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ORIGINAL ARTICLE

The impact of being the intermediate caring generation and intergenerational transfers on self-reported health of women in Ireland

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Abstract
Objectives To investigate the associations with being the "sandwich generation" in older women in Ireland and its impact on self-reported health.
Methods Analysis of 3,196 women from wave 1 of the Irish Longitudinal Study on Ageing (TILDA) was undertaken. Poisson regression was used to determine whether intergenerational transfers, were associated with self-rated physical health and depression, when controlling for other socio-demographic variables.
Results Multivariate analysis found that women in the sandwich generation who financially supported their children had better self-rated physical health (poor/fair health relative to excellent; RR 0.84, 95 % CI 0.72–0.97). Conversely, the women who provided other care for their children showed evidence of poorer mental health (case-level depression, RR 1.35, 95 %CI 1.05–1.73). Providing financial support for parents was associated with case-level depression (RR 2.21, 95 %CI 1.26–3.86).
Conclusions Supporting two generations was associated with both better self-rated health and poorer mental health, depending on the type and direction of the transfers. This generation of women have substantial caring responsibilities. Strategies to address the stresses associated with bi-directional intergenerational transfers are needed.

Keywords Ageing · TILDA · Intergenerational relations · Health status · Depression

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Introduction

Global population changes in the more developed world have occurred from increased life expectancy (United Nations Department of Economic and Social Affairs 2004) and delayed fertility leading women to having their children later in life (Murphy-Lawless and McCarthy 1999). These population changes have led to an increase in the intermediate population, or the "sandwich generation" those who have both living parents and younger dependent children. Previous studies in Northern European, Southern European and the United States of America (US) have shown that women, being the intermediate between elderly parents and young adult children bear the burden of care for both generations (Grundy and Henretta 2006; Attias-Donfut et al. 2005; Roll and Litwin 2010).

The patterns of intergenerational transfers vary geographically and while in Northern Europe more middle-aged children financially support their parents, in Southern Europe, parents are supported through co-residence and time (Bonsang 2007). Parental health and wealth were found to be important determinants for the types of contributions made to parents in the US, as was the age of younger children; children being young or in school was negatively associated with transfers from the intermediate generation (Wong et al. 1999). Giving to children dominated the flow of transfers and financial giving to parents

was rare. The patterns of financial assistance to family reflect both socioeconomic conditions within the family and cultural differences in expectations of care (Wong et al. 1999).

The population structure in Ireland is changing, people are living longer and show change in mother's average age from baseline. The proportion of men and women aged 85 years or over increased by 55 % between 1991 and 2011 (from 0.8 to 1.3 %) (Central Statistics Office 2012a). The average age of mothers giving birth increased to 31.5 years and for first-time mothers rose to 29.4 years in 2010 (Health Research Board and Information Division 2012). This delayed fertility has led to changes in society in Ireland and more women are remaining in the work-force; 56 % of women aged 16–64 years were in employment in 2011, a 30 % increase since 1997 (Central Statistics Office 2012b; Bloom and Canning 2003). These changes indicate that the sandwich generation will become more relevant and more women will be caring for dependent children, and elderly parents while also playing a more active role in the work-force. Additionally, the global recession may impact on the ability of both elderly parents and younger adult children to financially support themselves, thus the sandwich generation may be increasingly called upon to support both generations, both with their time and financially.

The impact of providing this intergenerational support on women's health varies by the type of support given. Giving financial support to children was associated with improved self-rated health (Li et al. 2009), and mental health (Roll and Litwin 2010). This positive association with providing financial support to children is hypothesised to be the result of altruistic motivations for giving (Roll and Litwin 2010). Non-financial giving in the form of caring for elderly parents has been negatively associated with health. Informal care-giving was associated with poor self-reported health (Coe and Van Houtven 2009; Legg et al. 2013) and depressive symptoms (Coe and Van Houtven 2009; Amirkhanyan and Wolf 2006). This effect increased with increased numbers of hours of care given (Legg et al. 2013) and with numbers of years of caring provided (Coe and Van Houtven 2009). Taking-over caring for grand-children has been associated with increased depressive symptoms and poorer physical health in grandmothers with worsening physical health and increased stress over time (Musil et al. 2011).

There are no estimates available of the impact that intergenerational transfers demands make on the health of the sandwich generation in Ireland. This study will provide national prevalence of intergenerational giving from women in Ireland to both their parents and their children. We will determine how intergenerational transfers impact on self-reported health of women within the sandwich generation.

