Is caring for others good for our mental health? Evidence from the COVID-19 pandemic in the UK

Chiara Costi[1] Bruce Hollingsworth[1] Vincent O'Sullivan[2]
Eugenio Zucchelli[3]

[1]Lancaster University
[2]University of Limerick
[3]Madrid Institute for Advanced Study and Lancaster University

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Overview

Aim:

Investigating informal caregivers' mental health during COVID-19, focusing on carers with different caregiving experiences

Why is it important?

Informal care is crucial for the sustainability of most healthcare systems

- Alternative to formal care; £132bn saved a year *(Carers UK, 2015)*

Sudden disruption of formal care services due to COVID-19

- 26% of UK adults now provides informal care (4.5 million started during the pandemic) *(Carers Week, 2020)*

Results:

Mental health fluctuated according to social restrictions:

- Existing caregivers seem to cope relatively well during COVID-19, while new carers were the most affected especially during lockdowns

Need to support informal caregivers at the start of their care provision

Contributions

Little research to understand caregivers' well-being during COVID-19

Contributions:

1. Examine the role of caregiving experience (groups of existing or new informal caregivers VS never-carers)
2. Employ a mixture of propensity score matching and DD models (accounting for self-selection into caregiving through observables, via statistical matching, and unobservables, via fixed effects)
3. DD approaches used to obtain causal estimates:
   - Traditional two-way fixed effects (TWFE) models
   - Difference-in-differences with multiple time periods as proposed by Callaway and Sant'Anna (2021)

Literature Review

Providing informal care is associated with a deterioration of carers' physical and mental health outcomes *(Lacey et al., 2019; Pinquart and Sorensen, 2003)*.

- Problem of self-selection into caregiving *(Bom et al., 2019)*

Propensity score matching used to account for self-selection, matching on a wide set of pre-treatment observed variables *(Bom et al., 2019; Bom and Stockel, 2021; Brenna, 2021; De Zwart et al., 2017; Lacey et al., 2019; Stockel and Bom, 2021)*

- These studies only employ PSM
- Arguably, the observed bias with PSM is reduced, but there might still be some unobserved variable bias

Literature Review

Most studies during the COVID-19 pandemic only look at associations:

- They focus on convenience samples, with limited external validity *(Azevedo et al., 2021; Borelli et al., 2021; Greaney et al., 2022; Irani et al., 2021; Li et al., 2021; Lightfoot et al., 2021)* and some are based on cross-sectional designs *(Beach et al., 2021; Leggett et al., 2021; Ng et al., 2020; Rodrigues et al., 2021; Todorovic et al., 2020)*

Some tried to account for self-selection using longitudinal datasets:

Mak et al (2021): compare mental health of informal caregivers VS non-carers through PSM

- Sample not representative; pre-COVID data not included; use only PSM

Bergmann and Wagner (2021): use two SHARE waves to analyse informal caregivers' mental health through matching and linear regressions

- Only two waves analysed; matching variables not related to care provision

Dataset

Data from UK Household Longitudinal Study (Understanding Society):

- 3 regular mainstage questionnaire waves collected before COVID-19: Wave 8 (2016-2018), Wave 9 (2017-2019) and Wave 10 (2018-2020)
- 8 COVID-19 survey waves: COVID1 to COVID8 (April 2020 - March 2021)

Final sample: 4,698 respondents interviewed for all the 11 waves, dropping

- Those who did not answer to mental health and to informal care
- Those who were already informal caregivers in Wave 8
- Home-carers and those without a continuous pattern

Table: Informal caregiving patterns

Period	Years	Treated			Control
		Existing carers (349)		New-carers (1,655)	Never-carers (2,694)
		Wave 9	Wave 10		
Pre-COVID-19	WAVE 8 (2016-2018)	0	0	0	0
	WAVE 9 (2017-2019)	1	0	0	0
	WAVE 10 (2018-2020)	1	1	0	0
After-COVID-19	April 2020	1	1	1	0

Note: April 2020 is the first Wave of the COVID questionnaire, collected after the COVID-19 outbreak.

