The Effect of Informal Care Provided by Children on Health in Nursing Homes

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Abstract – This paper estimates the causal effect of informal care provided by children on health outcomes for nursing home residents. We exploit the cross-sectional French survey *CARE-Institutions* (2016) providing a representative sample of 2,382 residents aged 60 or more, with children. Adverse health outcomes are depression, sleep disorders, poor appetite, and feelings of weariness. To deal with the endogeneity of informal care, we exploit an instrumental variable strategy where informal care receipt is instrumented by the gender composition of siblings. Informal care is found to have overall little effect on these health outcomes, and this is stable across gender and education level. These results are contrasting with those observed at home and call for further researches on the specific determinants of health and well-being in nursing homes.

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The opinions and analyses presented in this article are those of the author(s) and do not necessarily reflect their institutions' or INSEE's views.

Aging populations are associated with an increase of long-term care needs and costs. Informal care, defined as unpaid care provided by relatives, plays a major role in long-term care provision. While much attention has been paid to informal care provided to older persons living in the community, the literature on the role played by relatives in nursing homes is much more limited. However, evidence suggest that relatives are still providing concrete care for people living in nursing homes on top of providing emotional support (Keating *et al.*, 2001; Gaugler, 2005; Jeanneau *et al.*, 2022). This issue has been particularly raised by the COVID-19 pandemic: several studies have shown that lockdowns in nursing homes increased the loneliness of residents and diminished their well-being (Giebel *et al.*, 2020; Roest *et al.*, 2020; Verbeek *et al.*, 2020; McArthur *et al.*, 2021). Using the French survey CARE, Jeanneau *et al.* (2022) provide a detailed description of informal care in nursing homes. They show that three out of four nursing home residents receive informal care in France for the activities of daily living, with relatives being primarily involved in administrative tasks and activities related to mobility and the outside. Using the same data, Roquebert & Tenand (2023) show that the annual economic value of informal care provided in nursing homes represents an equivalent of 1.221 billion euros.

This paper estimates the causal effect of informal care provided by children on health for individuals living in nursing homes. While evidence exists for individuals living at home (Barnay & Juin, 2016), this question has not yet been directly explored in nursing homes. We explore the heterogeneity of the effect according to the gender of care recipient. Indeed, important differences are observed between men and women, both for informal care and health. Women are more likely to receive informal care than men, everything else being equal, in nursing homes (Jeanneau *et al.*, 2022) and they are also more likely to declare a poor state of health (Read & Gorman, 2010; Read & Grundy, 2011). Gender differences are found in the factors influencing health, and in particular, those related to social support (Kendler *et al.*, 2005; Pinquart & Sörensen, 2007; Fiori & Denckla, 2012; Santini *et al.*, 2015). Considering this heterogeneity at home, Byrne *et al.* (2009) find that informal care provided to mothers is less effective in improving health than informal care provided to fathers, due to greater caregiving needs of mothers.

We exploit the cross-sectional French survey *CARE-Institutions* (2016) which provides a representative sample of 2,382 individuals aged 60 or more, with children and living in a nursing home. Health outcomes are the probability of declaring depression, sleep disorders, poor appetite and feelings of weariness. To deal with the endogeneity of informal care to health variables, we exploit an instrumental variable strategy, using the gender composition of the sibling (having at least one daughter).

This paper brings several contributions to the literature. First, it focuses on informal care in nursing homes, a scope that has been little considered up to now (Jeanneau *et al.*, 2022), and it explores its causal impact on health. Second, it considers the heterogeneity of the effect according to gender, age and education level. Third, it shows that the usual instruments for informal care are weaker when focusing on the subsample of older men.

Results show that informal care has overall little effect on health outcomes, and this is stable across gender and education level. It is imprecisely suggested that it increases feelings of weariness for younger and single individuals. These results are contrasting with those observed at home and call for further researches on the specific determinants of health and well-being in nursing homes.

1. Literature Review

In the economic literature, formal and informal care are generally regarded as inputs in the health production function of an individual needing long-term care. Many papers have been interested in the theoretical formalization of the contribution of these inputs to the individual's health. Byrne *et al.* (2009) provide health-quality production functions in which health quality depends on the individual's characteristics and care provided by family members or by professional caregivers. The parameters associated to each type of care are allowed to depend on parent and child observed characteristics. Empirical evidence on the effect of informal care on health is more limited. Using US data, Byrne *et al.* (2009) find that formal and informal care slightly affect the individual's health quality. Focusing on French old individuals, Barnay & Juin (2016) show that informal care (instrumented by the proportion of daughters, having one child single, one child without children, one child living nearby) is likely to reduce the risk of depression. All these papers focus on informal care provided at home. One originality

of the present paper is to focus on informal care provided in nursing homes, where a considerable amount of formal care is provided. If the health production function is assumed to be similar for both people living at home and those living in nursing homes, we might expect that informal care could have an effect on individuals' health, even in the presence of quasi-constant formal care.

Recent evidence related to the COVID-19 crisis has shown that depriving individuals of their relatives' visits to nursing homes entails a deterioration of their well-being (Giebel *et al.*, 2020; Roest *et al.*, 2020; Verbeek *et al.*, 2020) and health (McArthur *et al.*, 2021). McArthur *et al.* (2021) evaluate the effect of some strategies (windows visits, use of technologies) used to prevent health disorders during the lockdowns and find that they are able to mitigate depression, delirium and behavioral problems. These papers are tied to the specific situation of the COVID-19 pandemic, however, where several mechanisms come into play (social isolation and limited interactions, as well as anxiety about the pandemic and increased workload of the staff). By contrast, the present paper highlights the effect of informal care on health outcomes in normal times.

2. Data

2.1. CARE Survey

We use the cross-sectional survey *Capacités, Aides et REssources des seniors* (CARE), which is a general population survey representative of French people aged 60 and older. Conducted by the statistical division of the Ministry of Health (DREES), it aims at documenting the living conditions of the individuals, their relationships with their relatives, and the limitations in the activities of daily living they face, as well as the human, technical and financial support they receive. The survey consists of two parts: *CARE-Ménages* (CARE-M) is devoted to individuals living in the community, while *CARE-Institutions* (CARE-I) surveys individuals living in nursing homes.

CARE-I was conducted between September and December 2016. 3,223 respondents from 616 long-term care units (non-medicalized and medicalized nursing homes, long-term care units of hospitals) participated in the survey, an average of 5 residents per unit. Due to the compulsory nature of the survey, the response rate was high (88% at the nursing home level and 86% at the respondent level).

Survey weights are provided together with the data to correct for non-response. About 80 observations are dropped because of missing information on activity restrictions or children. Focusing on individuals with children (75% of the initial sample), our sample consists of 2,382 individuals.

