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Can informal care help preserve mental health in nursing homes? Evidence of gender effects

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Abstract

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 in the community, little is known on the role of relatives as caregivers in nursing homes. Evidence, however, suggest that relatives are still providing concrete care for people living in nursing homes. This paper analyzes the causal effect of informal care provided by children on mental health for individuals living in nursing homes. We take into account gender differences, considering both the gender of caregivers and the gender of care recipients. We exploit the cross-sectional French survey Care-Institution (2016) which provides a sample of 2,382 individuals representative of the 60+ individuals living in a nursing home and having children. Mental health outcomes are the probability of declaring depression, sleep disorders, poor appetite and feeling of weariness. To deal with the endogeneity of informal care to health variables, we exploit an instrumental variable strategy where the probability of receiving informal care is instrumented by the geographical proximity of children. Results show that in general, informal care provided by children positively affects women's mental health (poor appetite, weariness) while it has no effect on men. It conceals important effects that appear when taking caregiver gender into account. Care provided by daughters has no effect on mental health while care provided by sons is effective in improving mental health of both women (poor appetite) and men (weariness). Public policies should thus take into account the role played by relatives in nursing homes and pay attention to the gender gap in long-term care provision.

JEL Classification: D10, I10, J14, J16, I18

Keywords: informal care, nursing homes, gender

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Data access

Access to the data has been provided through the Quetelet Progedo diffusion network (`http://quetelet.progedo.fr/`). It concerns the following dataset:

- Enquête Capacité, Aides et REssources des seniors (CARE institutions)-Volet établissements-2016

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1 Introduction

Population aging is associated to 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. Much attention has been paid to informal care provided to older persons 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 recently raised during the Covid-19 pandemic: several studies have shown that lockdowns in nursing homes have increased the loneliness of residents and deteriorated their well-being (Giebel et al., 2020; Van der Roest et al., 2020; Verbeek et al., 2020; McArthur et al., 2020). Using the survey CARE, Jeanneau et al. (2022) show that 3 over 4 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. Overall, the literature on informal care provided in nursing homes is relatively recent and the effect of informal care for residents has been little investigated.

This paper analyses the causal effect of informal care provided by children on mental health for individuals living in nursing homes, taking into account the heterogeneity of the effect according to gender. While evidence exist for individuals living at home (Barnay and Juin, 2016), this question has not been directly explored in nursing homes yet. The analysis in terms of gender is motivated by the fact that different trends are observed for men and women with respect to informal care and mental 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 mental health (Read and Gorman, 2010; Read and Grundy, 2011). Several studies have found gender differences in the factors influencing mental health, and in particular those related to social support (Pinquart and Sorensen, 2001; Kendler et al., 2005; Fiori and Denckla, 2012; Santini et al., 2015). At the caregiver level, the literature has shown that daughters and sons differ in the volume and the type of care they

provide (Bonnet et al., 2013; Bom et al., 2019).

We exploit the cross-sectional French survey Care-Institution (2016) which provides a sample of 2,382 individuals representative of the 60+ individuals living in a nursing home and having children. Mental health variables are the probability of declaring depression, sleep disorders, poor appetite and feeling of weariness. To deal with the endogeneity of informal care to health variables, we exploit an instrumental variable strategy. The important point here is to find an instrument correlated to informal care receipt and relevant for both the subsamples of women and men. Taking this constraint into account, the most relevant instrument we find is the geographical proximity of children. Results show that in general informal care receipt is associated to a lower probability to declare poor appetite and feeling of weariness for women. No effect is observed for men. However, when taking the gender of the caregiver into account, we find that care provided by daughters has no effect on mental health while care provided by sons is effective in improving mental health of both fathers (poor appetite) and mothers (feeling of weariness).

This paper brings several contributions to the literature that has analyzed the effect of informal care for aged individuals. First, it adresses the importance of informal care in nursing homes that has been little considered up to now (Jeanneau et al., 2022) and it explores its impact on health. Second, it considers the heterogeneity of effects according to gender. On a methodological point of view, it shows that usual instruments for informal care are not systematically relevant when focusing on the subsample of men.

Given these results, public policies should take into account the role played by relatives in nursing homes in the definition of long-term care policies. They could in addition make sure that the intervention of relatives in nursing homes for informal care is made possible and support so as to encourage its beneficial effects on older individuals. Moreover, they should pay attention to the gender gap in long-term care provision.

2 Literature review

In the economic literature, formal and informal care have been regarded as inputs in the health production function of an individual needing long-term care. Many papers have been interested in the theorical formalisation of the contribution of these inputs to the individual's health. Byrne et al. (2009) provide health-quality productions functions in which health quality depends on the individual's characterstics and care provided by family members or by professional caregivers. The parameters associated to each type of care are allowed to depend on observed parent and child 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 health quality[1] and that informal care is more effective than formal care in improving health quality. Focusing on French old individuals, Barnay and Juin (2016) shows that informal care (instrumented by the proportion of daughters, having one child who is not parent him/herself, having one child being single, having one child living nearby) is likely to reduce the risk of depression. These papers focus on informal care provided at home. To the best of our knowledge, there is no paper dealing with informal care provided in nursing homes.

Recent evidence related to the Covid-19 crisis have shown that depriving individuals from their relatives' visits in nursing homes entails a deteriation of their well-being (Giebel et al., 2020; Van der Roest et al., 2020; Verbeek et al., 2020) and mental health (McArthur et al., 2020). McArthur et al. (2020) evaluate the effect of some strategies (windows visits, use of technologies) to prevent mental health disorders during the lockdown 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, where several mechanisms come into play (social isolation and limited interactions, as well as anxiety towards the pandemic and increased workload of the staff). The present paper highlights the effect of informal care on mental health in normal times.

Overall, the present paper focuses on informal care provided in nursing homes, where a

[1]Not directly observed in the paper, but considered through the utility measured with the probability of having been happy the last week

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 individual's health, even in the presence of quasi-constant formal care.

3 Data

3.1 CARE survey

We use the cross-sectional survey Capacités, Aides et REssources des seniors (CARE), which is a general population survey representative of the French aged 60 and older. Conducted by the statistical division of the Ministry of Health (Drees), it aimed at documenting the living conditions of the elderly, their relationships with their relatives, 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 the individuals living in the community, while CARE-Institutions (CARE-I) surveys individuals living in a nursing home.

CARE-I was conducted between September and December 2016. 3,262 respondents from 616 long-term care units (non-medicalized and medicalized nursing homes, long-term care units of hospitals) participated into the survey.[2] 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 since critical information on activity restrictions or children is missing. Focusing on individuals having children (75% of the initial sample), our sample consists of 2,382 individuals.

[2]The sampling was made in two steps. First, a sample of long-term care homes was drawn and surveyed. in order to and retrieve the list of residents. In a second step, a sample of permanent residents was drawn within each nursing home. General information about the nursing home and some individual information about the residents that were surveyed (e.g. long-term care transfers received) was collected through a questionnaire at the level of the nursing home (Questionnaire Etablissements). A second questionnaire was administered to the selected residents or to proxy respondent (Questionnaire Seniors).

3.2 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 essentiel (ADL) or instrumental (IADL); moral support; financial support), the frequency and the volume of care received. This paper focuses on the fact of receiving concrete help for ADL/IADL from one child at least. Such a type of care is the most prevalent and is frequently associated with moral support, both at home and in nursing homes (Roquebert et al., 2018; Jeanneau et al., 2022).[3] It includes care provided for essential activities of daily living (ADL): grooming, dressing, using the toilets, transferring (from and to bed), and cutting and eating food (once it is ready). It also encompasses instrumental activities of daily living (IADL): grocery shopping, domestic chores, preparing meals, taking medication, moving around alone (on the floor 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 mental health measures. In the survey, individuals are asked if during the last 12 months, they have had one of the diseases or health issues mentionned in a list, including depression.[4] They are additionnally asked if they have encountered during the last 12 months, one of the health issues mentionned in a list, including sleep disorders, poor appetite and feeling of weariness.[5] Overall, we consider four mental health dichotomous variables: the fact of having suffered from (i) depression, (ii) sleep disorders, (iii) poor appetite, (iv) feeling of weariness. Figure 1 describes the relative frequency of these variables in our sample for women and men. There are similar in both populations, except that women more frequently declare a poor appetite (30% vs 19% among men) and feeling of weariness (50% vs 46% among men). These differences are respectively significant at the 1% and 5% level

[3]Informal care from other relatives than the partner or the children is not frequent : about 5% of individuals having a partner or children declare receiving care from other family members, 2% from friends. For individuals having no partner and no children, however, these shares are higher: 28% of individuals receive care from another family member, 13% by somebody else.

[4]The other diseases are heart diseases, hypertension, cerebrovascular accident, back pain, pressure sore, diabetes, Alzheimer, Parkinson, cancer.