Methodology

Participants and study methodology

The Irish Longitudinal Study on Ageing (TILDA) Wave 1 is a cross-sectional study using a stratified probability sample of 8,504 community-dwelling men and women aged over 50 who were resident in Ireland, 3,196 (37.6 %) of whom were women aged 50–69 years. The study, recruited and interviewed respondents between October 2009 and February 2011 and assessed social, economic and health, lifestyle and behaviour and attitudes of people resident in Ireland. The response rate was 62 %. The methodological details have been reported elsewhere (Kearney et al. 2011); but briefly, participants were interviewed by trained interviewers in their own home using computer-assisted personal interviewing (CAPI). The sampling frame was the Irish Geodirectory, a mapping of all residential addresses in the Republic of Ireland (Geodirectory 2008). A multi-stage probability sample of addresses was chosen using the RANSAM sampling procedure (Whelan 1979). All household residents aged over 50 years, and their spouse/partner were eligible to participate. This study was approved by the Faculty of Health Sciences Research Ethics Committee of Trinity College Dublin, and participants provided written informed consent prior to participation in the study.

The Intermediate or "sandwich generation" were defined as women aged 50–69 years with both a living parent and children within the last 2 years. Intergenerational transfers between the generations were investigated by the following questions.

Financial help to children (1) Large material gifts: "In the last 10 years, have you given the deeds of a house, business, property, or a large amount of money of €5,000 or more to any of your children/grandchildren? About how much was this support in total?" (2) Other financial help: "During the last 2 years, did you give financial or in-kind support totalling €250 or more to any of your children/grandchildren? Assistance may include student fees and accommodation. By in-kind support we mean goods or equipment (such as washing machine, computer, food, etc.)".

Financial help to parents "Not counting any shared housing or shared food, in the last 2 years, have you given financial help to your parents/father/mother? By financial help we mean help to pay bills in general (medical, utility bills, etc.), or covering specific types of costs such as health insurance, schooling, rent, down payment for a home, etc".

Non-financial help to children "In the last 2 years, excluding childcare, have you spent at least 1 h a week helping your adult children/grandchildren with things like: (1) Practical household help, e.g. with home repairs,

gardening, transportation, shopping, household chores. (2) Help with paperwork, such as filling out forms, settling financial or legal matters".

Non-financial help to parents was assessed separately as activities of daily living (*ADL*): "In the last 2 years, because of health problems, did you help your parents/father/mother regularly with basic personal activities such as dressing, eating and bathing?", and instrumental activities of daily living (IADL); "In the last 2 years, did you help your parents/father/mother regularly with other things such as household chores, errands, shopping, transportation etc.?"

Taking care of grandchildren "In the last 2 years, have you spent at least 1 h a week taking care of grandchildren/great-grandchildren (who live outside your own household)?"

Self-reported health was measured in two ways. Participants were asked to self-rate their physical health relative to other people their own age: "In general, compared to other people your age, would you say your health is, excellent, very good, good, fair or poor?" This was grouped as excellent/very good, good/fair or poor. Secondly their mental health, through depressive symptomology was measured with the Centre for Epidemiological Studies Depression scale (CES-D) (Beekman et al. 1997). The 20 items request a frequency score from never to almost all the time. The score was grouped as: no clinical symptoms if <7, sub-threshold depression (depressive symptoms but did not meet the criteria for a depressive disorder) if 7–15 and a major depressive disorder >15 (Vahia et al. 2010).

Statistical analysis

The data were weighted to account for differential selection probabilities and then post-stratified to Irish population estimates of the age, sex, region and education distribution from the Quarterly National Household Survey 2010. All analyses were performed using the survey analysis software of STATA 12, which accounts for the clustering, weighting and stratification of the data. Pearson Chi-square test was used to compare baseline characteristics of the sandwich generation women with non-sandwich women by socio-economic, self-reported health and generational structure variables. Population prevalence of intergenerational transfers was measured. To determine whether intergenerational transfers were associated with self-reported health variables when controlling for other socio-demographic and generational variables, a modified Poisson regression model (Zou 2004) was created. A model for each type of giving was generated separately: financial giving to parents, financial giving to children, other giving to parents, other giving to children and taking care of grandchildren. Risk ratios (RR) were used to compare the prevalence of self-reported health with giving and to derive independent associations with giving. Socio-demographic, generational and other giving variables, significant at the univariate level were included in the model. The models with the best fit included age, marital status, education, self-reported health variables, other factors relating to generational structure and intergenerational giving. The generational structure variables were: children or parents living at home, numbers of children aged less than 18, total numbers of children. Other intergenerational giving were: financially supported parents or children, ADL hours caring for parents, other support to children, or caring for grandchildren. Interaction terms between socio-demographic variables, age, education and marital status, and self-reported health were explored to investigate if the association of these variables with intergenerational transfers changed when stratified by other variables or whether self-reported health associations remain across all socio-demographic groups.

