Social vulnerability predicts mortality in rural Tanzania

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1. Introduction

- Social vulnerability is a measure of the adverse social factors in one's environment which may affect wellbeing.
- Social vulnerability has been operationalised by Canadian researchers using a **social vulnerability index (SVI)** which measures deficits related to social vulnerability (1).
- Social vulnerability correlates with frailty and predicts mortality in older adults. A large European study suggests that this relationship may be independent of frailty in poorer settings with higher inequity and less social expenditure (2).
- Tanzania is a lower-middle income country (LMIC) and a resource-limited setting. Only 4% of older people receive pensions and 26.4% people live under the national poverty line.
- I hypothesised that social vulnerability would be higher in this setting than in high or upper-middle income countries and would predict mortality independently of frailty.

2. Aims

- To produce and interpret a culturally adapted SVI for a Tanzanian population of community-dwelling older adults.
- To investigate the relationship between social vulnerability, frailty, and adverse outcomes in older adults in rural Tanzania.

3. Methods

- A SVI was produced using secondary data from a longitudinal stratified-cohort study by Lewis et al. (3). Participants aged over 60 living in rural Tanzania were assessed for frailty status and follow-up occurred at a median of 512 days to assess adverse outcomes (figure 1).
- Categories from the original Canadian SVI were used to select 48 variables representing potential social deficits from the Tanzanian dataset (see figure 2).
- Variables were graded between 0 to 1 to represent levels of social deficit. Each participant's deficit count was then calculated and divided by 48 to produce a final SVI score between 0 and 1, where 1 would indicate the maximum level of social vulnerability.

Figure 1: Participant undergoing the comprehensive geriatric assessment (CGA) to evaluate frailty status.

Figure 2: SVI categories and variables

Communication to engage with wider community	• Number of languages spoken, e.g. Kichagga, Kiswahili • Literacy
Living situation	• Marital status • Does the participant live alone? • Percentage of dependents at household
Social support, engagement, and leisure activities	• World Health Organisation Study on Global Ageing and Adult Health Social Engagement questionnaire • Interest in politics • Did the participant vote in the last election?
Socially orientated activities of daily living	• Problems using transport • How do transport issues restrict the participant's life?
Empowerment and life control	• Control, Autonomy, Self-Realization and Pleasure (CASP-19) questionnaire • Duke University Religion Index • Safety at home
Socio-economic status	• Educational attainment • Food insecurity: meals per day, frequency of eating meat, inability to afford food • Pension and financial dependence upon family • Household assets: motorbike, mobile phone, electricity

4. Results

- The mean SVI score was 0.47 (SD 0.15) and all 235 participants displayed some level of social vulnerability (see figure 3).
- The mean female SVI score was higher than for men (U=8503.5, P<0.001). This trend was displayed across all ages (see figure 4).
- The mean SVI score was significantly higher for participants with mobility problems (U=9276, P<0.001).
- Social vulnerability correlated highly with frailty measured by frailty index (r_s=0.809 P<0.001) and age (r_s=0.537, P<0.001).
- Cox regression analysis showed that a participant was 1.133 times more likely to die before follow-up for each additional social deficit when adjusting for age and sex (P=0.001) . However, significance was lost when adjusting for frailty.

