



Close kin availability and mortality among older adults in Brazil

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ABSTRACT

Brazil is rapidly aging with limited welfare infrastructure to support healthy aging, making spouses and adult children among the primary sources of support. Declining fertility and marital transitions may threaten older adults' health, raising a critical question: Are there gender differences in older Brazilians' mortality risks by partnership and parenthood status? We used baseline data from the Brazilian Longitudinal Study of Aging (ELSI-Brazil) of adults 50 and older (2015–2016), including 9412 participants with deaths linked to Brazil's Mortality Information System. Cox proportional hazard models assessed mortality by close kin availability: (1) partnered with children, (2) partnered childless, (3) unpartnered with children, and (4) unpartnered and childless, adjusting for demographic, early-life conditions, health, and social factors. For both men and women, lacking both traditional family ties presents the highest mortality risks, but for men, having children and lacking a partner also elevate mortality risks. We discuss these findings in the context of demographic and social changes in the availability of close kin and the potential opportunities to enhance survival among older adults in Brazil.

1. Introduction

Partners and children are critical to older adults' social networks, serving as important sources of social integration and support (Agree and Glaser, 2009; Dykstra, 2006), which can promote health and extend longevity. Whereas research across diverse societies indicates that marriage confers health benefits, including lower mortality rates, especially among older men (Bulanda et al., 2016; Manzoli et al., 2007), the health (dis)advantages of parenthood vary by social context (Grundy and Kravdal, 2008; Orr et al., 2021). Although less well-studied, studies suggest that the simultaneous unavailability of a partner and children can present a critical absence of support that undermines health and elevates mortality risks for older adults (Kravdal et al., 2012; Patterson et al., 2020). However, studies on partnership, parenthood, and mortality are primarily based on data from developed countries in Europe and North America.

We focus on mortality risks associated with the (un)availability of partners and children in Brazil, a rapidly aging upper-middle-income country in Latin America and the Caribbean (LAC) (Miranda et al., 2016). Despite near-universal pension coverage, which has contributed

to improved economic security among older adults, especially women (Cotlear and Tornarolli, 2011), and a universal healthcare system that has expanded primary healthcare access, Brazil has limited formal support and care systems for older adults (Neumann and Albert, 2018). Most Brazilian legislation centers family responsibility for supporting vulnerable family members, partially reflected in the limited availability of publicly funded long-term care institutions for older adults, thereby reinforcing the familialistic view of long-term care (Camarano and Kanso, 2010). Consequently, partners and adult children are an important social safety net of support and care for older Brazilians (Ceccon et al., 2021; Maximiano-Barreto et al., 2022).

In Brazil, like many LAC countries, formal marriage and cohabitation have coexisted since the colonial period, making partnership commonplace (Esteve et al., 2022). Many Brazilians born in the 1950s and earlier were shaped by stronger norms of formal marriages, whereas birth cohorts of the 1960s and later were exposed to increasing divorce and cohabitation rates (Covre-Sussai and Matthijs, 2010; Cruz, 2023). Additionally, Brazil's total fertility rate has declined from approximately 6 children per woman in the 1960s to below 1.8 children in the 2015–2020 period (Esteve et al., 2022). Childlessness is also increasing.

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In 2000, an estimated 11.2% of women 60 and older were biologically childless (De Vos, 2014). By 2010, 13% of women at the end of their reproductive years were biologically childless (Leocádio et al., 2022). Demographic and social welfare conditions suggest that many of the current cohorts of older Brazilians were exposed to near-universal family norms of partnership and children and likely prepared for later life with the potential availability of partners and children as sources of support. Therefore, Brazilians who are aging without the availability of these close kin ties may lack social support, potentially jeopardizing their health and survival.

To date, the relative importance of aging with or without partners and children - close kin - for later-life mortality has not been explored in LAC. Examining the associations between close kin availability and mortality among older men and women in Brazil provides critical insight into the role of traditional family ties for longevity in LAC, given the rapid pace of population aging amid social norms that emphasize family-based social safety nets (Wong and Palloni, 2009). Using nationally representative data of adults 50 years and older in Brazil from the Brazilian Longitudinal Study of Aging (ELSI-Brazil), linked to administrative mortality data, we examine whether mortality risks among older Brazilian men and women vary by the (un)availability of close family ties —partner, children, or both. Addressing this question is a timely contribution to the limited literature in the LAC region, given demographic projections indicating that many older adults will age with few or no close kin (Alburez-Gutierrez et al., 2023).

1.1. Partnership, parenthood and later-life mortality: Theoretical Considerations

The relationships between partnership, parenthood, and mortality may reflect a combination of social selection and causation mechanisms (Carr and Springer, 2010). Social selection posits that healthier and socioeconomically advantaged individuals are more likely to marry and remain married, or individuals opt out of marriage upon the onset of a partner's failing health, which partially accounts for the associations between marital status and mortality (Rendall et al., 2011; Vignoli et al., 2025). Early-life socioeconomic and health conditions also influence opportunities for partnership and parenthood. Socioeconomic and health disadvantages may constrain the potential for childbearing and partnership (Kiernan, 1988, 1989; Keizer et al., 2011). Conversely, poor early-life socioeconomic conditions are associated with earlier transitions to parenthood, higher fertility rates, and increased risks of partnership dissolution, which in turn are associated with higher mortality risks (Grundy and Foverskov, 2016; Grundy and Tomassini, 2005). Among Brazilian women born during the 1940s to the 1970s, more educated and urban-dwelling women typically delayed family formation (Heaton et al., 2002). Although childlessness is more prevalent among higher-educated Brazilian women, lower-educated women also have slightly higher rates of childlessness (relative to average education), possibly due to poor socioeconomic and health conditions (e.g., disability) that restrict family formation (Castro and Tapia, 2021). Therefore, socioeconomic and health selection may shape differential mortality risks among older Brazilian women with and without close kin.