2.2. Variables

We are interested in informal care received by residents. In the survey, residents declare if they receive some care from relatives; for each informal caregiver, they declare the type of care provided (concrete help for activities of daily living, either essential (ADL) or instrumental (IADL); moral support; financial support), and the frequency and the volume of care received. This paper focuses on informal care provided by one child (at least) for concrete help with the activities of daily living. Receiving care from someone other than a partner or a child is uncommon: about 5% of individuals having a partner or children declare receiving care from other family members, 2% from friends (Jeanneau *et al.*, 2022).[1] Care for the activities of daily living is the most prevalent and is frequently associated with moral support, both at home and in nursing homes (Gramain *et al.*, 2024; Jeanneau *et al.*, 2022; Roquebert *et al.*, 2018). It includes help for essential activities of daily living (ADL): grooming, dressing, using the toilet, transferring (from and to bed), and cutting and eating food (once it has been prepared). It also encompasses instrumental activities of daily living (IADL): grocery shopping, domestic chores, preparing meals, taking medication, moving around alone (in the area of one's room), using a phone, using transportation, leaving the nursing home, finding one's way and administrative tasks. In our sample, 75% of individuals receive informal care, corresponding to 63% of men and 78% of women (significant difference at the 1% level, Student test).

The outcome variables are health measures. In the survey, individuals are asked if during the last 12 months, they have had one of the diseases or health issues mentioned in a list, including depression.[2] They are additionally asked if in the last 12 months they have encountered one of the health issues mentioned in a list, including

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1. *For individuals without partner nor children, however, shares are higher: 28% of individuals receive care from another family member, 13% by somebody else.*
2. *The other diseases are heart diseases, hypertension, cerebrovascular accident, back pain, pressure sore, diabetes, Alzheimer's, Parkinson's, cancer.*

sleep disorders, poor appetite and feelings of weariness.[3]

Overall, we consider four health dichotomous variables: the fact of having suffered from *(i)* depression, *(ii)* sleep disorders, *(iii)* poor appetite, or *(iv)* feelings of weariness. These variables reflect the way individuals are feeling themselves. They are symptoms of a deteriorated health, while not necessarily requiring a diagnosis from a doctor. They are also relatively comparable from one individual to the other, compared to more general subjective health measures (Roquebert *et al.*, 2021). Indeed, general subjective health assessments are influenced by the reporting behavior of individuals, corresponding to the effect of non-health characteristics on the value of subjective health (age, gender, socio-economic variables, social norms, personality traits) (Layes *et al.*, 2012). Using narrow (closed-formed) questions on specific aspects of health is a relevant way to overcome this limitation (Bound, 1991).

2.3. Descriptive Statistics

Figure I shows the means of the outcome variables in our sample for women and men. There are similar in both populations, except that women more frequently declare a poor appetite (29% *vs* 19% among men) and feelings of weariness (53% *vs* 47% among men). These differences are respectively significant at the 1% and 5% level (Student test).

Table 1 presents the socio-demographic characteristics and health characteristics of women (Column (1)), men (Column (2)) and for the full sample of persons living in a nursing home and having children (Column (3)). About

3/4 residents of nursing homes with children are women. Reflecting differences in life expectancy, women are older on average and they are more frequently widowed while men are on average more frequently married or single/divorced, with a lower number of children. Regarding activity restrictions, based on the epidemiological literature (Barberger-Gateau *et al.*, 2000; Edjolo *et al.*, 2016), we distinguish between individual with moderate activity restrictions (IADL only), high activity restrictions (ADL) and severe activity restrictions (ADL including those on minimum independence: going to the toilet, self-feeding, getting up and down). Women are more frequently facing severe activity restrictions, echoing the difference in the age distribution. Appendix 1 provides more detailed descriptive statistics on the health status of nursing home residents.

3. Empirical Specification

3.1. Instrumental Variable Strategy

To identify the effect on health of informal care provided by children, we need to deal with the endogeneity of informal care to health. Indeed, reverse causality – when the health status of the individual affects informal care provision – and omitted variable bias – when unobserved characteristics affect both health and informal care – are likely. Appendix 2 shows the results of the estimation with health outcomes directly regressed on informal care provision (naive OLS estimations). On the full sample, a significant positive correlation is found between informal

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3. *The other issues are: respiratory problems, cough, gastric issues, diziness, paralysis*

Figure I – **Relative frequency of health troubles**
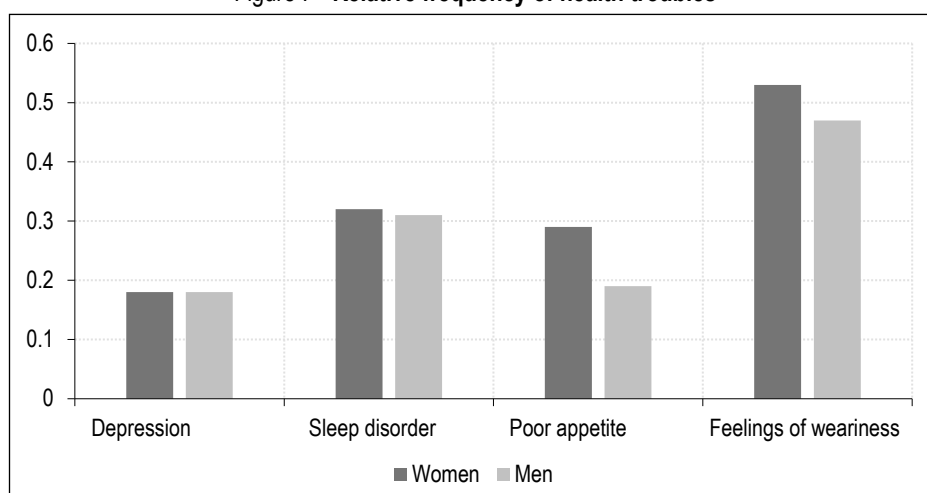
Notes: Weighted frequencies.
Sample: 2,382 individuals living in a nursing home and having children.

Table 1 – **Descriptive statistics: socio-demographic characteristics and activity restrictions**

	Women (1)	Men (2)	Full sample (3)
Informal care from children	78.0	62.8	74.6
Woman	100.0	0.0	77.7
Age: 60-74	5.2	12.4	6.8
Age: 75-84	19.8	26.2	21.2
Age: 85-89	30.1	25.5	29.1
Age: 90-94	30.0	26.0	29.1
Age: ≥ 95	14.9	9.9	13.8
Married	9.4	35.8	15.3
Widow	81.5	46.3	73.7
Single or divorced	9.0	17.9	11.0
Children: 1	30.7	28.6	30.2
Children: 2	33.1	29.0	32.1
Children: 3 or more	36.2	42.4	37.6
Sister(s) or brother(s) alive	41.7	47.2	42.9
Income: < 10,0000 €	5.1	2.1	4.4
Income: 10,000 - 14,999 €	30.2	14.6	26.7
Income: 15,000 - 19,999 €	27.2	20.2	25.6
Income: 20,000 - 24,999 €	15.3	19.3	16.2
Income: ≥ 25,000 €	22.2	43.9	27.1
Diploma: none	26.5	19.5	24.9
Diploma: primary education	34.3	32.1	33.8
Diploma: secondary education	17.3	22.5	18.4
Diploma: higher education	2.9	8.8	4.2
Diploma: missing	19.1	17.1	18.6
Restrictions: IADL only	11.5	14.6	12.2
Restrictions: ADL, except those of minimum independence	41.0	41.1	40.9
Restrictions: ADL on minimum independence	46.1	40.9	44.9
Observations	1,858	524	2,382

Notes: Weighted statistics.
Reading: 78.0% of women living in a nursing home and having children receive informal care from one child at least.
Sample: 2,382 individuals living in a nursing home and having children.

care receipt and depression or feelings of weariness, which are mainly driven by the subsample of men. A significant and positive correlation is also observed between sleep disorder and informal care, mainly driven conversely by the subsample of women. Overall, a positive relationship is suggested between informal care and a deteriorated health status.

