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The longitudinal association between informal caregiving and body mass index in the second half of life: findings of the German Ageing Survey

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ABSTRACT

Objective: We aimed to investigate the relation between informal caregiving and body mass index (BMI) longitudinally.
Study design: The data were drawn from wave 2 (2002) to wave 5 (2014) of the German Ageing Survey. This is a representative sample of the community-dwelling population aged 40 years and above in Germany.
Methods: Self-rated BMI was used. Individuals were asked whether they provide informal care on a regular basis. Adjusting for employment status, age, marital status, morbidity and depressive symptoms, fixed effects regressions were used.
Results: The fixed effects regressions showed that the onset of informal caregiving was not associated with changes in BMI in the total sample and in women, whereas the onset of informal caregiving was associated with increasing BMI in men ($\beta = 0.15$, $P < 0.05$). In addition, an increase in BMI was positively associated with ageing, an increase in morbidity and a decrease in frequency of sports activities in the total sample and in both sexes.
Conclusions: Our findings stress the longitudinal relation between informal caregiving and BMI in men. Consequently, it might be helpful to generate weight management strategies specifically designed for male informal caregivers.

Introduction

Numerous studies have shown that individuals in need of care prefer to be cared for at home rather than in a nursing home for as long as possible.[1] In Germany, care at home is mostly provided by informal caregivers.[2,3] It is expected that demographic changes will lead to an increased need for long-term care, stressing the relevance of informal care. However, it has been shown that starting informal care is associated with negative health outcomes for caregivers such as increased depressive symptoms or reduced life satisfaction.[4]

Thus far, there is little evidence concerning the association between informal caregiving and body mass index (BMI). Few

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cross-sectional studies compared the BMI of informal caregivers and non-caregivers. In a young and rather specific sample ($n = 57$ black female recipients; 37 caregivers and 20 non-caregivers; median age was 28.2 years), no significant differences in BMI between caregivers and non-caregivers were observed.[5] Contrarily, large, representative cross-sectional studies found significant differences in BMI between informal caregivers and individuals not providing informal care. For example, a cross-sectional American study (Behavioral Risk Factor Surveillance System; $n = 292,813$; 74,135 were self-identified as caregivers and 216,652 were non-caregivers; telephone interview in the year 2009) demonstrated that caregivers (mean BMI: 27.8 kg/m^2) had a slightly higher BMI than non-caregivers (mean BMI: 27.4 kg/m^2).[6] This finding was also supported by a cross-sectional study conducted in Thailand in 2009 ($n = 60,569$) where caregivers reported higher BMI compared to non-caregivers.[7] Drawing data from the Nurses' Health Study ($n = 54,411$, an ongoing cohort of the US female registered nurses aged 46–71 years; questionnaire), another study has shown that women providing care to an ill/disabled spouse had a higher BMI (mean BMI: 27.0 kg/m^2) compared to those not providing care at all (mean BMI: 25.6 kg/m^2).[8]

However, longitudinal studies are missing investigating the relation between informal care and BMI. Longitudinal studies are needed to get insights into the causal relationship between these factors. Moreover, using panel econometric techniques can mitigate the problem of unobserved heterogeneity.[9] Therefore, based on a representative sample of individuals in the second half of life (40 years and above), the aim of the present study was to investigate whether informal caregiving and BMI were associated longitudinally. We hypothesise that informal caregiving is positively related to BMI longitudinally in the total sample and in both sexes.

The knowledge about a longitudinal association between informal caregiving and BMI is meaningful because this might stress consequences of informal caregiving. This is important as an increased BMI is a risk factor for various physical illnesses, including diabetes, or cardiovascular diseases.[10] Furthermore, an increased BMI is associated with reduced quality of life and social exclusion.[11] In total, this might help to create interventional strategies for informal caregivers.

Methods

Sample

Data were drawn from the wave 2 (2002), wave 3 (2008), wave 4 (2011) and wave 5 (2014) of the German Ageing Survey (DEAS, 'Deutscher Alterssurvey'). It is a nationally representative cross-sectional and longitudinal survey of the community-dwelling population in the second half of life (40 years and above) in Germany organised by the German Centre of Gerontology (DZA, 'Deutsches Zentrum für Altersfragen') and funded by the Federal Ministry for Family Affairs, Senior Citizens, Women and Youth (BMFSFJ). The first wave took place in 1996. The DEAS study has a cohort-sequential longitudinal design with a wide thematic spectrum (e.g. social exclusion, occupation, psychological factors or meaning of ageing).

In the waves 1, 2, 3 and 5, a national representative baseline sample was drawn and followed-up afterwards, whereas wave 4 was a pure panel survey, i.e. including solely individuals who had already been interviewed before. 1526 individuals from wave 1 were re-interviewed in wave 2. In wave 3, 1995 individuals were reinterviewed and 6205 individuals were first time participants. In wave 5, about 6000 individuals were first time participants, whereas over 4000 individuals were reinterviewed. Register sampling of the community-dwelling individuals was used, disproportionally stratified by age, gender and geographical location. The panel data structure allows investigation of intraindividual changes over time.

A total of 5194 participants were interviewed in wave 2 (response rate: 38%). 8200 individuals were interviewed in wave 3 (response rate: 38%) and 4855 participants were interviewed in wave 4 (response rate: 56%). In wave 5, 10,355 individuals took part (response rate: 33%). The response rates are similar to other large survey studies carried out in Germany.[12] The main reasons for the lack of follow-up data were refusal to participate and bad health condition. Concerning the DEAS study (e.g. sample composition, panel attrition or sample selection), further details were provided elsewhere.[13,14]

Informal caregiving, BMI and various other variables were included from wave 2 onwards. Consequently and worth repeating, data from wave 2 to wave 5 were used in the present study. Written informed consent was given prior to the interview.

Dependent variable

Self-reported weight (kg) divided by self-reported height (metre) squared was used to calculate the BMI. The BMI is a widely used body weight classification system (e.g. to quantify excess weight) in adults.[15]

Independent variables

Several potential confounders were included in the current study. Age, marital status (married and living together with spouse and others [married and living separately, divorced, widowed and single]) and occupational status (employed, retired and others [not employed]). Based on the International Physical Activity Questionnaire,[16] the frequency of sports activities was quantified by asking 'How often do you do sports such as hiking, soccer, gymnastics, or swimming?' (daily; several times a week; once a week; 1–3 times a month; less often and never). This item was validated elsewhere.[17] The widely used and well-validated Center for Epidemiologic Studies Depression Scale[18] was used to measure depressive symptoms. In addition, the sum of physical illnesses (e.g. bladder problems; stomach and intestinal problems; cardiac and circulatory disorders; joint, bone, spinal or back problems; cancer and diabetes, ranging from 0 to 11) was used as an explanatory variable. The presence of providing informal care was assessed with the item 'Are there people you look after or care for regularly due to their poor state of health, either on a private or volunteer basis?' (no; yes).

Afterwards, respondents were asked for whom they provide support (e.g. father-in-law/partner's father, mother, father, mother-in-law/partner's mother, spouse/partner and