Results

Prevalence and characteristics of the sandwich generation

Overall 31.1 % (95 % CI 29.4–33.0) of women aged 50–69 were in the "sandwich generation", that is had both children and living parents. Their socio-demographic, health and generational structures are described in Table 1. They were younger than women not in the sandwich generation, were more likely to be married, employed and had a higher level of educational attainment. They also differed by generational structure; had more children, and were more likely to have co-resident children and younger children. Overall 60 % of the sandwich generation women had co-resident children and while only a small proportion of the sandwich generation had co-resident parents, it was significantly more than the non-sandwich generation women. Almost all the non-sandwich generation had neither parents alive and 15 % had no children. There was no evidence of a difference in self-reported health between the two groups.

Patterns of intergenerational transfers

Intergenerational transfers between women aged 50–69 to both parents and children are described in Table 2. Sandwich generation women were more likely to have provided help to either generation compared to non-sandwich generation women. Sandwich generation women were less likely to have supported their parents overall compared to women who had no children. While the sandwich generation women were less likely to have provided financial support to their parents, they were more likely to have

Table 1 Distribution of demographic, health and social and generational structure variables by whether sandwich generation in women aged 50–69, The Irish Longitudinal Study on Ageing, October 2009–February 2011

Demographics	Not sandwich, % (95 % CI)	Sandwich, % (95 % CI)
%	68.8 (67.1–70.6)	31.2 (29.4–33.0)
Base	2,187	1,009
Age		
Mean (SD)	59.9 (5.5)	55.5 (4.5)***
Area		
Dublin city or county	24.9 (21.2–28.9)	23.2 (19.3–27.8)
Another town or city	27.7 (24.2–31.4)	28.2 (24.3–32.6)
A rural area	47.5 (43.4–51.6)	48.5 (43.8–53.3)
Marital status		***
Married	72.0 (69.8–74.1)	78.1 (75.0–80.9)
Never married	8.8 (7.7–10.2)	2.2 (1.4–3.3)
Separated/divorced	8.4 (7.3–9.8)	12.9 (10.8–15.4)
Widowed	10.8 (9.4–12.3)	6.8 (5.3–8.7)***
Currently married	72.0 (69.8–74.1)	78.1 (75.0–80.9)
Not married (including single, separated/divorced, widowed)	28.0 (25.9–30.3)	21.9 (19.1–25.0)
Education		***
Primary	30.4 (28.0–32.9)	18.9 (16.2–22.0)
Secondary	49.0 (46.6–51.4)	55.5 (52.0–58.9)
Tertiary	20.6 (19.0–22.3)	25.6 (23.0–28.4)
Employment		***
Employed	36.7 (34.7–38.9)	48.0 (44.7–51.3)
Retired	21.6 (19.8–23.6)	10.4 (8.6–12.5)
Other	41.6 (39.4–44.0)	41.6 (38.3–45.0)
Generational structure		
Number of children		***
Mean children (SD)	2.9 (1.5)	3.2 (1.5)***
0	14.7 (13.2–16.4)	0
1	6.1 (5.2–7.3)	8.4 (6.8–10.2)
2	20.3 (18.5–22.2)	26.6 (23.8–29.6)
3–4	40.7 (38.6–42.8)	49.2 (46.0–52.4)
5+	18.2 (16.4–20.0)	15.9 (13.5–18.5)
Parents alive past 2 years		***
Neither alive	95.4 (94.4–96.3)	0
Only mother alive	3.4 (2.75 - 4.2)	67.9 (64.8–70.9)
Only father alive	0.3 (0.2–0.7)	13.3 (11.4–15.6)
Both mother and father alive	0.9 (0.6–1.4)	18.8 (16.5–21.3)
Proximity of children		***
Co-resident children	36.1 (33.8–38.5)	59.4 (56.2–62.6)
Child in the county	38.3 (36.0–40.6)	28.5 (25.7–31.5)
Child lives outside the county	8.3 (7.1–9.6)	7.1 (5.7–8.9)
Child lives outside the country	2.7 (2.0–3.5)	4.9 (3.7–6.6)
No children	14.7 (13.2–16.4)	–
Lives with parent	0.8 (0.5–1.3)	3.5 (2.5–4.9)***
Number of children living at home		
Mean (SD)	0.61 (0.99)	1.07(1.19)
Number of children aged less than 18		
Mean (SD)	0.09 (0.38)	0.25 (0.63)
Health measures		
Depressed CES-D		
Not depressed	68.2 (65.9–70.6)	66.6 (63.1–70.0)
Sub-threshold depression	18.9 (17.1–20.9)	19.5 (16.9–22.5)
Case-level depression	12.8 (11.3–14.5)	13.9 (11.6–16.5)
Self-rated health		
Excellent	54.0 (51.8–56.2)	53.8 (50.4–57.3)
Good	30.5 (28.6–32.5)	30.6 (27.7–33.6)
Fair/poor	15.5 (14.0–17.2)	15.6 (13.3–18.1)