The literature analyzing informal care has often dealt with this endogeneity using instrumental variable (IV) strategies. An instrument provides an exogenous variation in the variable of interest (informal care): it has to be correlated with informal care (relevance condition) and it should be correlated to the outcome only through informal care, thus being orthogonal to the error term (exclusion restriction). When analyzing the effect of informal care on several outcomes (formal care, living arrangements or health of recipients), the literature has proposed various instruments for informal care provision. Several studies use the number of children and the gender composition of the family, such as the proportion of daughters, the fact of having at least one daughter, or having a daughter as eldest child (Lo Sasso & Johnson, 2002; Van Houtven & Norton, 2004; Charles & Sevak, 2005; Bonsang, 2009; Bergeot & Tenand, 2023). The rationale is that children, and especially daughters, are more likely to provide informal care. Another instrument relies on the geographical proximity of individuals to their children (Stern, 1995; Charles & Sevak, 2005; Bolin *et al.*, 2008;

Hiedemann *et al.*, 2017). Individuals living close to their parents are indeed more likely to provide informal care (Stern, 2023).

In this study, we do not consider the number of children as a valid instrument since it could directly affect the health outcomes of old parents (Kruk & Reinhold, 2014). The geographical proximity of children could also affect directly health, for instance if proximity is associated with a feeling of emotional security that affects health even if the child is not providing concrete help (van der Pers *et al.*, 2015).

We use information on the sex of children as an instrument: the fact of receiving informal care for ADL/IADL is instrumented by the fact of having at least one daughter among children. To be valid, this instrumental variable has to be related to health only through the effect of informal care. Appendix 3 shows that *ceteris paribus*, daughters have a significant and higher probability to provide care than sons. Regarding the exclusion restriction, the sex composition of the sibling cannot be manipulated by parents since sex of children is random. It could nonetheless have a direct impact on health, for instance through the size of the sibling: the gender composition is correlated to the size of the sibling, which affects health outcomes of parents. Consequently, we control for the size of the sibling to have an effect of the instrument for a given number of children. Beyond this mechanism, there is no empirical evidence on a direct relationship between the gender composition of the siblings and the health outcomes of parents.

Compared to alternative instruments based on the gender composition of the siblings, having one daughter at least is statistically the strongest instrument on the full sample. Appendix 4 provides first stage and second stage results with alternative instruments based on the sex composition of the siblings (proportion of girls; eldest child is a daughter).

3.2. Econometric Specification

The instrumental variable estimator aims at identifying the causal impact of an endogenous explanatory variable. It is based on the following intuition: the effect of the endogenous regressor on the outcome breaks into two parts, one that might be correlated with the error term and one that is not. With the IV estimation, we isolate the part that is not correlated with the error term to estimate the effect of the endogenous regressor on the outcome. One can see Wooldridge (2009), for a general presentation of instrumental variables estimation. We estimate the model in two stages (two-stage least squares, or 2SLS). In the first stage, the probability of receiving informal care (IC_i, a dummy equal to 1 if the individual receives informal care) is regressed on the fact of having one daughter (D_i, a dummy equal to 1 if the individual has at least one daughter) and a set of covariates at the individual level (X_i) (1, linear probability model) and ϵ_i is an error term:

$$IC_i = \beta_1 D_i + X_i' \beta_2 + \epsilon_i \qquad (1)$$

In the second stage, the probability of declaring a health issue (H_{ik}) is estimated as a function of the predicted informal care receipt depending on the instrument and individual controls (Equation (2), linear probability model). We consider four health issues (H_{i1}: depression; H_{i2}: sleep disorders; H_{i3}: poor appetite; H_{i4}: weariness).

$$H_{ik} = \alpha_1 \widehat{IC_i} + X_i' \alpha_2 + \varepsilon_i \qquad (2)$$

With ε_i an error term.

In the first stage (Equation (1)), we assess the relevance of the instrument *(i)* looking at the magnitude and the significance of β_1; *(ii)* evaluating the F-stat corresponding to the test of the null hypothesis that the instrument is uncorrelated to the probability of receiving informal care ($H_0 : \beta_1 = 0$) (Staiger & Stock, 1997). Since we are estimating the model with clusters, we use the Kleibergen-Paap Wald F-test (Kleibergen & Paap, 2006). In the second stage (Equation (2)), we are not able to test the exclusion restriction using a Sargan test, which would require to have more instruments than endogenous variables (overidentification case).

We estimate this model for the full sample and for women and men separately. Regarding controls (X_i), we select variables that are the most exogenous to health and proceed in three steps: first, we estimate the model without any control; second, we control for sex, education level and number of children; third, we add to the previous controls the age category. To take into account potential correlation of disturbance terms, standard-errors are clustered at the nursing home level.

3.3. Relevance of the Instrument

Among individuals having children, 58% have at least one daughter and receive informal care from a child, while 9% have no daughter and do not receive informal care from children. Overall, for about 67% of the sample, we observe the expected relationship between informal care and the sex composition of the sibling. 16% have one daughter at least but do not receive informal

care, while 17% do not have a daughter but do receive informal care from a child at least.

Table 2 presents the first stage estimates of the simple IV model for the full sample and among subsamples of women and men. Models are successively estimated without any controls (Column (1)), controlling for gender, education level and number of children (Column (2)); adding age to the previous controls (Column (3)). It shows that having one daughter among children significantly increases the probability of receiving informal care, by about 10 percentage points in the full sample, with a similar magnitude for the subsamples of women and men. Whatever the controls included, the F-test is higher than 20 in the full sample and higher than 17 in the subsample of women. In the subsample of men, it decreases substantially, which might be explained by a lower number of observations in this subsample, and suggests that the instrument is weaker on the subsample of men. This is also the case when using alternative instruments (see Appendix 4, Table A4-1)

We have also tested if the instrument is correlated with the explanatory variables (see Appendix 4, Table A4-3). It shows that having one daughter at least is mainly correlated to the number of children but not to other explanatory variables. This is also the case for alternative instruments.

4. Results

4.1. Main Results

Table 3 presents the effect of informal care receipt from a child, instrumented by the fact of having one daughter at least, on the probability of declaring depression, sleep disorders, poor appetite and feelings of weariness, for the full sample (Panel A) and the subsamples of women (Panel B) and men (Panel C). For each outcome, we successively estimate the model without any controls (Columns (1), (4), (7), (10)); controlling for gender, education level and number of children (Columns (2), (5), (8), (11)); adding age to the previous controls (Columns (3), (6), (9), (12)). Reduced-form estimates (linear regressions of health outcomes on the instrument) are presented in Table 4, including all controls.