Alternatively, social causation posits that partnership and parenthood entail both protective and challenging conditions, which shape later-life health and mortality risks. Marriage confers economic advantages through the pooling of finances and financial security, which protects health (Carr and Springer, 2010). Partners and children, as key sources of social control, also influence lifestyle habits (Umberson et al., 2010). Adults with partners and children are less likely than unpartnered and childless individuals to have high alcohol consumption and smoke, and more likely to be physically active (Kendig et al., 2007; Yuan et al., 2024). Partners and children often provide support and care for older adults, and can be key sources of social participation that buffer stress and boost health (Dykstra, 2006; Agree and Glaser, 2009).

Nonetheless, parenthood presents opportunity costs due to lower labor force participation, financial strains, and increased role strain, which may constrain healthy lifestyle behaviors (Bellows-Riecken and Rhodes, 2008) and impair health over the life course. Poor relationship quality between partners can lead to worse health behaviors or less social support, which may increase mortality risks (Bulanda et al., 2016; Yuan et al., 2024). Despite the challenges, in societies with limited social welfare for older adults, the presence of partners and children potentially protects health (Grundy et al., 2019).

1.2. The role of gender

Gender-as-relational approaches to health suggest that men's and women's health outcomes vary by situational factors, such as marriage and parenthood, that shape how men and women interact with and among each other (Springer et al., 2012). As women are more strongly socialized into caregiving roles, and men have smaller social networks than women, older partnered men are more reliant on their spouses for caregiving, health monitoring, and social engagement; thus, being unpartnered is often associated with poorer health for men (Bulanda et al., 2016; Carr and Springer, 2010). Among men, the absence of children for instrumental and emotional support in navigating the challenges of aging may compound the adverse health effects of being unpartnered (Dykstra and Hagestad, 2007). However, the presence of children does not guarantee support among unpartnered men as divorce poses more strain on father-child contacts compared to mother-child (Buyukkececi and Leopold, 2024). Indeed, older divorced and widowed fathers receive less support from children compared to mothers (Ha et al., 2006; Kalmijn, 2007; Buyukkececi and Leopold, 2024), which may also contribute to diminished health and elevated mortality risks even among unpartnered fathers with children. Aging without a partner and children may also be salient for women's mortality risks, due to the strong cultural significance attached to motherhood and partnership, especially for older cohorts (Dykstra and Hagestad, 2007; Westfried, 1997). As women traditionally bear a higher share of responsibility for unpaid family caregiving and lower wages than men (Bruschini, 2007), unpartnered mothers may face exacerbated socioeconomic and health disadvantages throughout their lifecourse compared to partnered mothers due to the absence of support from a partner (Berkman et al., 2015). However, women are strongly socialized to establish and maintain strong social ties with kin and develop wider community networks (Cornwell, 2011; Schwartz and Litwin, 2018). In fact, in Brazil, the extended family supports unpartnered mothers with child rearing (Westfried, 1997), which may reduce parenting strain. Additionally, women are more likely than men to receive support from their children in later life (Ha et al., 2006; Buyukkececi and Leopold, 2024).

Children and partners are the main caregivers to older Brazilians (Ceccon et al., 2021; Maximiano-Barreto et al., 2022). Hence, having both a partner and children in later life may provide the optimal protection for longevity. There are, however, gendered patterns of family support for older women and men without close kin in Brazil. Coresidence with adult children is a primary form of support for unpartnered older women following widowhood or marital dissolution, and coresidence with extended family is common among childless older women who may also be unpartnered (De Vos, 2012, 2014). Therefore, unpartnered older Brazilian women with and without children might have alternative sources of support to buffer the absence of support, either once derived from or in the absence of a partner, which may minimize health risks. However, it is unclear whether the absence of one or both close kin ties, partner and/or children, presents different mortality risks among older Brazilian women and men.

1.3. Previous studies

Theoretically, unpartnered and childless older adults are expected to have higher mortality risks than those with partners and children.

Unpartnered older adults have higher mortality relative to partnered, often with stronger effects among men (Manzoli et al., 2007). The empirical evidence on parenthood and mortality is more inconsistent, with most research focusing on women in high-income countries. Among women aged 50 and older, both childlessness and having many children have been associated with elevated mortality risks in England and Wales (Grundy and Tomassini, 2005). Similarly, parenthood was associated with lower mortality among mid-life and older women in Norway and Ireland, net of marital status, health, and early-life socioeconomic conditions (Grundy, 2009; Orr et al., 2021). Studies of older US adults found either no (Henretta, 2007) or positive (Grundy, 2009) associations between parenthood status and mortality among older women, also after adjusting for marital status and early and midlife socioeconomic resources. Though limited, parenthood status is weakly associated with men's mortality. For instance, childlessness was unrelated to health and mortality risks among older English men in long-term marriages, net of socioeconomic conditions (Grundy & Tomassini, 2006), and among Dutch midlife and older men, after adjusting for socioeconomic conditions, partnership status, and health behaviors (Keizer et al., 2011), suggesting that social selection plays a role.

Considering gender differences in parenthood-mortality associations, childlessness is associated with higher mortality, whilst having many children is associated with lower mortality among Norwegian men and women, relative to those with two children (Grundy and Kravdal, 2008, 2010), also adjusting for marital status and socioeconomic resources. Thus, it is unclear whether aging with or without children presents a mortality (dis)advantage in later life. The ambiguous findings across country contexts may reflect a combination of differences in family social welfare policies to support parents, social norms about parenthood, and methodological approaches or data sources.

