DEMOGRAPHIC RESEARCH
A peer-reviewed, open-access journal of population sciences

DEMOGRAPHIC RESEARCH

VOLUME 50, ARTICLE 42, PAGES 1247–1264
PUBLISHED 5 JUNE 2024
https://www.demographic-research.org/Volumes/Vol50/42/
DOI: 10.4054/DemRes.2024.50.42

Descriptive Finding

Uncovering disability-free grandparenthood in Italy between 1998 and 2016 using gender-specific decomposition

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Demographic Research: Volume 50, Article 42
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Abstract

BACKGROUND

Decreasing fertility rates and increasing lifespan affect the time grandparents and grandchildren co-exist. Any changes in the time and length of grandparenthood could alter the quality and the direction of intergenerational exchange. In Italy, a country in which grandparents constitute a fundamental resource for the provision of childcare and where families are the main source of support for individuals, studying grandparents' health evolution is crucial, especially considering the limited evidence available.

OBJECTIVE

This study aims to uncover the evolution of disability-free grandparenthood at age 65 between 1998 and 2016 in Italy, analysing changes due to the longevity revolution and to grandparenthood–disability prevalence, with a focus on gender differences.

METHODS

Disability-free grandparenthood is estimated for Italy for the years 1998 to 2016 and by gender using the Sullivan method. The linear integral decomposition method is implemented to assess the contribution of changes in mortality and the grandparenthood–disability prevalence on the evolution of disability-free grandparenthood over time.

RESULTS

Between 1998 and 2016, Italian grandparents gained disability-free years of life overlapping with their grandchildren. Grandmothers gained 2.6 years (from 9.9 to 12.5 years), and grandfathers 1.8 years (from 8.9 to 10.7 years). Overall, this trend was primarily driven by improvements in health and survival. However, the postponement in the transition to grandparenthood for men slightly slowed down the trend.

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CONTRIBUTION

This study introduces grandparenthood into the estimation of generation overlap and provides the first evidence of a disability-free grandparenthood trend in Italy, where the health of grandparents is crucial to understanding intergenerational relationships and family dynamics.

1. Introduction

Increasing longevity and decreasing fertility were two key demographic features of European countries during the 20th century. These demographic changes have crucial implications for intergenerational dynamics and overlaps. While longer lifespans imply potentially longer periods of intergenerational overlap, fertility delay and reduction can offset this effect by delaying the onset of various family events, such as grandparenthood (Di Gessa, Bordone, and Arpino 2022; Leopold and Skopek 2015b; Margolis 2016; Skopek 2021; Szinovacz 1998).

The decline in fertility results in fewer new kin, such as fewer grandchildren, and a decrease in horizontal kinship ties. Moreover, the average age of becoming a grandparent has increased, reducing the prevalence of grandparents in the population, especially among younger groups (Skopek 2021). At the same time, populations have experienced a consistent improvement in survival, leading to fewer losses of kin because of death and an increase in vertical kinship ties as individuals age (Bengtson 2001; Caswell and Song 2021; Kolk et al. 2023). While mortality reductions have extended the expected years lived as a grandparent, delays in becoming a grandparent and a decrease in the number of grandchildren have somewhat offset these gains. Nonetheless, since the 1950s the duration of intergenerational overlap has increased, with multiple generations sharing more years of life than ever before. However, despite this increase the number of multigenerational family ties experienced over a lifetime has decreased in Europe over the last 60 years (Skopek 2021). For instance, Skopek's (2021) ranking of women highlights that Spain and Italy have the lowest number of expected grandchildren over a lifetime and the lowest prevalence of grandmothers.

The transition to grandparenthood, if delayed to older ages, can actually take place at ages when health is a concern (Margolis and Wright 2017). Grandparents are older today than in the past, and whether the years of life gained in later life are of good or bad quality is a major concern (Fries 2005; Gruenberg 2005; Kramer 1980; Manton 1982). Indeed, the health status of grandparents can strongly affect the generational overlap with grandchildren, both in terms of duration (Leopold and Skopek 2015a; Margolis 2016; Margolis and Verdery 2019) and quality (Margolis and Wright 2017). In particular,