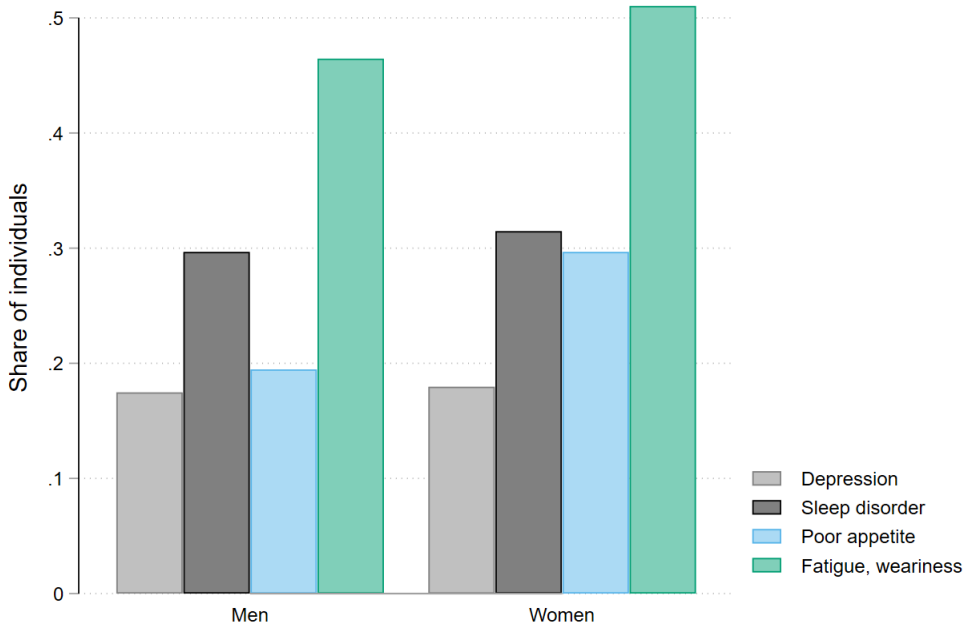
[5]The other issues are: respiratory problems, cough, gastric issues, diziness, paralysis.

(Student test).

Tables 1 and 2 respectively present the socio-demographic characteristics and health characteristics of women (Column 1), men (Column 2) and on the full sample of persons living in a nursing home and having children (Column 3) (representing 75% of the population in nursing homes). 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 health characteristics, the health status of women is overall more deteriorated in nursing homes, echoing the difference in the age distribution. There are more men with moderate restrictions in nursing homes compared to women who face more frequently severe restrictions. The share of individuals suffering from limitations (cognitive, sensory, suppleness and handling, locomotion and balance)[6] 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 Student test for continous or dummy variables and Chi-squared test for categorical variables. There is no significant difference at conventional threshold for chronic diseases (pvalue= 0.44) and subjective health (pvalue = 0.67).

[6]Cognitive limitations refer to difficulties in sense of time, memory and concentration issues, security and agressivity issues. Sensory limitations refer to eyesight and hearing issues.

Figure 1: Relative frequency of mental health variables by gender



SAMPLE: 2,382 individuals living in a nursing home and having children.
NOTES: Informal care is defined as concrete help for ADL/IADL. Weighted frequencies.

Table 1: Descriptive statistics: socio-demographic characteristics

	(1) Women	(2) Men	(3) Full sample
IC from one child at least	0.78	0.63	0.75
IC from one daughter at least[a]	0.67	0.70	0.56
IC from one son at least[b]	0.54	0.56	0.45
Woman	100.00	0.00	77.67
Age: 60-74	5.16	12.39	6.78
Age: 75-84	19.78	26.15	21.20
Age: 85-89	30.15	25.52	29.12
Age: 90-94	30.03	26.01	29.13
Age $\geq$ 95	14.89	9.92	13.78
Married	9.42	35.79	15.31
Widow	81.53	46.29	73.67
Single or divorced	9.04	17.92	11.03
Children: 1	30.70	28.62	30.24
Children: 2	33.06	28.98	32.15
Children: 3 or more	36.24	42.40	37.62
Sister(s) or brother(s) alive	41.65	47.21	42.89
Income: $<$ 10 0000	5.11	2.09	4.43
Income: 10,000 - 14,999	30.16	14.58	26.68
Income: 15,000 - 19,999	27.22	20.17	25.65
Income: 20,000 - 24,999	15.27	19.27	16.16
Income: $\geq$ 25,000	22.24	43.90	27.07
Diploma: none	26.49	19.51	24.93
Diploma: primary education	34.26	32.07	33.77
Diploma: secondary education	17.28	22.52	18.45
Diploma: higher education	2.91	8.79	4.22
Diploma: missing	19.07	17.10	18.63
Observations	1858	524	2382

SAMPLE: 2,382 individuals living in a nursing home and having children. NOTES: Weighted statistics. [a]: among individuals having one daughter at least. [b]: among individuals having one son at least. "IC" stands for informal care.

Table 2: Descriptive statistics: health characteristics

	(1) Women	(2) Men	(3) Full sample
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: suppleness, handling	96.36	93.01	95.61
Limitations: locomotion, balance	93.97	89.95	93.07
Incontinence	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 $\leq$ BMI $<$ 25)	30.50	33.19	31.10
Overweight or obese (BMI $\geq$ 25)	28.65	41.16	31.44
BMI missing	24.74	16.91	22.99
Has been hospitalized[a]	29.63	36.64	31.19
Proxy respondent	68.20	64.11	67.29
Observations	1858	524	2382

SAMPLE: 2,382 individuals living in a nursing home and having children.
NOTES: Weighted statistics. [a]: in the last 12 months

4 Empirical specification

4.1 Instrumental variable strategy

To identify the effect of informal care provision provided by children on mental health, we need to find an appropriate strategy to deal with the endogeneity of informal care to mental health. Indeed, reverse causality – mental health of the individual affecting informal care provision – and omitted variable bias – unobserved characteristics affecting both mental health and informal care – are likely.[7]

The literature on the effect of informal care on formal care has often dealt with this endogeneity using instrumental variable 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 elder child (Lo Sasso and Johnson, 2002; Van Houtven and Norton, 2004; Charles and Sevak, 2005; Bonsang, 2009). The rationale is that children, and especially daughters, are likely to provide informal care. Another instrument relies on the geographical proximity of individuals with their children (Stern, 1995; Charles and Sevak, 2005; Bolin et al., 2008; Hiedemann et al., 2018). Individuals living close to their parents are indeed more likely to provide informal care.

In this study, we use as an instrument the geographical proximity of children: the fact of receiving informal care for ADL/IADL is instrumented by the fact of having at least one child living in the same region (NUTS 2 level).[8] Alternative instruments have been tested;

[7] Appendix A shows the results of the estimation with mental health directly regressed on informal care provision. No significant correlation is found between informal care receipt and mental health, except in one case: informal care receipt increases the probability to declare fatigue or weariness for men (significant at the 10% level).

[8] The questionnaire states: "in the same region, in a common sense, not administrative sense".

however, the important point here is to find an instrument relevant for the subpopulations of men and women. Interestingly, instruments that are convincing on the entire population of nursing home residents are weaker when focusing on men (see Appendix B for more details).

To be valid, our instrumental variable (children proximity) has to be related to mental health only through the effect of informal care. This hypothesis has been extensively discussed in the literature. It might be threatened if individuals have moved to enter a nursing home closer to their children. According to Ramos-Gorand (2015), 68% of individuals have entered a nursing home in the municipality where they used to live or in the closest municipality offering a nursing home. For 75% of individuals, there is less than 20 km between the previous living place and the nursing home they enter. The choice of a nursing home also depends on nursing homes capacity (number of places, possibility to welcome specific pathologies) and their price. The choice of a nursing home is thus expected to depend on various factors independent from children location. This point is further adressed in the robustness checks. Another possibility is that children have relocated closer to their parent to ease informal care provision, either in nursing homes or at home, before nursing home entry, if the nursing home is close to the previous location. Stern (1995) and Hiedemann et al. (2018) argue that this endogeneity bias should be limited due to the limited observed mobility of children. Stern (1995) shows that after controlling for endogeneity, geographical proximity still affects informal care arrangements. Arnault and Juin (2021) shows that location decision of children are mainly driven by the care they could receive from their parents rather than the care they could provide as children.

Our instrument would also be biased is geographical proximity is associated with (i) a direct effect, corresponding to the effective concrete help that affects mental health (what we want to measure) and (ii) an indirect effect, corresponding to a feeling of emotional security that affects mental health even if the child is not providing concrete help (van der Pers et al., 2015). The literature on children mobility suggests that geographical proximity is generally associated with concrete exchanges and support. Hünteler and Mulder (2020) show that adult children are valuating the proximity to their parents when it is associated with concrete support, while providing emotional help is not identified as a determinant of (non) mobility

of children. They advocate that this difference might be explained by the fact that emotional support can be maintained even at distance. Ermisch and Mulder (2019) also show that among people living close to their parent, migrating is less likely when they have concrete and face-to-face exchanges with their parent. Overall, the effect of emotional support should be limited if it is not associated with concrete exchanges with the children.

In Appendix C, we further explore the correlation between child, parent and nursing home characteristics and the probability that the child lives in the same region than the parent. It shows that daughters are more likely to leave nearby, and that individual characteristics of the child are little correlated with proximity. At the parent level, the size of the sibling decreases the probability for one child to live nearby. Parental income as well as education are the most important variables affecting the proximity of children. Health variables are little correlated with proximity.

4.2 Econometric specifications

We develop our analysis in two steps. First, we analyze the effect of informal care provided by a child at least, whatever his/her gender. We implement an IV model. In the first stage, the probability to receive informal care (IC_i) is regressed on the children proximity (P_i, corresponding to the fact of having a child living in the same region) and a set of covariates at the individual level (X_i) and nursing home level (N_i) (Equation 1, linear probability model). In the second stage, the probability to declare a mental health issue (H_{ik}) is estimated as a function of the predicted informal care receipt depending on the instrument and individual and nursing-home controls (Equation 2, linear probability model). We consider four mental health issues (H_{i1}: depression; H_{i2}: sleep disorders;H_{i3}: poor appetite; H_{i4}: weariness).

$$IC_i = \beta_0 + \beta_1 P_i + \beta_2 X_i + \beta_3 N_i + \epsilon_{i3} \tag{1}$$

$$H_{ik} = \alpha_0 + \alpha_1 \hat{IC}_i + \alpha_2 X_i + \alpha_3 N_i + \epsilon_{i2} \tag{2}$$

In the second step, we are interested in distinguishing the care provided by a son and by a daughter. We estimate the same IV model, but restricting the sample to individuals having a daughter (resp. a son) at least to estimate the effect of receving informal care from a daugther (resp. a son), instrumented by the proximity of a daughter (resp. a son).