Variables

Outcome: 12-item General Health Questionnaire (GHQ-12)

- **GHQ-caseness** (0-12)
- **GHQ$\geq$ 4** (binary), as a robustness check

Covariates:

- Age (squared), living alone, children in household, gender, ethnicity, education, employment, household income, nation, COVID-19 cases, deaths and tests

Pre-treatment variables used in PSM:

Table: List of variables used in Propensity Score Matching

Area	Variables	Values
Need to provide care	Married/civil partner	(0-1)
	Living alone	(0-1)
	Number of children under 16	(0-4)
Willingness to provide care	Paid employment	(0-1)
	Job type	(1-12)
	Income (quintiles)	(0-4)
Ability to provide care	Age	(16-90+)
	Female	(0-1)
	White	(0-1)
	Long standing illness or disability	(0-1)
	Self-assessed health	(1-5)
	SF-12 physical	(0-76)
	SF-12 mental	(0-76)
	N functional limitations	(0-11)
	Satisfaction with health	(1-7)
	Satisfaction with income	(1-7)
	Satisfaction with life overall	(1-7)
	GHQ-12 Likert scale	(0-36)
	GHQ-12 Caseness scale	(0-12)

Analysis

TWFE is not robust to treatment effect heterogeneity *(Callaway and Sant'Anna, 2021; de Chaisemartin and D'Haultfoeuille, 2020; Goodman-Bacon, 2021; Sun and Abraham, 2021)*. Our approach:

- Pre-process data using propensity score matching

1. Separate TWFE regressions: each treated group considered one at a time, never-carers were always the control group (Results Tab 4-5)
2. Callaway and Sant'Anna (2021) framework: simultaneously estimate the average treatment effect on different treatment groups based on the time period in which units are first treated (Results Fig 3-5)

We checked critical assumptions of DD designs:

1. Parallel trends: visual inspection & pre-treatment coefficients
2. We conducted one-to-one PSM and Kernel PSM

Empirical analysis

Propensity Score Matching

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Table 1A: Propensity Score Matching on pre-treatment variables

	Existing carers VS never-carers		New carers VS never-carers	
	Before: t-test	After: t-test	Before: t-test	After: t-test
Need to provide care:				
Married/civil partner	0.3452	0.753	**0.0336**	0.511
Living alone	**0.0005**	0.648	**0.0050**	0.127
Number of children under 16	**0.0204**	0.602	**0.0000**	0.507
Willingness to provide care:				
Paid employment	0.3130	0.814	**0.0000**	0.908
Job type	0.4261	0.625	**0.0389**	0.847
Income (quintiles)	0.7268	0.267	**0.0042**	1.000
Ability to provide care:				
Age	**0.0010**	0.495	**0.0000**	0.403
Female	**0.0000**	0.815	**0.0000**	0.885
White	**0.0180**	0.690	0.5379	0.333
Long standing illness or disability	**0.0664**	0.875	**0.0071**	0.165
Self-assessed health	**0.0202**	0.593	**0.0001**	0.370
SF-12 physical health	**0.0023**	0.507	**0.0006**	0.614
SF-12 mental health	0.7500	0.778	**0.0912**	0.353
Number of functional limitations	**0.0369**	0.823	**0.0012**	0.291
Satisfaction with health	**0.0457**	0.677	**0.0114**	0.587
Satisfaction with income	**0.3640**	0.315	0.7616	0.445
Satisfaction with life overall	0.9661	0.779	0.2632	0.772
GHQ Likert scale	0.3734	0.988	**0.0054**	0.263
GHQ Caseness scale	0.5735	0.795	**0.0662**	**0.094**

Note: The high-quality matching procedure is showed by insignificant t-test coefficients after matching and by the %bias <10 (not shown here)