grandparents' health is crucial to understand the direction of intergenerational transfers, since it could impact whether grandparents are providers or recipients of care (Aassve, Meroni, and Pronzato 2012; Grundy 2005; Hank and Buber 2009; Igel and Szydlik 2011). Even though the potential for grandchild care by grandparents may vary depending on factors such as gender, age, proximity, and the number of grandchildren (Zamberletti, Cavrini, and Tomassini 2018), when grandparents are healthy they can potentially provide intergenerational transfers, such as caring for grandchildren, or supporting adult children financially, functionally, or emotionally. Conversely, when grandparents are unhealthy they are more likely to become recipients of care, potentially burdening adult children or grandchildren with caregiving responsibilities. Grandparents' health is crucial if we also value the beneficial effect of the time spent together, for both grandparents (Di Gessa, Glaser, and Tinker 2016) and grandchildren (Fruhauf and Orel 2008), and how grandparental care impacts adult children's outcomes, including labour force participation (Arpino and Bordone 2014; Moussa 2019; Tomassini et al. 2020), and fertility decisions (Rutigliano 2020).

Gender differences in mortality, health, and family behaviours affect grandparenthood dynamics: women typically marry at a younger age (with older men), have children (thus grandchildren) earlier, and live longer but in poorer health (Case and Paxson 2005; Di Gessa, Bordone, and Arpino 2022; Leopold and Skopek 2015b). This suggests women may live more grandparent years than men. However, older women often experience worse health, potentially resulting in an equal or shorter healthy-grandparent period compared to men.

Italy offers an interesting context for studying the evolution of grandparents' health. The country is renowned for its exceptional demographic traits (Billari and Tomassini 2021), with a very aged population structure due to a fertility that for a long time has been among the lowest in the world and a life expectancy which is one of the highest. Moreover, due to its family-focused welfare, with robust support networks among family members throughout life (Dykstra and Fokkema 2011) and inadequate public care facilities for children and older individuals, it is a country in which grandparents are both a fundamental resource for childcare provision (Glaser and Hank 2018; Zamberletti, Cavrini, and Tomassini 2018) and in need of care, which is provided mainly by young-adult (female) household members (Kalmijn and Saraceno 2008; Tomassini et al. 2020). Within this context, the study of grandparent-related health is of great importance for assessing family network well-being in the country.

Cisotto, Meli, and Cavrini (2022) reveal a three-year delay in the median age of becoming a grandparent in Italy between 1998 and 2016, for both genders. They also find that increased life expectancy counterbalances the fertility decline and postponement across two generations, maintaining stable years of overlap between grandchildren and

grandparents over the 18 years. However, research on healthy grandparenthood (Margolis and Wright 2017) is limited, with no evidence for Italy.

Our study aims to integrate healthy grandparenthood into the assessment of generational overlap, providing novel insights into family and health dynamics and intergenerational relationship in Italy. Specifically, it aims to shed light on the evolution of disability-free grandparenthood (DFGP) (i.e., the length of life as a disability-free grandparent) at age 65 between 1998 and 2016, disentangle DFGP progression according to changes due to the longevity revolution and grandparenthood–disability prevalence, and analyse their gender differences.

2. Data and methods

Our two data sources are the 1998 and 2016 Family and Social Subjects (FSS) surveys (first and last available) conducted by the Italian National Institute of Statistics (Istat), and the Italian life tables provided by Istat for the same years.

The FSS survey is based on nationally representative samples of individuals (59,050 in 1998 and 24,753 in 2016) residing in Italy and living in households, thus excluding individuals in institutions. The grandparenthood status is based on self-reported information, where respondents indicate if they have grandchildren. Disability status is also self-reported: chronic diseases inducing permanent disability in 1998 and long-standing activity limitations due to health problem, using the Global Activity Limitation Indicator (GALI) (Robine, Jagger, and the Euro-REVES Group 2003), in 2016. Both variables demonstrate analogous patterns across years, allowing the identification of respondents with severe functional limitation (i.e., severe disability) due to health problems or chronic diseases (Cisotto, Meli, and Cavrini 2022; Pasqualini, Di Gessa, and Tomassini 2021). Our analytical sample (summarized in Tables 1a and 1b) considers all FSS respondents aged 65 and over, reporting their grandparenthood and disability status. The final sample comprises 7,972 and 6,407 individuals in 1998 and 2016, respectively. For further details regarding the FSS (e.g., response rate or study design), please consult Istat (2016).

Our research methodology builds on the healthy grandparenthood measure introduced by Margolis and Wright (2017), as we apply the Sullivan method (Imai and Soneji 2007; Sullivan 1971) to partition life expectancy into years spent being (1) a disability-free grandparent (DFGP), (2) a grandparent with disability, (3) disability-free and grandchild-less, and (4) grandchild-less with disability. The key outcome is the DFGP estimate, which measures the period life expectancy as a disability-free grandparent.

