The Influence of Sociodemographics on Presentation, Treatment, and Survival in Pediatric, Adolescent and Young Adult Patients with Osteosarcoma.

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INTRODUCTION: Osteosarcoma is the most common primary malignancy of bone. Although osteosarcoma is rare overall, it occurs more commonly in pediatric, adolescent, and young adult populations, and is the eighth leading cause of childhood cancer. Among patients ages 0-19 years old, the five-year osteosarcoma survival rate ranges from around 67-69%. While the associations between patient demographics on osteosarcoma incidence and survival have been well-studied, few works have examined the variations in osteosarcoma presentation and treatment among demographic groups, and how these factors relate to survival. In our population-based study, our objective is to examine the impact of patient demographics on disease presentation, treatment and survival for children, adolescents, and young adults (AYAs) with osteosarcoma.

METHODS: Patient data was downloaded from The Surveillance, Epidemiology, and End Results (SEER) database. Cases included patients ages 0-24 who were diagnosed with osteosarcoma between 2004 and 2020. As the data was deidentified, institutional review board approval was not required. We used multivariate logistic regression to determine the association between patient sociodemographics and disease presentation and treatment. Disease-specific survival was assessed using multivariate Cox regression to estimate hazard ratios. We included patient age, sex, county rurality, and average annual county income as covariates in our multivariate analyses. Additionally, we controlled for disease-related factors when assessing treatments and survival.

RESULTS SECTION: 2364 patients were included in our analysis. 1036 (44%) patients were non-Hispanic White (NHW), 773 (33%) were Hispanic, 352 (15%) were non-Hispanic Black (NHB), and 203 (9%) were non-Hispanic Asian (NHA). 20% of patients were diagnosed between ages 0-10. 88% of patients presented with an extremity tumor. 61% of patients presented with a tumor ≥8cm. 22% of patients presented with either local or regional metastases. Chemotherapy was administered in 91% of cases. 23% of patients who had an extremity tumor underwent amputation, and 45% had ≥1 month elapse between diagnosis and treatment. When compared to NHW patients, Hispanic patients were more likely to have regional or distant metastases (OR=1.54, $p<0.01$), tumors ≥8cm (OR=1.38, $p<0.01$), and undergo amputation when presenting with extremity tumors (OR=1.56, $p<0.01$). NHA patients were more likely to have tumors ≥8cm (OR=1.89, $p<0.01$), and receive chemotherapy (OR=4.91, $p<0.01$), but were less likely to have non-extremity tumors (OR=0.52, $p=0.02$). NHB patients were more likely to have ≥1 month elapse between diagnosis and treatment (OR=1.33, $p=0.03$). The five-year disease-specific survival rate was 70% for NHW patients, 66% for NHB patients, 67% for NHA patients, and 66% for Hispanic patients. Although NHB, NHA and Hispanic patients had higher odds of cancer related death, these differences were not significant when accounting for primary site and metastases at presentation.

DISCUSSION: Hispanic patients were more likely to have larger and metastatic tumors, Asian patients were more likely to have larger tumors, and Black patients had longer times from diagnosis to treatment. Based on these findings, there may be issues preventing pediatric osteosarcoma patients in these groups from accessing care, thus resulting in more advanced disease progression at presentation. Based on our analysis, the lower survival rates within these groups may be attributable to their comparatively advanced disease status at presentation. Future work should address disparities in pediatric cancer and examine the underlying factors contributing to the differences observed in this study.

SIGNIFICANCE/CLINICAL RELEVANCE: In this study we observed differences in pediatric osteosarcoma severity at presentation, treatment, and survival among sociodemographic groups that have not been well explored in previous literature. Our findings may support initiatives to expand healthcare access within these groups.