

## Loneliness trajectories among older adults in Australia: the influence of chronic conditions

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**Background :** Loneliness is an important factor determining older adults' social health. Although numerous cross-sectional studies have identified various factors associated with loneliness, there is a limited understanding of the longitudinal progression of loneliness. This study examines the associations between loneliness trajectories and patterns of psychological and health conditions as people age.

**Methods :** We used data of 2,628 community-dwelling adults aged 65 years and older from The Household, Income and Labour Dynamics in Australia (HILDA) Survey, who reported their prevalence of loneliness at least 4 times from 2015 to 2019. We applied Group-Based Trajectory Modelling to describe trajectory of loneliness with number of chronic conditions as time-varying covariates. Cross-lagged regression was used for the association between trajectories of loneliness with psychological distress and health-related quality of life.

**Results :** We identified three distinct trajectories of loneliness: "Low & Stable" (67.88%), "Moderate & Increase" (20.55%), and "High & Declining" (11.57%). Number of chronic conditions was significantly associated with loneliness trajectory in both the "Low & Stable" and "High & Declining" groups. Compared to participants in "Low & Stable" group, participants in other trajectories were more likely to report psychological distress and poor mental health status. Participants in "High & Declining" trajectory had significantly higher odd of poor physical health than participants in "Low & Stable" trajectory.

**Conclusion :** Loneliness among older Australians follows distinct patterns over time, and chronic conditions are an important influence upon these trajectories. The findings highlight the potential long-term health consequences of sustained social disconnection. Targeted interventions that address both health management and social connection, particularly for those with multiple chronic conditions, are needed.

## Gender differences in work-family conflict and mental health among employed Australian parents

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**Background :** Australian households with both parents in paid employment has been increasing over the last decades, with growing numbers of dual-earner couples and working parents with dependent children. These shifts have led to increased household and work responsibilities. This presents challenges in organising work and non-work responsibilities around children which may impact parents' mental health.

**Methods :** Data across 21 waves of the Household, Income, and Labour Dynamics in Australia (HILDA) survey were used to employ within person fixed effects regression analysis to examine associations between work-family conflict and mental health in working-age (aged 25–64 years) Australian adults with parental responsibilities for children 14 years of age and under. Mental health was assessed using the MHI-5 scale. Both dimensions of the work-family conflict (work to family and family to work) were interrogated, as were the gender differences.

**Results :** Of the 10,130 participants (58,064 observations) across waves 2001-2021 of the HILDA survey who were working-age parents engaged in paid employment with children  $\leq 14$  years, 7,264 participants (46,527 observations) with at least two waves of data and non-missing data and were included in the analyses. Increasing work to family conflict was negatively associated with mental health in both women ( $\beta$  coefficient = -1.37 (95% CI: -1.56, -1.19)) and men ( $\beta$  coefficient = -1.37 (-1.55, -1.18)). While increasing family to work conflict was associated with worse mental health in women ( $\beta$  coefficient = -0.66 (-0.82, -0.49)), the association for men was stronger ( $\beta$  coefficient = -0.97 (-1.14, -0.80)).

**Conclusion :** Both work to family conflict and family to work conflict are independently associated with adverse mental health for women and men. More attention needs to be devoted to identifying and implementing strategies to enable working parents to cope with or reduce work-family conflict.

## Effect Modification on Dietary Patterns on the Relationship of Slow Gait with Depressive Symptoms

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**Background :** Slower gait speed is a known predictor of late-life depressive symptoms. Diet may influence biological processes involved in gait decline and depression, potentially modifying their association. This study examined whether adherence to healthy dietary patterns alters the relationship between gait speed and incident depressive symptoms in older adults.

**Methods :** We analyzed data from 1,887 depression-free, community-dwelling adults aged  $\geq 65$  years in the NISSIN Project, Japan. Baseline gait speed was self-rated as fast, normal, or slow. Dietary intake was assessed via a validated food frequency questionnaire, and principal component analysis identified three patterns: vegetables, fat&meat, and bread&egg. Incident depressive symptoms were defined as a Geriatric Depression Scale score  $\geq 6$  at six-year follow-up. Modified Poisson regression estimated relative risks (RRs); interactions were evaluated on multiplicative and additive scales.