Notably, our study adds an additional methodological dimension to previous research with the application of the linear integral decomposition method (Horiuchi, Wilmoth, and Pletcher 2008), used to assess the age-specific contributions of changes in mortality and grandparenthood–disability prevalence to the evolution of DFGP from 1998 to 2016. This decomposition method assumes that the summary measure (here DFGP) is a differentiable function of its inputs (here death rates and disability–grandparenthood prevalence), that can change gradually along the analysed dimension (here time). This method consists in dividing the analysed dimension into small intervals and estimating the changes needed for its inputs to vary between two populations at the beginning and end of each interval. In this study the changes over time in DFGP can be approximated using a linear combination of the partial derivatives of DFGP with respect to age-specific mortality rates and disability–grandparenthood prevalence. By numerically integrating these variations along the time dimension, the contribution of each input can be derived.

Table 1a: Sample distribution by gender, age class, grandparenthood, and disability status. Italy, FSS Survey, 1998

	1998			
	Women			
	Disability-free grandparent	Grandparent with disability	Disability-free grandchild-less	Grandchild-less with disability
65–69	871	110	355	52
70–74	701	160	267	62
75–79	509	198	164	58
80–84	201	161	69	42
85+	159	231	51	67
	Men			
	Disability-free grandparent	Grandparent with disability	Disability-free grandchild-less	Grandchild-less with disability
65–69	735	82	420	49
70–74	620	116	212	50
75–79	387	106	143	37
80–84	157	87	37	14
85+	108	94	17	13

Table 1b: Sample distribution by gender, age class, grandparenthood, and disability status. Italy, FSS Survey, 2016

	2016			
	Women			
	Disability-free grandparent	Grandparent with disability	Disability-free grandchild-less	Grandchild-less with disability
65–69	545	50	279	24
70–74	466	55	200	16
75–79	411	71	179	26
80–84	290	90	97	33
85+	270	160	116	63
	Men			
	Disability-free grandparent	Grandparent with disability	Disability-free grandchild-less	Grandchild-less with disability
65–69	444	23	399	23
70–74	420	30	264	18
75–79	352	52	158	21
80–84	269	59	95	17
85+	168	83	49	22

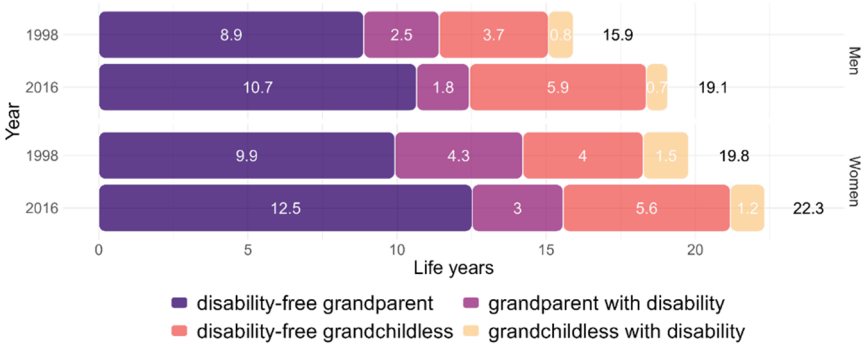
3. Results

Figure 1 shows the partition of overall life expectancy at age 65 into the different states of grandparenthood and disability by gender, for 1998 and 2016. In 1998, at the age of 65, Italian men have a life expectancy of approximately 16 years, while women have nearly 20 years. In these years, more time is spent as a grandparent (11.4 years for men and 14.2 for women) than as grandchild-less, and around half of the total life expectancy is DFGP (almost 9 and 10 years for men and women, respectively). While women live longer as grandparents than men, the proportion of years lived as grandparents compared to the total life expectancy at age 65 is similar for both genders, exceeding 70% (11.4 years out of 15.9 for men, 14.2 years out of 19.8 for women). Additionally, despite women having one more year of DFGP than men, the proportion of DFGP in total life expectancy at age 65 and overall years as a grandparent is higher for men (55% or 8.9 out of 15.9 years, and 78% or 8.9 out of 11.4 years respectively) compared to women (50% or 9.9 out of 19.8 years and 70% or 9.9 out of 14.2 years respectively). In fact, Italian women aged 65 in 1998 report experiencing more years of disability than men and, notably, expect to live more years as grandmothers.