All percentages are of column-weighted bases. Bases vary from totals in previous item because of item non-response

CI confidence interval, *SD* standard deviation

All p values from Chi-squared tests, * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

provided financial support to their children compared to non-sandwich women. Almost a third of sandwich generation women provided other non-financial support to their children, although they were less likely to provide this when compared to non-sandwich women. There was no difference between the two groups in the proportions of women with grandchildren who provided childcare for them.

The patterns of transfers from sandwich generation women to their parents and children are described in Table 3. Sandwich generation women provided more financial support to their children than their parents with a similar mean value of support of 2,000 euro. Almost a quarter had given a large financial gift to their children greater than 5,000 euro in the past 10 years. Parents received the highest frequency of non-financial time transfers; half of the women provided some time-support to their parents, a third providing support towards ADL and more than half for IADL. For those providing ADL the mean number of hours was 21 per week and for IADL was 10 per week. One-third provided other time-support, excluding childcare of grandchildren, to their children. A low proportion of sandwich generation co-resided with their parents, while almost two-thirds still had children living with them.

Factors associated with financial transfers in sandwich generation

There were no significant interactions between socio-demographic variables and self-reported health and intergenerational transfers. Financial transfers to parents were independently associated with case-level depression, when controlling for demographic, generational factors and other types of transfers (Table 4). Self-rated physical health was

Table 2 Intergenerational giving by women within the past 2 years by intermediate generation status, The Irish Longitudinal Study on Ageing, October 2009–February 2011

Intergenerational giving	Not sandwich, % (95% CI)	Sandwich, % (95% CI)
N	2,187	1,009
Any transfers in the past 2 years		
Gives any help to parents or children[a]	82.1 (80.1–83.9)	90.4 (88.1–92.3)***
Gives help to parents (financial or other)[b]	68.7 (58.9–77.0)	58.3 (55.2–61.4)*
Gives help to children (financial or other)[c]	82.8 (80.8–84.6)	82.9 (80.1–85.3)
Gives to two generations both parents and children		50.7 (47.5–54.0)
Financial transfers in the past 2 years		
Gives financial help to either parent or child[a]	59.6 (57.2–62.0)	70.6 (67.2–73.7)***
Gives financial help to parents[b]	19.2 (12.8–27.7)	8.5 (7.0–10.4)***
Gives financial help to child[c]	61.8 (59.3–64.3)	68.8 (65.3–72.0)***
Non-financial transfers in the past 2 years		
Gives other help to parents[b]	64.9 (55.2–73.5)	55.8 (52.7–58.9)
Gives other help to children excluding childcare[c]	37.1 (34.6–39.6)	32.9 (29.9–36.1)*
Looks after grandchildren overall[c,d]	47.2 (44.7–49.7)	36.6 (33.5–40.0)***
Women with grandchildren who look after their grandchildren[e,f]	70.4 (67.7–73.0)	70.8 (66.3–75.0)

All p values from Chi-squared tests, * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

[a] Includes only those non-sandwich generation with either living parents or children, $n = 1{,}944$

[b] Includes only those non-sandwich generation with living parents, $n = 115$

[c] Includes only those non-sandwich generation with children, $n = 1{,}826$

[d] Denominator includes all sandwich generation women of whom 51.3 % have grandchildren