Figure 3: Histogram demonstrating SVI score distributions

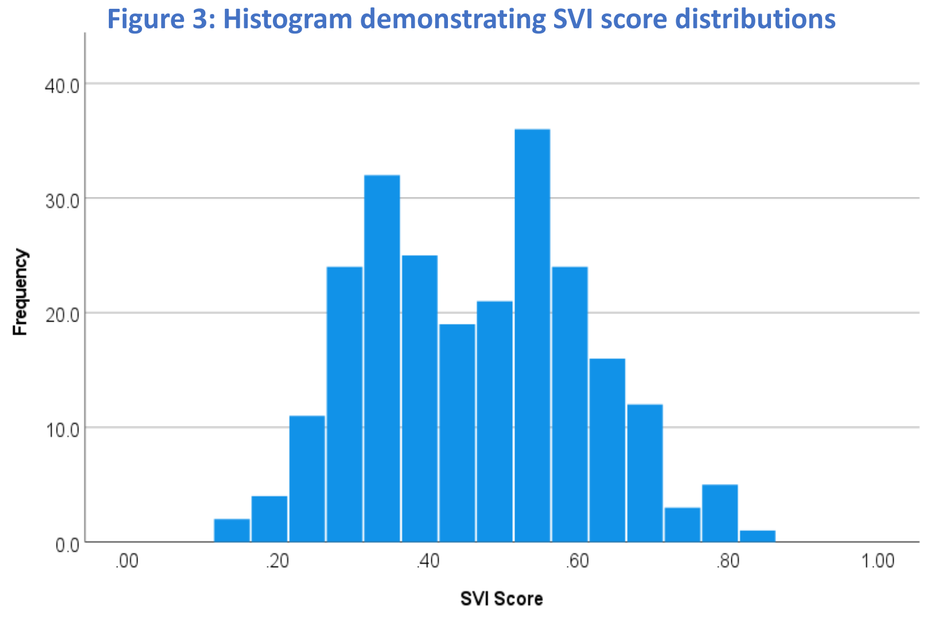
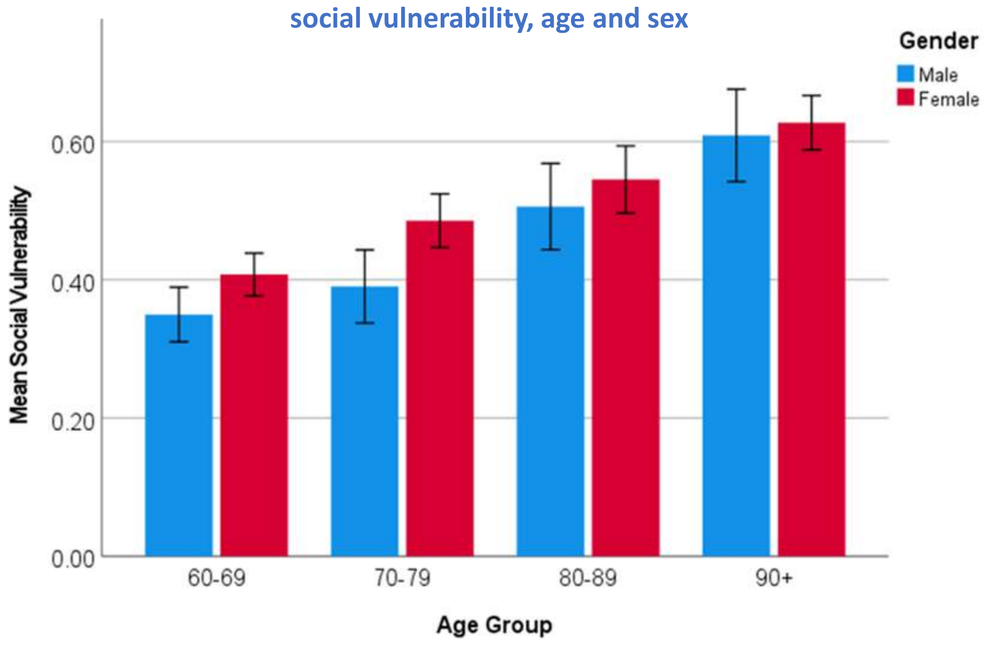


Figure 4: Bar chart demonstrating the relationship between social vulnerability, age and sex



5. Discussion

- Social vulnerability in this sample was greater than observed in higher-income settings. However, the sample was frailty-weighted, which have may inflated this figure.
- Social vulnerability predicted mortality, but not independently of frailty. This result might be attributed to contextual differences between Tanzania and other SVI settings. The community-dwelling Tanzanian cohort may be more frail as care homes are rare. Also, the most socially vulnerable may not have survived to older age in a resource-limited setting, limiting the relationship between social vulnerability and mortality.
- Social vulnerability correlated with frailty and age which indicates construct validity.
- Increased social vulnerability in women is a common finding throughout studies and may be due to gender inequality causing fewer social advantages through life.
- Mobility problems might be a strong contributor to social vulnerability in this resource-limited setting where walking aids and public transport are less available.
- Limitations include frailty-weighting, a small sample size, and a short follow-up period.

6. Conclusions and future work

- This is the first work to develop a SVI to investigate frailty and social vulnerability in a LMIC and Sub-Saharan Africa (SSA). The results suggest that SVIs can be cross-culturally adapted and operationalised successfully in similar settings.
- Social vulnerability predicts mortality and is high amongst a frailty-weighted population of older adults in rural Tanzania compared to previous SVI studies.
- Further analysis of the SVI might identify modifiable social factors to improve health. Focusing on social determinants of health may be more cost-effective and efficient in a low-resource setting than narrower medical interventions. This work could aid policy makers to implement interventions or policy changes such as improving walking aid provision or access to public transport to aid healthy ageing.
- Further work might test the SVI on a larger and more representative sample with a longer follow-up period.

Acknowledgements: I would like to thank Dr Grace Lewis, Professor Richard Walker, Dr Catherine Dotchin and Dr Keith Gray for their support and guidance throughout my project. I would like to thank all groups who contributed to data collection, including Tanzanian researchers, UK-based medical professionals, and Newcastle MRes students. I would also like to thank all study participants and their relatives. Finally, I am grateful towards the Newcastle Biomedical Research Centre for providing bursary funding and training opportunities throughout the MRes.

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