Who cares first? A MAIHDA analysis of intersectional inequalities in the age of caregiving onset using European longitudinal data

Enrique Alonso-Perez

enrique.alonsoperez@charite.de

Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin and Humboldt-Universität zu Berlin

Julie Lorraine O'Sullivan

Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin and Humboldt-Universität zu Berlin

Susanne Schnitzer

Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin and Humboldt-Universität zu Berlin

Alina Schmitz

TU Dortmund

Martina Brandt

TU Dortmund

Paul Gellert

Charité – Universitätsmedizin Berlin, corporate member of Freie Universität Berlin and Humboldt-Universität zu Berlin

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Abstract

Caregiving for older relatives is central for many people's lives in aging societies. The timing of caregiving onset significantly influences caregivers' health, social, and employment trajectories. However, the age at which family caregiving begins and its potential social and intersectional stratification have not been sufficiently explored. Using data from the Survey of Health, Ageing and Retirement in Europe (SHARE), we analysed individuals becoming daily caregivers between waves 1 and 9 (ages 50–95). We applied Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy (MAIHDA) to determine intersectional inequalities in the age of caregiving onset, separately for intragenerational (partner, siblings) and intergenerational (parents, in-laws) caregiving. We created 48 intersectional strata with combinations of sex/gender, migration background, education, and occupation. Intragenerational care onset was at 70.18 years on average (N = 10,146), with 11 years of difference between strata. Intersectional strata explained substantial variation in onset age (VPC = 7.14%), and 10% of these differences were due to intersectional interaction effects. Intergenerational care (N = 3,966) began earlier at 59.56 years on average, with a difference of over 4 years between strata. Most between-strata variation was additive. For both intra- and intergenerational care, combinations of women with low-skill occupations and high education were associated with earlier caregiving onset. We found large differences in the age of caregiving onset between intersectional strata in both intra- and intergenerational care. Mapping social heterogeneity and the intersectional nature of caregiving onset within the life-course is critical to further understand the prerequisites, meaning, and consequences for family caregivers.

Introduction

In rapidly ageing societies, informal care is fundamental for many families and for the sustainability of most healthcare systems (Brandt et al., 2009; Tur-Sinai et al., 2020; Wolff et al., 2016). Between 12% and 18% of European adults regularly provide informal care to family members (European Commission, 2021); in the UK, for example, men and women aged 50 are expected to spend an average of 4.9 and 5.9 years of their remaining lives as informal caregivers (Di Gessa & Deindl, 2024). Although numerous studies examined the consequences of family caregiving (for an overview, see Schulz et al. (2020)), less attention has been given to the transition into caregiving and how social inequalities across the life-course may affect the timing of this transition.

Integration of family caregiving into life-course trajectories

Despite the growing prominence of family care in ageing societies, relatively little empirical research has investigated caregiving trajectories. Recent developments have advocated for recognizing family caregiving as a distinct trajectory within the life-course, arguing that it is a normative phenomenon whose increasing diversity and cumulative impact on late-life outcomes are inadequately understood (Keating et al., 2019). This conceptualization stems from the central assumption in life-course research

that transitions and trajectories influence the structure and pace of individual lives, as the impact of experiences is critically influenced by when they occur within the life-course (Alwin, 2012). In particular, Keating and colleagues emphasized the importance of the age at onset of the first care episode (i.e., timing within the life-course) as crucial in shaping caregiving and other overlapping trajectories. Capturing the life-course stage at which individuals become caregivers is fundamental for adequately understanding different pathways into caregiving and their intersection with family and employment. It makes a significant difference whether caregiving begins before or after retirement, or before or after becoming a grandparent (Hamilton & Cass, 2017). Researchers have started to move beyond snapshots of individual predictors of caregiving onto larger mechanisms and dynamic processes (Moen & DePasquale, 2017), aiming to understand pathways to caregiving and its life-course timing. Nonetheless, differences in age of caregiving onset and the factors that influence such timing remain unexplored.

Numerous studies have explored the social determinants of family caregiving, yet they often adopted a static approach, which understates the complexity of caregiving trajectories within the life-course (Rodrigues et al., 2022). Differences in the timing of caregiving onset may be influenced by cumulative processes of social (dis)advantage across various life-course domains (Carmichael & Ercolani, 2016; Fast et al., 2021). Social positions result from cumulative exposure to risks during adult life, such as weak attachment to the labour market, family conflicts or reduced social networks (Hradil, 2012). These positions are associated with different opportunities and advantages, not only deriving from individual responsibility but also from structural inequalities, and may set pathways to caregiving at a particular age. Several studies indicated that mid-life (ages 45–60 for intergenerational caregiving) and late-life (ages 60–75 for intragenerational caregiving) are the periods with the highest likelihood of providing care (Conde-Sala et al., 2010; Hajek & König, 2016).

Focusing on late-life as the timing of care transition, a more nuanced understanding of the differences in pathways to caregiving onset may help explain why late caregivers suffer more social disadvantage, financial strain and poorer mental and physical health compared to those who become caregivers earlier in life (Keating et al., 2019). Caregiving onset in this phase often overlaps with end-of-employment trajectories and other family commitments towards parents and children, potentially compromising these responsibilities. Recent studies have examined how the timing of caregiving is linked to other life trajectories such as employment (Raiber et al., 2022; Simard-Duplain, 2022), family relations (Hamilton & Cass, 2017; Latham-Mintus et al., 2022), and health (Barnett, 2015).