The few studies that have examined the joint effects of partnership and parenthood status on mortality have also focused on samples of older adults in the European and US contexts. Kravdal and colleagues (2012) showed that among Norwegian midlife and older adults, being unpartnered (never married or divorced) and childless was associated with elevated mortality risks, compared to married persons with two or more children, regardless of gender. Yet among Swedish older adults, childlessness was associated with higher mortality risks compared to parents, and more pronounced for unmarried relative to married men (Modig et al., 2017). Another study of US older adults found that unpartnered and childless older adults have the highest mortality risks, while those partnered with children have the lowest. Furthermore, lacking one tie while having the other (e.g., partnered but childless, unpartnered with children) was associated with higher mortality than having both ties (Patterson et al., 2020).

These studies did not account for early-life socioeconomic or health conditions that may differentially shape partnership and parenthood trajectories and subsequent mortality (i.e., social selection). However, they provide important foundations for understanding how the combined (un)availability of partners and children influences mortality risks in more economically developed countries, despite wide variations in social welfare and norms about families' roles in care and support to older adults. Norway is characterized by generous social welfare and weaker family care norms (Grundy and Kravdal, 2010). Sweden's long-term care policies support formal home-based care for older adults, but families also provide support (Brändström et al., 2022). The US has strong family care norms and limited publicly funded care for older adults (Patterson, 2022), making the availability of close kin an important factor for older adults' care and health.

Research in LAC centers on the mortality implications of partnership status. In Brazil, unpartnered older adults have higher mortality risks (Macinko et al., 2024; Souza et al., 2021- widowed). Gomes and colleagues (2013) also reported that single older men in São Paulo faced higher mortality risks than partnered men, while divorced/separated and widowed women also showed elevated risks, after adjustment for social participation, socioeconomic and health conditions. In Chile,

Sandoval and Alvear Portaccio (2022) found that being unmarried (divorced, widowed, or single) was associated with higher mortality risks than being married, even after accounting for co-residence with children and other sources of social support, demographic, social, and health factors, suggesting social causation is more prominent than social selection. However, these LAC studies have not considered the intersecting role of parenthood in shaping older adults' mortality.

1.4. Current study

Our study extends prior research by examining the combined effects of partnership and parenthood on mortality in Brazil, a rapidly aging middle-income country (Miranda et al., 2016), with limited state social welfare and strong family-based and gendered norms of support for older adults. We examine gendered patterns of mortality risks among adults aged 50 and older linked to the unavailability of partners and children, and the availability of a partner or children, compared to being partnered with children, to understand the nuanced mortality risks of aging with both, one, or none of these close ties. Drawing on evidence that social causation may be more relevant than social selection processes and given that children and partners are a critical social safety net for older Brazilians, we expect that.

H1. Among both men and women, being unpartnered and childless will be associated with higher mortality risks compared to those with a partner and children.

Prior research suggests that the absence of one close kin tie also elevates mortality risks. As children are the main source of support for women and partners are critical support resources for men, we expect that the absence of children will have a more pronounced influence on mortality risks for women, while the absence of partners will be more dominant for men. Therefore.

H2. Partnered childless women will have higher mortality risks than those with a partner and children.

H3. There will be minimal distinction in mortality risks between women who are unpartnered with children and those partnered with children.

H4. Unpartnered men with children will have higher mortality risks than men with a partner and children.

H5. There will be no differences in mortality risks between men who are partnered childless and those partnered with children.

2. Materials & methods

2.1. Data

The Brazilian Longitudinal Study of Aging (ELSI-Brazil) is a nationally representative cohort study of the Brazilian population aged 50 and older. The baseline survey was conducted between May 2015 and October 2016, followed by a second survey from July 2019 to March 2021 (Lima-Costa et al., 2023). ELSI-Brazil employed a probabilistic sampling method with a three-stage process (Lima-Costa et al., 2018). The baseline sample comprised 9412 individuals from 70 municipalities across the country's five major regions. Additional details about the study design can be found on ELSI-Brazil's homepage (<http://elsi.cpqrr.fiocruz.br>). (Lima-Costa et al., 2018) The ELSI-Brazil study was approved by the Research Ethics Committee of the Fundação Oswaldo Cruz, Minas Gerais (CAAE 34649814.3.0000.5091). All participants signed informed consent forms to participate in the study.

2.2. Measures

Outcome: Our outcome measure was all-cause mortality. Mortality was reported by family members until March 2021, with these reports

being cross-referenced with death records available from the Program for the Improvement of Mortality Information, the State Data Analysis System (SEADE), and the Mortality Information System (SIM). Of the original 9412 participants, 6172 (65.6%) were successfully followed up in the second wave. A total of 2533 were lost to follow-up, and 707 had died, with the date of death provided by a proxy informant. A probabilistic linkage method, using participants' names, sex, birth dates, municipality of residence, and their mothers' names, was employed to match those lost to follow-up and deceased individuals with records from the Brazilian SIM. This process revealed that 263 (10.4%) of those initially categorized as lost to follow-up had died. Additionally, among the 707 deaths reported by proxy, 609 (89.9%) were confirmed. Therefore, the total number of deaths examined in the current study is 970 (707 + 263). Details of mortality data have been published elsewhere (Macinko et al., 2024). In the original data, mortality by kinship among women and men, respectively, was as follows: partnered with children 136 (5.2%) and 275 (8.4%); partnered childless 4 (3.2%) and 11 (11.4%); unpartnered with children 307 (11.6%) and 158 (17.4%); and unpartnered and childless 45 (10.7%) and 33 (15.9%). Eight participants had missing information on children's availability.