[e] Includes only 56.8 % of non-sandwich generation who have grandchildren, $n = 1{,}179$

[f] Includes only 51.3 % of sandwich generation who have grandchildren, $n = 483$

Table 3 The patterns of transfers given from the sandwich generation to their parents and children by type of transfer in Ireland, The Irish Longitudinal Study on Ageing, October 2009–February 2011

	Given to parents	Given to children
Financial transfers		
Overall frequency (%)	8.5 (7.0–10.4)	68.8 (65.3–72.0)
Large financial gift > 5,000 or deeds of house within the past 10 years (%)		23.2 (20.5–26.2)
Mean value in euro[a]		40,900 (30,400–51,400)
Financial transfer given (>250 euro) within the past 2 years (%)	8.5 (7.0–10.4)	62.2 (58.7–65.6)
Mean value in euro[a]	2,300 (1,400–2,100)	2,000 (1,800–2,200)
Non-financial time transfers in the past 2 years		
Overall frequency (%)	55.8 (52.7–58.9)	32.9 (29.8–36.2)
Activities of daily living (ADL) %[b]	32.9 (29.8–36.2)	–
Mean hours per week	21 (18–25)	
Instrumental activities of daily living (IADL) %[c]	53.8 (50.7–56.9)	32.9 (29.8–36.2)
Mean hours per week	10 (9–11)	
Mean hours per month		12 (8–17)
Providing care to grandchildren (%)	–	36.6 (33.5–40.0)
Mean hours per month		34 (27–41)
Co-residence		
Frequency (%)	3.5 (2.5–4.9)	59.4 (56.1–62.6)

[a] Rounded to the nearest 100

[b] Activities of daily living include basic personal activities such as dressing, eating and bathing

[c] Instrumental activities of daily living include household chores, errands, shopping and transportation

not associated with financial transfers to parents. Financial transfers to parents were associated with younger age and higher educational attainment. Giving to parents decreased with increasing numbers of children, and with increasing numbers of children still living at home. Women who spent more than 10 h per week assisting their parents with ADL were more than twice as likely to also have provided financial support to their parents. Financial transfers to children were associated with improved self-rated physical health, higher educational achievement, being not currently married, increased numbers of children, and more children living at home. Women who financially supported their children were also more likely to have supported their children with other activities and have provided ADL assistance to their parents.

Factors associated with non-financial transfers in sandwich generation

Providing other non-financial transfers to parents was not associated with self-reported health in women in the sandwich generation (Table 4). Women who gave non-financial support to their parents were more likely to be co-resident with their parent, and have financially supported their parent. They were also more likely to have provided both financial and non-financial support to their children. The provision of other non-financial transfers to children was independently associated with case-level depression. Other non-financial transfers to children were also

Table 4 Multivariate association of intergenerational transfers by demographic, health and social and generational structure variables within the intermediate generation of women aged 50–69, The Irish Longitudinal Study on Ageing, October 2009–February 2011