Particularly for intergenerational care, earlier onset of parental caregiving may imply a longer overlap between caregiving responsibilities and working years, increasing the likelihood of financial strain (Simard-Duplain, 2022). This is especially important in pre-retirement years, as becoming a caregiver at younger ages could negatively impact the final employment years and lead to pension penalties. Earlier caregiving onset could act as a catalyst for the accumulation of inequalities over time, potentially accelerating the health and wellbeing deterioration while setting individuals onto trajectories of weaker employment ties or reduced social activities (Fast et al., 2021; Raiber et al., 2022). Most importantly, the

earlier this transition occurs, the more persistent these trajectories are likely to be, with more profound consequences in later life.

Determinants of timing of caregiving onset and intersectionality

Alongside with population aging, growing social inequalities have become paramount in the study of prerequisites and consequences of informal care (Brandt et al., 2022; Cohen et al., 2019; Moen, 2001). The “Informal Care Model” posits that caregiving transitions arise from care needs in the family, followed by a decision process involving individual disposition, expectations, social norms and availability of care alternatives (Broese van Groenou & De Boer, 2016). Moreover, it is likely that all these steps are socially stratified. While behavioural components are important to understand the onset of care provision, diversity of contexts and the influence of individual axes of inequalities as determinants of the timing of caregiving onset merit special attention. Family caregiving is largely influenced by social determinants such as sex/gender, migration background or socioeconomic status (SES), with women and those with lower SES being more likely to provide care (Lee & Tang, 2015; Schmitz et al., 2024). Although there is substantial evidence about the gendered and socioeconomic gradient in family caregiving, most of the work unveiling differences in the timing of care transitions has focused on single indicators of social inequalities rather than their intersections.

Earlier life events and social determinants such as sex/gender, SES or social class, particularly when considered together, can influence the timing of caregiving onset, and thus mutually shape the consequences for the caregivers’ life-course (Carmichael & Ercolani, 2016). Characteristics like the caregiver’s income (lower), sex/gender (female), and partnership status (single) are associated with an increased likelihood of becoming a caregiver (Gaugler et al., 2003; Quashie et al., 2022; Uccheddu et al., 2019). However, the stratification of the timing of caregiving onset by social determinants or their intersections has rarely been investigated. The gendered nature of caregiving has been extensively documented, with women typically becoming caregivers at earlier ages on average (Fast et al., 2021; Rodrigues et al., 2022). Such disparities in the timing of caregiving onset are illustrative of sex/gender as context, where a gendered life-course determines the impacts of social roles and shapes differential caregiving pathways, opportunities, and risks (Kim, 2023). Regarding migration background, older non-western immigrant women tend to have earlier transitions to caregiving than their non-migrant counterparts (Syed, 2022; Zhou, 2013). This variance in caregiving onset should be accounted for by considering life-course timings within intersectional and transnational feminist perspectives (Syed, 2022). Further, differences in SES prior to family caregiving are associated with divergent onset timings, where individuals with lower education, lower social class and less skilled occupations become caregivers at earlier life phases (Carmichael & Ercolani, 2016; Moen & DePasquale, 2017). Low-skilled occupational classes may begin caregiving earlier due to limited resources, including a lower ability to afford paid home care.

While some evidence links social determinants to the age of caregiving onset, few studies have explored this association through a cumulative (dis)advantage perspective (Rodrigues et al., 2022). Differences in the timing of caregiving onset have been investigated in terms of sex/gender, migration background or SES, but not by considering the impact of multiple overlapping social determinants. The intersectionality framework can provide new insights, based on the idea that people can access to social positions following the intersection of multiple socio-environmental characteristics that have been accumulated throughout the life-course (Crenshaw, 1990). Intersectionality entails that existing interlocking systems of privilege and oppression interact upon the individual social position, creating a perpetuation of structural social and health inequalities that define people's discrimination experiences (e.g., sexism, racism, classism) (Crenshaw, 1990; Dressel et al., 1997; Hill Collins, 1990).

Most importantly, individuals' intersectional social strata might determine the age of care onset, shaping a distinct impact in the nature of caregiving and other overlapping trajectories. A recent scoping review concluded that family care research has largely overlooked aspects of diversity and intersectionality, calling for the adoption of an intersectional perspective to achieve a more nuanced understanding of the caregiving experiences (Hengelaar et al., 2023). The novel approach of Multilevel Analysis of Individual Heterogeneity and Discriminatory Accuracy (MAIHDA) provides the opportunity to incorporate intersectionality into quantitative analyses (Merlo, 2018), but it has not been applied yet in the family care context. Developed by Evans et al. (2018), MAIHDA is useful to gain a nuanced understanding on differences in health care outcomes (i.e., timing of caregiving onset) across intersectional social strata, while embedding intersectionality within a life-course perspective (Bell et al., 2019; Holman & Walker, 2021).