We systematically control for the parental socio-demographic characteristics (sex, age, marital status, number of children, education level and income at the household level) as well as health characteristics (restrictions, Alzheimer, limitations, incontinence, self-reported health, BMI). We additionnally control for the presence of a proxy, who helped filling in the questionnaire (partially or completely), and for the fact the individual is under tutelage. We finally include controls for the nursing home status (public, forprofit, non-for-profit). To take into account potential correlation of disturbance terms, standard-errors are clustered at the nursing home level.

4.3 Relevance of the instrument

Among individuals having children, 67% have at least one child leaving nearby and receive informal care from a child, while 9% have not child living nearby and do not receive informal care from children. Overall, for about 3/4 of the sample, we observe the expected relationship between informal care and child proximity. 16% have one child in the region but do not receive care from a child, while 8% do not have any child living nearby but do receive informal care from a child at least.

Considering care provided by children whatever their gender, Table 3 presents the first stage estimates of the simple IV model for the full sample and among subsamples of women and men. It shows that having at least one child leaving in the same region significantly increases the probability to receive informal care of about 26 percentage points (pp) in the full sample (27 pp among women and 23 pp among men). The F-test equals 96 in the full sample and 73 in the subsample of women; in the subsample of men, it decreases to 24, which might be mainly explained by a lower number of observations in this subsample.

Taking the gender of children into account, Table 4 presents the first stage estimates of the IV model for the subsamples of individuals having at least one daughter (resp. son) and

Table 3: First stage: correlation of child proximity with informal care provision

	Receives informal care from one child at least		
	All	Women	Men
At least one child living nearby	0.262***	0.268***	0.234***
	(0.0267)	(0.0312)	(0.0521)
Socio-demographic controls	Yes	Yes	Yes
Health and disability controls	Yes	Yes	Yes
Nursing homes controls	Yes	Yes	Yes
Observations	2382	1858	524
R^2	0.196	0.166	0.257
F-test (instrument)	96.04	73.55	20.18

READING: When individuals have one child nearby (living in the region), it increases their probability to receive informal care by 21 percentage points.
SAMPLE: 2,382 individuals living in a nursing home and having children.
NOTES: Standard errors are clustered at the nursing-home level. Informal care is defined as concrete help for ADL/IADL. Socio-demographic, family and health characteristics are controlled for, as well as nursing homes characteristics. Estimations of linear probability models. F-test corresponding to the test of the null hypothesis that the instrument is uncorrelated to the probability to receive informal care.

differentiating women and men. It shows that the proximity of a daughter (resp. a son) is strongly correlated with the probability to receive informal care from a daughter (resp. a son).

5 Results

5.1 Main results

Figure 2[9] presents the effect of informal care receipt from a child whatever his/her gender, instrumented by child proximity, on the probability to declare depression, sleep disorders, poor appetite and feeling of weariness, for the full sample and the subsamples of woman and men. Informal care receipt does not affect depression nor sleep disorders, both in the full sample and when distinguishing men and women. Informal care receipt is however associated to a significantly lower probability to declare poor appetite and feeling of weariness in the full sample. In both cases, the effect is driven by a significant effect among women, while the effect is not significant among men. For women, receiving informal care would be associated to a 20pp-lower probability to declare poor appetite or to declare a feeling of weariness. Overall,

[9]See Appendix D for Tables associated with graphical results.

Table 4: First stage: correlation of daughters and sons proximity with informal care provision

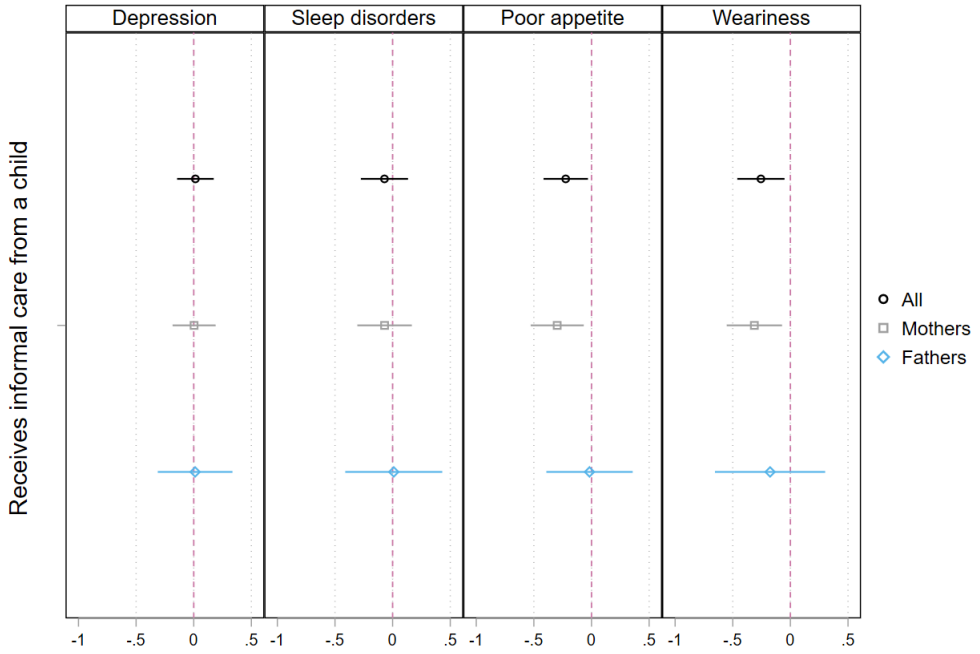
	All	Women	Men
PANEL A: HAVE A LEAST ONE DAUGHTER	Receives informal care from a daughter		
At least one daughter living nearby	0.336***	0.344***	0.336***
	(0.0283)	(0.0323)	(0.0535)
Socio-demographic controls	Yes	Yes	Yes
Health and disability controls	Yes	Yes	Yes
Nursing homes controls	Yes	Yes	Yes
Observations	1763	1360	403
R^2	0.191	0.170	0.255
F-test (instrument)	141.24	113.30	39.47
PANEL B: HAVE A LEAST ONE SON	Receives informal care from a son		
At least one son living nearby	0.321***	0.331***	0.264***
	(0.0260)	(0.0306)	(0.0562)
Socio-demographic controls	Yes	Yes	Yes
Health and disability controls	Yes	Yes	Yes
Nursing homes controls	Yes	Yes	Yes
Observations	1695	1325	370
R^2	0.158	0.151	0.242
F-test (instrument)	152.33	117.09	22.11

READING: When women have one daughter nearby (living in the region), it increases their probability to receive informal care from a daughter by 0.344 percentage points.
SAMPLE: Panel A: 1,763 individuals living in a nursing home and having one daughter at least. Panel B: 1,695 individuals living in a nursing home and having one son at least.
NOTES: Standard errors are clustered at the nursing-home level. Informal care is defined as concrete help for ADL/IADL. Socio-demographic, family and health characteristics are controlled for, as well as nursing homes characteristics. Estimations of linear probability models. F-test corresponding to the test of the null hypothesis that the instrument is uncorrelated to the probability to receive informal care.

results would suggest an asymmetric effect of informal care on mental health, i) which only affects the appetite and feeling of weariness, but not the depression or the sleep disorders, ii) and only for women and not for men.

We then distinguish between informal care provided by daughters and informal care provided by sons. Second-stage results of the IV for daughters and sons are presented in Figures 3 and 4. It shows that informal care provided by daughters never affect mental health variables of their mother or father. By contrast, when a son is providing care to his parent, it is associated to a lower probability that the mother declares a poor appetite (by 27 pp, significant at 1% level) while the probability is lower by 30 pp (significant at 5% level) that the father declares a feeling of weariness (57 pp for women, significant at the 5% level).

Figure 2: Main results

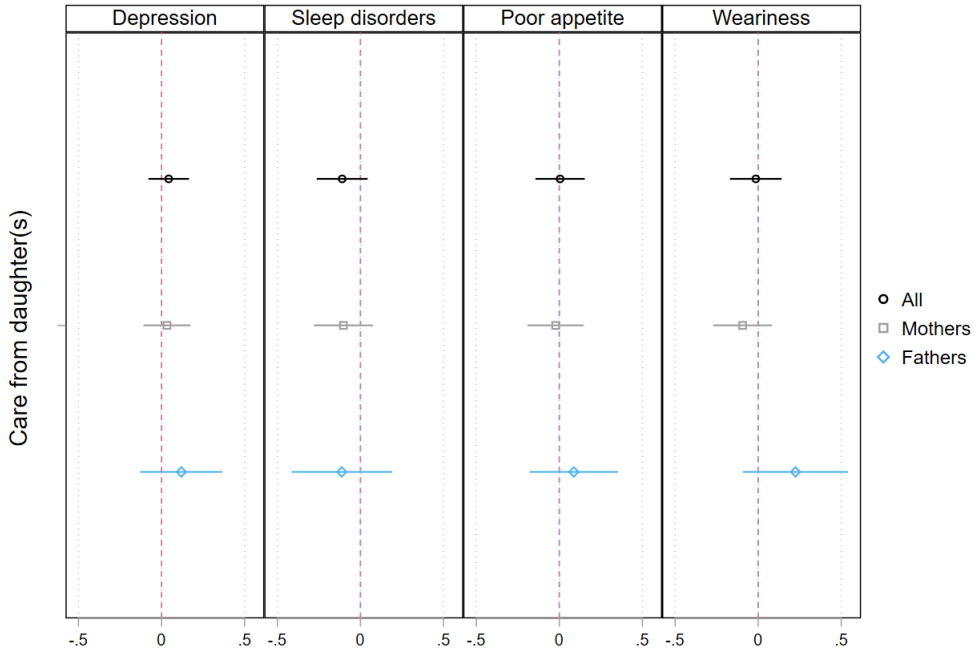


SAMPLE: 2,382 individuals living in a nursing home and having children.
NOTES: Informal care is defined as concrete help for ADL/IADL.

