

## **Project Title**

Associations of Social Isolation, Social Participation, and Loneliness with Frailty in Older adults in Singapore: A panel data analysis

## **Project Lead and Members**

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## **Organisation(s) Involved**

National Healthcare Group

## **Healthcare Family Group Involved in this Project**

Healthcare Administration

## **Specialty or Discipline (if applicable)**

Population Health

## **Aims**

To 1) examine the associations of social isolation, social participation, and loneliness with level of frailty among community-dwelling older adults using panel data, and 2) explore the moderating effect of gender on the association of social isolation, social participation and loneliness with frailty.

## **Background**

There is a shortage of research evidence about how social isolation, social participation, and loneliness were longitudinally associated with frailty. This study was to 1) examine the associations of social isolation, social participation, and loneliness with level of frailty among community-dwelling older adults using panel data, and 2) explore the moderating effect of gender on the association of social isolation, social participation and loneliness with frailty.

## Methods

The study included 606 participants aged 60 years and above from the longitudinal Population Health Index (PHI) survey conducted in the Central region of Singapore. The PHI survey was initiated in November 2015 and the two subsequent data collection were conducted yearly in 2016/2017 and 2017/2018 using face-to-face interviews and interviewer-administrated questionnaires. At each data collection point, the Clinical Frailty Scale (CFS) was used to determine the level of frailty (CFS1-7). Social isolation was assessed by the two subscales of the 6-item Lubben Social Network Scale; social participation was measured using the social role domain of the Late-Life Function and Disability Instrument; and loneliness was assessed using the three-item UCLA Loneliness Scale. Three fixed-effects ordinal logistic regressions were conducted to examine the associations of social isolation and social participation (continuous variables) and loneliness status (not lonely vs lonely) with level of frailty (a seven-level ordered variable): Model 1 included social isolation, social participation, and loneliness status adjusted for all time-invariant factors (e.g., gender, ethnicity, and highest education level). Model 2 additionally adjusted for time-varying demographic factors including age, marital status, employment status, living arrangement and self-reported money sufficiency for essential daily living. Model 3 additionally adjusted for lifestyle and health-related factors including current smoking status, alcohol misuse, number of chronic conditions, number of long-term medications, current nutritional status, and functional independence. Sensitivity analysis (SA) was conducted using 1) isolation status (not isolated vs isolated) instead of isolation score as the independent variable (SA 1), and 2) loneliness score instead of loneliness status as the independent variable (SA 2). We also ran a fixed-effects logistic regression using dichotomous frailty (non-frail: CFS1-3 vs. frail: CFS4-7) as the outcome variable, controlling for all the covariates included in the Model 3 (SA 3). To examine the moderating effect of gender on the associations, the interaction term of gender and each social connection indicator was added to the Model 3. Odds ratios (ORs) and 95% confidence intervals (CIs) were reported for each model.

## Results

Of the 606 participants, 57.6% were females, 84.3% were Chinese and 52.0% had no formal education or primary school qualification only. The mean age of the participants at baseline was 70.9 years old; 58.6% were married, and 46.0% were out of labour force (inactive). At baseline, 19.6% were living alone, 17.7% of participants were categorized as “isolated” based on the LSNS-6 Family subscale and 47.4% were categorized as “isolated” based on the LSNS-6 Friends subscale. There were 7.3% individuals categorized as “lonely” (loneliness score <6). The results of the three fixed-effects models are presented in Table 1. Increased frequency of social participation was consistently associated with lower level of frailty with OR of 0.95 remaining unchanged in Model 1 and Model 2 and 0.96 in Model 3. However, no significant association between either LSNS-6 Family or LSNS-6 Friends and level of frailty was observed in any model. Feeling lonely was consistently associated with higher level of frailty (Model1: OR=2.43, Model 2: OR=2.62, Model 3: OR=2.90, all  $p < 0.05$ ), and the association increased slightly after adjusting for time-varying socio-demographic and health-related factors. The three sensitivity analyses showed that the association of social isolation and participation as well as loneliness with frailty remained even the types of data for the respective indicators changed. After adding the interaction terms of gender and each social connection indicator to the Model 3, while feeling lonely remained significantly associated with level of frailty, the association between social participation and level of frailty attenuated to be non-significant. None of the interaction terms showed association with level of frailty.

## Lessons Learnt

Our findings suggest that loneliness and frailty should be measured and addressed concurrently among community-dwelling older adults.

## Conclusion

This study observed that social isolation and loneliness had differential longitudinal association with level of frailty among community-dwelling older adults. Social

participation and feeling of loneliness were independently associated with higher level of frailty in older adults and gender did not moderate the associations.

### **Additional Information**

Singapore Health & Biomedical Congress (SHBC) 2021 – Merit award (Category: Singapore Young Investigator Award, Health Services Research)

### **Project Category**

Applied Research, Quantitative Research, Care Continuum, Population Health, Physical Health, Intermediate & Long Term Community Care, Social Care

### **Keywords**

Frailty, Social Isolation, Social Participation, Loneliness, Older Adults, Population Health Index

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