Informal care does not affect the probability to declare depression, sleep disorder or poor appetite in the full sample, nor in the subsamples of women and men. Regarding feelings of weariness, a positive but imprecisely estimated effect (significance at the 10% level) is found when there are no controls (Columns (10)) or

Table 2 – **First stage: correlation of having a daughter with informal care receipt**

	Receives informal care from one child at least		
	(1)	(2)	(3)
Panel A: Full sample			
At least one daughter	0.118***(0.022)	0.114***(0.022)	0.100***(0.022)
Observations	2,382	2,382	2,382
F-test (instrument)	29.634	25.906	20.947
Panel B: Women			
At least one daughter	0.119***(0.023)	0.111***(0.024)	0.101***(0.024)
Observations	1,858	1,858	1,858
F-test (instrument)	26.595	20.770	17.619
Panel B: Men			
At least one daughter	0.142***(0.051)	0.131**(0.053)	0.100** (0.051)
Observations	524	524	524
F-test (instrument)	7.725	6.021	3.912
Controls:			
Gender	No	Yes	Yes
Education	No	Yes	Yes
Number of children	No	Yes	Yes
Age	No	No	Yes

Notes: * p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors in parentheses, clustered at the nursing home level. Informal care is defined as concrete help for ADL/IADL. Estimations of linear probability models. Kleibergen-Paap Wald rk F-test corresponding to the test of the null hypothesis that the instrument is uncorrelated to the probability of receiving informal care.
Sample: 2,382 individuals living in a nursing home and having children.

controls for gender, education and number of children (Column (11)). It seems to be mainly driven by the subsample of men. However, this effect vanishes when we control for age (Column (12)).

Looking at the effect of controls (see Table A5-1 in Appendix 5) we see that individuals older than 95 (both men and women) are less likely to declare depression, which might be related to a lack of diagnosis for these individuals. A lower education level affects the probability to declare adverse health events, but the sense of the correlation depends on the outcome (positive for poor appetite, negative for depression) and it is mainly driven by the subsample of women.

4.2. Extensions

To elaborate on the effect of informal care on health in nursing homes, we explore the potential heterogeneity of this effect, considering subsamples according to *(i)* age, *(ii)* education level (Table 5). For the younger individuals (aged 84 or less), we observe a positive effect of informal care on the probability to declare feelings of weariness. This effect is not observed for individuals aged 85 or more. It echoes the change in the significance level of the estimation when we add age as a control (Table 3). There

is remarkably no heterogeneity of the informal care informal on subsamples depending on education level.

The definition of informal care includes administrative tasks. This item could be ambiguous since it might be provided remotely (paperwork for instance). We have thus estimated our model excluding administrative tasks from the definition of informal care. With this alternative definition, 57% of persons with children receive informal care from their children (compared to 75% with the previous definition). Despite this substantial change, results are stable and no effect of informal care is found on health outcomes (Table 6). Note that on the subsample of men, the instrument is particularly weaker.

The analysis shows that the instrument is particularly relevant for women: both men and women are more likely to declare receiving informal care when they have at least one daughter, but the instrument is weaker for men. This difference might be explained *(i)* by technical reasons (e.g. low number of observations for men) or *(ii)* by differences in the relationship between children's gender and informal care receipt. Given the difference in the life expectancy according to gender, older men are more likely than older women to receive care from a partner. We have

Table 3 – **Second stage: the effect of informal care receipt on health outcomes**

	Probability to have declared:											
	Depression			Sleep disorder			Poor appetite			Feelings of weariness		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Panel A: Full sample												
Informal care receipt	−0.121	−0.133	−0.113	0.094	0.006	−0.007	0.140	0.237	0.217	0.392*	0.416*	0.410
	(0.156)	(0.169)	(0.191)	(0.182)	(0.202)	(0.232)	(0.182)	(0.200)	(0.228)	(0.207)	(0.229)	(0.262)
Observations	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382	2,382
Panel B: Women												
Informal care receipt	−0.212	−0.197	−0.169	0.010	−0.110	−0.130	0.229	0.335	0.322	0.287	0.273	0.237
	(0.181)	(0.200)	(0.218)	(0.198)	(0.229)	(0.255)	(0.207)	(0.240)	(0.264)	(0.228)	(0.255)	(0.278)
Observations	1,858	1,858	1,858	1,858	1,858	1,858	1,858	1,858	1,858	1,858	1,858	1,858
Panel C: Men												
Informal care receipt	0.199	0.097	0.146	0.369	0.378	0.438	−0.075	−0.060	−0.174	0.743*	0.848*	1.059
	(0.284)	(0.319)	(0.411)	(0.358)	(0.413)	(0.552)	(0.296)	(0.336)	(0.441)	(0.423)	(0.504)	(0.712)
Observations	524	524	524	524	524	524	524	524	524	524	524	524
Controls:												
Gender	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Education	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Nb. children	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Age	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses, clustered at the nursing home level. Informal care is defined as concrete help for ADL/IADL and is instrumented by the fact of having one daughter at east.
Sample: 2,382 individuals living in a nursing home and having children.

Table 4 – **Reduced-form estimations**

	Probability to have declared:			
	Depression	Sleep disorder	Poor appetite	Feelings of weariness
	(1)	(2)	(3)	(4)
Panel A: Full sample				
At least one daughter	−0.011 (0.019)	−0.001 (0.023)	0.022 (0.022)	0.041* (0.025)
Observations	2,382	2,382	2,382	2,382
Panel B: Women				
At least one daughter	−0.017 (0.022)	−0.013 (0.025)	0.033 (0.025)	0.024 (0.028)
Observations	1,858	1,858	1,858	1,858
Panel C: Men				
At least one daughter	0.015 (0.042)	0.044 (0.051)	−0.018 (0.044)	0.106** (0.054)
Observations	524	524	524	524
Controls:				
Gender	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes
Number of children	Yes	Yes	Yes	Yes
Age	Yes	Yes	Yes	Yes

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses, clustered at the nursing home level.
Sample: 2,382 individuals living in a nursing home and having children.

Table 5 – **The effect of informal care receipt on health outcomes, heterogeneity according to age and education level**

	Probability to have declared:			
	Depression	Sleep disorder	Poor appetite	Feelings of weariness
	(1)	(2)	(3)	(4)
Panel A: Age: 60-84				
Informal care receipt	−0.321 (0.331)	−0.075 (0.339)	0.485 (0.328)	0.992** (0.492)
Observations	671	671	671	671
F-test (instrument)	7.757	7.757	7.757	7.757
Panel B: Age ≥ 85				
Informal care receipt	0.005 (0.228)	0.057 (0.304)	0.035 (0.285)	0.057 (0.325)
Observations	1,711	1,711	1,711	1,711
F-test (instrument)	14.185	14.185	14.185	14.185
Panel C: Education: none or primary				
Informal care receipt	−0.239 (0.425)	0.264 (0.507)	0.908 (0.620)	0.058 (0.517)
Observations	1,406	1,406	1,406	1,406
F-test (instrument)	5.476	5.476	5.476	5.476
Panel D: Secondary or higher education				
Informal care receipt	−0.069 (0.235)	−0.322 (0.291)	−0.126 (0.249)	0.450 (0.334)
Observations	513	513	513	513
F-test (instrument)	14.430	14.430	14.430	14.430
Controls:				
Gender	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes
Number of children	Yes	Yes	Yes	Yes
Age	Yes	Yes	Yes	Yes

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses, clustered at the nursing home level. Informal care is defined as concrete help for ADL/IADL and is instrumented by the fact of having one daughter at least. F-test (instrument) corresponding to the first-stage Kleibergen-Paap Wald rk F-test testing of the null hypothesis that the instrument is uncorrelated to the probability of receiving informal care.
Sample: 2,382 individuals living in a nursing home and having children.