The present study

The aim of the present study was to investigate the age of caregiving onset, and whether such timing in the life-course varied across intersectional social strata. Strata were created by the intersection of sex/gender, migration background, education and occupation. Thereby, we considered intra- and intergenerational care relationships separately. Given the later stage in the life-course and more accumulated inequalities, we assumed that between-strata differences in the age of caregiving onset would be more pronounced for the intragenerational than for the intergenerational cases, although the evidence on this is limited. We hypothesized that women, with a migration background, with lower education, and with lower-skill occupations would have an earlier caregiving onset than men, without a migration background, with higher education, and in white-collar high-skill occupations.

Methods

Data and Sample

We drew our data from waves 1–9 (2004–2022) of the Survey of Health, Ageing and Retirement in Europe (SHARE). This is a European panel study collecting longitudinal data on demographic, socioeconomic and health outcomes for adults aged 50+ (Börsch-Supan et al., 2013). SHARE data are

collected through face-to-face computer-assisted personal interviews (CAPI), with methodological details on the survey extensively described elsewhere (Bergmann et al., 2017). Out of 34,285 individuals with more than two observations and who became informal long-term caregivers between waves 2–9, we selected 15,607 respondents who had complete information on all caregiving variables of interest. From those, we excluded 740 individuals (4.74%) for whom the intra- or intergeneration of caregiving could not be determined (care recipient being classified as "other relative"), and another 755 individuals (4.84%) with missing information in any of the sociodemographic variables of interest (sex/gender, migration background, education and occupation). This resulted in a final sample of N = 14,112, of which N = 10,146 became intragenerational caregivers and N = 3,966 intergenerational caregivers.

Outcome: Age of caregiving onset

Informal long-term caregiving was defined as providing personal care to an adult family member daily during at least three consecutive months. SHARE distinguishes between informal family care outside of the household "*In the last twelve months, have you personally given any kind of help to a family member from outside the household?"*, followed by the questions "*Was this help with personal care (e.g., dressing, bathing or showering, eating, getting in or out of bed or using the toilet)?"* and *"How often?"*; and inside the household "*Is there someone living in this household whom you have helped regularly during the last twelve months with personal care, such as washing, getting out of bed, or dressing? (By regularly we mean daily or almost daily during at least three months. We do not want to capture help during short-term sickness of family members)"*. Both questions were coded as binary variables (0 = No; 1 = Yes), hence we included individuals who answered yes to any of them, only selecting those who provided daily personal care outside of the household. The two variables were added-up, resulting in a binary caregiving variable either inside or outside the household (yes/no).

We opted to collapse inside and outside the household care due to our focus on the timing of care onset, and to retain a sufficient sample size to further classify into inter- and intragenerational care and intersectional strata. Since waves 4 and 5 did not distinguish personal care and other types of support outside the household, we followed the strategy by Nolan et al. (2024) and limited caregiving outside of the household to waves 1–2 and 6–8, as opposed to waves 1–9 for caregiving inside the household. We only included individuals who provided care to identifiable family members, and we used this information to classify caregiving into intra- and intergenerational (Table S1). The first wave when an individual became a caregiver was used to set the corresponding age, which was the outcome variable in all analyses.

Intersectional social strata

We created 48 intersectional social strata through the unique combinations of sex/gender (2 categories), migration background (2 categories), education (3 categories) and occupation (4 categories) (2x2x3x4 = 48). Such sociodemographic variables were selected since they are known to be related to social (dis)advantages and access to particular social positions, in a way where they represent the effects produced by systems of privilege and oppression, especially at their intersections. *Sex/gender* was

coded as male or female since SHARE only provides this imperfect binary categorization. Nonetheless, we opted to employ the term sex/gender to account for the conflation of sex and gender in the survey item. *Migration background* was categorized as yes or no after the question "Were you born in the country of interview?". *Education* was assessed according to the International Standard Classification of Education (ISCED-97), and coded as high (ISECD-97 level 5–6), medium (ISCED-97 level 3–4) or low (ISECD-97 level 1–2). *Occupation* was obtained from the self-reported present or most recent job type, and categorized in four groups based on the International Standard Classification of Occupations (ISCO-88): white-collar high-skill (WCHS), white-collar low-skill (WCLS), blue-collar high-skill (BCHS), and blue-collar low-skill (BCLS). These four variables have been found to be associated with differences in the timing of caregiving onset, although consistently in a separate way and not at their intersections (Carmichael & Ercolani, 2016; Fast et al., 2021; Kim, 2023; Moen & DePasquale, 2017; Syed, 2022).

Statistical analysis

We employed the MAIHDA approach, which is based on multilevel models where individuals at the first level are nested within the intersectional social strata at the second level (Evans et al., 2018). This methodology allowed us to assess the variation in age of caregiving onset across intersectional strata, thus determining the discriminatory accuracy of the intersectional strata in explaining the variance of the outcome. We used Restricted Maximum Likelihood (REML) estimation to fit a series of linear multilevel models.

