Becoming a Grandparent affects Hospitalization Risks: Emulating a Target Trial in a Swedish National Birth Cohort

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Extended Abstract

Introduction

Population ageing poses challenges to hospital care systems, but it also comes with great opportunities such as an increase in shared life time between grandparents and grandchildren. As most people will become grandparent at some point (1,2), there is an urgent need to better understand how becoming a grandparent affects health. Grandparenthood can enrich a person's life, provide meaning and satisfaction (3–5) and has thus been hypothesized to be associated with positive physical and mental health as well as wellbeing. Conversely, role strain, care burden and increased exposures to infections might negatively affect grandparent's health.(6) Previous studies on the health effects of grandparenthood have had ambiguous findings ranging from protective, over no effects to detrimental effects.(7–9) Differences in findings have often been attributed to contextual differences, heterogeneity in the middle generation, demographic characteristics, and the intensity of providing grandparental child care.(7,10,11) The potentially positive effect of becoming a grandparent in Europe is likely due to the salient role transition rather than one of actually providing grandparental care,(12) which explains why additional grandchildren (after the first) do not further effect well-being.(13,14) Our study extends existing research in several ways: first, in estimating the effects of the transition to grandparenthood on disease-specific hospitalization risks; second, we in providing evidence from a full population birth cohort in a context that allows grandparents to take on supplementary carer role at low intensity; third, we apply a causal inference design to estimate effects of grandparenthood minimizing common forms of bias and yielding another means of triangulation for previous findings.

If there is a positive effect of grandparenthood, it is likely to be found in the Swedish context, which allows grandparents to be mostly supplementary carers in addition to formal child care services. (10,14) The pressure and need for grandparents to provide intensive child care is shaped by societal norms and the availability and affordability of child care. Sweden, with its tradition of defamiliarization and supported familialism, provides subsidized public child care services and effective parental leave which makes families less dependent on grandparent's help.(10) Fears that this context might foster very low involvement of grandparents are unfounded, as Swedish grandparents generally rank among the top in Europe in involvement with their grandchildren.(15)

As randomizing people into becoming grandparent is not possible, we rely on observational studies to answer the question whether becoming a grandparent positively or negatively impacts health.(16) Previous observational studies based on prevalent exposure designs - comparing health between grandparents and non-grandparents or those providing grandchild care to those who do not - are often seriously biased due to confounding, selection and immortal time.(17) Simplified, grandparents might appear healthier because surviving and being relatively healthier increases the chances of being a grandparent. Common sources of bias with observational data can be overcome with more advanced study designs.(18) One way of avoiding such biases is by using a study designs that aligns the observational analysis with the principles of a randomized trial – known as a target trial framework.(19) Grandparenthood is here not considered a treatment in the sense of an intervenable risk factor but a common social exposure. Nevertheless, applying a target trial framework helps us to estimate hospitalization risks after becoming grandparent with more robustness and relevance to better understand the health care and prevention needs of grandparents.

The primary aim of this study was to estimate the effect of becoming a grandparent (for the first time) on ICD-10 chapter-specific hospitalization risks in the context of a welfare state with childcare provision. We hypothesized that the transition into grandparenthood would be associated with lower risks of hospitalization for mental health-related causes, but potentially an increase for infectious or other disease chapters. We also investigated subgroups based on sex, ten-year age groups for becoming grandparent, and lineage (gender of the related parent, which could be an instrument for involvement in care).

Methods

Study design and population

We conducted this preregistered (20) national cohort study, applying a target trial emulation framework to minimize selection and immortal time bias. We aim to estimate per protocol effects during five years after transitioning into grandparenthood on cause-specific death and hospitalizations. The target population is grandparents in high-income countries with affordable and accessible child care. The study population is drawn from deidentified register data of the entire population of the 1953 national birth cohort who lived in Sweden in 1963 (at age 10, n=110,154).(21) From the complete birth cohort of 110,154 individuals, we excluded individuals, who were not at risk of becoming grandparent because

they did not have a living biological child in the year 1993 when they turn age 40 (n=21,796), those who have already become a grandparent (n=1399), and those who died before 1993 (n=687). The study sample included 86,272 living cohort members at age 40 who had a living biological child but had not become a grandparent in 1993. In 24 nested yearly trials (1993-2016) we compare cause-specific hospitalizations during a five-year follow-up of those who become a first-time biological grandparent to those who remain non-grandparents (ages of 40–68) in the trial-starting year.(22)

Exposure

All cohort members have been linked to their biological children and grandchildren via the Multigenerational Register. We consider the date of birth of the first biological grandchild as the transition into first time grandparenthood. On January 1st of every year between 1993–2016 we start a new hypothetical trial with a five-year follow-up. All cohort members in the study sample, if they had a child above the age of 13, were assigned on the starting date of the trial to either the treatment group if they had a first grandchild born in the year of the trial or to the control group, if they did not have their first grandchild born that year.

Outcome

The outcomes in this study were the first fatal or non-fatal cause-specific event (either hospitalization or death) recorded from entering each trial until emigration, death due to any causes, or five years after the entry into the trial (latest 31st December 2020). All hospital admissions since the 1st of January 1993 are retrieved from The Patient Register. Deaths are based on The Causes of Death register. Cause groups are classified by disease chapter according to the International Classification of Diseases 10th edition (ICD-10) based on underlying cause of hospitalization or death.

Confounders

Demographic, socioeconomic, and health indicators are measured yearly for each cohort member. Time-fixed baseline confounders were sex (men/women), education by age 40 (elementary, secondary, tertiary), age at having the first child (40-49, 50-59, 60-63, not by age 63) and total number of children (1, 2-3, 4-5, 6 or more). Time-varying confounders were measured in the year before the start of each trial and included civil status, disposable income, employment status, and the Charlson comorbidity index score.

Statistical analysis

The main effects were estimated as per protocol effect comparing the treatment and the control group pooled across all 24 yearly trials. We use inverse-probability weights to adjust for the time-fixed and time-varying covariates that could affect adherence to treatment. The year when the trial started was also included as a covariate to account for age differences across trials. All participants were censored at the date of emigration. Moreover, individuals in the treatment group were censored when their first grandchild died. In the per-protocol analysis, people assigned to the control group were censored when they become a grandparent. We accounted for censoring in the statistical models by applying clone-censoring weights. We report both the absolute risk difference between grandparents minus non-grandparents and the risk ratio with non-grandparents as reference group. The absolute effects quantify the excess number of hospitalisations and are directly interpretable for assessing the public health relevance.

Key Results

At the EPC conference 2026 we will present our results across all ICD10 chapters, comparing grandmothers and grandfathers, and by age at transitioning into grand-parenthood. In a nutshell, our study suggests that grandparents have higher absolute and relative risks of most cause-specific hospitalizations and deaths compared to non-grandparents. With one notable exception of cancers in grandmothers were there are no differences. Apart from some exceptions, effect sizes are small. Yet, the 40%-52% increases in relative risks might be clinically and public health relevant as conditions such as cardiometabolic diseases, infection, and musculoskeletal diseases in highly prevalent and thus result in relatively large case numbers among grandparents. Moreover, our findings also indicate that there are few if any differences between grandmothers and grandfathers and that risks are not increased among those who transition into grandparenthood after the age of 60 years.

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