5.2 Extensions

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 a least one child leaving nearby, 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 proximity and informal care according to the gender. Given the difference in the life expectancy according to gender, older men are for instance more likely to be provided care by a partner that older women. To neutralize this aspect, we conduct the estimations on the subsample of individuals being single, divorced or widow, thus excluding 35% of men and 10% of women (Appendix E). Results are robust: informal from a child decreases the probability that mothers declare a poor appetite and weariness and when distinguishing according to child gender, informal care provided by sons decreases the poor appetite of mothers and the weariness of fathers.

Figure 3: Informal care provided by daughters

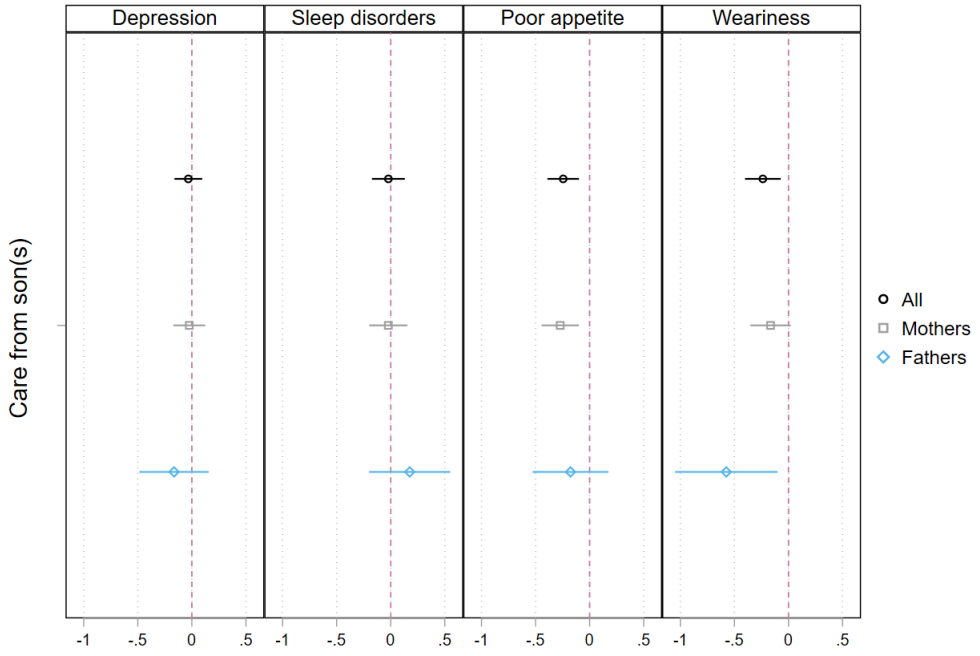


SAMPLE: 1,763 individuals living in a nursing home and having at least one daughter (1,360 mothers, 403 fathers).
NOTES: Informal care is defined as concrete help for ADL/IADL.

We also focus on specific families. First, we look at mixed siblings, to analyze the effect of informal care from daughters and sons where parents are likely to receive care from both. Results are presented in Figure 5. We only observe that informal care received from son(s) decreases the probability of poor appetite for mothers. The effect on the weariness of fathers is imprecisely identified (pvalue = 0.16). Second, we focus on individuals having only one child (Table 5). Due to the size of the subsample, we are not able to estimate separately the effect on mothers and fathers. Indeed, 718 individuals have only one child in the sample. 573 are women (285 have a daughter, 288 have a son), 145 are fathers (82 have a daughter, 63 have a son). Though it is not necessarily possible to generalize results on these individuals, it offers the possibility to neutralize interactions among siblings and analyze the specific effect of child gender. Results show that informal care from the (only) son decreases the probability of sleep disorders, poor appetite and weariness for parents.

We focus on concrete care and include in the definition of informal care support for ADL

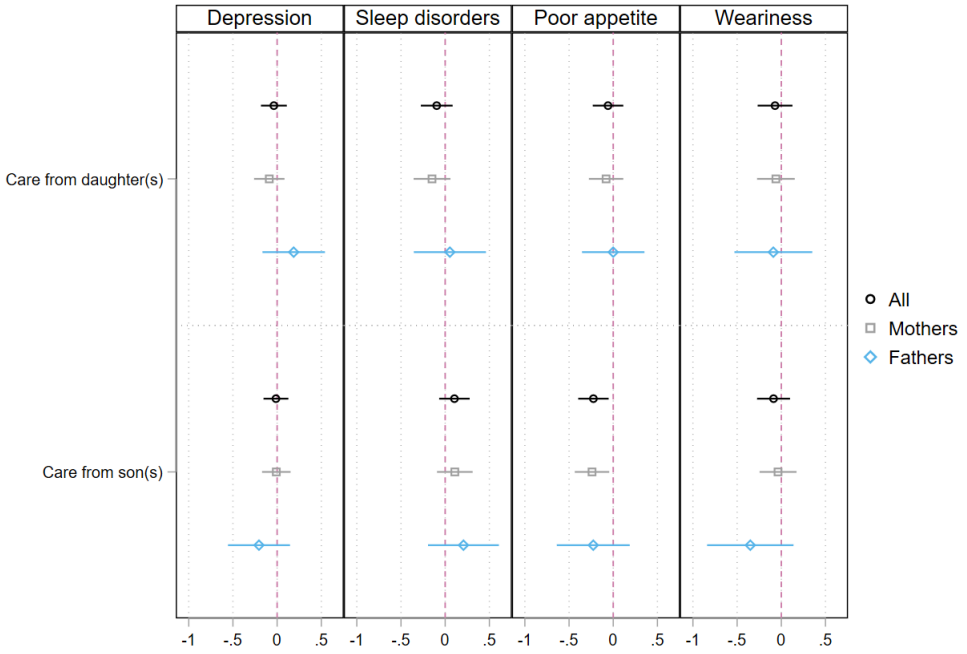
Figure 4: Informal care provided by sons



SAMPLE: 1,695 individuals living in a nursing home and having at least one son (1,325 mothers, 370 fathers).
NOTES: Informal care is defined as concrete help for ADL/IADL.

and IADL, including administrative tasks. This last tasks might be more ambigous since it might be provided remotely (paperworks for instance). Thus, we have estimated our model excluding administrative tasks from the definition of informal care. This change has important consequences for our variable of interest: not taking administrative tasks into account, 57 % of persons with children receive informal care from their children (compared to 75% with the previous definition). First-stage and main results (Figures 6 and 7), however, are stable. We even observe that the effect of care from sons for women has a significant effect on the probability to declare a feeling of weariness (pvalue = 0.08). Overall, it suggests that our main results are not driven by administrative tasks that could be provided at distance.

Figure 5: Informal care from son(s) or daughter(s) in mixed siblings



SAMPLE: 1,093 individuals living in a nursing home and having at least one daughter and one son (367 with a daughter, 351 with a son).
NOTES: Informal care is defined as concrete help for ADL/IADL. Results from separated estimations for informal care from daughters and informal care from sons.

6 Discussion

Results show that, in general, informal care provided by children positively affects women's mental health (poor appetite, weariness) while it has no effect on men. These results are actually resulting from distinct effects. The probability that women declare a poor appetite is significantly lower when sons provide informal care, but not when daughters do. Similarly, the probability that men declare weariness is lower only when sons provide care. Overall, analysing the effect at the population level is concealing important gender effects.

Results show a substantial difference in the effect of informal care provided by sons and daughters. To better understand this difference, we explore the characteristics of informal care provided thanks to information provided in the CARE survey at the caregiver level (Table 6). As regularly shown in the literature, daughters have a higher probability to be caregiver for daily-life activities: 51% of daughters are declared as caregivers, while it falls to 38% of sons.

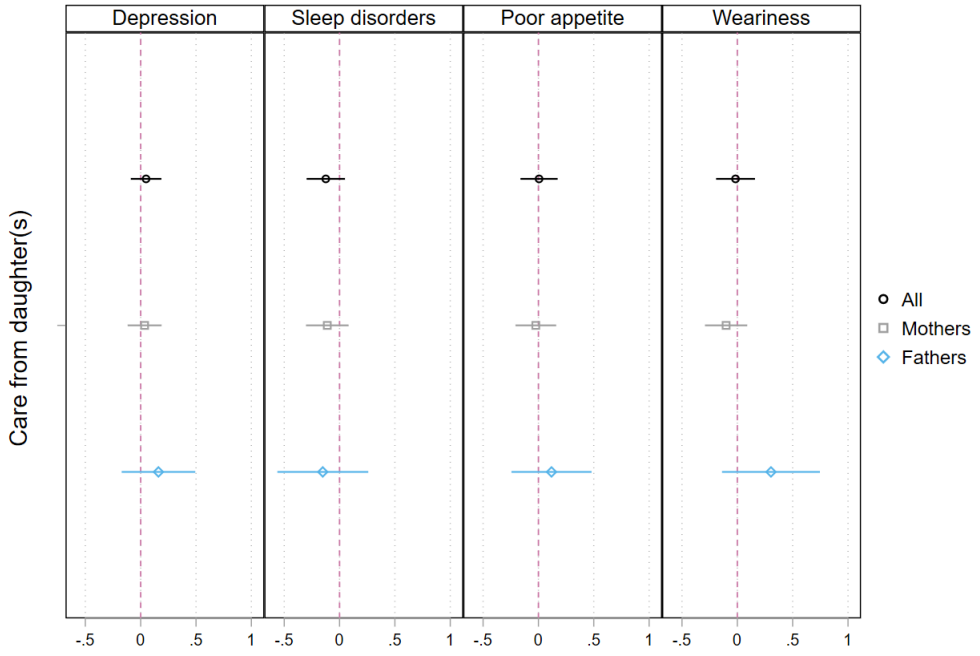
Table 5: One-child family

	One child	One daughter	One son
	Probability to declare: depression		
IC from the only child	-0.00000875		
	(0.149)		
IC from the daughter		0.0285	
		(0.233)	
IC from the son			-0.0735
			(0.222)
Observations	718	367	351
	Probability to declare: sleep disorders		
IC from the child	-0.208		
	(0.183)		
IC from the daughter		0.109	
		(0.266)	
IC from the son			-0.540*
			(0.308)
Observations	718	367	351
	Probability to declare: poor appetite		
IC from one child at least	-0.157		
	(0.171)		
IC from one daughter at least		0.125	
		(0.262)	
IC from one son at least			-0.422*
			(0.253)
Observations	718	367	351
	Probability to declare: weariness		
IC from one child at least	-0.527**		
	(0.204)		
IC from one daughter at least		-0.237	
		(0.292)	
IC from one son at least			-0.874***
			(0.333)
Observations	718	367	351

Sample: 718 individuals living in a nursing home and having one child (367 having a daughter, 351 having a son).
Notes: Standard errors are clustered at the nursing-home level. Informal care is defined as concrete help for ADL/IADL. Socio-demographic, family and health characteristics are controlled for, as well as nursing homes characteristics. Informal care receipt is instrumented by child proximity.