We first calculated a null model (Model 1), which allowed to map the differences in age of caregiving onset across the intersectional social strata. With this model we calculated the Variance Partition Coefficient (VPC), which measures level of variation in the outcome between intersectional strata. The VPC is analogous to the intra-class correlation coefficient (ICC), where values ≥ 5% can indicate a fair magnitude of clustering (Axelsson Fisk et al., 2018; Merlo, 2018). Further, we fitted a model adjusted for the strata-defining variables as fixed effects (Model 2). By doing so, we accounted for the additive effects explaining the outcome variance. With this model we were able to calculate the VPC and the Proportional Change in Variance (PCV), which is the difference in variance explained at the strata-level compared to Model 1. In case of Model 2 not explaining the total strata variance (i.e., PCV < 100%), this would mean that the observed inequalities were due to intersectional interaction effects (i.e., multiplicative effects) (Bell et al., 2019). Lastly, we examined the strata-level residuals to determine which particular intersectional strata were exposed to such multiplicative effects. If the residuals' 95% CI did not cross zero, such strata would have either negative (advantageous) or positive (hazardous) intersectional interaction effects. All models were fitted separately for intra- and intergenerational groups. The analyses were conducted in Stata/BE®18.0 (Statacorp, College Station, TX, USA), and statistical significance was based on a two-tailed p-value < 0.05 for regression coefficients.

Results

Descriptive Statistics

Our sample consisted of 10,146 individuals who became intragenerational caregivers and 3,966 who became intergenerational caregivers (Table 1). Within the intragenerational group, a large majority provided care to their partner or spouse (95.60%), followed by siblings (3.64%). Regarding intergenerational care, most individuals cared for their parents (71.72%), followed by in-laws (22.35%), step-parents (3.56%), grandparents (0.98%), and aunts and uncles (0.66%) (Table S1). Overall, there were differences in sociodemographic characteristics between intra- and intergenerational caregivers. The average age of caregiving onset was higher for intragenerational caregivers (70.18 years; SD = 9.93) than for intergenerational caregivers (59.56 years; SD = 6.06). The proportion of women was lower among intragenerational caregivers (53.32% compared to 68.68%), whereas there were more caregivers with a migration background among the intragenerational group (11.20% versus 6.76% in intergenerational caregivers). Educational levels were generally lower among intragenerational caregivers compared to the intergenerational group (19.25% versus 26.65% with high education, and 43.87% versus 29.05% with low education, correspondingly). A similar pattern was seen for occupation, where the intragenerational sample had less white-collar and lower skilled occupations than intergenerational caregivers (27.37% versus 31.92% with white-collar high-skill, and 24.47% versus 19.97% with blue-collar low-skill, correspondingly).

Table 1
Socio-demographic characteristics of the intra- and intergenerational caregiving sample.

	Intragenerational care		Intergenerational care	
	N	%	N	%
Total	10,146		3,966	
Age of caregiving onset (Mean ± SD)	70.18 (9.93)		59.56 (6.06)	
Sex/gender				
Male	4,736	46.68%	1,242	31.32%
Female	5,410	53.32%	2,724	68.68%
Migration Background				
No	9,010	88.80%	3,698	93.24%
Yes	1,136	11.20%	268	6.76%
Education				
High	1,955	19.27%	1,057	26.65%
Middle	3,740	36.86%	1,757	44.30%
Low	4,451	43.87%	1,152	29.05%
Occupation				
White-collar high-skill	2,777	27.37%	1,266	31.92%
White-collar low-skill	2,904	28.62%	1,298	32.73%
Blue-collar high-skill	1,982	19.53%	610	15.38%
Blue-collar low-skill	2,483	24.47%	792	19.97%

Intragenerational caregiving

The predicted ages of intragenerational caregiving onset for each intersectional stratum are presented in Fig. 1 (average = 70.18 years; SD = 9.93). There were clear between-strata disparities, with a remarkable difference of more than 11 years between those with the lowest age of onset (65.17 years, consisting of women without a migration background, high education and blue-collar low-skill occupation), and the highest age of onset (75.97 years, formed by men with a migration background, low education and white-collar high-skill occupation). Trends in Fig. 1 show that in general women became caregivers at a younger age, higher education implied earlier onset and there was a gradual decrease of onset age in blue-collar and less-skilled occupations.

Results on intragenerational caregiving obtained from the MAIHDA models are displayed in Table 2. The VPC in Model 1 indicated that 7.14% of the differences in age of caregiving onset were explained at the strata-level, suggesting a fair level of clustering (Axelsson Fisk et al., 2018). This is in line with the variation seen in Fig. 1. After adjusting for the main effects in Model 2, the VPC decreased to 0.76%, meaning that some amount of clustering at the strata-level remained. Notably, a PCV of 90.00% indicated that additive effects could not explain all the outcome variance. This implies that 10% of the differences in the age of caregiving onset between strata were due to multiplicative effects, that is, intersectional interaction effects. The main effects in Model 2 showed that on average, the age of caregiving onset for women was almost three years earlier than for men ($\beta = -2.67$). On average, people with a migration background were almost six months older when they became caregivers, although the difference was not statistically significant ($\beta = 0.39$). Further, those with low education became caregivers at an older age compared to people with high education ($\beta = 3.70$). Finally, respondents with white-collar low-skilled and blue-collar low-skilled occupations had an earlier onset of caregiving compared to those with white-collar high-skilled occupations ($\beta = -2.55$ and $\beta = -3.03$, respectively). Figure 2A shows the strata-level residuals obtained from Model 2, where some multiplicative interaction effects are uncovered. Three strata had positive interaction effects, meaning their age of caregiving onset was older than expected based on the main effects only, whereas one stratum had negative interaction effects, meaning an earlier onset than expected (see Table S3 for intersectional strata details). These results reveal a substantial level of intersectionality, as shown by a PCV value below 100% (90.00%).