Descriptive statistics

Fig. 1 Existing carers and Never-carers

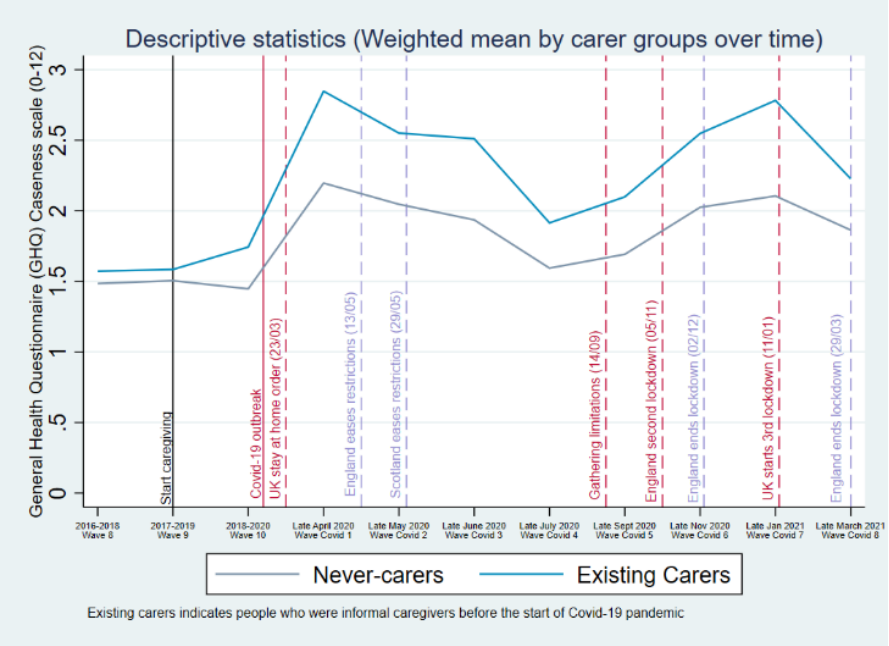
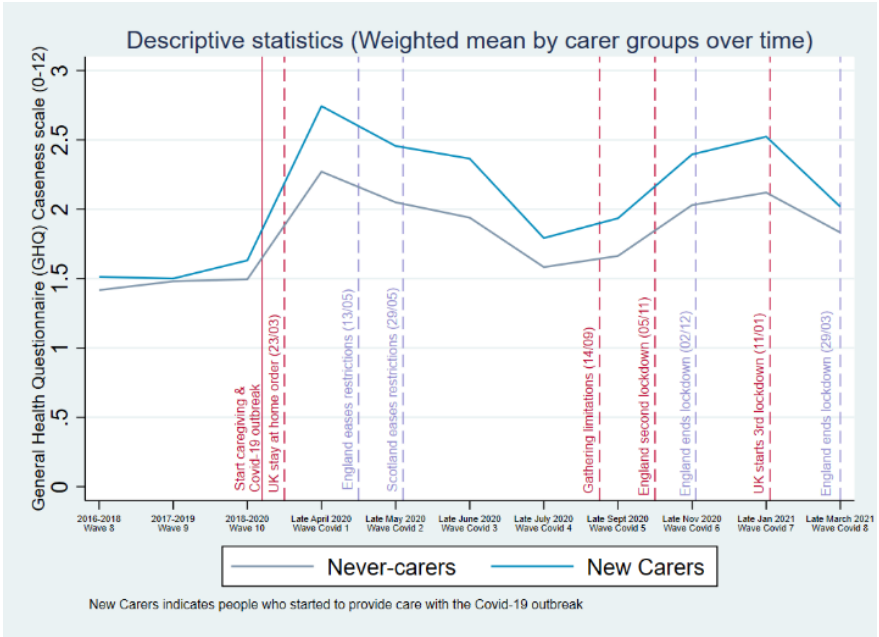


