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Depression, Cognition, & Social Determinants of Health: Assessing Associations in Older African Americans with Diabetes

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Background

- Social determinants of health have been widely identified as characteristics of one's social and economic climate that affect one's health outcomes¹. (see Graphic 1)
- The Alzheimer's Association indicates that rates of Alzheimer's disease (AD) and other forms of dementia are two times higher in older African Americans than their white counterparts². People who have diabetes are also at an increased risk.
- The prevalence and co-morbidity of depression among older Americans with diabetes (both with and without cognitive impairment) has been well established³.
- Understanding the effect that social determinants of health have on the onset and progression of dementia and depression in older African American diabetics is important as such an understanding may better inform future health policy and government spending on healthcare intervention(s).



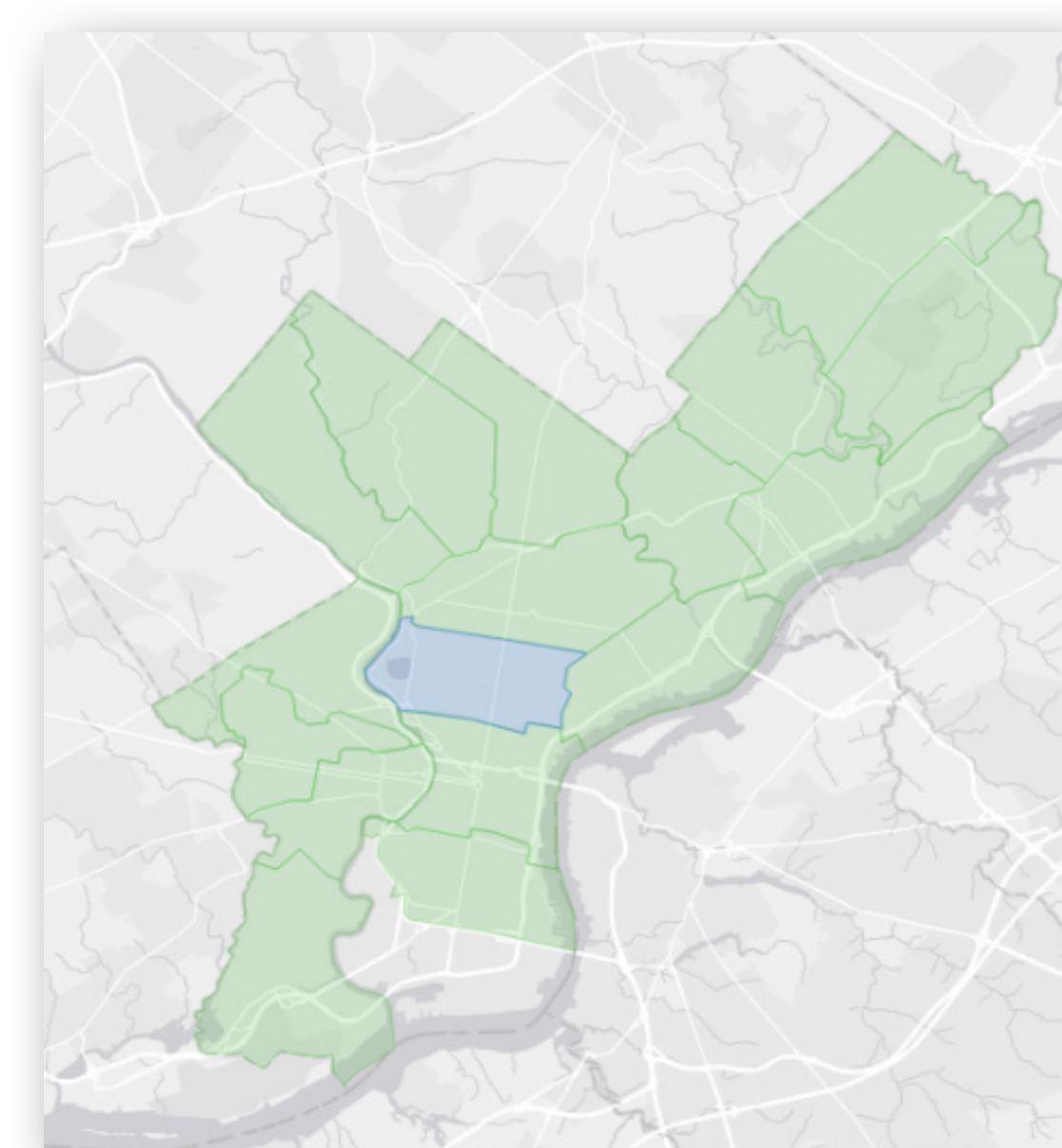
Graphic 1. Social Determinants of Health per Healthy People 2020

Objective

- To assess whether mild cognitive impairment (MCI) and rates of depression are associated with social determinants of health in a population of older (≥65) diabetic African Americans.