Table 6 – **Effect of informal care receipt (excluding administrative tasks)**

	Probability to have declared:			
	Depression	Sleep disorder	Poor appetite	Feelings of weariness
	(1)	(2)	(3)	(4)
Panel A: Full sample				
Informal care receipt (excluding administrative tasks)	−0.116 (0.195)	−0.007 (0.236)	0.221 (0.233)	0.418 (0.266)
Observations	2,382	2,382	2,382	2,382
F-test (instrument)	16.637	16.637	16.637	16.637
Panel B: Women				
Informal care receipt (excluding administrative tasks)	−0.149 (0.194)	−0.115 (0.225)	0.285 (0.232)	0.210 (0.243)
Observations	1,858	1,858	1,858	1,858
F-test (instrument)	13.340	13.340	13.340	13.340
Panel C: Men				
Informal care receipt (excluding administrative tasks)	0.348 (1.025)	1.044 (1.693)	−0.415 (1.109)	2.523 (3.146)
Observations	524	524	524	524
F-test (instrument)	0.675	0.675	0.675	0.675
Controls:				
Gender	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes
Number of children	Yes	Yes	Yes	Yes
Age	Yes	Yes	Yes	Yes

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses, clustered at the nursing home level. Informal care is defined as concrete help for ADL/IADL, excluding administrative tasks. It is instrumented by the fact of having one daughter at least.
F-test (instrument) corresponding to the first-stage Kleibergen-Paap Wald rk F-test testing of the null hypothesis that the instrument is uncorrelated to the probability of receiving informal care.
Sample: 2,382 individuals living in a nursing home and having children.

thus conducted estimations on the subsample of individuals who are single, divorced or widowed, thus excluding 35% of men and 10% of women (Appendix 6) Results are robust to this change, except that even when controlling for age, a positive effect of informal care on feelings of weariness is observed (significant at the 10% level).

5. Discussion

Results show that, in the population of nursing home residents, informal care provided by children little affects health outcomes, and this is true also when considering subsamples of persons of the same education level. In robustness checks, informal care is suggested to increase the probability to declare feelings of weariness for younger or single individuals. For these individuals, receiving informal care may have a signaling effect, increasing the feeling of vulnerability of individuals.

Additionally, there is little heterogeneity of the effect according to the gender of the care recipient. Men and women are however likely to have different behaviors when declaring health issues. The literature has observed that women are more likely to report a deteriorated health status than men. This result has been shown to come both from "true" health differences (differences in the prevalence of chronic deseases) (Case & Paxson, 2005) and from sex-related differences in health-reporting behavior. Indeed, for a given health status, some variables are found to influence self-reported health, in particular gender (Bago d'Uva *et al.*, 2008; Caroli & Weber-Baghdiguian, 2016). Caroli and Weber-Baghdiguian (2016) show that reporting behavior depends on the social environment of individuals: women working with a majority of men tend to under-report health issues while the reverse is observed for men working with a majority of women. Transposing this idea to nursing homes, where a majority of women is found, we could expect that men over-report health issues. It could blur differences between gender.

Some limitations of this paper should be discussed. First, we are not able to disentangle the effect of the care provided in itself and the time spent with the parent or the moral support provided by children that might – or might not – be associated to care provision. When considering the effect of receiving moral support from children, instrumented by the fact of having a daughter, the results are very close to those we observe using informal care from children (results available upon request). Second, we miss some key information that would be useful to understand informal care in nursing homes, such as the seniority of nursing home entry, the history of informal care configurations or the intensity of informal care provision.

Finally, we are using cross-sectional data. While they offer us very rich information on care provided to the individuals in nursing homes and their families, longitudinal data would be useful to reinforce the causal aspect of the analysis.

Further investigation should explore the mechanisms through which informal care is related to health. Due to data limitations, the present analysis only considers the extensive margin of informal care (receiving informal care): future research could investigate the effect of informal care intensity on health outcomes for nursing home residents.

* *
*

This paper analyses the causal effect of informal care on health variables (depression, sleep disorders, poor appetite, feelings of weariness) for individuals living in nursing homes. We investigate the heterogeneity of the effect according to gender and according to age and education level. Informal care is found to have overall little effect on health outcomes, and this is stable across gender and education level. It is imprecisely suggested to increase feelings of weariness for younger and single individuals.

This study makes several contributions to the literature that has analyzed the effect of informal care for recipients. It explores the question of informal care in nursing homes, a scope that has been little considered up to now (Jeanneau *et al.*, 2022) and it analyzes the impact of informal care, considering the heterogeneity of the effect according to gender, age and education level. From a methodological point of view, it shows that the usual instruments used in the literature for informal care are weaker when focusing on the subsample of men, at least for the population of nursing home residents.

These results on the causal effect of informal care on health are thus contrasting with those observed at home, where informal care decreases the risk of depression (Barnay & Juin, 2016). Moreover, the population dynamics of older individuals at home and in nursing home are expected to change in the coming years, with changes in the availability of informal caregivers and different populations in each setting (Carrère *et al.*, 2023). These results, combined with the future sociodemographic changes, call for further researches on the specific determinants of health and well-being in nursing homes. □

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DESCRIPTIVE STATISTICS ON HEALTH STATUS

Table A1-1 provides more details on the health status of nursing home residents, comparing men and women. Cognitive limitations refer to difficulties in sense of time, memory and concentration issues, taking risks for oneself and aggressiveness issues. Sensory limitations refer to eyesight and hearing issues. The share of individuals suffering from limitations (cognitive, sensory, mobility and dexterity, locomotion and balance) is at least 75% and generally about 90%. Rate are higher for women. Most differences are significantly different from zero at the 1% level, as evaluated by the Student test for continuous or dummy variables and the Chi-squared test for categorical variables. There is no significant difference at the conventional threshold for chronic diseases (p-value = 0.44) and subjective health (p-value = 0.67).

