. Headache, seizure and vomiting are the most common clinical presentations among patients with brain tumor. But this was a single centered study with a small sample size. So the findings of this study may not reflect the exact scenario of the whole country. For getting more specific findings we would like to recommend for conducting more studies regarding the same issue with larger sample size.

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