Title: The burden of COVID-19 on all-cause mortality in older adults living in Wales

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Abstract

Background: The COVID-19 pandemic has profoundly impacted the lives of people living with dementia (PLWD). Mitigating measures have led to extreme social isolation and reduced or limited capacity within routine health and social care services. Using anonymised individual-level, population-scale linked electronic healthcare, demographic and mortality records in Wales, we have examined the impact of the COVID-19 pandemic on all-cause mortality in PLWD and in older adults living with other comorbid conditions.

Method: Using the Secure Anonymised Information Linkage (SAIL) Databank (Lyons et al., 2009), we identified six cohorts of individuals aged 50-101 and living in Wales on or before 1st February 2020, with conditions in the following domains: dementia, cardiovascular, respiratory, metabolic, renal, and cerebrovascular. For each, we identified paired samples matched by age and sex using propensity sampling. Evidence for comorbidities were extracted using ICD-10 and READ codes. We quantified excess mortality in PLWD during the COVID-19 period (July 2020 – May 2021 at the point of the analysis) by comparing weekly mortality to a baseline rate (2015-2019 average) and to the population paired sample. We then extracted retrospective datasets across sixteen-month periods from 2010-2020. Finally, we estimated all-cause mortality odds-ratios for each period and comorbid domain using logistic regression, controlling for age and sex.

Result: PLWD had higher risk of all-cause mortality compared to a matched sample of individuals without dementia (Figure 1a), especially during the first wave of the pandemic (April 2020, Figure 1b), and in older PWLD (Figure 1c). Examining evidence across other comorbid conditions (Figure 2), logistic regression modelling showed the greatest increase in mortality odds among PWLD (Figure 2f) compared to people without dementia, increasing from 4.47 in 2018 to 5.61 in 2020. The magnitude of the increase in odds among people with cardiovascular, metabolic, renal, and cerebrovascular conditions from 2020-2021 compared to previous years was smaller compared to the increase in PLWD (Figures 2a, 2c-e).

Conclusion: PLWD experienced increased mortality risk compared to those living with other comorbid conditions during 2020. Further work will focus on the composition of death causes and the contribution of other comorbidities to all-cause mortality among PLWD.
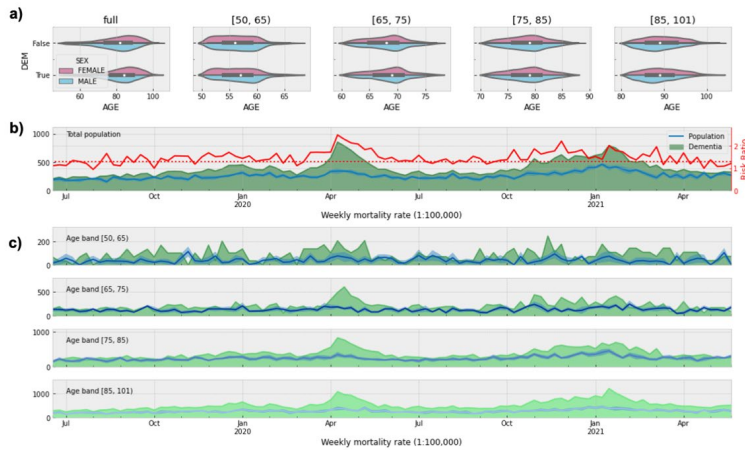
Figure 1: Weekly mortality and risk ratio in people living with dementia compared to people without dementia from July 2020 - May 2021. a) Violin plots showing results of propensity sampling for age- and sex-matched individuals by age band. b) Weekly risk ratio (red) and mortality sampling in people with dementia (green) and population without dementia (blue), compared to baseline mortality (red dotted line, average mortality from 2015-2019), c) stratified by age band.
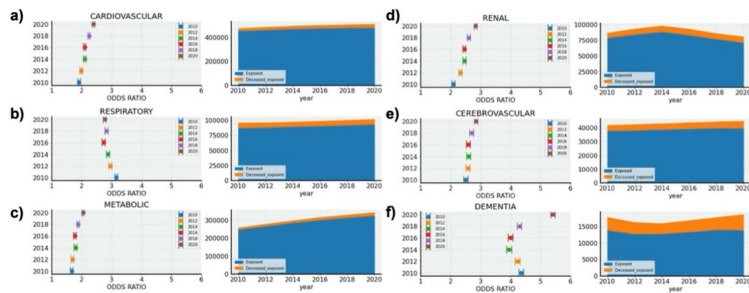

Figure 2: Mortality odds (left) and exposed population (right – orange: exposed deceased; blue: total exposed - exposed deceased) for people living with comorbid health conditions (a-f: cardiovascular, respiratory, metabolic, renal, cerebrovascular, and dementia), retrospectively sampled for the duration of the pandemic (16 months at the point of analysis) from 2010 onwards.