



Background

Public Health Priorites: Alzheimer's disease and related disorders (ADRD) and Loneliness in Aging

- Dementia
Degenerate brain regions in ADRDs overlap with regulating emotions regulating areas for social well-being and loneliness
Subsequent activation of the hypothalamic-pituitary-adrenal axis.



Emotion and Mood (Social well being)

- Loneliness
Perceived experience of social deprivation and increased risk of chronic medical conditions.

Previous Studies

- Observational studies suggest psychosocial factors such as loneliness are associated with vulnerability for cognitive decline in older adults.

Current study

- Whether lower levels of loneliness were associated with better cognitive performance

Methods

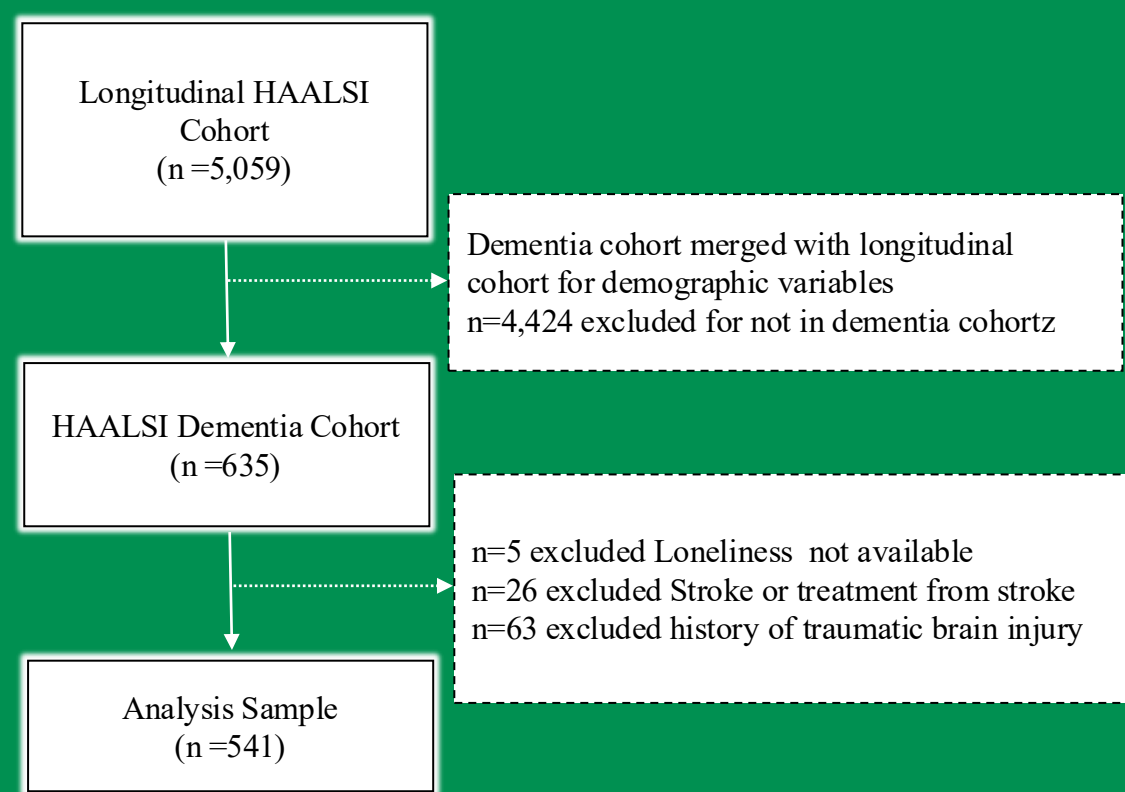


Figure 1. Sample selection for the association of Loneliness with cognitive function

Population:
Health and Aging in Africa: A Longitudinal Study of an INDEPTH Community in South Africa) Dementia Cohort, 2019 - 2020, a cross-sectional study (n=541)
Age $\geq$ 49.

