

Association of community-level deprivation with breast cancer risk and mortality among women residing in Southern States of United States of America (USA) who participated in the Southern Community Cohort Study (SCCS)

Kabisa Mwala – MD

University of Zambia, School of Public Health
(VZCARE PhD Fellow in Cancer Epidemiology)

Disclosure

- I have none to make.

Introduction / Background

- Breast cancer (BC) is one of the major cause of cancer related morbidity and of mortality among women in USA and world over.
- Non-Hispanic blacks have lower BC incidence but higher mortality than non-Hispanic white women.
- BC is a heterogenous disease with diverse risk factors and biology influenced by individual and community-level environment resulting in variation of incidence and mortality.
- Studies on the association of community-level deprivation indices with risk for BC and mortality have yielded mixed results, and few have considered individual-level risk factors.

Specific Aim

- To evaluate the association of community-level deprivation with BC risk and mortality among the female participants in the Southern Community Cohort Study (SCCS), USA.

Design, setting and participants

- Southern Community Cohort Study: Large prospective cohort study conducted in 12 South-East States communities in USA:
 - Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia.
 - 84,797 total participants
- Participants age group; 40 – 79yr old
 - Recruitment commenced in March 2002 to September 2009
 - Follow-up to December 2020.
 - Recruitment sites: CHC = 86% and Mail = 14%.
- Inclusion criteria for current analysis
 - Any female participants without history of previous malignancy apart from nonmelanoma skin malignancy.



Variables of interest

- Exposure:
 - Neighbourhood deprivation Index (NDI) for community-level deprivation.
- Outcomes (linked to vital statistics registries)
 - Breast cancer incidence
 - Mortality
- Analysis
 - Cox (Proportional hazards) regression models
 - Nested Models used in adjusting for confounding.
- Reported HR, 95% CI, $p < 0.05$ for significance level.

Neighbourhood deprivation Index (NDI)

- Based on the 2000 census tract level variables for participants' geocoded addresses.
- Multiple variable construct based on eight census tract-level variables derived using final principal component analysis.
- Categorised into quartiles, with the first (lowest) quartile representing the least deprived communities and last quartile the most deprived communities.

Results

- A total of 43,384 female participants included in analysis.
- Median age of 51 years [IQR:45-58] recruited.
- Participants black women 69.2% and 30.8% white women.
- During follow up,
 - 1,363 women developed breast cancer after a median follow up of 12.8 years [IQR: 10.6-14.5].
 - 365 BC overall deaths recorded.

Association of neighbourhood deprivation index (NDI) with breast cancer risk (incidence) by race stratification.

	ALL Races		Black women		White women	
Exposure	Cases	aHR (95% CI)	Cases	aHR (95% CI)	Cases	aHR (95% CI)
Quartile 4	686	1.0	616	1.0	70	1.0
Quartile 3	309	1.01 (0.88-1.16)	178	0.96 (0.81-1.14)	131	1.23 (0.92-1.65)
Quartile 2	222	1.00 (0.85-1.18)	109	1.04 (0.84-1.27)	113	1.12 (0.83-1.52)
Quartile 1	146	1.01 (0.83-1.23)	44	0.74 (0.55-1.02)	102	1.41 (1.03-1.94)
p trend		0.897		0.243		0.087

Model Description

Model 1: Age at enrolment, Enrollment source and Race

Model 2: Model 1 covariates and marital status, BMI, Age at menarche, Age at first birth, Parity, Menopause status, Mammogram, History of breast cyst, History of breast cancer in Mother and/or sister, Health Eating Index, and comorbidity status

Model 3: Model 2 covariates and Household income and Education status

Association of neighbourhood deprivation index (NDI) with breast cancer mortality by race stratification

Exposure	ALL Races		Black women		White women	
	Deaths	aHR (95% CI)	Cases	aHR (95% CI)	Cases	aHR (95% CI)
Quartile 4	197	1.0	182	1.0	15	1.0
Quartile 3	75	0.95 (0.69-1.31)	47	1.16 (0.79-1.69)	28	0.93 (0.44-1.94)
Quartile 2	60	0.93 (0.66-1.32)	26	0.61 (0.38-1.00)	34	1.58 (0.77-3.26)
Quartile 1	33	1.21 (0.76-1.94)	6	0.80 (0.29-2.23)	27	1.53 (0.71-3.27)
p trend		0.871		0.138		0.085

Model Description

Model 1: Adjusted for Age at diagnosis and Enrollment source.

Model 2: Adjusted for Model 1 covariates, BMI, Total physical activity time (MET), comorbidity status, AJCC Breast cancer stage, Breast cancer IHCs status and treatment: chemotherapy, surgery and radiotherapy.

Model 3: Adjusted for Model 2 covariates, household income and education status.

Conclusion

- White women living in least deprived communities had increased risk for breast cancer.
- NDI was not associated with risk of BC among black women or mortality for both races.
- Neighbourhood deprivation influences breast cancer risk and mortality differently among black and white women, emphasising the need for race-specific prevention programs that address both community and individual factors.

Conclusion

- Strength
 - >85% participants were recruited from community health centers that provide cases to underserved populations
 - A large proportion of non-Hispanic black women ~ 69% of sample population
 - Wide range of covariates adjusted for
- Limitation
 - Community level deprivation indices can be “dynamic” over time, may be influenced by area development and calamities.

Acknowledgements

- Thank the participants of the SCCS.
- Training grant supported by the National Cancer Institute of the US National Institutes of Health under Fogarty International Center Award Number D43 CA270474.
 - Vanderbilt- Zambia Cancer Research Training Program (VZCARE)
- Co-authors: Ronald Fisa - MSc, Violet Kayamba - MD PhD, Wilbroad Mutale - Mphil PhD, Martha J Shrubsole PhD, Wei Zheng - MD PhD, Loren Lipworth ScD and Xiao-Ou Shu - MD PhD.

Thank you