Independent Variable: The key independent variable, close kin availability, is constructed from respondents' self-reported current partnership status and the number of living children at baseline. Partnership status was coded as 0 for individuals who were unpartnered—widowed (14.7%), divorced or separated (10.3%), or single/never-married (11.5%)—and as 1 for those who were partnered, including married, cohabiting, or in a stable union (63.5%). Parenthood status is coded as 0 for parents of at least one living child and 1 for those who are childless (i.e., have no living children). Importantly, the response options for current partnership status combined formal and informal unions (married/common-law marriage/living together). Although this limits our ability to differentiate between formal marriage and cohabitation, the combination aligns with Brazilian sociocultural norms of partnership. We are further limited in our assessment of children as respondents provided the total number of living children regardless of (non)biological status. Nevertheless, our interest lies in understanding how the availability of partners and children, who are likely the most important source of social support for older Brazilians, shapes mortality rather than the nuanced nature of these kin relations. We created four categories of kin availability that represent a gradient from having both partner and children to the absence of both: 1) partnered with children (reference), (2) partnered childless, (3) unpartnered with children, and (4) childless and unpartnered.

Covariates: Our analyses adjust for time-invariant covariates, from the baseline survey, that are associated with mortality: age (50–59 [reference], 60–69, 70–79, and 80 and over), education based on years of schooling (no education [reference], 1 to 4, 5 to 10, and 11 or more years), and early life conditions, including childhood SES and health. Childhood SES was assessed using three variables, referring to the period before age 15: self-reported socioeconomic status (above average [reference], average, poor, varied); experience of food insecurity (0 = no, 1 = yes); and area of residence (1 = rural, 0 = urban). For childhood health, we included the self-rated health at age 15 (excellent [reference], good, regular, and poor).

Following prior research (Orr et al., 2021; Tam et al., 2023), we adjust for health behaviors that may develop during adolescence and childbearing years, specifically smoking history (ever vs. never), which potentially confounds the relationship between close kin availability and mortality as individuals who smoke may be more inclined to undertake risky behaviors that reduce opportunity for family formation and increase mortality risks in later life. We also adjusted for body mass index (BMI) and current health status, based on selected diagnosed chronic conditions—diabetes, heart disease, hypertension, and cancer—following Macinko and colleagues (2024). BMI was calculated from measured height and weight (kg/m^2) and classified according to WHO cutoffs: underweight ($<18.5 \text{ kg}/\text{m}^2$), normal ($18.5\text{--}24.9 \text{ kg}/\text{m}^2$)

[reference], overweight ($25.0\text{--}29.9 \text{ kg}/\text{m}^2$), and obese ($\geq 30.0 \text{ kg}/\text{m}^2$). Finally, we account for the presence and frequency of social contacts with extended family and friends, conceptualized as potential alternative sources of social support. Frequency of contact is categorized as weekly [reference], monthly, a few times per year, rarely/never, or absent.

2.3. Analytic approach

To address missing data (ranging from 0% to 3% for some variables), multiple imputation by chained equations was employed to generate 20 complete datasets. The examination of the association between family availability and all-cause mortality was based on a series of gender-stratified analyses to account for potential differences in social and health-related factors that may influence mortality. First, descriptive statistics summarized the distribution of covariates across the categories of availability of close kin. Kaplan-Meier survival curves are based on the unadjusted survival probabilities by the availability of close kin. We used the long-rank test to assess differences in survival distributions.

Cox proportional hazards models, stratified by gender, estimated the adjusted association between the availability of close kin and all-cause mortality. Model 1 (M1) is unadjusted, Model 2 (M2) controlled for age, Model 3 (M3) included childhood health and socioeconomic status, and education, Model 4 (M4) included health behaviors, and Model 5 (M5) included contact with extended family and friends as potential alternative sources of social support. The proportional hazards assumption was tested after fitting M1 and M5 using Schoenfeld residuals. For women and men, there was a violation of the proportional hazard assumption for the category childless and unpartnered. For women, the category partner only also violated the assumption. Therefore, we present average marginal effects (AME) by gender, which summarize the associations between close kin availability and mortality over the observation period rather than assuming constant hazard ratios. The AMEs are calculated by estimating the marginal effect for each individual, then averaging the probabilities across all individuals in the estimation sample. The AME can be interpreted as the difference in the percentage points (abbreviated as pp) between each group: partnered childless, unpartnered with children, and unpartnered and childless, compared to those partnered with children, in the average predicted probability of mortality. All analyses used STATA SE 17.0, applying survey weights to account for the complex survey design and ensure population representativeness. Statistical significance was set at $p < 0.05$. Analyses were conducted using survey-adjusted Cox regression models implemented with STATA's "svy", "mi", and "margins" procedures (mimrgns).

3. Results

3.1. Descriptive findings

Tables 1a and 1b present the participant characteristics by gender and across four categories of close kin availability: partnered with children, partnered childless, unpartnered with children, and unpartnered and childless. Significant differences were observed across kinship categories for both women and men in terms of age, childhood food insecurity, childhood rural residency, education, BMI, hypertension, and social contacts with family and friends ($p < 0.05$). Most men and women were partnered with children. Among the oldest old (80+), a higher percentage were unpartnered with children than in the other kinship groups.