	Financial giving parents Risk ratio (95 % CI)	Financial giving children Risk ratio (95 % CI)	Other giving parents Risk ratio (95 % CI)	Other giving children Risk ratio (95 % CI)	Looking after grandchildren Risk ratio (95 % CI)
Health measures					
Depressed CES-D	*			*	
Not depressed	1.0	1.0	1.0	1.0	1.0
Sub-threshold depression	0.94 (0.56–1.60)	1.06 (0.95–1.18)	0.98 (0.84–1.15)	1.19 (0.95–1.48)	1.00 (0.81–1.23)
Case-level depression	2.21 (1.26–3.86)	0.95 (0.82–1.10)	1.09 (0.91–1.30)	1.35 (1.05–1.73)	0.99 (0.78–1.25)
Self-rated health		**			
Excellent	1.0	1.0	1.0	1.0	1.0
Good	1.10 (0.68–1.79)	0.87 (0.79–0.97)	1.01 (0.90–1.15)	0.96 (0.79–1.18)	1.06 (0.88–1.27)
Fair/poor	0.53 (0.24–1.19)	0.84 (0.72–0.97)	0.88 (0.72–1.08)	0.86 (0.65–1.14)	1.04 (0.82–1.32)
Demographics					
Age	0.98 (0.93–1.04)	0.99 (0.97–1.00)	1.00 (0.99–1.02)	0.97 (0.94–0.99)**	1.01 (0.99–1.03)
Education	***	***			**
Primary	1.0	1.0	1.0	1.0	1.0
Secondary	1.39 (0.65–2.98)	1.26 (1.07–1.51)	1.19 (1.00–1.42)	1.17 (0.89–1.53)	0.83 (0.0.68–1.00)
Tertiary	2.75 (1.30–5.80)	1.47 (1.24–1.74)	1.11 (0.93–1.33)	1.17 (0.87–1.58)	0.56 (0.44–0.72)
Marital status		*			
Married	1.0	1.0	1.0	1.0	1.0
Not currently married	0.69 (0.40–1.19)	0.84 (0.74–0.96)	1.05 (0.91–1.20)	1.02 (0.82–1.27)	0.98 (0.82–1.18)
Generational structure					
Number of children	*	**		**	**
1	1.0	1.0	1.0	1.0	1.0
2	0.41 (0.22–0.77)	1.39 (1.11–1.75)	0.95 (0.75–1.22)	1.77 (0399–3.18)	2.13 (1.08–4.21)
3–4	0.46 (0.26–0.80)	1.45 (1.16–1.82)	0.94 (0.74–1.19)	2.50 (1.40–4.49)	2.71 (1.36–5.41)
5+	0.43 (0.18–1.00)	1.32 (1.02–1.72)	0.95 (0.72–1.25)	2.73 (1.46–5.10)	2.92 (1.41–6.05)
Number of children living at home (per additional child)	0.82 (0.66–1.01)	1.05 (1.00–1.1)*	1.05 (0.99–1.12)	0.77 (0.69–0.87)***	0.94 (0.85–1.04)
Number of children aged under 18 (per additional child)	–	0.83 (0.76–0.91)***	0.94 (0.83–1.05)	1.00 (0.80–1.25)	0.59 (0.44–0.81)***
Living with parents		*	**		
No	1.0	1.0	1.0	1.0	1.0
Yes	0.62 (0.17–2.28)	1.26 (1.04–1.52)	1.63 (1.37–1.93)	1.16 (0.71–1.89)	0.96 (0.64–1.45)
Number of grandchildren (per additional child)	–	–	–	–	1.08 (1.05–1.11)***
Number of grandchildren	–	–	–	***	–
0				1.0	
1–2				1.86 (1.43–2.43)	
2–4				1.53 (1.12–2.09)	
5+				1.70 (1.17–2.47)	
Other transfers in the past 2 years					
Numbers of hours helping parents with activities of daily living/week	*	*	–	**	
0	1.0	1.0		1.0	1.0
<10	1.10 (0.63–1.92)	1.12 (1.01–2.25)		1.39 (1.12–1.72)	0.94 (0.77–1.15)
10+	2.04 (1.27–3.25)	1.10 (0.99–2.24)		1.23 (0.96–1.59)	1.07 (0.85–1.34)
Helped children with other activities excluding childcare at least one hour/month		1.15 (1.05–1.26)**	1.29 (1.14–1.46)***	–	2.00 (1.69–2.34)***
Financial support given to parents	–	1.13 (1.01–1.28)*	1.28 (1.10–1.48)**	1.00 (0.74–1.37)	0.75 (0.52–1.08)
Financial support given to children	–	–	1.18 (1.03–1.36)*	1.47 (1.16–2.20)**	1.10 (0.92–1.32)

CI confidence interval

All p values risk ratios, * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

associated with younger age, increasing numbers of children and grandchildren, less children living at home and financial transfers to children. There was no association between providing childcare to grandchildren and self-reported health in the adjusted model. Providing childcare to grandchildren was associated with lower educational attainment. It was also associated with fewer children aged less than 18, increasing numbers of children and grandchildren and provision of other non-financial support to children. Women who looked after grandchildren in the past month were twice as likely to have also helped their children with other activities in the past month.