Appendix C further explored the determinants of being a caregiver, taking child, parent and nursing home characteristics into account. When looking at the type of care provided, we observe that among caregivers, daughters provide significantly more frequently personal care (grooming, dressing and undressing), care related to nutrition (grocery shopping,cutting food, eating). Orverall, the difference in type of care provided by daughters and sons helps little in

Figure 6: Informal care excluding administrative tasks (from daughters)

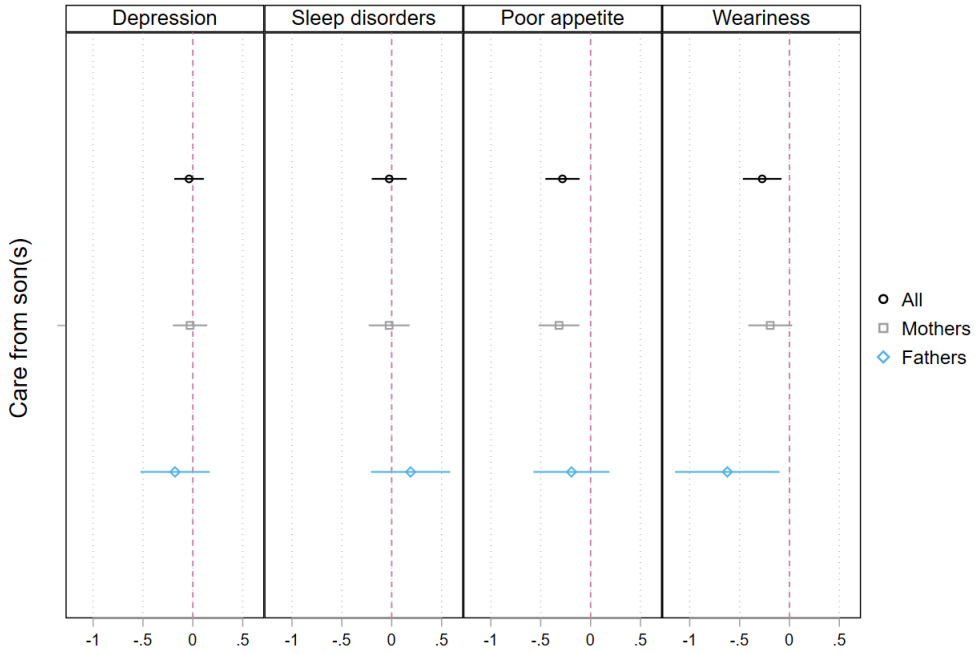


SAMPLE: 1,763 individuals living in a nursing home and having at least one daughter (1,360 mothers, 403 fathers).
NOTES: Informal care is defined as concrete help for ADL/IADL, excluding administrative tasks.

understanding the difference in effect of care provided by sons and daughters. The difference in the effect of care provided by daughters and sons on the other hand could then reflect gender norms. Since care from sons is less frequent, it could be perceived as unusual and more noticeable. Then, it would entail more positive effects than care provided by daughters which would be perceived as normal. Another possibility is that sons provide more frequently informal care jointly with another children. In this case, we would capture the effect of having several caregivers instead of only one daugther providing informal care. However, among caregivers, daughters are not more frequently single caregivers: about 47% of daughters are providing care alone, and the same proportion is observed among sons (difference not significant according to Student test).

Effects also differ according to the mental health variables. For both men and women, informal care is found to affect the probability to declare a poor appetite and/or the feeling of weariness, while depression and sleep disorders are not affected by informal care. Appetite and

Figure 7: Informal care excluding administrative tasks (from sons)



SAMPLE: 1,695 individuals living in a nursing home and having at least one son (1,325 mothers, 370 fathers).
NOTES: Informal care is defined as concrete help for ADL/IADL, excluding administrative tasks.

weariness might be more general indicators reflecting both physical and mental health status. Moreover, informal care might have an effect on appetite since informal careers often do grocery and more rarely, prepare meals and help eating (Jeanneau et al., 2022). Informal care could also be associated with meal sharing, which could increase the utility of consumption of the parent. As we are focusing on concrete care, informal care can directly bring relief to the parent. In particular, most individuals who receive informal care (75%) are helped by careers for administrative tasks (Jeanneau et al., 2022). It could explain why it particularly affects the feeling of weariness.

We show a double differentiated effect of informal care according to gender: care provided by sons and daughters affected differently women's and men's mental health. One should have in mind here that men and woman are likely to have different behaviors when declaring health issues. The literature has observed that in general women are more likely to report a worse health status than men. It has been shown to come both from "true" health differences

(differences in the distribution of chronic conditions) (Case and Paxson, 2005) and from sex-related differences in health-reporting behavior. Indeed, for given health conditions, some variables are found to influence self-reported health, including gender (Bago d'Uva et al., 2008; Caroli and Weber-Baghdiguian, 2016). Interestingly, Caroli and Weber-Baghdiguian (2016) show that reporting behavior depends on the social environnement 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. In nursing homes, with a majority of women, men could tend to over-report health issues.

Some limitations of this paper are discussed here. First, we are not able to disentangle between the effect of the care provided in itself and the time spent with the parent or the moral support provided by children that might be - or not - associated to care provision. When considering the effect of receving moral support from children, instrumented by child proximity, results are very close to those we observe using informal care from children.[10] Second, to get a valid instrument, we have to make the important assumption that child proximity affects mental health only through informal care. This assumption can not be tested directly. In a robustness check, we have excluded from our sample the individuals who declare they entered a nursing home because of their feeling of loneliness and to get closer to their children (155 mothers, 55 fathers). Results are robust to this exclusion (see Appendix F). We have also analyzed whether having a child living in the region affects the mental health of individuals who do not receive informal care. Results show there is no effect of having a child living in the region on mental health for these persons. They should be interpreted cautiously, though, since having a child in the same region and not receiving any informal care refers to a specific situation. Third, we do not observe some key information that would be useful to understand informal care in nursing homes, such as the seniority of nursing home entry or the lenght of ongoing informal care configurations. We are controlling only for the status of the nursing home (for-profit, not-for-profit, public). Other characteristics of the nursing home could correlate with mental health, informal care and child proximity, such as supervision rate or family policies. Moreover, due to the limited number of residents surveyed

[10]Results available upon request.

in the same nursing home (6 at most), we are not able to conduct the analysis including a fixed-effect for nursing homes. Finally, we are using cross-sectional data. While it comes with rich information on care provided to the individuals in nursing homes and their family, longitudinal data would be useful to reinforce the causal aspect of the analysis.

Further investigation should explore the mechanisms through which informal care affects mental health and the gender differential in this effect. In particular, one could try to understand why different aspects of mental health are affected by informal care for men and women. Moreover, the present analysis only considers the extensive margin of informal care (receiving informal care for ADL/IADL): future research could investigate the effect of informal care intensity on health outcomes for nursing home residents.

Table 6: Characteristics of care provided by sons and daughters

	All	Daughters	Sons	Difference
	(1)	(2)	(3)	(4)
Among all children:				
Is caregiver	0.44	0.51	0.38	-0.14***
Observations	5800	2903	2897	
Among caregivers, provide care for:				
Gromming; dressing and undressing	0.03	0.04	0.01	-0.02***
Cutting food and eating, drinking	0.06	0.08	0.04	-0.04***
Domestic chores	0.02	0.03	0.01	-0.02**
Preparing meals	0.01	0.01	0.01	-0.00
Administrative tasks	0.74	0.74	0.73	-0.01
Grocery shopping	0.49	0.52	0.45	-0.07***
Dealing with medical care	0.19	0.20	0.17	-0.03*
Moving around	0.23	0.25	0.21	-0.04*
Going outside	0.41	0.42	0.41	-0.01
Using transportation	0.17	0.17	0.17	-0.00
Finding one's way outside	0.12	0.12	0.13	0.00
Using a phone	0.04	0.04	0.03	-0.01
Observations	2580	1493	1087	

Sample: 5800 children of individuals living in a nursing home.

7 Conclusion

This paper analyses the causal effect of informal care on mental health variables (depression, sleep disorders, poor appetite, feeling of weariness) for individuals living in nursing homes and taking into account the heterogeneity of the effect according to gender. We show

a double-differentiated effect of informal care according to gender: care provided by sons and daughters affected differently women's and men's mental health. In general the receipt of informal care is associated to a lower probability to declare poor appetite and feeling of weariness for women mainly, while no effect is observed for men. Care provided by daughters has no effect on mental health while care provided by sons is effective in improving mental health of both women (poor appetite) and men (feeling of weariness).