Table 2
Results from MAIHDA models predicting age of caregiving onset, both for inter- and intragenerational care.

Age of caregiving onset				
	Intragenerational care (N = 10,146)		**Intergenerational care (N = 3,966)**	
FIXED EFFECTS	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Constant	69.96 (69.13, 70.79)	71.41 (70.46, 72.36)	59.87 (59.41, 60.34)	60.82 (60.30, 61.33)
Sex/gender				
Male		Ref.		Ref.
Female		**-2.67 (-3.39, -1.95)**		**-1.75 (-2.19, -1.32)**
Migration Background				
No migration		Ref.		Ref.
Yes migration		0.39 (-0.41, 1.19)		0.55 (-0.21, 1.31)
Education				
High education		Ref.		Ref.
Medium education		0.22 (-0.73, 1.17)		-0.31 (-0.84, 0.23)
Low education		**3.70 (2.72, 4.67)**		**1.14 (0.52, 1.75)**
Occupation				
White-collar high-skill		Ref.		Ref.
White-collar low-skill		**-2.55 (-3.51, -1.58)**		-0.29 (-0.83, 0.26)
Blue-collar high-skill		-0.92 (-1.97, 0.14)		-0.12 (-0.79, 0.54)
Blue-collar low-skill		**-3.03 (-4.07, -2.00)**		**-0.90 (-1.53, -0.28)**
RANDOM EFFECTS				

Notes: estimates in bold are statistically significant; CI: Confidence Interval; VPC: Variance Partition Coefficient; PCV: Proportional Change in Variance.

Age of caregiving onset				
	Intragenerational care (N = 10,146)		Intergenerational care (N = 3,966)	
FIXED EFFECTS	**Model 1**	**Model 2**	**Model 1**	**Model 2**
Between-strata variance	7.11 (2.01, 3.32)	0.71 (0.23, 2.21)	1.40 (0.66, 2.82)	0.11 (0.01, 2.49)
VPC (%)	7.14%	0.76%	3.69%	0.07%
PCV (%)		90.00%		98.20%

Notes: estimates in bold are statistically significant; CI: Confidence Interval; VPC: Variance Partition Coefficient; PCV: Proportional Change in Variance.

Intergenerational caregiving

The predicted ages of intergenerational caregiving onset for each intersectional stratum are presented in Fig. 3 (average = 59.56 years; SD = 6.06). There was a difference of four and a half years between the intersectional strata with the lowest age of onset (57.84 years, consisting of women without a migration background, medium education and blue-collar low-skill occupation), and the strata with the highest age of onset (62.39 years, formed by men with a migration background, low education and blue-collar high-skill occupation). An overall clear pattern emerged, where women have a lower age of onset, people with migration background have a higher age of onset, higher educational levels are associated with an older age of onset, and blue-collar and less-skilled occupations are associated with a younger age of onset.

Table 2 also shows the MAIHDA results for intergenerational caregiving, where a VPC of 3.69% in Model 1 suggested a poorer level of clustering at the strata level. In fact, when adjusting for the main effects in Model 2, the VPC was reduced to 0.07%, meaning that almost all the clustering at the strata-level was explained away by those main effects. A PCV of 98.20% confirmed that the largest majority of differences in age of caregiving onset were explained by additive effects, leaving only around 2% of the outcome variance to be explained by multiplicative effects. The main effects were very similar to those in the intragenerational care, since women became caregivers at a younger age than men (β = -1.75). In this case, the effect of migration background on a later onset of caregiving was larger yet still non-significant (β = 0.55). Respondents with low education became caregivers at an older age than those with high education (β = 1.14), whereas individuals with white-collar low-skill and blue-collar (both high and low skill) occupations became caregivers at a younger age than those with white-collar high-skill occupations, only the latter being significant (β = -0.29, β = -0.12 and β = -0.90, respectively). Figure 2B shows the strata-level residuals obtained from Model 2. Since all the confidence intervals overlapped with 0, no statistically significant multiplicative interaction effects were revealed. This is aligned with a PCV value close to 100% (98.20%), meaning that practically all between-strata differences were due to additive effects.

Discussion

The objective of the current study was to examine the timing of family caregiving onset in late mid-life, with a particular focus on differences in age of onset across intersectional social strata. These strata were created by the combination of sex/gender, migration background, education and occupation of the caregivers. We used SHARE data to analyse intersectional inequalities in the age of caregiving onset by employing the MAIHDA framework, considering intra- and intergenerational caregiving separately. We found more than 11 years of difference between intersectional strata for intragenerational care when, for instance, the partner became a caregiver. For intergenerational care, these differences were up to four and a half years. Although there were some intersectional interaction effects in the intragenerational case, this pattern was not found in the intergenerational analyses. For both generational groups, being a woman and low-skill occupations were related with an earlier onset of caregiving. We found no clear pattern between migration background and timing of caregiving onset. More surprisingly, high education was also related with an earlier onset of caregiving.