Table A1-1 – **Detailed descriptive statistics on health characteristics**

	Women	Men	Full sample
	(1)	(2)	(3)
Restrictions: IADL only	11.45	14.64	12.16
Restrictions: ADL, except those of minimum independence	41.09	40.88	41.04
Restrictions: ADL on minimum independence	46.08	40.89	44.92
Alzheimer's disease	38.94	31.84	37.36
Limitations: cognitive	93.67	87.90	92.38
Limitations: sensory	75.91	74.65	75.63
Limitations: mobility, dexterity	96.36	93.01	95.61
Limitations: locomotion, balance	93.97	89.95	93.07
Incontinency	66.71	62.02	65.66
Self-reported chronic disease or health condition	67.21	70.01	67.84
Subjective health: bad or very bad	35.52	36.13	35.66
Subjective health: rather good	41.12	42.65	41.46
Subjective health: good or very good	22.47	20.66	22.07
Subjective health: missing	0.88	0.55	0.81
Underweight (BMI < 20)	16.11	8.73	14.46
Normal weight (20 ≤ BMI < 25)	30.50	33.19	31.10
Overweight or obese (BMI ≥ 25)	28.65	41.16	31.44
BMI missing	24.74	16.91	22.99
Has been hospitalized in the last 12 months	29.63	36.64	31.19
Proxy respondent	68.20	64.11	67.29
Observations	1,858	524	2,382

Notes: Weighted statistics. "BMI" stands for Body Mass Index.
Sample: 2,382 individuals living in a nursing home and having children.

APPENDIX 2

NAIVE ESTIMATIONS

Table A2-1 – **Naive estimations**

	Depression	Sleep disorder	Poor appetite	Feelings of weariness
	Probability to have declared:			
	(1)	(2)	(3)	(4)
Panel A: Full sample				
Informal care receipt	0.0335* (0.0195)	0.0405* (0.0230)	0.0239 (0.0218)	0.0628** (0.0256)
Observations	2,382	2,382	2,382	2,382
R^2	0.014	0.009	0.025	0.012
Panel B: Women				
Informal care receipt	0.0169 (0.0228)	0.0546** (0.0274)	0.0180 (0.0268)	0.0301 (0.0300)
Observations	1,858	1,858	1,858	1,858
R^2	0.014	0.010	0.019	0.009
Panel C: Men				
Informal care receipt	0.0743** (0.0366)	0.0002 (0.0434)	0.0370 (0.0373)	0.140*** (0.0462)
Observations	524	524	524	524
R^2	0.042	0.013	0.026	0.040
Controls:				
Gender	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes
Number of children	Yes	Yes	Yes	Yes
Age	Yes	Yes	Yes	Yes

Notes: * p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors in parentheses, clustered at the nursing home level. Informal care is defined as concrete help for ADL/IADL.
Sample: 2,382 individuals living in a nursing home and having children.

DETERMINANTS OF CARE PROVISION

In this Appendix, we investigate at the child level the variables that correlate with the probability of care provision (Table A3-1), taking child, parent and nursing home characteristics into account. It shows that everything else being equal, daughters have a higher probability of being a caregiver. For both daughters and sons, the probability to be caregiver increases with the fact of being part of a couple that has children and decreases with job inactivity. When the size of the sibling group increases, the probability of being a caregiver decreases. This is also the case for daughters when the parent has a partner at home. Finally, care provision is affected by the health status of the parent, as measured by ADL restrictions, limitations and subjective health.

Table A3-1 – **Explaining children care provision**

	Probability of being declared as caregiver:		
	All	Daughters	Sons
Child characteristics			
Daughter	0.387*** (0.0364)		
Age 00-39	*Ref.*	*Ref.*	*Ref.*
Age 40-49	−0.109 (0.164)	−0.197 (0.228)	0.00272 (0.236)
Age 50-59	−0.164 (0.165)	−0.219 (0.230)	−0.0893 (0.230)
Age 60-69	−0.114 (0.172)	−0.222 (0.241)	−0.00280 (0.241)
Age 70-79	−0.0987 (0.188)	−0.159 (0.260)	−0.0256 (0.263)
Age 80-89	−0.563 (0.409)	0 (.)	0.287 (0.556)
Age missing	0.349* (0.182)	0.359 (0.257)	0.315 (0.253)
Single and no children	0.334*** (0.0999)	0.180 (0.144)	0.415*** (0.142)
Couple with child/children	0.323*** (0.0604)	0.315*** (0.0761)	0.310*** (0.101)
Couple without child/children	0.164 (0.105)	0.180 (0.153)	0.120 (0.150)
Single with children	*Ref.*	*Ref.*	*Ref.*
Family status missing	0.0434 (0.0992)	0.0828 (0.133)	−0.0316 (0.151)
Job status: inactive	−0.400*** (0.0964)	−0.377*** (0.113)	−0.519*** (0.200)
Job status: active	*Ref.*	*Ref.*	*Ref.*
Job status missing	−0.711*** (0.103)	−0.789*** (0.140)	−0.598*** (0.151)
Job status: retired	0.0105 (0.0675)	−0.0500 (0.0926)	0.0735 (0.0950)
Parent characteristics			
Woman	0.0376 (0.0560)	0.0550 (0.0748)	0.0152 (0.0740)
Number of children	−0.186*** (0.0226)	−0.172*** (0.0264)	−0.202*** (0.0243)
Age: 60-74	−0.310*** (0.112)	−0.380*** (0.140)	−0.248 (0.154)
Age: 75-84	*Ref.*	*Ref.*	*Ref.*
Age: 85-89	−0.00460 (0.0598)	0.0399 (0.0805)	−0.0378 (0.0817)
Age: 90-94	0.0904 (0.0742)	0.141 (0.0962)	0.0450 (0.0922)
Age ≥ 95	−0.0646 (0.0842)	−0.0569 (0.112)	−0.0533 (0.109)
Widow	0.246*** (0.0697)	0.0957 (0.0970)	0.399*** (0.0959)
Partner at home	−0.178* (0.108)	−0.331** (0.141)	−0.0295 (0.137)
No partner	*Ref.*	*Ref.*	*Ref.*
Partner in nursing home	−0.0414 (0.107)	−0.142 (0.148)	0.0859 (0.146)
Sister(s) or brother(s) alive	−0.0203 (0.0442)	0.0226 (0.0599)	−0.0625 (0.0587)
Income: < 10 0000	−0.200** (0.0987)	−0.321** (0.140)	−0.0912 (0.136)
Income: 10,000 - 14,999	−0.0793 (0.0529)	−0.0733 (0.0713)	−0.109 (0.0744)
Income: 15,000 - 19,999	*Ref.*	*Ref.*	*Ref*
Income: 20,000 - 24,999	−0.0156 (0.0622)	−0.0822 (0.0881)	0.0584 (0.0844)
Income: ≥ 25,000	0.0483 (0.0620)	0.0457 (0.0844)	0.0342 (0.0848) →

