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# Baseline single institutional retrospective review of body mass index (BMI) as a prognostic indicator in patients with newly diagnosed glioblastoma (GBM)

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## Abstract

**Purpose:** Glioblastoma (GBM) is the most common primary brain cancer in adults with a very poor prognosis. Metabolic drivers of tumorigenesis are highly relevant within the central nervous system, where glucose is the critical source of energy. The impact of obesity on survival outcomes in patients with GBM is not well established. This study investigates the prognostic value of body mass index (BMI) in patients diagnosed with GBM.

**Methods:** Adult patients with newly diagnosed GBM treated at Thomas Jefferson University Hospital between January 1, 2008, and December 31, 2022, were included in the study. BMI was calculated using the formula  $BMI = \text{kg}/\text{m}^2$ . Patients BMI groups were underweight (BMI < 19.00), normal weight (BMI 19.00-24.99), overweight (BMI 25-29.99), and obese (BMI > 30.00). All patients received 60 Gy of radiation therapy with concurrent and adjuvant temozolomide following maximal safe resection. A difference in clinical outcomes of overall survival (OS) and progression-free survival (PFS) were evaluated between the groups using Kaplan-Meier and log-rank tests.

**Results:** A total of 392 patients met inclusion criteria. The median age was 60.3 (range 18.9-86.7), with 144 females and 248 males. Median BMI was 27.0 (Range; 17.7-52.9). Non-overweight GBM patients (BMI < 25.00, OS 2.1 years, CI 1.7-2.4 years) had increased overall survival compared to overweight patients (BMI  $\geq$  25.00, OS 1.5 years, CI 1.4-1.6 years) ( $p < 0.001$ ). Patients with MGMT-methylated GBM also had significantly greater OS and PFS compared to MGMT-unmethylated patients ( $p < 0.001$ ). Non-overweight GBM patients (BMI < 25.00, median PFS 1.5 years, CI 1.3-2.0 years) also had increased progression-free survival compared to overweight patients (BMI  $\geq$  25.00, median PFS 1.1 years, CI 0.9-1.2 years) ( $p < 0.001$ ).

**Conclusions:** Our study indicates normal BMI (19.00-24.99) at the time of GBM diagnosis is a favorable prognostic indicator for overall and progression-free survival. Additional studies are warranted for further analysis of BMI and survival outcomes in GBM patients.

**Keywords:** BMI; Glioblastoma; Prognosis; Radiation treatment; Survival.

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