Although there is some evidence indicating the differences in caregiving onset and its consequences across intersecting social determinants (Cohen et al., 2019; Gaugler et al., 2003; Nikzad-Terhune et al., 2019; Willert & Minnotte, 2021), to date no study had investigated the differences in the age of caregiving onset with an intersectional approach. We used the tenet of *timing* within the life-course theory to explore stratified pathways into family caregiving. Our findings on sex/gender and occupation are in line with previous studies that analysed them as separate predictors of the timing of caregiving onset (Carmichael & Ercolani, 2016; Gaugler et al., 2003; Moen & DePasquale, 2017; Nikzad-Terhune et al., 2019). Furthermore, we provide new empirical insights by considering the intersection of both social determinants. We found significant intersectional interaction effects for intragenerational caregiving, indicating the fundamental role of social position in shaping differential pathways into family caregiving. A lifelong exposure to interlocked systems of power and oppression is reflected in the differences in age of onset across intersectional strata (Bauer, 2014). Our results illustrate the heterogeneities created by systemic social processes, such as women with blue-collar occupations experiencing interlaced sexism and classism, which result in an earlier onset of caregiving with potential implications for the remaining life-course. This underscores the importance to adopt an intersectional lens to gain a more nuanced understanding of disparities in family caregiving and unequal life-courses.

Our findings linking higher education with an earlier onset of caregiving, despite not having available direct comparisons in the literature, are opposed to the overall trend that associates lower SES (either education, income or wealth) with a higher rate of care onset (Quashie et al., 2022). However, our results are aligned with evidence revealing positive associations between higher education and likelihood of caregiving, particularly women with tertiary education (Albertini et al., 2023; Baji et al., 2019; Brandt et al., 2009; Sacco et al., 2022). To test for over-control bias, we also conducted analyses with only education included (without occupation). The effect direction remained unchanged, indicating the robustness of a positive educational gradient in the timing of caregiving onset. It seems probable that lower educational qualifications may not necessarily align with low-skill occupations for older cohorts in SHARE, which

reinforces our intersectional approach. Since higher levels of education are associated with greater financial security and better health in later life (Tur-Sinai et al., 2020), this could translate into improved access to resources, more active and productive aging, and a greater likelihood to be healthy and thus engage in caregiving. Aligned with this, individuals with lower education may have to rely on publicly funded services and formal care at an earlier age, only becoming informal caregivers at later life phases (Albertini et al., 2023).

Some social determinants, such as sex/gender, migration background or SES influence the access to social positions within status hierarchies that affect the timing of caregiving onset. While gendered inequalities and other forms of stratification are thoroughly embedded in care work research, less is known about how the social environments associated with these attributes produce and reproduce persistent inequalities (Moen & DePasquale, 2017). Hence, mapping social heterogeneity and vulnerability in the context of family caregiving is fundamental to further understand the drivers of such inequalities. We shed some light into how social stratification can shape pathways to caregiving, with a particular focus on the life-course and the timing of such transition. Our findings emphasize the importance of how caregiving trajectories unequally unfold across the life-course, and their intersectional nature through cumulative (dis)advantages. More attention should be paid at how diverse caregiving pathways, particularly the age of onset, may in fact be reproducing inequalities experienced throughout the life-course.

The present study has several strengths, including the large longitudinal sample and an intersectionality-informed, sophisticated analysis that had not been applied to informal caregiving research. However, our study also has imitations. Firstly, the composition of the groups followed an intra- and intergenerational perspective, yet these categories are broad and heterogeneous. For instance, caring sisters and partners or adult children and stepchildren were pooled together. We opted for broader categories to avoid further exclusion of caregiver groups from the analysis. The average age in the intergenerational group was slightly biased upwards, as it would probably be younger if SHARE was not a survey on older people. Moreover, different generations entail a mix of age-period-cohort effects, which future research should disentangle. Secondly, we did not include confounders such as caregiver characteristics because the additional fixed effects would not have a straightforward interpretation in the MAIDHA framework. Nonetheless, future studies should investigate potential pathways and explanations for differences in caregiving onset across intersectional strata. Thirdly, we excluded individuals who did not become caregivers, as this was beyond the scope of our study. While prospective or matched designs for the stratified caregiving onset would provide valuable insights, our aim was to characterize caregivers regarding the stratified onset. Further, although SHARE provides comprehensive assessment instruments, we could not obtain more detailed information about the care situation. Our sample included multiple countries with differences in healthcare settings, such as institutional care support or social norms, which may affect the age of caregiving onset. Although we accounted for country differences, future research should focus on intersectional stratification differences across several healthcare settings. Finally, future studies should examine the trajectory or patterns of family caregiving, not only in the onset, from an intersectional perspective.

Potential implications include informing practitioners and policy makers on the importance that diverse family caregiving situations have different support needs and require stratified approaches over the life-course. The fact that certain groups are more at risk of becoming caregivers earlier in life (e.g., women in blue-collar occupations) should be considered to tailor caregiver support strategies and public health campaigns in a more intersectional approach. Conceptual implications may concern the life-course theory of caregiving and potential research questions that relate the onset of caregiving with health and socioeconomic trajectories. While we found an intersectional pattern in the age of caregiving onset, particularly for intragenerational caregivers, more theorizing about the life-course effects of the exact timing of the onset of caregiving would be warranted. Whether the effects on family behaviour, mental and physical health, work life and pension are intersectionally stratified, is currently unknown. Additionally, having the optimal combination of resources during the onset of caregiving would be part of such a life-course theory of caregiving.