Poor childhood SES was common across all groups, especially among the unpartnered with children, although differences were only statistically significant among men. Unpartnered and childless individuals had the lowest prevalence of perceived food insecurity in childhood and were more likely to have lived in urban areas during childhood. Self-rated childhood health did not differ significantly by kinship category

Table 1a

Descriptive characteristics of the sample by availability of close kin: Women. (Weighted).

Characteristics	Total (N = 5314)	Partnered with children (51.5%)	Partnered childless (2.0%)	Unpartnered with children (39.5%)	Unpartnered and childless (7.0%)	p-value
Age (%)						<0.001
50-59	45.8	55.0	59.5	34.1	40.5	
60-69	29.6	29.7	25.7	28.7	36.2	
70-79	16.4	12.8	10.5	21.5	15.9	
80+	8.1	2.5	4.2	15.7	7.4	
Perceived childhood SES (%)						0.008
Above average	5.7	5.1	4.2	6.3	7.0	
Average	22.1	23.6	26.8	19.3	25.8	
Poor	59.1	58.3	55	61.2	54.5	
Varied a lot	13.1	13	14	13.2	12.7	
Perceived food insecurity in childhood (%)						0.006
No	75.4	75.3	71.6	73.9	86.2	
Yes	24.6	24.7	28.4	26.1	13.8	
Area of residency in childhood (%)						0.006
Urban	41	38.9	50.2	41.4	51.4	
Rural	59	61.1	49.8	58.6	48.6	
Self-rated childhood health (%)						0.044
Excellent	24.2	24.4	28	23.7	23.8	
Good	53.1	51.6	40.4	55.7	53.8	
Regular	15.6	16.6	24.4	13.8	16.9	
Poor	7.1	7.5	7.2	6.8	5.5	
Years of Education (%)						<0.001
No schooling	14.3	11.7	3.6	18.8	11.6	
4 to 11	39	40.1	36.2	39.8	26.7	
5 to 10	23.2	25.2	17	21.7	18.1	
11+	23.6	23	43.2	19.8	43.5	
Smoking (%)						<0.001
Never smoked	55.5	58.7	54.5	50.9	58.0	
Ever smoked	44.5	41.3	45.5	49.1	42.0	
BMI categories (%)						<0.001
Underweight	2.1	1.1	0	3.1	4.9	
Normal	26.1	22.7	36.2	27.9	37.9	
Overweight	37	37.9	36.8	37.1	29.2	
Obese	34.8	38.3	26.9	31.9	28.0	
Chronic conditions (%)						
Diabetes	16.7	16.5	11.4	17.9	13.2	0.084
Heart disease	4.7	4.5	2.2	5.5	2.5	0.026
Hypertension	55.9	55	46.7	59	47.9	0.005
Cancer	5	4.7	6.5	5.3	5.4	0.792
Extended Family contact (%)						<0.001
Weekly	34.2	32.6	44.9	32.6	51.6	
Monthly	19	20.8	14.3	17.1	17.1	
A few times/year	28.5	29.9	21.6	28.5	19.4	
Rarely or never	14.5	13.4	15.2	16.6	9.8	
Don't have	4	3.3	4	5.1	2.1	
Friend contact (%)						0.056
Weekly	66.3	67	62.7	66	63.6	
Monthly	13.3	14	14.8	12	14.3	
A few times/year	6.4	6.7	7.1	6	7.3	
Rarely or never	2.8	2.6	5.9	2.7	3.6	
Don't have	11.2	9.6	9.6	13.3	11.1	

Notes: ELSI-Brazil, 2015-2016; p-value based on chi-square tests.

for men, but more partnered women reported excellent health. Higher educational attainment (11+ years) was more common among the unpartnered and childless group. Smoking history differed by kin availability group among women, with a higher prevalence of ever smoking among those unpartnered with children. Obesity was more common among partnered individuals with children, while underweight was more prevalent among unpartnered, childless individuals. Differences in the prevalence of heart disease and hypertension among women were observed across kinship groups, with higher rates among unpartnered women with children. Among men, rates of diabetes and hypertension differed; diabetes was more common among men who were partnered with children, while hypertension was more frequent among those who were partnered childless. Social contacts with family varied among women and men, with unpartnered, childless women having a higher prevalence of weekly contacts. Among partnered childless men, a

higher percentage reported having no friends.

Fig. 1 displays Kaplan–Meier survival curves stratified by the availability of close kin and gender. Consistent with prior evidence, men exhibit lower overall survivorship than women. The presence of a partner is positively associated with survival for both genders, although the patterns differ between men and women. Among women, those who are partnered with children show the highest survival rates, followed by partnered women without children. In contrast, unpartnered women—whether or not they have children—experience substantially lower survival. For men, survival differences between partnered individuals with and without children are minimal. Instead, the gradient emerges among the unpartnered: men without children have lower survival, and unpartnered men with children experience the poorest outcomes.

Table 1b

Descriptive characteristics of the sample by availability of close kin: Men (Weighted).

