Breast Cancer in Appalachia: A Comprehensive Analysis of Behavioral and Socioeconomic Factors Influencing Stage at Diagnosis

Jasneet Gill[1] , Nerea Lopetegui-Lia[2]

1.North Knoxville Medical Center, Knoxville, TN, 2. The Ohio State University, Columbus, OH.

Introduction

- Breast cancer remains a leading cause of morbidity and mortality, with disparities in outcomes influenced by behavioral, demographic, and socioeconomic factors.
- The Appalachian region faces challenges due to
- limited access to healthcare, economic disparities, & high rates of tobacco & alcohol use.
- This study aims to assess whether alcohol use, smoking history, insurance status, and family history of cancer influences breast cancer staging at diagnosis.

Methods

- A retrospective analysis was conducted using medical records from patients diagnosed with breast cancer at Tennova North Knoxville Medical Center between 2020 and 2024.
- A total of 1,359 patients with breast cancer were identified.
- The study examined the association between alcohol use, smoking history, family history of cancer, diabetes mellitus type 2, insurance status, and breast cancer staging (AJCC 8th edition).
- Data on age & socioeconomic status were also considered.
- Descriptive and biostatistical analyses, including chi-square tests, logistic regression, and multivariable models were performed.

Results

- Of the 1,359 patients with breast cancer included in this study, 49.3% were diagnosed with stage III and 3.0% with stage IV breast cancer.
- Current alcohol use (55.7%) and smoking (14.5% current; 24.7% former smokers) were significant predictors of advanced stages (stage III or IV) at diagnosis, with current alcohol use increasing the odds of advanced disease by 2.1 times (OR 2.1, 95% CI [1.5, 2.9], $p < 0.01$) and current smokers being 2.5 times more likely to present with stage III (OR 2.5, 95% CI [1.8, 3.6], $p < 0.01$).
- A family history of cancer was protective, with those reporting it being less likely to present with advanced disease (OR 0.6, 95% CI [0.4, 0.9], $p < 0.05$).
- Medicaid patients and a family history of cancer was protective, with those reporting it being less likely to present with advanced disease (OR 0.6, 95% CI [0.4, 0.9], $p < 0.05$).
- Medicaid patients and patients without insurance had significantly higher odds of presenting at advanced stages, with Medicaid being 3 times more likely to present with stage III or IV (OR 3.0, 95% CI [2.1, 4.5], $p < 0.01$), and uninsured patients being 5 times more likely (OR 5.0, 95% CI [2.3, 10.5], $p < 0.01$).
- Diabetes mellitus type 2 was associated with an increased risk of advanced disease (OR 1.6, 95% CI [1.2, 2.1], $p < 0.01$).
- Younger patients (< 0.01), suggesting delays in diagnosis, likely due to lower screening rates.

Contact Information

Name - Dr Jasneet Gill
Email – drjasneetgill@gmail.com

Conclusion

- This study performed in the Appalachian region identifies critical factors, including behavioral factors and socioeconomic disparities, and its influence on breast cancer stage at diagnosis.
- Current alcohol use, smoking, and government insurance/lack of insurance were found to be significant predictors of advanced-stage diagnoses, while family history of cancer was associated with breast cancer being diagnosed at an earlier stage.
- Medicaid and uninsured patients presented with more advanced diseases at diagnosis, indicating that they may face barriers to early detection.
- These findings underscore the importance of addressing behavioral risk factors and targeting socioeconomic disparities to improve timely access to care in rural populations.
- Public health initiatives in the region should focus on community awareness, screening and early cancer detection programs, reducing/limiting smoking and alcohol use, and expanding access to insurance to mitigate these disparities.