Conclusion

Understanding inequalities in family caregiving, including its timing within the life-course comprehensively and in all dimensions, is fundamental for the wellbeing of individuals and their families. Future research should bring together socioeconomic and health perspectives on family caregiving, with a particular focus on intersectional disparities throughout the life-course. How specifically health and wealth trajectories are affected by an earlier onset and how these trajectories vary by intersectional social strata needs further investigation.

Declarations

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Figures

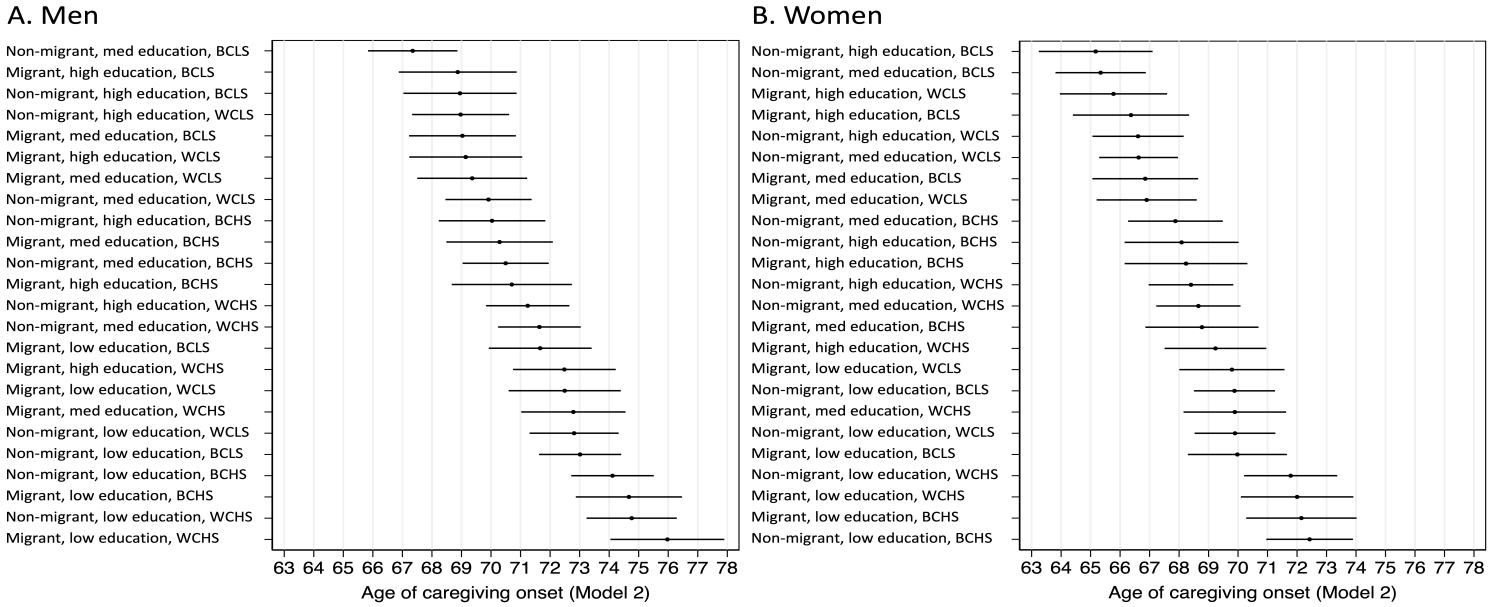

Figure 1

Predicted age of caregiving onset by intersectional social strata, for intragenerational care. Estimates and their 95% confidence intervals were obtained from Model 1. WCHS: white-collar high-skill; WCLS:

white-collar low-skill; BCHS: blue-collar high-skill; BCLS: blue-collar low-skill.