It brings several contributions to the literature that has analyzed the effect of informal care for recipients. First, it explores the question of informal care in nursing homes that has been little considered up to now (Jeanneau et al., 2022). Second, it explores the impact of informal care and shows the heterogeneity of the effect according to gender. On a methodological point of view, it shows that usual instruments for informal care are not systematically relevant when focusing on the subsample of men, at least for the population of nursing home residents.

Public policies should take into account the role played by relatives in nursing homes in the definition of long-term care policies. They could in addition make sure that the intervention of relatives in nursing homes for informal care is made possible and support it so as to encourage its beneficial effects on older individuals. They should pay attention to the gender gap in long-term care provision which has noticeable consequences for individuals.

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Appendix

A Naive estimations

Table A.1: Naive estimations

	Probability to have declared:			
	Depression	Sleep disorder	Poor appetite	Fatigue, weariness
	(1)	(2)	(3)	(4)
Sample: ALL				
IC from one child at least	0.0125	0.00879	-0.00660	0.0152
	(0.0195)	(0.0234)	(0.0211)	(0.0253)
Observations	2382	2382	2382	2382
R^2	0.058	0.059	0.099	0.106
Sample: WOMEN				
IC from one child at least	-0.00855	0.0254	-0.0164	-0.0151
	(0.0230)	(0.0279)	(0.0258)	(0.0295)
Observations	1858	1858	1858	1858
R^2	0.059	0.060	0.108	0.104
Sample: MEN				
IC from one child at least	0.0533	-0.0229	0.0312	0.0876*
	(0.0362)	(0.0447)	(0.0394)	(0.0480)
Observations	524	524	524	524
R^2	0.123	0.122	0.093	0.164

SAMPLE: 2,382 individuals living in a nursing home and having children.
NOTES: Standard errors are clustered at the nursing-home level. Informal care is defined as concrete help for ADL/IADL. Socio-demographic, family and health characteristics are controlled for, as well as nursing homes characteristics.

B Alternative instruments

We have tested several instruments that are likely to correlate with informal care and are usually used in the literature. Table B.1 shows the results of the estimations linearly regressing the probability to receive informal care on the instrumental variables and control variables (individual and nursing home characteristics). The probability to receive informal care is not correlated to the number of children for the subsample of men. Thus, this variable is not a potential candidate for instrumenting informal care receipt. In the other estimations, the interest variables (proportion of daughters, at least one daughter, elder child is a girl) are generally correlated with the probability to receive informal care but the correlation

is imprecisely estimated for men. F-tests analysis show that they are weaker instruments for informal care receipt, in particular when considering the subsamples. Moreover, these variables could not be used as instruments when we are interested in the effects of informal care according to children gender.

Table B.1: Potential candidates for instrument variables

	Receives informal care		
	All	Women	Men
Estimation 1:			
Number of children	0.0122**	0.0123*	0.00913
	(0.00560)	(0.00638)	(0.0118)
R^2	0.149	0.116	0.222
F-test	4.72	3.72	0.60
Estimation 2: :			
Proportion of daughters	0.0711***	0.0640**	0.113**
	(0.0230)	(0.0255)	(0.0538)
R^2	0.151	0.118	0.228
F-test	9.55	6.28	4.42
Estimation 3: :			
At least one daughter	0.0901***	0.0907***	0.0957**
	(0.0202)	(0.0222)	(0.0474)
R^2	0.155	0.124	0.227
F-test	19.90	16.68	4.08
Estimation 4: :			
Elder child is a girl	0.0578***	0.0528***	0.0804**
	(0.0163)	(0.0180)	(0.0375)
R^2	0.152	0.119	0.227
F-test	12.51	8.59	4.59
Observations	2382	1858	524

SAMPLE: 2,382 individuals living in a nursing home.
NOTES: Standard errors are clustered at the nursing-home level. Informal care is defined as concrete help for ADL/IADL. Socio-demographic, family and health characteristics are controlled for. Estimations of linear probability models.

C Determinants of children proximity and care provision

In this Appendix, we investigate at the child level the variables that correlate to the probability to live in the same region than the parent (Table C.1, Probit model). We take into account child, parent and nursing home characteristics and analyze these variables for the full sample of children (Column 1), daughters (Column 2) and sons (Column 3). Standard errors are clustered at the parent level to take into account potential correlation of error terms for individuals of the same sibling.

Compared to sons, daughters are more likely to live in the parent's region. Child characteristics are little correlated with the probability to live in the same region. We only observe that daughters have a higher probability to be in the same region when they are retired, and that missing information on the job status is associated with a lower probability to live nearby. Regarding parent characteristics, the size of the sibling is an important correlated of proximity: the higher the number of children the parent, the lower the probability for one child to live nearby. Parent's age affects non linearly the probability of living nearby. A higher income is associated with a lower probability that the child (daughter or son) lives nearby, while a higher education further reduces this probability for sons. Health variables of the parent are little correlated with the probability to leave nearby, except incontinency increasing the probability for sons.

Table C.2 further explores the determinants of being a caregiver, taking child, parent and nursing home characteristics into account. It shows that everything else being equal, daughters have a higher probability to be caregiver. For both daughters and sons, the probability to be caregiver increases with the fact of being in couple with children and decreases with job inactivity. When the size of the sibling increases, the probability to be caregiver decreases. It is also the case for daughters when there is one partner at home. Health status, as measured by ADL restrictions, limitations and subjective health suggest that care provided by children is affected by the health status of the parent.

Table C.1: Explaining children proximity

	Probability to live in the same region than the parent

	All	Daughters	Sons
Child characteristics			
Daughter	0.168***	0	0
	(0.0367)	(.)	(.)
Age (child): 00 - 39	Ref.	Ref.	Ref
Age (child): 40 - 49	-0.0175	-0.127	0.0844
	(0.147)	(0.213)	(0.193)
Age (child): 50 - 59	-0.0299	-0.108	0.0399
	(0.153)	(0.216)	(0.197)
Age (child): 60 - 69	-0.187	-0.343	-0.0488
	(0.160)	(0.226)	(0.211)
Age (child): 70 - 79	-0.348**	-0.389	-0.342
	(0.177)	(0.250)	(0.236)
Age (child): 80 - 89	-0.389	-0.125	-0.530
	(0.400)	(0.670)	(0.579)
Age missing	0.209	0.223	0.185
	(0.173)	(0.242)	(0.221)
Alone and no children	0.105	-0.0816	0.251*
	(0.0994)	(0.139)	(0.146)
Couple with child/children	0.0948	0.0859	0.124
	(0.0596)	(0.0796)	(0.0994)
Couple without child/children	-0.125	-0.166	-0.0921
	(0.109)	(0.155)	(0.152)
Alone with children	Ref.	Ref.	Ref
Family status missing	-0.0275	-0.0213	-0.00775
	(0.103)	(0.141)	(0.142)
Job status: inactive	0.0880	0.159	0.0490
	(0.0964)	(0.114)	(0.180)
Job status: active	Ref.	Ref.	Ref
Job status missing	-0.596***	-0.588***	-0.605***
	(0.105)	(0.140)	(0.136)
Job status: retired	0.115*	0.222**	0.0172
	(0.0695)	(0.0948)	(0.0991)
Parent characteristics			
Number of children	-0.0603***	-0.0498***	-0.0674***

	(0.0148)	(0.0183)	(0.0171)
Woman	0.0369	0.0644	0.0103
	(0.0570)	(0.0716)	(0.0750)
Age: 60-74	-0.262**	-0.313**	-0.209
	(0.114)	(0.150)	(0.140)
Age: 75-84	Ref.	Ref.	Ref
Age: 85-89	-0.149**	-0.0918	-0.189**
	(0.0642)	(0.0820)	(0.0855)
Age: 90-94	-0.0860	-0.0701	-0.0800
	(0.0703)	(0.0926)	(0.0911)
Age $\geq$ 95	-0.188**	-0.254**	-0.101
	(0.0882)	(0.114)	(0.117)
Widow	0.206***	0.158	0.223**
	(0.0776)	(0.0999)	(0.102)
Partner at home	0.0356	-0.0620	0.102
	(0.105)	(0.134)	(0.138)
No partner	Ref.	Ref.	Ref
Partner in nursing home	0.217*	0.239	0.187
	(0.122)	(0.154)	(0.161)
Sister(s) or brother(s) alive	-0.00643	-0.0160	-0.00179
	(0.0470)	(0.0608)	(0.0619)
Income: $<$ 10 0000	0.0161	0.127	-0.0839
	(0.131)	(0.156)	(0.164)
Income: 10,000 - 14,999	0.0655	0.121	-0.0111
	(0.0582)	(0.0759)	(0.0779)
Income: 15,000 - 19,999	Ref.	Ref.	Ref
Income: 20,000 - 24,999	-0.105	-0.0214	-0.197**
	(0.0681)	(0.0912)	(0.0889)
Income: $\geq$ 25,000	-0.233***	-0.173**	-0.297***
	(0.0664)	(0.0859)	(0.0904)
Diploma: none	-0.0131	-0.0601	0.0260
	(0.0577)	(0.0741)	(0.0746)
Diploma: primary education	Ref.	Ref.	Ref
Diploma: secondary education	-0.330***	-0.373***	-0.286***
	(0.0650)	(0.0831)	(0.0883)
Diploma: higher education	-0.339***	-0.209	-0.480***