Discussion

One-third of women aged 50–69 in Ireland were in the sandwich generation and the majority provided care to both elderly parents and dependent children. Almost two-thirds of the sandwich generation women had provided financial support to their children in the past 2 years and 10 % to their parents. A quarter gave a large financial gift to their children in the past decade. One-third helped their parents with ADLs, for an average of 21 h per week. Intergenerational giving was associated with self-reported health and impacted both positively and negatively depending on the direction of the transfers. We found that financial support for children was associated with improved self-rated physical health, but financial support for parents was associated with increased depression. This supports previous findings from cross-sectional studies where financially supporting children was associated with improved self-rated health and mental health (Li et al. 2009; Roll and Litwin 2010). We found no association between providing non-financial care to parents with self-reported health, but providing non-financial care to children was associated with poorer self-reported health. This relationship between informal caring and poorer self-rated physical health and increased depression has been well documented (Breeze and Stafford 2010; Glazer et al. 2005; Legg et al. 2013; Lee et al. 2003; Schulz and Beach 1999; Vlachantoni et al. 2013). When considering non-financial care, the type of care given and longevity of provision is important. Informal care for conditions like dementia or chronic arthritis is complex and dynamic. While informal carers have reported better health status in some studies, health status deteriorated as care intensity increased (Vlachantoni et al. 2013). The TILDA cohort will allow us to examine the long-term effects of caring on health as we follow this cohort over subsequent waves.

The impact of financial giving on mental health could operate via different pathways. Providing financial support to parents may reflect more elderly, frail parents who require both informal and formal care. We found that women were twice as likely to have also provided ADL care for their parents. Thus the financial support provided by children may be for paid home-help and the associated depression may reflect both the financial strain and the stress of informal caring for parents. Alternatively depression could be associated with the reduction in the women's savings due to financially supporting their parents, and subsequent worry about their ability to provide for themselves and both their parents and children in the future (Evandrou and Glazer 2003; Roll and Litwin 2010).

The association between social inequality and health should also be considered when interpreting these results. Women with less financial ability to support their parents and children may also have poorer health due to social inequalities in health from other associations. However, longevity and later childbirths are both associated with higher socioeconomic groups and higher-education was associated with having both children and parents living, and less education with increased numbers of children but lower probability of parents living (Ferrie et al. 2002; Lunn and Fahey 2011). Providing financial support to parents and non-financial help to non-co-resident children remained associated with poor mental health, independent of education in this population of sandwich generation women.

There are limitations to this study, as wave 1 of TILDA is a cross-sectional design and so the temporal associations and long-term effects between providing care, both financial and non-financial, and self-reported health cannot be observed. Additionally, our response rate of 62 % may mean that individuals that take part in the study may be different from those who do not. Selection bias is unlikely to explain the observed association between transfers and self-reported health within the population since it is unlikely that a differential response in that women with good self-reported health who gave financial transfers to their parents were less likely to participate and vice versa. Some degree of inaccuracy of reporting, self-reported health and intergenerational transfers may have occurred, however, it seems likely that misclassifications would be random, and random measurement error is likely only to attenuate any relationships, not produce spurious associations. We used education as a measure of socioeconomic status in women, as women's social class is difficult to measure in the absence of employment and this was considered appropriate in this cohort. We examined self-reported health and a gradient in self-reported health and social class has been found (Breeze and Stafford 2010; Broe et al. 1999; Rahrig et al. 2009), thus some of the differentials in self-reported health could be due to residual confounding associated with social class. The main strength of the study is its large

nationally representative sample which examines these relationships with self-reported health. Future waves of the cohort will allow the disentangling of the relationship between self-reported health and intergenerational transfers, and the temporal associations to be directly measured. It will monitor change over time as parents become more elderly and require more care and the personal and health situations of the three generations change.

In conclusion, older women within the sandwich generation make an important contribution to supporting two generations; their children and their elderly parents, and this has an impact on their self-reported physical and mental health. A key challenge facing public health in Ireland will be the burgeoning ageing population and the increasing demands on the middle generation for both financial and informal care which may lead to an increasing negative impact on health. There is a need to develop systems for identifying people at risk and to develop effective interventions to prevent ill health in this essential population.

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References

Amirkhanyan AA, Wolf DA (2006) Parent care and the stress process: findings from panel data. J Gerontol B Psychol Sci Soc. Sci. 61:S248–S255

Attias-Donfut C, Ogg J, Wolff F (2005) European patterns of intergenerational financial and time transfers. Eur J Ageing 2:161–173

Beekman AT, Deeq DJ, Van Limbeek J, Braam AW, De Vries MZ, Van Tilburq W (1997) Criterion validity of the Center for Epidemiologic Studies Depression scale (CES-D): results from a community-based sample of older subjects in The Netherlands. Psychol Med 27:231–235

Bloom D, Canning D (2003) Contraception and the Celtic tiger. Econ Soc Rev 34:229–247

Bonsang E (2007) How do middle-aged children allocate time and money transfers to their older parents in Europe? Empirica 34:171–188