Characteristics	Total (N = 4098)	Partnered with children (72.5%)	Partnered childless (2.8%)	Unpartnered with children (18.3%)	Unpartnered and childless (6.4%)	p-value
Age (%)						<0.001
50-59	49.7	49.4	61.4	42.5	68.4	
60-69	29.7	30.3	28.1	30.7	20.3	
70-79	14.7	15.2	6.2	16.4	8.8	
80+	5.9	5.1	4.4	10.4	2.5	
Perceived childhood SES (%)						0.490
Above average	4.4	4.2	3.9	5.5	3.7	
Average	22.6	23.2	21.2	19.9	23.8	
Poor	56	55.3	57.7	59.4	53.9	
Varied a lot	17	17.4	17.2	15.2	18.6	
Perceived food insecurity in childhood (%)						0.003
No	75.1	74.7	79.7	72.5	85.4	
Yes	24.9	25.3	20.3	27.5	14.6	
Area of residency in childhood (%)						0.003
Urban	38.1	35.8	41.2	41.4	52.5	
Rural	61.9	64.2	58.8	58.6	47.5	
Self-rated childhood health (%)						0.789
Excellent	24.3	24.7	18.2	24.4	22.2	
Good	54.5	54	56.2	56.6	53.3	
Regular	15	15.2	16.5	13.4	16.6	
Poor	6.1	6	9.1	5.6	7.9	
Years of Education (%)						<0.001
No schooling	12.2	10.2	12.2	18.6	15.9	
4 to 11	37.4	38.3	46.4	36.3	27.5	
5 to 10	26.3	27.4	20	23	26.4	
11+	24	24.1	21.4	22.1	30.1	
Smoking (%)						0.059
Never smoked	33.9	35.4	32.9	27.7	35.3	
Ever smoked	66.1	64.6	67.1	72.3	64.7	
BMI categories (%)						<0.001
Underweight	2.2	1.4	1	4.1	5.8	
Normal	32.3	29.7	25.6	40.7	41.7	
Overweight	42.6	44.7	52.7	36	33.1	
Obese	22.9	24.3	20.7	19.3	19.5	
Chronic conditions (%)						
Diabetes	14.7	15.9	8.5	12.1	11.3	0.008
Heart disease	6.5	6.2	3.9	8.8	3.9	0.071
Hypertension	47.8	48.9	50.9	48.3	32.7	0.000
Cancer	5.6	5.7	9.3	4.8	4.6	0.462
Extended Family contact (%)						0.003
Weekly	34.7	33.1	39.4	34	52.6	
Monthly	18.5	19.3	18.3	17.3	14.2	
A few times/year	28.9	30.4	19.7	28	18.3	
Rarely or never	14.7	14.5	16.4	16.8	10.6	
Don't have	3.2	2.8	6.3	3.8	4.3	
Friend contact (%)						0.007
Weekly	72.1	72.8	59.4	71.8	71.2	
Monthly	11.3	11.7	11.4	11.3	7.2	
A few times/year	4.8	4.9	8.6	4.4	3.6	
Rarely or never	2	1.7	0.8	2	6.4	
Don't have	9.7	9	19.7	10.5	11.7	

Notes: ELSI-Brazil, 2015-2016; p-value based on chi-square tests.

3.2. Multivariate results

Table 2 presents the average marginal effects from Cox proportional hazards models estimating the association between kin availability and mortality, stratified by gender. Across all models that adjust for age (i.e., M2-M5) and for both women and men, being unpartnered and childless was consistently statistically significant and positively associated with mortality, and exhibited the highest probability of mortality compared to those partnered with children.

Among women, the probability of mortality for the unpartnered and childless group remained elevated and statistically significant across all models - 73 percentage points (pp) in Model 1 (M1) to 63 pp in the fully adjusted model. Being unpartnered with children was positively associated with mortality in M1, with a magnitude of 82 pp, which declined to 27 pp in M5 and became non-significant after the inclusion of adult

health indicators in M4.

Among men, unpartnered and childless adults had a higher probability of mortality with an AME of 67pp in M1 compared to those partnered with children, which increased to 92 pp in M5 after adjusting for all covariates. For men, being unpartnered with children was consistently positively associated with mortality, with an AME of 76 pp in M1 and remaining significant at 64 pp after adjusting for all covariates in M5. There were no statistically significant differences in mortality risks between partnered and childless individuals and those partnered with children in any model, regardless of gender.

3.2.1. Sensitivity analyses

All sensitivity analyses are available online. As marital dissolution and the presence of children may shape associations (Bulanda et al., 2016; Grundy and Kravdal, 2010), we examined mortality risks

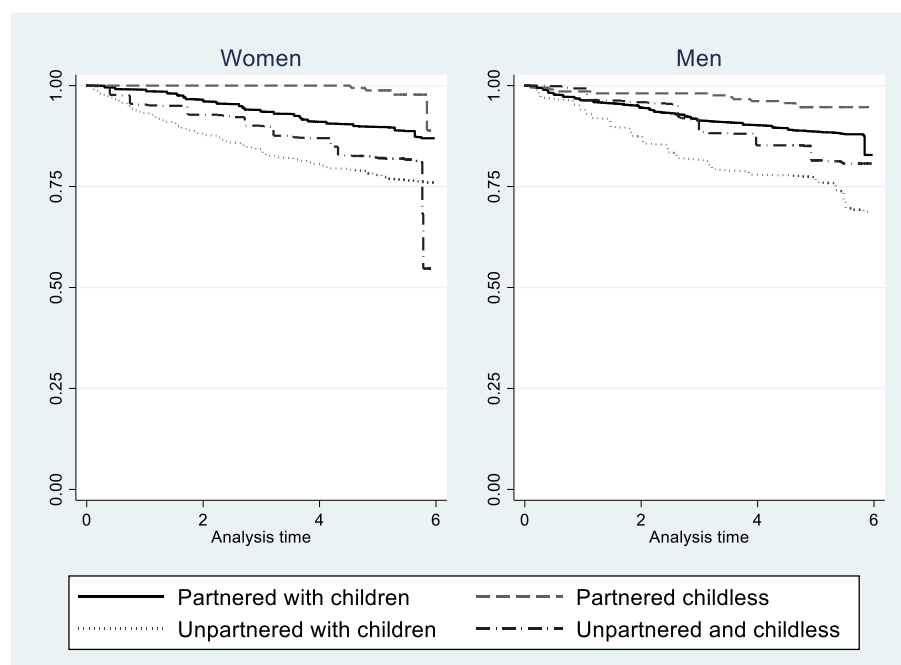


Fig. 1. Probability of survival according to the availability of close kin by gender: ELSI-Brazil 2015-2021.