Exposure

- Loneliness
- Centers for Epidemiological Studies Depression Scale
- Participants' self-reported loneliness, measured by a survey question of "During the past week, how often have I felt lonely?"
- Score assignment to answers included “most or all of the time (5-7 days)”, “occasionally or a moderate amount of time (3-4 days)”, “some or little of the time (1-2 days)”, and “rarely or none of the time (less than 1 day)”

- Subjective measurements

Outcomes

- Cognitive domains
Mini-Mental State Exam (MMSE); episodic memory: tested using the Wechsler Memory Scale-IV; executive function: tested using Go/No-Go; verbal memory (the Boston Naming Test); and visuospatial constructional ability (Spatial and Constructional Praxis Recall testing)

Methods

- Raw cognitive domain scores were converted into Z scores.
- Global cognitive function: Composite Z scores of Cognitive domains
- Covariates : age, gender, education, depression, vascular risk factors
- Statistical Analysis: SAS 9.4
- Generalized estimated equation
- Robust Regression (S-efficiency)

Model 1: Unadjusted

Model 2: Adjusted for age, gender, educational level, depression

Model 3: Adjusted for Adjusted for vascular risk + Model 2

Vascular risk : Hypertension, Diabetes

Education level: no education vs. some education(at least preschool to partial tertiary education)

Results

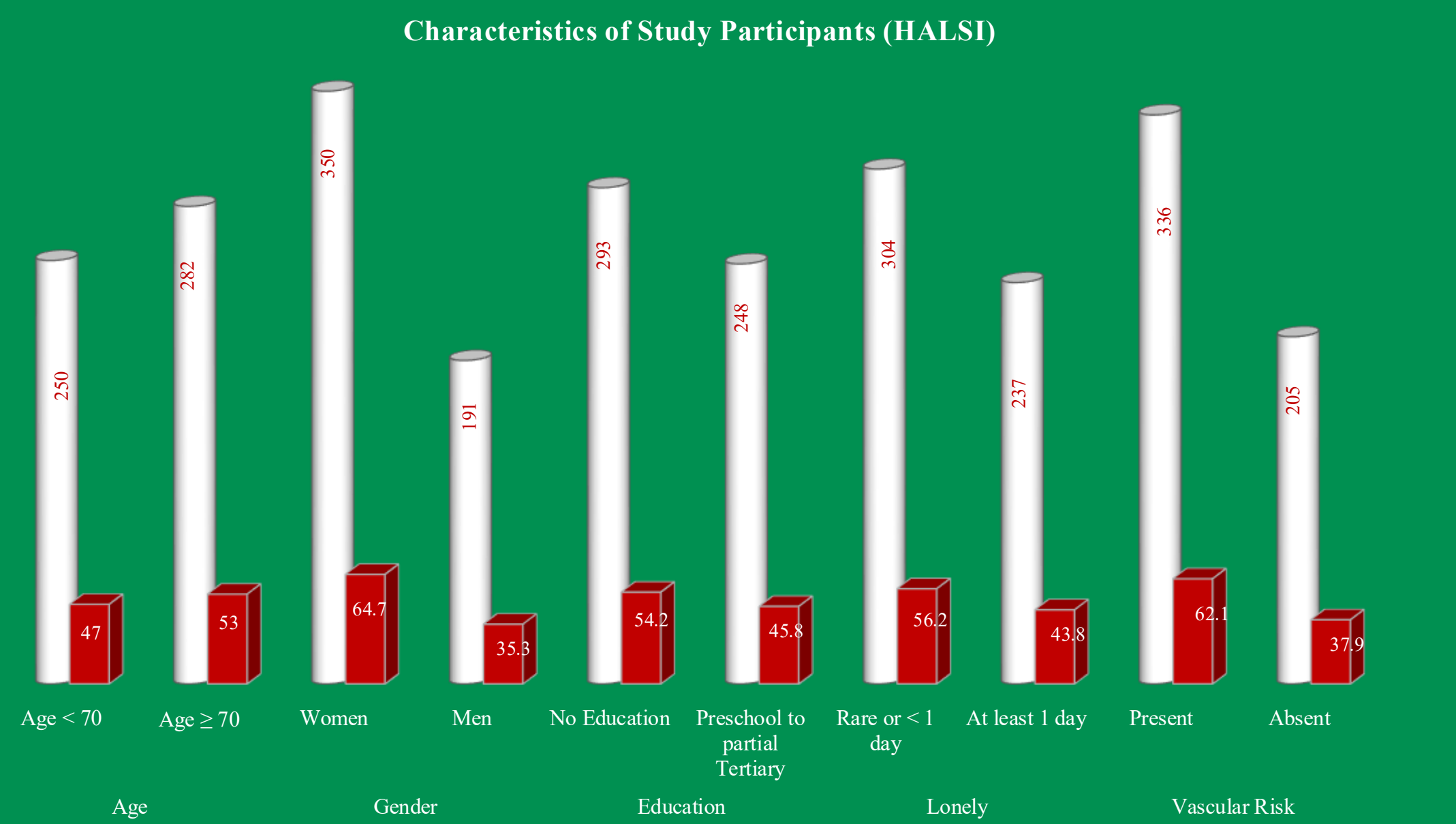


Figure 2.: Characteristics of Study Participants in HALSI (2019-2020)