Methods

- The sample under study included 141 African American Philadelphians, aged 65 or older with type II diabetes.
- Each subject was administered six neuropsychological exams and a depression questionnaire by trained community health workers.
 - Tests included: Folstein Mini Mental Status Exam (MMSE), Logical Memory test and Logical Memory test delayed, Trail Marking Test, Digit Symbol Substitution Test (DSST), Wide-Range Achievement Test (WRAT-4), and the Depression Patient Health Questionnaire (PHQ-9)
- Using subjects' mailing addresses, subjects were grouped by neighborhood planning district (defined by the City of Philadelphia's Department of Public Health) and values were assigned for neighborhood characteristics using publicly available data. (see Graphic 2 and Table 1)
- Each social determinant of health measure was dichotomized based on a median split.
- A series of one-way ANOVAs were performed to examine differences in cognitive test scores and depression based on neighborhood status (i.e., high or low on each social determinant).



Graphic 2. Planning Districts per City of Philadelphia Community Health Explorer

Planning District	N	Descriptive (Mean) Statistics				
		Unemployment Rate	Poverty	Homicide Mortality	Firearm Homicide	Rat Complaints
UPPER FAR NORTHWEST	2	8.8	11.9	1.5	1.5	3.3
LOWER FAR NORTHWEST	1	11.0	9.7	2.8	2.8	8.7
CENTRAL NORTHWEST	2	12.2	15.5	3.6	1.2	7.6
NORTH DELAWARE LOWER NORTHWEST	2	16.9	18.6	9.7	6.5	19.8
NORTH DELAWARE NORTHWEST	1	18.7	30.0	20.1	17.0	12.8
RIVER WARDS NORTHWEST	1	19.4	32.0	25.2	20.8	39.5
NORTH DELAWARE NORTH	13	24.7	46.3	36.4	30.1	42.0
UPPER NORTH DELAWARE	24	19.7	25.0	14.7	12.8	9.0
LOWER NORTH DELAWARE	22	20.8	46.0	37.2	35.0	28.3
UPPER NORTHWEST DELAWARE	15	14.5	23.0	18.6	17.5	11.4
LOWER NORTHWEST DELAWARE	2	7.5	14.2	0.0	0.0	7.7
WEST PARK WEST	5	13.4	27.9	22.5	18.0	9.2
UNIVERSITY CITY WEST	16	20.2	34.4	32.9	29.2	11.7
SOUTH UNIVERSITY CITY WEST	4	13.2	40.2	18.5	13.6	7.8
CENTRAL UNIVERSITY CITY	11	6.3	14.6	3.4	4.2	13.0
SOUTH UNIVERSITY CITY	16	14.1	23.5	9.5	8.8	24.9
LOWER UNIVERSITY CITY	4	17.7	29.0	31.8	31.8	12.7
SOUTHWEST UNIVERSITY CITY	4	17.7	29.0	31.8	31.8	12.7
Total	141	17.15	30.17	21.49	19.26	18.09

Table 1. This table is a graphic representation of data obtained from Philadelphia's Community Health Explorer site.

TEST NUMBER	CORRECT OF 30	MEAN	SD	95% Confidence Interval	Sig. determined by		Sig.	
					Lower Bound	Upper Bound		
MMSE	19	24.9516	3.75238	0.47854	23.9987	25.9045	12.00	0.042
MMSE	70	26.0758	2.73885	0.30620	25.4622	26.6897	17.00	0.045
MMSE	141	25.5816	3.26049	0.27438	25.0387	26.1244	12.00	0.044
MMSE	70	25.0286	3.03849	0.42293	24.1948	25.8722	12.00	0.045
MMSE	71	26.1288	2.88310	0.34216	25.4443	26.8090	16.00	0.045
MMSE	141	25.5816	3.26049	0.27438	25.0387	26.1244	12.00	0.044
MMSE	70	25.4071	3.47365	0.15389	25.1754	25.6389	18.00	0.044
MMSE	70	25.9428	2.64653	0.16324	24.5234	27.3522	25.00	0.045
MMSE	140	25.5816	3.26049	0.27438	25.0387	26.1244	25.00	0.044
MMSE	68	23.2899	2.31055	0.88000	21.5337	25.0460	1.00	0.044
MMSE	71	27.0000	7.46994	0.88962	25.2319	28.7681	8.00	0.044
MMSE	140	25.1714	2.99680	0.64205	23.9820	26.4409	1.00	0.044
MMSE	68	25.0102	3.68910	0.45986	24.1091	25.9212	12.00	0.045
MMSE	70	26.0800	2.76440	0.31921	25.4440	26.7160	17.00	0.045
MMSE	141	25.5816	3.26049	0.27438	25.0387	26.1244	12.00	0.044

Table 2. This table shows results of one-way ANOVA on cognitive test scores.