Breeze E, Stafford M, (2010) Receipt and giving of help and care. In: Banks J, Lessof C, Nazroo J, Rogers N, Stafford M, Steptoe A (eds) Financial circumstances, health and well-being of the older population in England. The 2008 English Longitudinal Study of Ageing. The Institute for Fiscal Studies, London, pp 348–85

Broe GA, Jorm AF, Creasey H et al (1999) Carer distress in the general population: results from the Sydney Older Persons Study. Age Ageing 1999(28):307–311

Central Statistics Office (2012a) Profile 2 older and younger. Census Stationary Office, 2011 Dublin, Ireland

Central Statistics Office (2012b) Women and men in Ireland 2011 Dublin. The Stationary Office, Ireland

Coe NB, Van Houtven CH (2009) Caring for mom and neglecting yourself? The health effects of caring for an elderly parent. Health Econ 18:991–1010

Evandrou M, Glazer K (2003) Combining work and family life: the pension penalty of caring. Ageing Soc 23:583–601

Ferrie JE, Shipley MJ, Davey SG, Stansfeld SA, Marmot MG (2002) Change in health inequalities among British civil servants: the Whitehall II study. J Epidemiol Community Health 56:922–926

Geodirectory (2008) Dublin. An Post Geodirectory Limited

Glazer K, Evandrou M, Tommassini C (2005) The health consequences of multiple roles at older ages in the UK. Health Soc Care Community 13(5):470–477

Grundy E, Henretta JC (2006) Between elderly parents and adult children: a new look at the intergenerational care provided by the 'sandwich generation'. Ageing Soc 26:707–722

Health Research Board and Information Division (2012) Perinatal statistics report. ESRI

Kearney PM, Cronin H, O'Regan C, Kamiya Y, Savva GM, Whelan B et al (2011) Cohort profile: the Irish Longitudinal Study on Ageing. Int J Epidemiol 40:877–884

Lee S, Colditz GA, Berkman LF, Kawachi I (2003) Caregiving and risk of coronary heart disease in US women: a prospective study. Am J Prev Med 24:113–119

Legg L, Weir CJ, Langhorne P, Smith LN, Stott DJ (2013) Is informal caregiving independently associated with poor health? A population-based study. J Epidemiol Community Health 67:95–97

Li S, Song L, Feldman MW (2009) Intergenerational support and subjective health of older people in rural China: a gender-based longitudinal study. Australas J Ageing 28:81–86

Lunn P, Fahey T (2011) Households and family structures in Ireland: a detailed statistical analysis of census 2006. Family Support Agency/The Economic and Social Research Institute

Murphy-Lawless J, McCarthy J (1999) Recent fertility change in Ireland and the future of Irish fertility. In: Below replacement fertility. Population Bulletin of the United Nations, Special Issue 40/41, pp 235–246, United Nations, New York

Musil CM, Gordon NL, Warner CB, Zauszniewski JA, Standing T, Wykle M (2011) Grandmothers and caregiving to grandchildren: continuity, change, and outcomes over 24 months. Gerontologist 51:86–100

Rahrig JK, Kabeto MU, Langa KM (2009) Does caring for your spouse harm one's health? Evidence from a United States nationally-representative sample of older adults. Ageing Soc 29(2):277–293

Roll A, Litwin H (2010) Intergenerational financial transfers and mental health: an analysis using SHARE-Israel data. Aging Ment Health 14:203–210

Schulz R, Beach SR (1999) Caregiving as a risk factor for mortality: the Caregiver Health Effects Study. JAMA 282:2215–2219

United Nations Department of Economic and Social Affairs, P.D. (2004) World population to 2300. United Nations, New York

Vahia IV, Meeks TW, Thompson WK, Depp CA, Zisook S, Allison M et al (2010) Subthreshold depression and successful aging in older women. Am J Geriatr Psychiatry 18:212–220

Vlachantoni A, Evandrou M, Falkingham J, Robards J (2013) Informal care, health and mortality. Maturitas 74:114–118

Whelan BJ (1979) RANSAM: a random sample design for Ireland. Econ Soc Rev 10:169–174

Wong R, Capoferro C, Soldo BJ (1999) Financial assistance from middle-aged couples to parents and children: racial-ethnic differences. J Gerontol B Psychol Sci Soc Sci 54:S145–S153

Zou G (2004) A modified poisson regression approach to prospective studies with binary data. Am J Epidemiol 159:702–706