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Citation for published version:

Baranyi, G, Cox, S, Deary, I, Shortt, N, Thompson, CW, Welstead, M & Pearce, J 2021, 'P33Life course neighbourhood deprivation and frailty in older adulthood', pp. A57.1-A57. <https://doi.org/10.1136/jech-2021-SSMabstracts.121>

Digital Object Identifier (DOI):

[10.1136/jech-2021-SSMabstracts.121](https://doi.org/10.1136/jech-2021-SSMabstracts.121)

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Peer reviewed version

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Life course neighbourhood deprivation and frailty in older adulthood

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Background

Frailty describes a decline in resilience to physical, physiological and emotional stressors, and is linked to increased risk of disability, morbidity and mortality. Neighbourhood features are important risk factors of frailty; however, evidence mainly relies on studies with lack of repeated measurement of neighbourhood. We assessed whether exposure to neighbourhood deprivation across the life course (childhood to late adulthood) was related to the risk and progression of frailty in older age.

Methods

Lifetime residential addresses were collected for participants of the Lothian Birth Cohort 1936 at the age of 78. Edinburgh-based addresses were linked to historical measure of neighbourhood deprivation in childhood (1936-1955), early adulthood (1956-1975) and mid-to-late adulthood (1976-2015). Frailty was measured using the Frailty Index in five consecutive waves between the ages of 70 and 82. Linear mixed effects models were fitted for male ($n=161$) and female ($n=162$) participants separately. First, we detected the most appropriate life course model compared to a saturated model. Second, we adjusted selected models with a set of nested confounders (age, childhood IQ, father's occupational social class, childhood smoking, years of education, adult occupational social class, smoking, living alone). Third, we explored accelerated frailty by imputing the product term of age and neighbourhood deprivation in the selected models. In a sensitivity analysis, we restricted the sample to those with Edinburgh-based addresses in every decades of their life ($n=240$). Analyses were conducted using R.

Results

In the male subsample, relaxed accumulation provided the best model fit whereby periods contributed independently to the risk of frailty; preliminary results indicated increased risk of frailty by higher childhood ($b=0.004$; $p=0.041$) and mid-to-late adulthood neighbourhood deprivation ($b=0.005$; $p=0.014$). In the female subsample, mid-to-late adulthood sensitive period was deemed as best fitting with increased risk of frailty in the adjusted model ($b=0.005$; $p=0.014$). Importantly, we identified accelerated frailty among woman in deprived neighbourhoods during mid-to-late adulthood ($p=0.002$). Sensitivity analysis were consistent with the main results.

Conclusions

Our study presents the first investigation of life course impact of neighbourhood deprivation on frailty and frailty trajectories; despite the small sample size limiting the generalisability of our findings. Life course models differed across gender and accelerated frailty was only present in the female subgroup. Future research should explore mediating pathways, and potential opportunities to buffer against the detrimental effect of neighbourhood deprivation on frailty. Policy should focus on tackling neighbourhood inequalities throughout the lifecourse to support healthy population ageing.

Keywords: Life course; frailty; neighbourhood deprivation