	Probability of being declared as caregiver:		
	All	Daughters	Sons
Diploma: none	−0.0456 (0.0574)	−0.0760 (0.0736)	−0.0335 (0.0746)
Diploma: primary education	*Ref.*	*Ref.*	*Ref.*
Diploma: secondary education	−0.194*** (0.0592)	−0.158** (0.0805)	−0.246*** (0.0842)
Diploma: higher education	−0.0837 (0.121)	−0.201 (0.155)	0.0374 (0.147)
Diploma: missing	−0.122** (0.0621)	−0.202** (0.0867)	−0.0416 (0.0865)
Restrictions: IADL only	*Ref.*	*Ref.*	*Ref.*
Restrictions: ADL, except those of minimum independence	0.277*** (0.0731)	0.343*** (0.0967)	0.238** (0.100)
Restrictions: ADL on minimum independence	0.217*** (0.0829)	0.252** (0.110)	0.206* (0.114)
Limitations: cognitive	0.171** (0.0816)	0.182 (0.114)	0.155 (0.110)
Limitations: sensory	−0.00828 (0.0599)	0.00267 (0.0758)	−0.00863 (0.0742)
Limitations: mobility, dexterity	0.322** (0.134)	0.304* (0.163)	0.338* (0.191)
Limitations: locomotion, balance	0.183* (0.0985)	0.174 (0.123)	0.187 (0.146)
Incontinency	−0.0299 (0.0490)	−0.0767 (0.0684)	0.0111 (0.0672)
Self-reported chronic disease or health condition	−0.0785 (0.0496)	−0.0879 (0.0662)	−0.0640 (0.0676)
Subjective health: bad or very bad	0.0136 (0.0461)	−0.0102 (0.0623)	0.0438 (0.0629)
Subjective health: average	*Ref.*	*Ref.*	*Ref.*
Subjective health: good or very good	−0.102* (0.0536)	−0.119 (0.0743)	−0.0786 (0.0748)
BMI: normal	*Ref.*	*Ref.*	*Ref.*
Underweight (BMI < 20)	0.0755 (0.0684)	0.0969 (0.0912)	0.0692 (0.0905)
Overweight or obese (BMI ≥ 25)	0.00433 (0.0556)	−0.0169 (0.0720)	0.0283 (0.0741)
BMI missing	0.0444 (0.0584)	−0.0204 (0.0775)	0.117 (0.0780)
Has been hospitalized in the last six months	0.0269 (0.0451)	0.0615 (0.0596)	−0.00220 (0.0608)
Tutelage	−0.382*** (0.121)	−0.394** (0.174)	−0.398** (0.174)
Proxy respondent	0.193*** (0.0513)	0.337*** (0.0681)	0.0411 (0.0699)
Nursing home characteristics			
For-profit	0.0402 (0.0559)	0.101 (0.0746)	−0.0246 (0.0825)
Public	0.0115 (0.0466)	−0.00969 (0.0638)	0.0372 (0.0626)
Not for-profit	*Ref.*	*Ref.*	*Ref.*
Constant	−0.687*** (0.244)	−0.214 (0.340)	−0.775** (0.333)
Observations	5,800	2,898	2,897

Notes: * p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors in parentheses, clustered at the parent level. Estimation of Probit models.
Sample: 5,800 children of individuals living in a nursing home.

DETAILS ON INSTRUMENTS

We have tested several instruments that are likely to correlate with informal care and are commonly used in the literature. Table A4-1 shows the first stage estimations, where the probability to receive informal care from a child is explained either by the proportion of daughters or by the fact that the eldest child is a daughter. These variables are indeed correlated with informal care receipt, but these instruments are weaker than the fact of having one daughter at least (lower F-test). Table A4-2 shows the second stage results of the estimations instrumenting informal care by each of the two instruments, controlling for sex, education level, number of children and age category. Results are consistent with our main estimations, using the fact of having one daughter as an instrument.

Table A4-1 – **First stage results with alternative instruments**

	Receives informal care from one child at least		
	All	Women	Men
Instrument: proportion of daughters			
Proportion of daughters	0.0892***(0.0235)	0.0819***(0.0255)	0.114** (0.0546)
Observations	2,382	1,858	524
F-test (instrument)	14.437	10.274	4.323
Instrument: eldest child is a daughter			
Elder child is a girl	0.0749***(0.0171)	0.0685***(0.0187)	0.0937**(0.0392)
Observations	2,382	1,858	524
F-test (instrument)	19.222	13.455	5.724
Controls:			
Gender	Yes	Yes	Yes
Education	Yes	Yes	Yes
Number of children	Yes	Yes	Yes
Age	Yes	Yes	Yes

Notes: * p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors in parentheses, clustered at the nursing home level. Informal care is defined as concrete help for ADL/IADL. Estimations of linear probability models.
Sample: 2,382 individuals living in a nursing home and having children.

Table A4-2 – **Second stage results with alternative instruments**

| | Probability to have declared: | | | |
| | Depression | Sleep disorder | Poor appetite | Feelings of weariness |
	(1)	(2)	(3)	(4)
Instrument: proportion of daughters				
Panel A: Full sample				
Informal care receipt	0.103 (0.239)	0.261 (0.289)	0.362 (0.302)	0.643* (0.343)
Observations	2,382	2,382	2,382	2,382
Panel B: Women				
Informal care receipt	0.068 (0.303)	0.047 (0.344)	0.556 (0.401)	0.480 (0.403)
Observations	1,858	1,858	1,858	1,858
Panel C: Men				
Informal care receipt	0.216 (0.381)	0.837 (0.634)	−0.136 (0.435)	1.111 (0.695)
Observations	524	524	524	524
Instrument: eldest child is a daughter				
Panel A: Full sample				
Informal care receipt	0.273 (0.217)	0.131 (0.256)	0.015 (0.246)	0.335 (0.269)
Observations	2,382	2,382	2,382	2,382
Panel B: Women				
Informal care receipt	0.262 (0.281)	−0.040 (0.315)	0.062 (0.313)	0.114 (0.327)
Observations	1,858	1,858	1,858	1,858
Panel C: Men				
Informal care receipt	0.313 (0.355)	0.581 (0.508)	−0.110 (0.391)	0.877 (0.539)
Observations	524	524	524	524
Controls:				
Gender	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes
Number of children	Yes	Yes	Yes	Yes
Age	Yes	Yes	Yes	Yes

Notes: * p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors in parentheses, clustered at the nursing home level. Informal care is defined as concrete help for ADL/IADL. Estimations of linear probability models.
Sample: 2,382 individuals living in a nursing home and having children.

We additionally test if the instruments (having one daughter, eldest child is a daughter, proportion of girls) are correlated with the instrument (Table A4-3). Standard-errors are not clustered at the nursing home level since we are studying variables that are fixed before nursing home entry. The F-test corresponds to the F-statistic associated to the null hypothesis that all coefficients are jointly equal to zero. It shows that the null hypothesis can be rejected for the instrument "having one daughter at least", due to the high correlation of the instrument with the size of the sibling. For the other instruments, the null hypothesis cannot be rejected at conventional significance thresholds.

Table A4-3 – **Regression of instruments on controls**

	Having one daughter at least (1)	Eldest child is a daughter (2)	Proportion of daughters (3)
Woman	−0.022 (0.020)	−0.014 (0.024)	−0.027 (0.018)
Diploma: none	−0.029 (0.022)	−0.052** (0.026)	−0.027 (0.020)
Primary education	*Ref.*	*Ref.*	*Ref.*
Diploma: secondary education	−0.010 (0.024)	−0.034 (0.031)	−0.012 (0.023)
Diploma: higher education	−0.083* (0.046)	−0.121** (0.052)	−0.063 (0.040)
Diploma: missing	−0.050** (0.024)	−0.046 (0.029)	−0.039* (0.022)
Number of children	0.092*** (0.005)	−0.000 (0.007)	−0.007 (0.004)
Constant	0.556*** (0.026)	0.555*** (0.032)	0.563*** (0.024)
Observations	2,382	2,382	2,382
F-test	52.929	1.431	1.609

Notes: * p < 0.10, ** p < 0.05, *** p < 0.01. Standard errors in parentheses. Estimations of linear probability models.
The F-test corresponds to the F-statistic associated to the null hypothesis that all coefficients are jointly equal to zero.
Sample: 2,382 individuals living in a nursing home and having children.