From 1998 to 2016, along with the increase in life expectancy at the age of 65 (by more than 3 years for men and 2.5 for women), DFGP also increased, exceeding 10 years for grandfathers and 12 for grandmothers. Over the same period, the increase in men's DFGP (of around 2 years) was at a slower pace than that of life expectancy at age 65, while women's increase (more than 2.5 years) was faster. As a result, despite the fact that

the male disadvantage in longevity decreased between 1998 and 2016, the DFGP gender gap increased to reach almost 2 years in 2016. In 2016, around 56% of the remaining life expectancy of both 65-year-old women and men is to be lived as disability-free grandparents (10.7 years out of 19.1 for men and 12.5 years out of 22.3 for women). However, women have a higher proportion of their life expectancy at age 65 as grandmothers compared to men as grandfathers (almost 70% for women and 65% for men, respectively 15.5 years out of 22.3 and 12.5 years out of 19.1). Women have a smaller share of their total grandparent years without disability that men (12.5 years out of 15.5 years for women, 80%; 10.7 years out of 12.5 years for men, 85%), suggesting disparities in health quality between grandmothers and grandfathers. Finally, despite the overall increase in life expectancy at age 65, the proportion of life lived as grandparents has remained relatively stable and has even declined for grandfathers, from approximately 70% to 65% (11.4 years out of 15.9 and 12.5 years out of 19.1, respectively).

Figure 1: Life expectancy at age 65 by grandparent–disability status for Italian men and women in 1998 and 2016

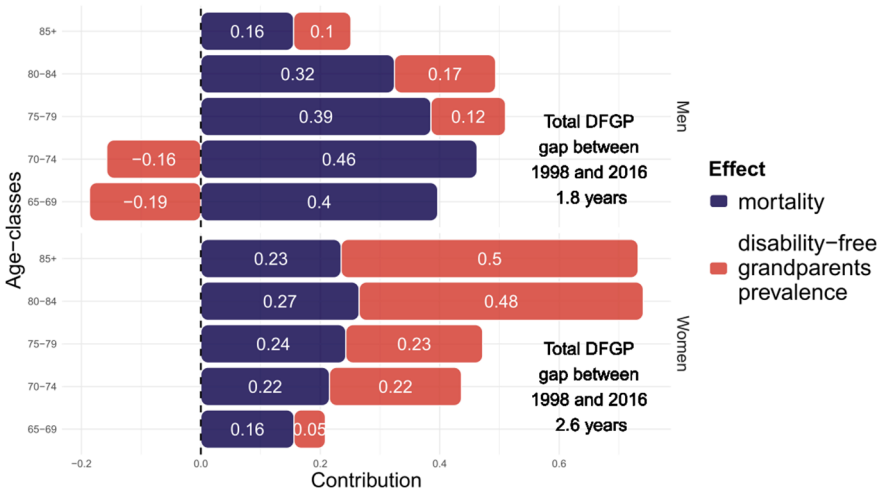


Note: Life expectancy at age 65 is represented by the overall length of the bar (with a value noted in black next to them) and it is partitioned, by gender, into the years being: a disability-free grandparent, a grandparent with disability, disability-free and grandchild-less, and grandchild-less with disability. The analysis and graphic depiction of the results are performed in R (R Core Team 2021)

Figure 2 displays the contributions of the evolution of mortality rates and disability-free grandparents' prevalence to the overall variation in DFGP at age 65 between 1998 and 2016, by gender. The DFGP variation over time is 2.6 years for women and 1.8 years for men, to which changes in mortality risks contribute 1.1 and 1.7 years, while changes in the prevalence of disability-free grandparents contribute 1.5 and 0.04 years, respectively. For women, the impact of increased longevity and prevalence of disability-free grandparents rises with age (except for mortality contribution at age 85+). Up to age 80, the contribution of improved survival is of greater relevance in determining the

increase in DFGP, while for the oldest old women (80+) the increased prevalence of disability-free grandmothers contributes most. Over time, there is a clear improvement in women's survival and an increase in the prevalence of healthy grandmothers at any age. For men, the reduction in mortality rates shows a positive impact on the increase in DFGP, which, however, decreases after the age of 70. Overall, in determining the evolution of men's DFGP, the prevalence of disability-free grandparents contributes less than mortality and, moreover, negatively between the ages of 65 and 74. Hence, between 1998 and 2016 there is a decrease in the prevalence of disability-free grandfathers, which leads to a 4-month reduction (0.19 + 0.16 years) in the average number of DFGP years. Importantly, it should be noted that the overall disability-free prevalence does not diminish between 1998 and 2016, as shown in Figure 3 and already found by previous studies such as Caselli, Egidi, and Strozza (2021). This implies that the functional health of Italian older men has not worsened during this period. However, the reduction (delay) in men's grandparent prevalence (Figure 4) offsets the positive effects of the reduction in disability prevalence and mortality risks. As a result, in these age classes there is a slowdown in the increase of DFGP due to a reduction in grandparenthood prevalence, partially counteracting the reduction in disability and mortality risks.