Table 2

Average Marginal Effects from Weighted Cox Proportional Hazards Models of the Associations Between Close Kin Availability and Mortality by Gender: Adults aged 50 and older in Brazil.

Kin Availability (Partner & Child)	Women (n = 5314)					Men (n = 4098)				
	M1	M2	M3	M4	M5	M1	M2	M3	M4	M5
	AME (SE)	AME (SE)	AME (SE)	AME (SE)	AME (SE)	AME (SE)	AME (SE)	AME (SE)	AME (SE)	AME (SE)
Partnered Childless	-0.536 (0.554)	-0.592 (0.53)	-0.478 (0.534)	-0.453 (0.552)	-0.408 (0.553)	0.339 (0.328)	0.499 (0.345)	0.428 (0.345)	0.442 (0.337)	0.378 (0.350)
Unpartnered with Children	0.822*** (0.128)	0.330* (0.148)	0.319* (0.151)	0.257 (0.16)	0.265 (0.159)	0.763*** (0.105)	0.632*** (0.111)	0.629*** (0.120)	0.622*** (0.121)	0.639*** (0.119)
Unpartnered and Childless	0.729** (0.223)	0.486* (0.224)	0.635** (0.232)	0.569* (0.225)	0.627** (0.217)	0.672*** (0.199)	0.883*** (0.189)	0.892*** (0.194)	0.911*** (0.201)	0.923*** (0.197)

Notes: ELSI-Brazil, 2015-2021; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; Reference category in parentheses.; AME = Average Marginal Effects; SE= Standard Error.

M1: unadjusted; M2: includes age; M3 adds self-reported childhood socioeconomic status, food insecurity, self-rated health, rural residence and years of completed schooling; M4 adds smoking status, BMI, ever diagnosed with diabetes, heart disease, hypertension, cancer; M5 adds frequency of contact with family and friends.

disaggregated by unpartnered status - widowed, divorced/separated, and never married (single) - with and without children (Table S3). Being single/never married and childless was consistently associated with a higher AME of mortality among men and women. Among women, the elevated probability for divorced mothers and widows (with and without children) in M1 became nonsignificant after adjustment for age (widowed) and adult health conditions (divorced). Among men, higher mortality for never married, divorced and widowed fathers persisted, suggesting enduring health consequences of lacking a partner. Further, as the association between partnership, parenthood, and mortality may vary across cohorts, we restricted our analyses to adults 60 and older. The results for both women and men align (Table S5) with the main results—unpartnered and childless individuals face higher mortality risks and unpartnered men with children also have increased mortality risk. Overall, the findings confirm that lacking both close kin is associated with higher mortality, regardless of gender, and partnership is more prominent than parenthood for men's mortality.

4. Discussion

This is the first known study to examine whether (un)availability of close kin in later life, partners and/or children, may shape mortality risk

for older adults in Brazil. Aligned with our Hypothesis 1, we find that older men and women in Brazil who are aging without a partner and children face the highest mortality disadvantages relative to those aging with a partner and children. These associations are gendered. Among women, the absence of both close kin presents a critical risk factor for mortality, even after adjusting for all covariates. Among men, being unpartnered with or without children is associated with higher mortality regardless of covariates adjusted. Similar to prior research in Norway, Sweden, and the United States (Kravdal et al., 2012; Patterson et al., 2020), we adjusted for older adults' educational attainment but further accounted for a broader array of early-life socioeconomic and health conditions, which are known to be associated with adulthood health conditions, lifestyles, family transitions, and mortality. As being unpartnered and childless was persistently associated with mortality even after accounting for these possible social selection factors, this finding underscores that social causation also plays a role in the association between family unavailability and mortality. In contrast to the Norwegian, Swedish, and US contexts, we found that the mortality risks associated with lacking both ties were prominent among women. Supplementary analyses (Table S3) indicate this association was driven by single/never married childless women. This finding likely reflects the sociocultural significance of traditional family ties among the current

cohorts of older Brazilian women (Westfried, 1997). Although our descriptive analyses suggest that unpartnered childless women had more advantaged social backgrounds and, single and childless women specifically, were more highly educated and had good childhood health (Table S2a), they may have been exposed to more social stigma (Westfried, 1997) and limited social support that could impair well-being over the lifecourse.

Our findings are consistent with prior research in the US (Patterson et al., 2020), which suggests that having one tie but not the other (being unpartnered with children) is associated with higher mortality than having both close kin ties available. Unlike the US context, which found no gender differences (Patterson et al., 2020), this association was evident only among Brazilian unpartnered men (single/never married, divorced, and widowed) with children, supporting Hypothesis 4. Our finding likely reflects that divorced and widowed men experience more relationship strains and social support losses from children compared to women (Buyukkececi and Leopold, 2024; Kalmijn, 2007), which may impact health. Moreover, as family support norms in Brazil typically favor unpartnered women (De Vos, 2012), and women (wives) are the primary caregivers (Maximiano-Barreto et al., 2022), unpartnered older Brazilian men may be at greater risk of psychosocial stressors, including social isolation and loneliness, or unmet care needs, which may increase mortality risks and warrant further investigation. Our examination of gendered patterns and the intersection of partnership and parenthood reinforces that partnership is a more dominant influence than parenthood for long-term health protection among older Brazilian men.