DEPRESSION SCORE	POVERTY	N	Mean	SD	95% Confidence Interval	Sig. determined by		Sig.	
						Lower Bound	Upper Bound		
DEPRESSION SCORE	POVERTY	68	6.4354	5.89782	0.70136	5.0287	7.9401	0.00	0.046
DEPRESSION SCORE	POVERTY	70	8.5200	6.48568	0.74900	7.0276	10.0122	0.00	0.046
DEPRESSION SCORE	POVERTY	141	7.5461	6.19617	0.52181	6.8144	8.3377	0.00	0.046
DEPRESSION SCORE	POVERTY	62	6.0161	5.43303	0.89007	4.8362	7.3960	0.00	0.046
DEPRESSION SCORE	POVERTY	70	8.7468	6.51914	0.72348	7.2868	10.2078	0.00	0.046
DEPRESSION SCORE	POVERTY	141	7.5461	6.19617	0.52181	6.8144	8.3377	0.00	0.046
DEPRESSION SCORE	POVERTY	61	5.9558	5.45413	0.88833	4.5540	7.3477	0.00	0.046
DEPRESSION SCORE	POVERTY	60	8.7625	6.47628	0.72440	7.3006	10.2084	0.00	0.046
DEPRESSION SCORE	POVERTY	141	7.5461	6.19617	0.52181	6.8144	8.3377	0.00	0.046

Table 3. This table shows results of one-way ANOVA on depression scores

Results

- Results indicate that global cognition [Mini Mental State Exam (MMSE) scores] is related to objective characteristics of living environment, namely homicide rates (p=0.042), rat infestation (p=0.045), and neighborhood poverty (p=0.053). (see Table 2)
- The results also showed that subjects who lived in neighborhoods with higher homicide (p=0.009), firearm homicide (p=0.007), and poverty (p=0.046) rates had lower mean scores on the PHQ-9. (see Table 3)
- One-way ANOVA was performed with planning districts containing at least 8% of the total subject population showed that geographical characteristics accounted for variance in subjects' Logical Memory test and Trail Marking Test (p-values of 0.036 and 0.032 respectively). (*Not shown)
- No statistically significant associations were made between unemployment and subjects' scores on neuropsychological tests or the depression questionnaire.

Study Limitations

- The presence of both counter-intuitive and contradictory one-way ANOVA results for depression may be considered statistical artifact due to volunteer bias and/or cultural (e.g. social and community support) and geographical variance between planning districts: factors which were not accounted for in this study.
- Another consideration for improvement of this study is to incorporate subjective measures of social determinants of health.
- Last, unemployment as an objective measure for economic stability was ineffective, as the statistic used was not representative of individual subjects' job status but that of the community they occupy.

Implications

- Findings from this study show that an association exists between global cognition and social determinants of health in a population of older (≥65) diabetic African Americans.
- Though exploration of a causal relationship is warranted, this finding supports the notion that public health intervention at the community level (e.g. community enrichment and safety improvement) may be an effective measure for the reduction of disparities in diabetes-related MCI.
- Further investigation with the intent of identifying how social determinants of health contribute to the aforementioned health disparities should invoke a study design that addresses the limitations noted in this study.

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References

- Marmot, Michael. "Social determinants of health inequalities." *The Lancet* 365.9464 (2005): 1099-104. *The Lancet*. Web. 25 July 2017.
- Alzheimer's Association. 2017 Alzheimer's Disease Facts and Figures. *Alzheimer's Dement* 2017;13:325-373.
- Finkelstein, E. A., J. W. Bray, H. Chen, M. J. Larson, K. Miller, C. Tompkins, A. Keme, and R. Manderscheid. "Prevalence and Costs of Major Depression Among Elderly Claimants With Diabetes." *Diabetes Care* 26.2 (2003): 415-20. *American Diabetes Association*. Web. 24 July 2017.