Figure 2: Contributions of mortality and disability-free grandparent prevalence to the DFGP gap between 1998 and 2016 for Italian older men and women, by age classes



Note: The total DFGP gap between 1998 and 2016 for the two genders is divided into the different contributions of mortality and morbidity in each age class. The analysis and graphic depiction of the results are performed in R (R Core Team 2021) and the decomposition is implemented using the Demodecomp (Riffe 2018) R-package.

Figure 3: Age-specific prevalence of disability-free Italian older-adults, by gender, 1998 and 2016

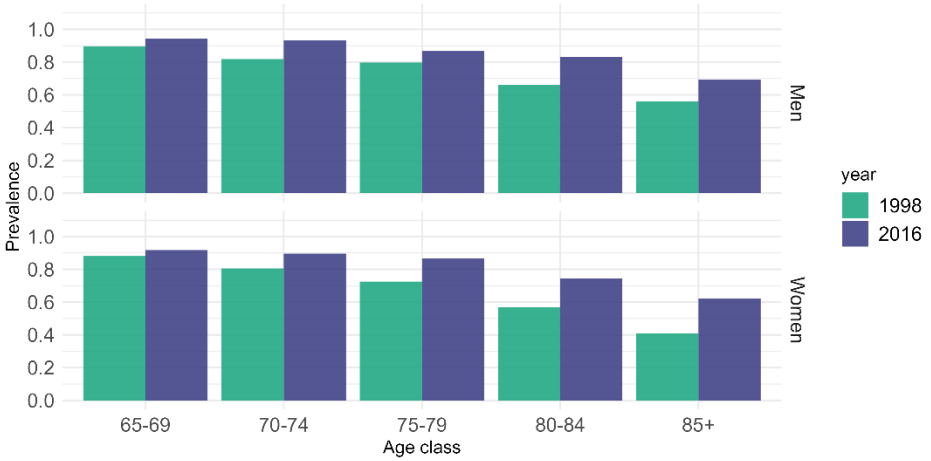
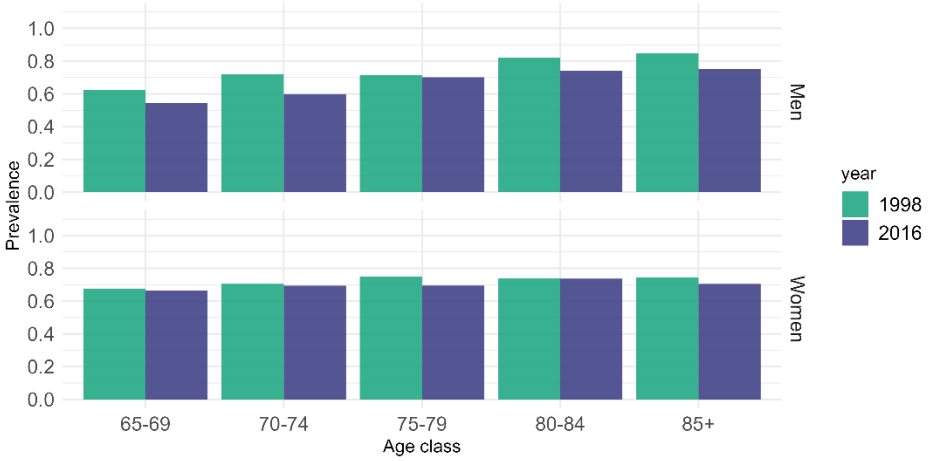


Figure 4: Age-specific prevalence of Italian older-adult grandparents, by gender, 1998 and 2016



4. Discussion and conclusions

Between 1998 and 2016, DFGP and its share in total grandparenting years increased for both genders in Italy, indicating that grandparents now enjoy more disability-free years with their grandchildren. The decomposition analysis indicates that improved health and survival conditions primarily contributed to this increase in DFGP. However, the late entry into grandparenthood has slowed this progress for men.