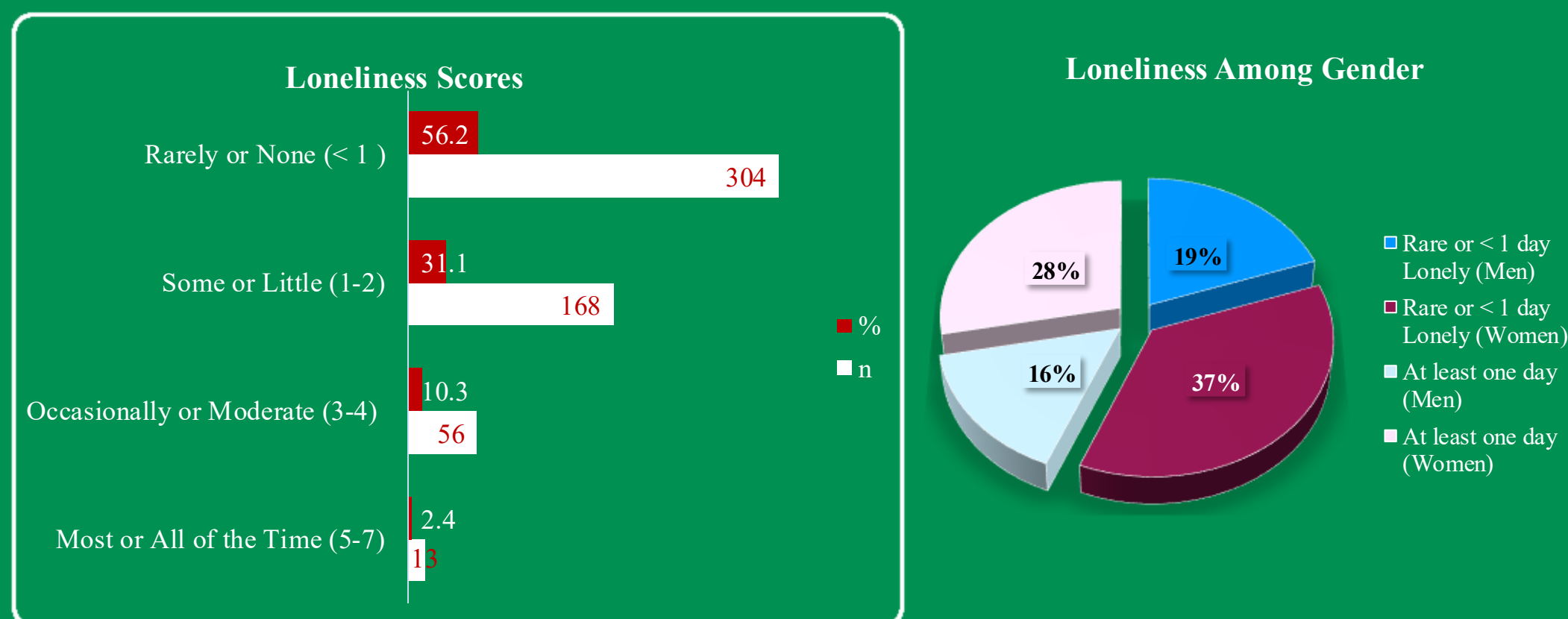


Figure 3.: Descriptions of Study Among Participants in HALSI (2019-2020)

- Better global cognitive function is associated with a lower level of loneliness at (β = -0.0131, 95 % CI -0.1990, -0.0071) after adjustment for age, gender, and education.
- Education impact on improvement in Global Cognitive Function
- Lower levels of loneliness were associated with varying cognitive domains after adjustment for age, gender, and education, and persisted after additional adjustments for vascular risk factors.