MAIN RESULTS WITH CONTROLS

Table A5-1 – **Second stage: effect of informal care receipt on health outcomes**

	Full sample				Women				Men			
	Depression	Sleep disorder	Poor appetite	Feelings of weariness	Depression	Sleep disorder	Poor appetite	Feelings of weariness	Depression	Sleep disorder	Poor appetite	Feelings of weariness
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Informal care receipt	−0.113	−0.007	0.217	0.410	−0.169	−0.130	0.322	0.237	0.146	0.438	−0.174	1.059
	(0.191)	(0.232)	(0.228)	(0.262)	(0.218)	(0.255)	(0.264)	(0.278)	(0.411)	(0.552)	(0.441)	(0.712)
Woman	0.029	0.016	0.051	0.005	-	-	-	-	-	-	-	-
	(0.031)	(0.035)	(0.036)	(0.042)								
Diploma: none	−0.038*	0.033	0.057**	−0.004	−0.051**	0.032	0.066**	−0.022	0.008	0.030	0.018	0.045
	(0.021)	(0.027)	(0.024)	(0.028)	(0.024)	(0.031)	(0.028)	(0.030)	(0.044)	(0.064)	(0.049)	(0.081)
Diploma: primary educ.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Diploma: secondary educ.	0.013	0.006	0.050*	0.047	−0.009	−0.009	0.047	0.006	0.045	−0.011	0.105*	0.091
	(0.028)	(0.030)	(0.028)	(0.032)	(0.036)	(0.040)	(0.037)	(0.041)	(0.056)	(0.068)	(0.057)	(0.095)
Diploma: higher educ.	−0.030	0.073	0.047	0.010	−0.042	0.080	−0.003	−0.008	0.035	0.110	0.067	0.127
	(0.044)	(0.053)	(0.045)	(0.054)	(0.050)	(0.068)	(0.055)	(0.065)	(0.086)	(0.115)	(0.089)	(0.142)
Diploma: missing	0.006	−0.066*	0.146***	0.034	−0.002	−0.071*	0.163***	0.012	0.035	−0.055	0.092	0.104
	(0.030)	(0.036)	(0.034)	(0.039)	(0.035)	(0.041)	(0.041)	(0.042)	(0.059)	(0.081)	(0.066)	(0.100)
Nb. children	0.002	0.008	−0.003	−0.001	−0.003	0.011	−0.005	0.002	0.014	−0.003	0.003	−0.012
	(0.006)	(0.008)	(0.007)	(0.008)	(0.007)	(0.009)	(0.009)	(0.009)	(0.013)	(0.016)	(0.012)	(0.020)
Age: 60-74	0.018	−0.007	−0.050	−0.028	0.030	0.017	−0.041	−0.153*	0.050	0.020	−0.135	0.297
	(0.056)	(0.068)	(0.062)	(0.077)	(0.065)	(0.075)	(0.068)	(0.080)	(0.123)	(0.161)	(0.127)	(0.203)
Age: 75-84	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Age: 85-89	−0.022	0.026	−0.009	−0.000	−0.039	0.052	−0.011	−0.014	0.009	−0.098	0.043	−0.033
	(0.030)	(0.034)	(0.032)	(0.039)	(0.031)	(0.036)	(0.036)	(0.040)	(0.086)	(0.106)	(0.086)	(0.140)
Age: 90-94	−0.055	0.010	0.038	−0.041	−0.044	0.041	0.034	−0.042	−0.126	−0.126	0.084	−0.105
	(0.036)	(0.042)	(0.041)	(0.048)	(0.038)	(0.043)	(0.046)	(0.048)	(0.099)	(0.129)	(0.102)	(0.170)
Age ≥ 95	−0.080**	0.003	0.028	−0.032	−0.071*	0.024	0.013	−0.042	−0.172**	−0.089	0.135	−0.060
	(0.034)	(0.041)	(0.040)	(0.048)	(0.036)	(0.043)	(0.044)	(0.048)	(0.085)	(0.124)	(0.103)	(0.161)
Constant	0.286**	0.288**	0.012	0.216	0.378**	0.373**	−0.015	0.379*	0.080	0.106	0.224	−0.220
	(0.117)	(0.143)	(0.138)	(0.159)	(0.164)	(0.189)	(0.195)	(0.208)	(0.222)	(0.306)	(0.241)	(0.390)
Observations	2,382	2,382	2,382	2,382	1,858	1,858	1,858	1,858	524	524	524	524
F-test	20.947	20.947	20.947	20.947	17.619	17.619	17.619	17.619	3.912	3.912	3.912	3.912

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses, clustered at the nursing home level.
Informal care is defined as concrete help for ADL/IADL and it is instrumented by the fact of having at least one daughter. Estimations of linear probability models. Kleibergen-Paap Wald rk F-test corresponding to the test of the null hypothesis that the instrument is uncorrelated to the probability of receiving informal care.
Sample: 2,382 individuals living in a nursing home and having children.

APPENDIX 6

EXCLUSION OF INDIVIDUALS WITH A PARTNER ALIVE

Table A6-1 – **Estimation on individuals without partner alive: informal care from a child**

	Probability to have declared:			
	Depression	Sleep disorder	Poor appetite	Feelings of weariness
	(1)	(2)	(3)	(4)
Panel A: Full sample				
Informal care receipt	0.031 (0.260)	0.313 (0.313)	0.339 (0.329)	0.717* (0.373)
Observations	2,017	2,017	2,017	2,017
F-test (instrument)	12.940	12.940	12.940	12.940
Panel B: Women				
Informal care receipt	−0.041 (0.309)	0.036 (0.348)	0.464 (0.400)	0.568 (0.415)
Observations	1,681	1,681	1,681	1,681
F-test (instrument)	10.146	10.146	10.146	10.146
Panel C: Men				
Informal care receipt	0.266 (0.453)	1.256 (0.909)	−0.082 (0.492)	1.270 (0.822)
Observations	336	336	336	336
F-test (instrument)	3.117	3.117	3.117	3.117
Controls:				
Gender	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes
Number of children	Yes	Yes	Yes	Yes
Age	Yes	Yes	Yes	Yes

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses, clustered at the nursing home level. Informal care is defined as concrete help for ADL/IADL and it is instrumented by the fact of having at least one daughter.
F-test (instrument) is the Kleibergen-Paap Wald rk F-test testing of the null hypothesis that the instrument is uncorrelated to the probability of receiving informal care.
Sample: 2,017 individuals living in a nursing home, having children and having no partner alive.