The study's strengths are the analysis of DFGP and its evolution over time in a country where family support is crucial. By employing demographic methods such as expectancies and decomposition, we examine how changes in mortality, disability, and grandparenthood affect the duration and quality of intergenerational overlaps. Expectancy indicators enable cross-population and temporal comparisons, being independent of their population age-structure changes. The use of decomposition, advancing beyond previous research, enriches the comprehension of DFGP evolution by disentangling the effects arising from evolving mortality risks and grandparenthood-disability prevalence.

Some limitations are acknowledged. First, the DFPG indicator is based on cross-sectional data, assuming stationarity of the population and age-specific risks (see Imai and Soneji 2007 and Mathers and Robine 1997 for details on the methodology and associated limitation). Second, the reliance on self-reported disability may introduce gender bias, as women tend to report poorer health than men (Verbrugge et al. 1987). Moreover, the 2016 FSS includes the harmonized GALI, absent in 1998 survey, where disability was assessed based on permanent disability. While prior studies have demonstrated similar patterns (Cisotto, Meli, and Cavrini 2022; Pasqualini, Di Gessa, and Tomassini 2021), differences in disability measurement could influence the results. Third, grandparenthood assessment is limited to those aged over 65 (due to the relatively low number of grandparents and individuals with disability under 65), potentially underestimating total (healthy) grandparent years. Nevertheless, this age threshold is commonly used to identify older adults, enabling comparison with other studies. Additionally, the exclusion of individuals living in institutions in the FSS survey may underestimate the disability burden. However, since institutionalized individuals constitute approximately 2% or less of Italy's over-65 population (Istat 2020), their impact on the study's conclusions is likely minimal.

Another limitation is that we have not examined the disparities in mortality and health based on geography and education (Moretti and Strozza 2022; Petrelli et al. 2018), as our study is limited by sample size constraints (Tables 1a and b). Moreover, in Italy mortality data by education are only available for the year 2011. Additionally, fertility patterns, including the timing of becoming a grandparent, are also known to be influenced by these factors (Impicciatore and Zuanna 2017). Fertility history closely correlates with

mortality and health outcomes (Barclay et al. 2016; Grundy and Tomassini 2005), and we acknowledge potential selectivity in our findings. However, addressing this would require currently unavailable longitudinal data. As data availability improves, conducting thorough prospective cohort analyses of life courses and family transitions remains promising for future research. Lastly, the decomposition method employed does not differentiate between the contribution of changes in grandparenthood and disability prevalence separately. This is because the inputs to compute DFGP are the age-specific mortality rates and the joint disability–grandparenthood prevalence, rather than the two separate prevalences. Thus, the method allows distinguishing only between the two parameters composing the indicator. However, integrating the analysis of the contributions of the joint prevalence (from the decomposition) and the trend of disability and grandparenthood prevalence, separately, allows for more comprehensive conclusions.

Despite these limitations, our study provides the first evidence on DFGP evolution and gender differences in Italy, which is crucial for understanding intergenerational overlaps. It prompts reflection on the interplay of mortality, health, and family dynamics, reporting a comprehensive indicator such as life expectancy by disability and grandparenthood.

5. Data availability

The data used in this study are from the Family and Social Subjects survey of the Italian National Institute of Statistics (Istat) and must be requested using the Institute's Contact centre (https://contact.istat.it/). See https://www.istat.it/it/archivio/5725 and https://www.istat.it/en/archivio/236643 for more information. The data processing for the year 2016 was conducted at Istat Laboratory for the Analysis of Elementary Data (ADELE) in compliance with the regulations on the protection of statistical confidentiality and personal data protection. The results and opinions expressed are the sole responsibility of the authors and do not constitute official statistics.

6. Acknowledgements

We acknowledge co-funding from Next Generation EU, in the context of the National Recovery and Resilience Plan, Investment PE8 – Project Age-It: 'Ageing Well in an Ageing Society'. This resource was co-financed by the Next Generation EU [DM 1557 11.10.2022]. The views and opinions expressed are only those of the authors and do not necessarily reflect those of the European Union or the European Commission. Neither

the European Union nor the European Commission can be held responsible for them. The authors are grateful to the research network Grandparenting in Europe (https://sites.google.com/view/grandparentingeu), the Laboratory on Longevity and Ageing – LoLA (https://lola.projects.unibz.it/), Viviana Egidi, three anonymous reviewers, and the editor, whose comments helped to greatly improve the manuscript. A preliminary version of this study is included in MM's PhD thesis. EC collected the data. MM and EC conceived and designed the analysis, which was performed by EC for the prevalence computation and by MM for the expectancies and decomposition analysis. MM and EC wrote the article. ADR provided supervision throughout the process.

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