**Results :** Over six years, 12.5% developed depressive symptoms. Slow gait was associated with higher depression risk (RR: 2.7; 95% CI: 1.6–4.6), whereas no dietary pattern alone predicted symptoms. Among slow walkers, higher adherence to vegetable or bread&egg patterns tended to lower risk, though interactions were non-significant. A significant negative interaction was observed between slow gait and low adherence to a fat&meat diet on both additive (RERI = -2.5; 95% CI: -4.1 to -0.8) and multiplicative scales (Ratio of RRs: 0.3; 95% CI: 0.2–0.3).

**Conclusion :** Dietary patterns may modify the link between slow gait and depression in older adults. Reduced fat&meat intake was linked to a lower combined risk, suggesting dietary improvement as a scalable mental health strategy for physically vulnerable populations.

## Heated tobacco product use and depressive symptoms: a working population-based study

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**Background :** Although there is evidence linking cigarette smoking to mental health issues, little research has been conducted on the effects of heated tobacco product (HTP) use. This study examined the associations of HTP use with depressive symptoms.

**Methods :** This cross-sectional study analyzed data from 11,214 participants (88.4% male, mean age  $42.1 \pm 12.2$  years) of the Japan Epidemiology Collaboration on Occupational Health Study, collected during fiscal years 2021-2023. The participants were categorized into five groups based on their self-reported tobacco use: never smokers, former smokers, exclusive HTPs users, dual users of HTPs and cigarettes, and exclusive cigarette smokers. Depressive symptoms were assessed using the 11-item Center for Epidemiological Studies - Depression Scale (cutoff score  $\geq 9$ ). A multilevel Poisson regression model with a robust variance estimator was used to calculate prevalence ratios (PRs) of depressive symptoms and 95% confidence intervals (CIs), adjusting for a wide range of covariates.

**Results :** Among the participants, 6.4% reported exclusive HTP use, 8.4% dual use, and 12.9% exclusive cigarette smoking. Depressive symptoms were present in 27.5% of the participants. Compared to never smokers, exclusive HTP users showed a significantly higher prevalence of depressive symptoms after full adjustment for covariates (PR 1.12, 95% CI 1.01–1.23). There was also a suggestion of an increased prevalence of depressive symptoms among dual users (PR 1.09, 95% CI 0.94–1.25) and exclusive cigarette smokers (PR 1.06, 95% CI 0.99–1.14). A dose-response relationship was observed, with a significantly higher prevalence of depressive symptoms among exclusive users of either HTPs or cigarettes who consumed 11 or more per day.

**Conclusions :** HTP use was associated with a higher prevalence of depressive symptoms, especially in those consuming 11 or more HTPs daily, showing a pattern similar to that observed with cigarette smoking.

## Relative age within a school grade and suicide in middle age: a cohort study in Japan, 1974-2023

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**Background :** Given the arbitrary school entering date, some individuals within the same school grade can be up to one year younger than their peers. Such younger relative age within a school grade has been associated with mental health issues, including suicide, from childhood through young adulthood. However, its association with suicide risk into middle age remains unclear. We thus examined whether relative age within a school grade is associated with suicide risk from childhood into middle age.

**Methods :** This nationwide cohort study used vital statistics (birth and death records) in Japan from January 1st, 1974, to December 31st, 2023. We included all individuals of Japanese nationality who were born during the study period and followed them until their death or the administrative end. Relative age was estimated based on the birth date. Suicide was identified from death records. We used the Aalen-Johansen estimator to estimate cumulative incidence of suicide by relative age. We also applied regression discontinuity design to address potential confounding (the cutoff was April 2nd).

**Results :** Over 1,735 million person-years of follow-up among 62,000,538 individuals, 149,959 people died by suicide. Younger individuals within a school grade had a higher risk of suicide than their older peers from young adulthood through middle age ( $P < 0.001$ ). Using a regression discontinuity design, we found that the youngest individuals had a higher cumulative incidence of suicide through middle age compared with their oldest peers (difference [95% confidence interval] at age 20: 0.85% [0.53-1.19]; at age 30: 3.88% [2.26-5.50]; at age 40: 7.25% [4.84-9.65]).

**Conclusion :** Younger relative age was associated with an increased risk of suicide extending into middle age. Educational systems and practices that take account of relative age may reduce suicide risk across the life course. Our findings also underscore the importance of adopting a life-course perspective in suicide prevention efforts.