Results

Loneliness and Cognitive Functions									
Cognitive_Function	betamodel1	lcmodel1	ucmodel1	betamodel2	lcmodel2	ucmodel2	betamodel3	lcmodel3	ucmodel3
Go/ No-Go	-0.3633	-0.4734	-0.2531	-0.1614	-0.2766	-0.0462	-0.1476	-0.264	-0.0311
Visuospatial Constructional									
Spatial Forward	-0.2007	-0.3366	-0.0648	-0.1245	-0.2818	0.0329	-0.1219	-0.2803	0.0365
Spatial Reverse	-0.1177	-0.2341	-0.0013	-0.1873	-0.3202	-0.0544	-0.1925	-0.3253	-0.0597
Episodic Memory									
Immediate	-0.1683	-0.2919	-0.0447	-0.1052	-0.2466	0.0361	-0.1024	-0.243	0.0382
Delayed	0.2053	0.0715	0.3391	0.1638	0.0084	0.3192	0.1616	0.0053	0.3179
Token Test	-0.1503	-0.2785	-0.0221	0.0706	-0.0732	0.2144	0.0728	-0.0716	0.2173
Ravens Matrices	-0.1308	-0.2586	-0.0031	-0.0346	-0.1802	0.111	-0.0305	-0.1766	0.1155
Global Cognition	-0.1031	-0.199	-0.0071	-0.0294	-0.1402	0.0813	-0.0187	-0.1297	0.0924

Figure 4.: Multiple Robust Regression Models for Association of Cognitive function and Scores of Loneliness

Loneliness and Cognitive Functions by Education									
Cognitive_Function	betamodel1	lcmodel1	ucmodel1	betamodel2	lcmodel2	ucmodel2	betamodel3	lcmodel3	ucmodel3
MMSE No Education	-0.0603	-0.1893	0.05	0.067	-0.0728	0.2068	0.0795	-0.0596	0.2186
MMSE Education	-0.1814	-0.3201	-0.0427	-0.1843	-0.3393	-0.0293	-0.1776	-0.3362	-0.0191
Go/No-GoNo Education	-0.3217	-0.4757	-0.1677	0.0913	-0.2511	0.0685	-0.0768	-0.2375	0.0839
Go/No-Go Education	-0.3579	-0.5244	-0.1914	-0.2122	-0.3907	-0.0338	-0.2194	-0.4017	-0.0371
Spatial Forward No Education	-0.2251	-0.3923	-0.058	-0.1396	-0.3324	0.0532	-0.1387	-0.3323	0.0549
Spatial Forward Education	-0.1509	-0.387	0.0852	-0.0857	-0.3602	0.1888	-0.0707	-0.3506	0.2063
Spatial Reverse No Education	-0.1285	-0.2579	0.0009	-0.212	-0.359	-0.0651	-0.2103	-0.3539	-0.0666
Spatial Reverse Education	-0.0911	-0.3514	0.1693	-0.163	-0.4562	0.1333	0.1665	-0.4697	0.1367
Episodic Immediate No Education	-0.0418	-0.2081	0.1224	0.0097	-0.1825	0.201	0.0045	-0.188	0.1989
Episodic Immediate Education	-0.3769	-0.5674	-0.1895	-0.2809	-0.4887	-0.0731	-0.246	-0.4586	-0.0334
Episodic Delayed No Education	0.2322	0.0617	0.4028	0.1768	-0.021	0.3747	0.1803	-0.0189	0.3796
Episodic Delayed Education	0.1527	-0.0664	0.3719	0.1359	-0.1184	0.3902	0.1288	-0.1321	0.3897
Token Test No Education	-0.0882	-0.2491	0.0728	0.1348	-0.0425	0.3121	0.1364	-0.0411	0.314
Token Test Education	-0.2738	-0.4799	-0.0677	-0.1085	-0.3406	0.1327	-0.1022	-0.3474	0.143
Symbol Cancellation No Education	-0.0049	-0.0964	0.0865	-0.0087	-0.1159	0.0985	-0.0086	-0.1165	0.0992
Symbol Cancellation Education	-0.3553	-0.5518	-0.1588	-0.295	-0.52	-0.0701	-0.3353	-0.5641	-0.1066
Global Cognition No Education	0.0025	-0.1111	0.1161	0.0782	-0.0551	0.2114	0.081	-0.0514	0.2134
Global Cognition Education	-0.2904	-0.45	-0.1308	-0.2396	-0.4232	-0.0559	-0.2269	-0.4157	-0.0382

Figure 5.: Multiple Robust Regression Models for Association of Cognitive function and Scores of Loneliness by Education

Conclusion

Strength

- Consistency of previous findings
- Selection and Information bias avoided – Internal Validity
- Guide future hypothesis generation, policy implantation, and help guide future studies on loneliness and cognitive performance

Limitation

- Findings were days of loneliness in 1 week
- No temporal association , no causality
- Residual confounding
- Less generalization
- Futher prospective
- Guide public health policy establishment and further studies with details measurement of loneliness and longitudinal study