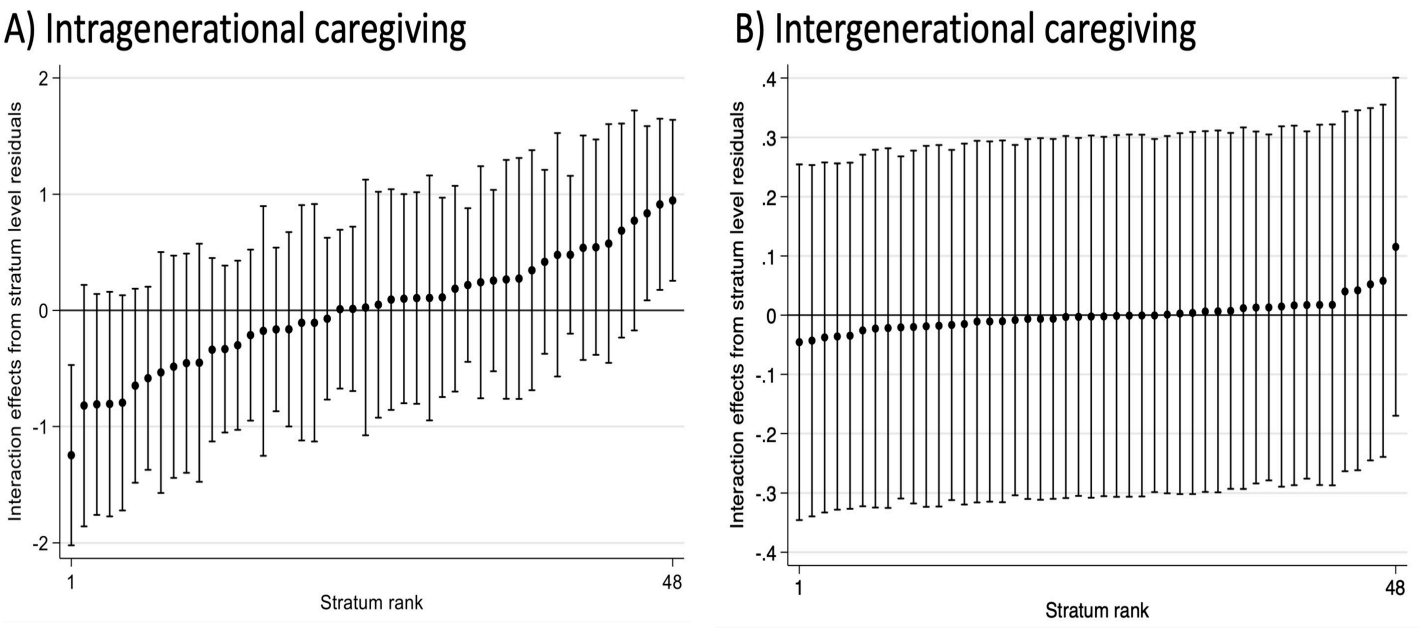

Figure 2

Strata-level residuals obtained from Model 2, both for (A) intra- and (B) intergenerational care.

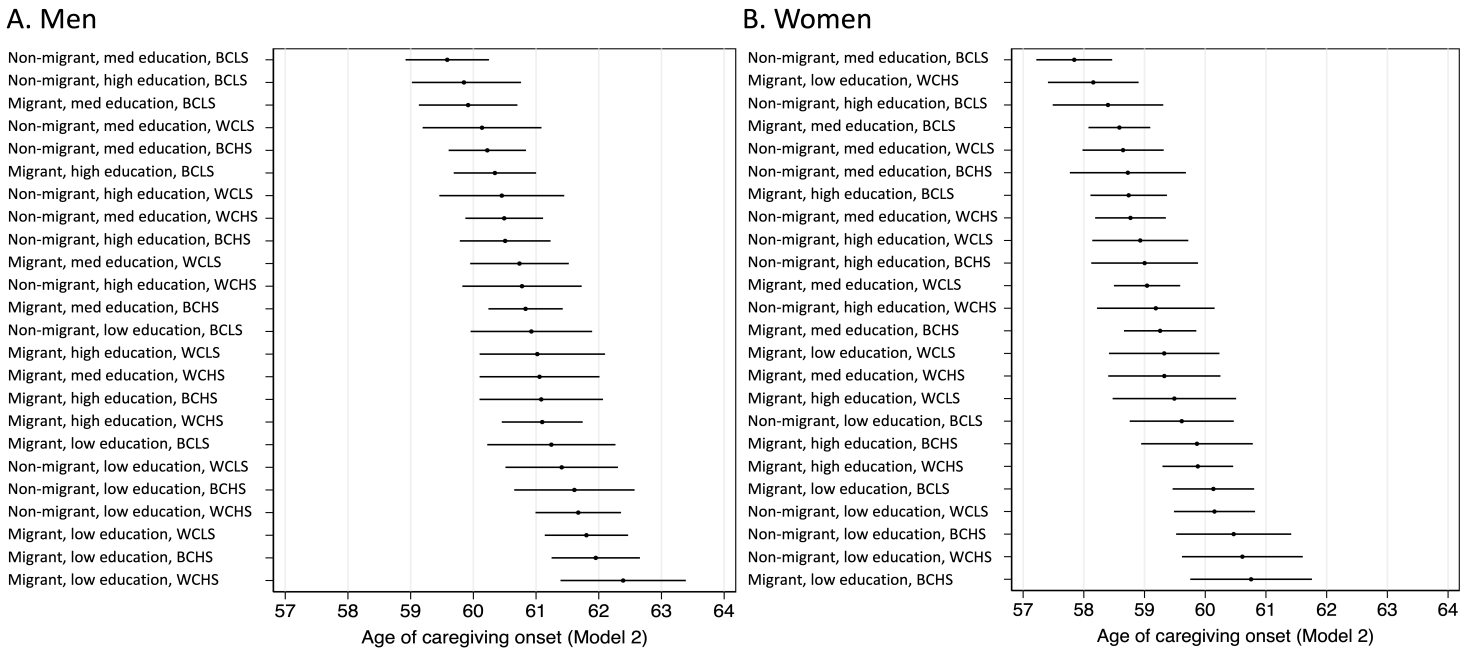

Figure 3

Predicted age of caregiving onset by intersectional social strata, for intergenerational care. Estimates and their 95% confidence intervals were obtained from Model 2. WCHS: white-collar high-skill; WCLS: white-collar low-skill; BCHS: blue-collar high-skill; BCLS: blue-collar low-skill.

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