We did not find support for Hypothesis 2 that partnered childless women would have higher mortality risks than women partnered with children. This finding may reflect social and health advantages, which may compensate for the absence of children. Furthermore, partnered childless women constitute a small subsample, limiting the statistical power to detect differences in mortality. We found partial support for Hypothesis 3 that there will be minimal differences in the mortality risks among women unpartnered with children. Importantly, the statistically significant differences in mortality risks between unpartnered women with children and women partnered with children were eliminated after accounting for adult health conditions. Thus, the presence of children, in the absence of a partner, may offer support for older women to manage their chronic conditions and minimize health risks. Our findings support Hypothesis 5, as there were no statistically significant differences in mortality risks between partnered and childless men and those partnered with children, suggesting the presence of a partner may offer some protection for men's survival.

This study advances the nascent literature on the linkages between partnership and parenthood status with mortality, which has so far largely focused on the European and US contexts. By examining this topic in contemporary Brazil, where social welfare infrastructure is underdeveloped, we demonstrate that aging without both partners and children-key sources of potential social support, control, and integration in later life-likely compromises longevity across diverse social contexts. Nonetheless, *aging without one* of these close kin ties may *not necessarily* present a mortality risk for older Brazilian women and men.

4.1. Limitations and future directions

Due to data limitations, we cannot examine the age of childbearing or union formation, which is important because early parenthood is associated with poor health and mortality (Grundy and Tomassini, 2005; Henretta, 2007), and because potential cohort effects are confounded by age. Second, we cannot examine marital histories to distinguish between lifelong partnerships and singlehood, nor can we account for marital transitions after the baseline, which can shape both pathways to parenthood and mortality risks. Additionally, we cannot differentiate between the mortality rates of married and cohabiting couples. Although social security benefits treated married and cohabiting couples similarly since the 1940s, legal protection for cohabiting

couples and their children upon dissolution of the partnership was unavailable until 1988 (Laplante et al., 2018). Therefore, current cohorts of older adults who cohabited over their lifecourse are potentially more socially vulnerable to experience worse health than married adults. Despite narrowing education gaps in cohabitation since the 1980s, it remains common among Brazil's socioeconomically disadvantaged (Esteve et al., 2022), who may also face higher mortality risks. We cannot assess pathways into childlessness—voluntary or involuntary—which affect health differently for partnered and unpartnered adults. Additionally, we cannot evaluate relationship quality with children and partners; negative relations increase mortality risk. (Bulanda et al., 2016). We encourage future studies to examine detailed marital and parenthood histories to understand how transitions into marriage/parenthood, and duration, differentially shape mortality risks. Marital histories should include formal marriages and cohabitation to enable distinguishing the possibly unique lifecourse (dis)advantages in Brazil.

5. Conclusion

Our study reveals significant differences in mortality risks associated with the unavailability of close family ties-partner and children-regardless of gender among older Brazilians. Among men, however, the presence of children does not completely buffer the mortality risks of those without a partner. These findings suggest that the availability of partners constitutes a salient source of support with distinct implications for survival among older men.

We contribute to the limited literature on the relative importance of partnership and parenthood status for the mortality of older adults in Latin America, an increasingly important topic given the region's rapid population aging amidst embedded normative family-based support for older adults (Wong and Palloni, 2009). Brazil offers an ideal case study considering declining marriage and fertility rates since the 1960s (Cruz, 2023; Esteve et al., 2022), indicating a growing share of adults will likely age without traditional close kin ties in a country with a weak public social welfare infrastructure to support older adults (Neumann and Albert, 2018). Current and future older Brazilians without partners and children may face significant health and care disadvantages that may elevate their mortality risks. We also consider that the evolving socio-cultural changes among Brazilian birth cohorts of the 1960s and later, including the increasing higher education among women, later ages of union formation among higher educated women, and increasing acceptance of childless couples, may contribute to the increasing prevalence of childlessness (Cruz, 2023; Leocádio et al., 2022) and potentially weaker associations with mortality among future cohorts of older Brazilians.

The traditional model of informal kinship-based care may become increasingly unsustainable. In response to this growing care gap, Brazil has recently proposed the National Care Policy, which aims to formalize care as a fundamental right and promote shared responsibility among the state, families, and society (Brasil, 2024). Key components of the policy include the expansion of public care services, support for family and professional caregivers, and the integration of health, education, and social assistance policies to develop a cohesive and inclusive care infrastructure. This policy provides an opportunity for expanded access to care and support for older adults regardless of their kin availability, which may contribute to extended longevity.

Data statement

The data files and documentation for the ELSI-Brazil baseline data used in this study are publicly available on the study website: <<http://elsi.cpqrr.fiocruz.br/en>>.

Ethics approval

ELSI-Brazil was approved by the ethics board of FIOCRUZ, Minas

Gerais (Certificado de Apresentação para Apreciação Ética: 34649814.3.0000.5091). Participants signed separate informed consent forms for the interviews, physical measurements, and laboratory assays, as well as authorized sample storage and access to administrative records.

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CRediT authorship contribution statement

Nekehia T. Quashie: Conceptualization, Methodology, Writing – original draft. **Flavia C.D. Andrade:** Conceptualization, Data curation, Formal analysis, Methodology, Visualization, Writing – original draft. **Joseph L. Saenz:** Conceptualization, Methodology, Writing – original draft. **Daniella P. Nunes:** Conceptualization, Writing – original draft.

Declaration of competing interest

The authors do not have any conflicts of interest to declare.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.socscimed.2026.119183>.

Data availability

The data files and documentation for the ELSI-Brazil baseline data used in this study are publicly available on the study website.

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