	(0.116)	(0.158)	(0.148)
Diploma: missing	-0.173**	-0.212**	-0.146
	(0.0689)	(0.0922)	(0.0942)
Restrictions: no ADL	Ref.	Ref.	Ref.
Restrictions: ADL, except those of minimum independence	-0.104	-0.103	-0.0924
	(0.0770)	(0.102)	(0.0991)
Restrictions: ADL on minimum independence	-0.0869	-0.0198	-0.144
	(0.0891)	(0.117)	(0.113)
Limitations: cognitive	-0.0675	-0.118	-0.0251
	(0.0925)	(0.120)	(0.117)
Limitations: sensory	0.0665	0.103	0.0456
	(0.0542)	(0.0694)	(0.0699)
Limitations: suppleness, handling	0.0625	-0.000634	0.133
	(0.123)	(0.178)	(0.158)
Limitations: locomotion, balance	-0.0366	-0.112	0.0245
	(0.102)	(0.136)	(0.135)
Incontinence	0.0603	-0.0381	0.148**
	(0.0544)	(0.0735)	(0.0699)
Self-reported chronic disease or health condition	-0.0615	-0.0840	-0.0342
	(0.0528)	(0.0681)	(0.0705)
Subjective health: bad or very bad	-0.0174	-0.0538	0.0241
	(0.0513)	(0.0664)	(0.0676)
Subjective health: average	Ref.	Ref.	Ref
Subjective health: good or very good	-0.0576	-0.0508	-0.0573
	(0.0582)	(0.0760)	(0.0771)
Underweight (BMI $<$ 20)	-0.0495	-0.00608	-0.0981
	(0.0667)	(0.0890)	(0.0894)
BMI: normal	Ref.	Ref.	Ref
Overweight or obese (BMI $\geq$ 25)	-0.0371	-0.0888	0.00162
	(0.0555)	(0.0727)	(0.0741)
BMI missing	-0.0532	-0.0740	-0.0362
	(0.0605)	(0.0794)	(0.0795)
Has been hospitalized[a]	0.0250	0.0506	0.0000606
	(0.0471)	(0.0606)	(0.0620)
Tutelage	-0.424***	-0.477***	-0.388**
	(0.139)	(0.184)	(0.173)

Proxy respondent	0.0837	0.147**	0.0270
	(0.0549)	(0.0706)	(0.0726)
Nursing home characteristics			
For-profit	-0.00836	0.00793	-0.0416
	(0.0620)	(0.0813)	(0.0859)
Public	-0.0440	-0.0437	-0.0542
	(0.0500)	(0.0665)	(0.0667)
Not for-profit	Ref.	Ref.	Ref.
Constant	0.829***	1.175***	0.664**
	(0.238)	(0.324)	(0.308)
Observations	5800	2903	2897

Sample: 5,800 children of individuals living in a nursing home.

Notes: Standard errors are clustered at the parent level. Estimation of Probit models.

Table C.2: Explaining children care provision

	Probability to be declared as caregivier		
	All	Daughters	Sons
Child characteristics			
Daughter	0.387***		
	(0.0364)		
Age (child): 00 - 39	Ref.	Ref.	Ref
Age (child): 40 - 49	-0.109	-0.197	0.00272
	(0.164)	(0.228)	(0.236)
Age (child): 50 - 59	-0.164	-0.219	-0.0893
	(0.165)	(0.230)	(0.230)
Age (child): 60 - 69	-0.114	-0.222	-0.00280
	(0.172)	(0.241)	(0.241)
Age (child): 70 - 79	-0.0987	-0.159	-0.0256
	(0.188)	(0.260)	(0.263)
Age (child): 80 - 89	-0.563	0	0.287
	(0.409)	(.)	(0.556)
Age missing	0.349*	0.359	0.315
	(0.182)	(0.257)	(0.253)
Alone and no children	0.334***	0.180	0.415***
	(0.0999)	(0.144)	(0.142)
Couple with child/children	0.323***	0.315***	0.310***

	(0.0604)	(0.0761)	(0.101)
Couple without child/children	0.164	0.180	0.120
	(0.105)	(0.153)	(0.150)
Alone with children	Ref.	Ref.	Ref
Family status missing	0.0434	0.0828	-0.0316
	(0.0992)	(0.133)	(0.151)
Job status: inactive	-0.400***	-0.377***	-0.519***
	(0.0964)	(0.113)	(0.200)
Job status: active	Ref.	Ref.	Ref
Job status missing	-0.711***	-0.789***	-0.598***
	(0.103)	(0.140)	(0.151)
Job status: retired	0.0105	-0.0500	0.0735
	(0.0675)	(0.0926)	(0.0950)
Parent characteristics			
Woman	0.0376	0.0550	0.0152
	(0.0560)	(0.0748)	(0.0740)
Number of children	-0.186***	-0.172***	-0.202***
	(0.0226)	(0.0264)	(0.0243)
Age: 60-74	-0.310***	-0.380***	-0.248
	(0.112)	(0.140)	(0.154)
Age: 75-84	Ref.	Ref.	Ref
Age: 85-89	-0.00460	0.0399	-0.0378
	(0.0598)	(0.0805)	(0.0817)
Age: 90-94	0.0904	0.141	0.0450
	(0.0742)	(0.0962)	(0.0922)
Age $\geq$ 95	-0.0646	-0.0569	-0.0533
	(0.0842)	(0.112)	(0.109)
Widow	0.246***	0.0957	0.399***
	(0.0697)	(0.0970)	(0.0959)
Partner at home	-0.178*	-0.331**	-0.0295
	(0.108)	(0.141)	(0.137)
No partner	Ref.	Ref.	Ref
Partner in nursing home	-0.0414	-0.142	0.0859
	(0.107)	(0.148)	(0.146)
Sister(s) or brother(s) alive	-0.0203	0.0226	-0.0625
	(0.0442)	(0.0599)	(0.0587)

Income: $<$ 10 0000	-0.200**	-0.321**	-0.0912
	(0.0987)	(0.140)	(0.136)
Income: 10,000 - 14,999	-0.0793	-0.0733	-0.109
	(0.0529)	(0.0713)	(0.0744)
Income: 15,000 - 19,999	Ref.	Ref.	Ref
Income: 20,000 - 24,999	-0.0156	-0.0822	0.0584
	(0.0622)	(0.0881)	(0.0844)
Income: $\geq$ 25,000	0.0483	0.0457	0.0342
	(0.0620)	(0.0844)	(0.0848)
Diploma: none	-0.0456	-0.0760	-0.0335
	(0.0574)	(0.0736)	(0.0746)
Diploma: primary education	Ref.	Ref.	Ref
Diploma: secondary education	-0.194***	-0.158**	-0.246***
	(0.0592)	(0.0805)	(0.0842)
Diploma: higher education	-0.0837	-0.201	0.0374
	(0.121)	(0.155)	(0.147)
Diploma: missing	-0.122**	-0.202**	-0.0416
	(0.0621)	(0.0867)	(0.0865)
Restrictions: no ADL	Ref.	Ref.	Ref.
Restrictions: ADL, except those of minimum independence	0.277***	0.343***	0.238**
	(0.0731)	(0.0967)	(0.100)
Restrictions: ADL on minimum independence	0.217***	0.252**	0.206*
	(0.0829)	(0.110)	(0.114)
Limitations: cognitive	0.171**	0.182	0.155
	(0.0816)	(0.114)	(0.110)
Limitations: sensory	-0.00828	0.00267	-0.00863
	(0.0599)	(0.0758)	(0.0742)
Limitations: suppleness, handling	0.322**	0.304*	0.338*
	(0.134)	(0.163)	(0.191)
Limitations: locomotion, balance	0.183*	0.174	0.187
	(0.0985)	(0.123)	(0.146)
Incontinence	-0.0299	-0.0767	0.0111
	(0.0490)	(0.0684)	(0.0672)
Self-reported chronic disease or health condition	-0.0785	-0.0879	-0.0640
	(0.0496)	(0.0662)	(0.0676)
Subjective health: bad or very bad	0.0136	-0.0102	0.0438

	(0.0461)	(0.0623)	(0.0629)
Subjective health: average	Ref.	Ref.	Ref
Subjective health: good or very good	-0.102*	-0.119	-0.0786
	(0.0536)	(0.0743)	(0.0748)
BMI: normal	Ref.	Ref.	Ref
Underweight (BMI $<$ 20)	0.0755	0.0969	0.0692
	(0.0684)	(0.0912)	(0.0905)
Overweight or obese (BMI $\geq$ 25)	0.00433	-0.0169	0.0283
	(0.0556)	(0.0720)	(0.0741)
BMI missing	0.0444	-0.0204	0.117
	(0.0584)	(0.0775)	(0.0780)
Has been hospitalized[a]	0.0269	0.0615	-0.00220
	(0.0451)	(0.0596)	(0.0608)
Tutelage	-0.382***	-0.394**	-0.398**
	(0.121)	(0.174)	(0.174)
Proxy respondent	0.193***	0.337***	0.0411
	(0.0513)	(0.0681)	(0.0699)
Nursing home characteristics			
For-profit	0.0402	0.101	-0.0246
	(0.0559)	(0.0746)	(0.0825)
Public	0.0115	-0.00969	0.0372
	(0.0466)	(0.0638)	(0.0626)
Not for-profit	Ref.	Ref.	Ref.
Constant	-0.687***	-0.214	-0.775**
	(0.244)	(0.340)	(0.333)
Observations	5800	2898	2897

Sample: 5,800 children of individuals living in a nursing home.

Notes: Standard errors are clustered at the parent level. Estimation of Probit models.

D Main results (Tables)

Table D.1: Main results: informal care from a child

	Probability to have declared:			
	Depression	Sleep disorder	Poor appetite	Fatigue, weariness
	(1)	(2)	(3)	(4)
Sample: ALL				
IC from one child at least	0.0144	-0.0708	-0.223**	-0.255**
	(0.0809)	(0.104)	(0.0981)	(0.104)
Observations	2382	2382	2382	2382
Sample: WOMEN				
IC from one child at least	0.00316	-0.0696	-0.297**	-0.312**
	(0.0951)	(0.120)	(0.117)	(0.122)
Observations	1858	1858	1858	1858
Sample: MEN				
IC from one child at least	0.0120	0.00984	-0.0171	-0.176
	(0.165)	(0.214)	(0.190)	(0.243)
Observations	524	524	524	524

Sample: 2,382 individuals living in a nursing home and having children.
Notes: Standard errors are clustered at the nursing-home level. Informal care is defined as concrete help for ADL/IADL. Socio-demographic, family and health characteristics are controlled for, as well as nursing homes characteristics. Informal care receipt is instrumented by child proximity.

Table D.2: Main results: informal care from a daughter

	Probability to have declared:			
	Depression	Sleep disorder	Poor appetite	Fatigue, weariness
	(1)	(2)	(3)	(4)
Sample: ALL				
IC from one child at least	0.0433	-0.110	0.00485	-0.0141
	(0.0624)	(0.0781)	(0.0757)	(0.0793)
Observations	1763	1763	1763	1763
Sample: WOMEN				
IC from one child at least	0.0329	-0.102	-0.0217	-0.0933
	(0.0723)	(0.0907)	(0.0864)	(0.0901)
Observations	1360	1360	1360	1360
Sample: MEN				
IC from one child at least	0.119	-0.112	0.0871	0.225
	(0.126)	(0.155)	(0.136)	(0.161)
Observations	403	403	403	403

Sample: 1,763 individuals living in a nursing home and having children.
Notes: Standard errors are clustered at the nursing-home level. Informal care is defined as concrete help for ADL/IADL. Socio-demographic, family and health characteristics are controlled for, as well as nursing homes characteristics. Informal care receipt is instrumented by child proximity.

Table D.3: Main results: informal care from a son

	Probability to have declared:			
	Depression	Sleep disorder	Poor appetite	Fatigue, weariness
	(1)	(2)	(3)	(4)
Sample: ALL				
IC from one child at least	-0.0329	-0.0217	-0.244***	-0.237***
	(0.0655)	(0.0775)	(0.0743)	(0.0843)
Observations	1695	1695	1695	1695
Sample: WOMEN				
IC from one child at least	-0.0238	-0.0222	-0.272***	-0.166*
	(0.0751)	(0.0900)	(0.0877)	(0.0953)
Observations	1325	1325	1325	1325
Sample: MEN				
IC from one child at least	-0.165	0.175	-0.177	-0.575**
	(0.164)	(0.191)	(0.179)	(0.242)
Observations	370	370	370	370

Sample: 1,695 individuals living in a nursing home and having children.
Notes: Standard errors are clustered at the nursing-home level. Informal care is defined as concrete help for ADL/IADL. Socio-demographic, family and health characteristics are controlled for, as well as nursing homes characteristics. Informal care receipt is instrumented by child proximity.

E Exclusion of individuals with a partner alive

Table E.1: Estimation on individuals without partner alive: informal care from a child

	Probability to have declared:			
	Depression	Sleep disorder	Poor appetite	Fatigue, weariness
	(1)	(2)	(3)	(4)
Sample: ALL				
IC from one child at least	-0.0299	-0.115	-0.274**	-0.294***
	(0.0897)	(0.114)	(0.107)	(0.112)
Observations	2017	2017	2017	2017
Sample: WOMEN				
IC from one child at least	-0.0595	-0.124	-0.366***	-0.384***
	(0.109)	(0.133)	(0.130)	(0.135)
Observations	1681	1681	1681	1681
Sample: MEN				
IC from one child at least	-0.00994	-0.0578	0.0239	-0.0766
	(0.166)	(0.222)	(0.199)	(0.220)
Observations	336	336	336	336

Sample: 2,017 individuals living in a nursing home, having children and having no partner alive.
Notes: Standard errors are clustered at the nursing-home level. Informal care is defined as concrete help for ADL/IADL. Socio-demographic, family and health characteristics are controlled for. Informal care receipt is instrumented by child proximity.

Table E.2: Estimation on individuals without partner alive: informal care from a daughter

	Probability to have declared:			
	Depression	Sleep disorder	Poor appetite	Fatigue, weariness
	(1)	(2)	(3)	(4)
Sample: ALL				
IC from one child at least	0.0368	-0.0921	-0.0154	-0.0556
	(0.0649)	(0.0844)	(0.0818)	(0.0857)
Observations	1490	1490	1490	1490
Sample: WOMEN				
IC from one child at least	0.0107	-0.114	-0.0392	-0.157
	(0.0757)	(0.0957)	(0.0912)	(0.0959)
Observations	1232	1232	1232	1232
Sample: MEN				
IC from one child at least	0.134	0.0239	0.101	0.399**
	(0.135)	(0.179)	(0.177)	(0.172)
Observations	258	258	258	258

Sample: 1,490 individuals living in a nursing home, having one daughter at least and having no partner alive.
Notes: Standard errors are clustered at the nursing-home level. Informal care is defined as concrete help for ADL/IADL. Socio-demographic, family and health characteristics are controlled for. Informal care receipt is instrumented by child proximity.

Table E.3: Estimation on individuals without partner alive: informal care from a son

	Probability to have declared:			
	Depression	Sleep disorder	Poor appetite	Fatigue, weariness
	(1)	(2)	(3)	(4)
Sample: ALL				
IC from one child at least	-0.0435	-0.0786	-0.241***	-0.189**
	(0.0714)	(0.0865)	(0.0823)	(0.0904)
Observations	1424	1424	1424	1424
Sample: WOMEN				
IC from one child at least	-0.0278	-0.0907	-0.270***	-0.150
	(0.0808)	(0.0987)	(0.0945)	(0.101)
Observations	1190	1190	1190	1190
Sample: MEN				
IC from one child at least	-0.234	0.0980	-0.191	-0.419*
	(0.182)	(0.197)	(0.183)	(0.233)
Observations	234	234	234	234

Sample: 1,424 individuals living in a nursing home, having one son at least and having no partner alive.
Notes: Standard errors are clustered at the nursing-home level. Informal care is defined as concrete help for ADL/IADL. Socio-demographic, family and health characteristics are controlled for. Informal care receipt is instrumented by child proximity.

F Exclusion of individuals who entered a nursing home to be closer to their children

We exclude from the sample individuals who declared they entered a nursing home because of a feeling of loneliness and potentially to get closer to their children. When the gender of children is not taken into account, results are stable (Table F.1). Taking into account children gender, we observe a slight decrease in the precision of coefficients related to the feeling of fatigue or weariness. Moreover, the care provided by daughter is slightly diminishing the probablity that mothers declare a poor appetite (significant at the 10% level).

Table F.1: Exclusion of individuals who moved to be closer to their children

	Probability to have declared:			
	Depression	Sleep disorder	Poor appetite	Fatigue, weariness
	(1)	(2)	(3)	(4)
Sample: ALL				
IC from one child at least	-0.0200	-0.0356	-0.267**	-0.257**
	(0.0883)	(0.110)	(0.108)	(0.111)
Observations	2182	2182	2182	2182
Sample: WOMEN				
IC from one child at least	-0.0243	-0.0178	-0.340***	-0.320**
	(0.102)	(0.126)	(0.126)	(0.128)
Observations	1703	1703	1703	1703
Sample: MEN				
IC from one child at least	-0.0738	0.00576	-0.0316	-0.171
	(0.189)	(0.227)	(0.215)	(0.272)
Observations	479	479	479	479

SAMPLE: 2,222 individuals living in a nursing home, having children and who did not declare they move to a nursing home to be closer to their children.
NOTES: Standard errors are clustered at the nursing-home level. Informal care is defined as concrete help for ADL/IADL. Socio-demographic, family and health characteristics are controlled for. Informal care receipt is instrumented by child proximity.

Table F.2: Exclusion of individuals who moved to be closer to their children: informal care from a daughter

	Probability to have declared:			
	Depression	Sleep disorder	Poor appetite	Fatigue, weariness
	(1)	(2)	(3)	(4)
Sample: ALL				
IC from one child at least	0.0469	-0.101	-0.0150	-0.0322
	(0.0642)	(0.0797)	(0.0792)	(0.0819)
Observations	1613	1613	1613	1613
Sample: WOMEN				
IC from one child at least	0.0548	-0.0789	-0.0504	-0.0990
	(0.0749)	(0.0924)	(0.0912)	(0.0932)
Observations	1249	1249	1249	1249
Sample: MEN				
IC from one child at least	0.0969	-0.116	0.106	0.202
Observations	364	364	364	364

Sample: 1,613 individuals living in a nursing home, having one daughter at least and who did not declare they move to a nursing home to be closer to their children.
Notes: Standard errors are clustered at the nursing-home level. Informal care is defined as concrete help for ADL/IADL. Socio-demographic, family and health characteristics are controlled for. Informal care receipt is instrumented by child proximity.

Table F.3: Exclusion of individuals who moved to be closer to their children: informal care from a son

	Probability to have declared:			
	Depression	Sleep disorder	Poor appetite	Fatigue, weariness
	(1)	(2)	(3)	(4)
Sample: ALL				
IC from one child at least	-0.0383	-0.0281	-0.239***	-0.202**
	(0.0704)	(0.0839)	(0.0804)	(0.0917)
Observations	1567	1567	1567	1567
Sample: WOMEN				
IC from one child at least	-0.0381	-0.0228	-0.267***	-0.133
	(0.0787)	(0.0941)	(0.0935)	(0.100)
Observations	1226	1226	1226	1226
Sample: MEN				
IC from one child at least	-0.186	0.209	-0.145	-0.633*
	(0.211)	(0.247)	(0.218)	(0.323)
Observations	341	341	341	341

Sample: 1,567 individuals living in a nursing home, having one son at least and who did not declare they move to a nursing home to be closer to their children.
Notes: Standard errors are clustered at the nursing-home level. Informal care is defined as concrete help for ADL/IADL. Socio-demographic, family and health characteristics are controlled for. Informal care receipt is instrumented by child proximity.