Fig. 2 New carers and Never-carers



First inspection of the parallel trends assumption by plotting the average of the outcome of interest

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1) TWFE in generalised DD approach *(Cunningham, 2021)*

$$Y_{it} = \alpha_i + \lambda_t + \delta^{DD} D_{it} + \gamma X_{it} + \varepsilon_{it} \quad (1)$$

- δ^{DD}: effect of providing informal care on Y_{it} (mental health)
- α_i and λ_t: individual and time fixed effects
- X_{it}: observed covariates
- ε_{it}: standard errors clustered at primary sampling unit
- D_{it}: treated units in treated time periods ($TREAT_i x POST_t$)
  - $TREAT_i$=1 for informal carers; $TREAT_i$=0 for never-carers
  - $POST_t$: dummy variable for each period included in the analysis

2) Difference-in-difference with multiple time periods

Under parallel trends assumption on never-treated units:

$$ATT(g,t) = E[Y_t - Y_{g-1}|G = g] - E[Y_t - Y_{g-1}|C = 1] \quad (2)$$

ATT simultaneously estimated for each treated group at each time period

- Treated groups defined by the time period in which units are first treated

TWFE regression models: Results

Table 4: DD results. GHQ-caseness

DD interactions (Wave 10 as baseline)	GHQ Existing carers (1)	(2)	(3)	GHQ New carers (1)	(2)	(3)
Carer x Wave 8 (2016-2018)	-0.312	-0.349	-0.349	-0.040	-0.024	-0.024
	(0.358)	(0.251)	(0.251)	(0.104)	(0.121)	(0.121)
Carer x Wave 9 (2017-2019)	-0.428	-0.202	-0.202	-0.116	-0.069	-0.069
	(0.347)	(0.223)	(0.223)	(0.099)	(0.115)	(0.115)
Carer x Wave COVID 1 (April 2020)	0.480	0.293	0.292	**0.336*** **	**0.369*** **	**0.367*** **
	(0.414)	(0.283)	(0.283)	(0.119)	(0.137)	(0.137)
Carer x Wave COVID 2 (May 2020)	0.512	0.125	0.124	**0.270****	**0.319****	**0.316****
	(0.356)	(0.243)	(0.243)	(0.117)	(0.136)	(0.136)
Carer x Wave COVID 3 (June 2020)	0.370	0.357	0.358	**0.289****	**0.387*** **	**0.385*** **
	(0.378)	(0.256)	(0.257)	(0.119)	(0.138)	(0.138)
Carer x Wave COVID 4 (July 2020)	0.107	0.052	0.048	0.073	0.180	0.176
	(0.342)	(0.244)	(0.244)	(0.113)	(0.131)	(0.132)
Carer x Wave COVID 5 (Sept 2020)	0.225	0.062	0.061	0.135	0.193	0.189
	(0.331)	(0.241)	(0.241)	(0.114)	(0.130)	(0.130)
Carer x Wave COVID 6 (Nov 2020)	-0.007	0.316	0.311	**0.228***	**0.265***	**0.261***
	(0.275)	(0.246)	(0.246)	(0.118)	(0.137)	(0.137)
Carer x Wave COVID 7 (Jan 2021)	0.323	**0.477***	**0.472***	**0.267****	**0.246***	**0.240***
	(0.309)	(0.244)	(0.243)	(0.123)	(0.140)	(0.140)
Carer x Wave COVID 8 (Mar 2021)	-0.034	0.094	0.091	0.049	0.092	0.086
	(0.354)	(0.245)	(0.245)	(0.121)	(0.138)	(0.138)
Demographic/Socioeconomic Ch.		✓	✓		✓	✓
COVID variables			✓			✓
Wave fixed effects	YES	YES	YES	YES	YES	YES
Individual fixed effects	YES	YES	YES	YES	YES	YES
Observations	30360	23176	23176	47322	34472	34472
N of respondents	2760	2112	2112	4302	3143	3143

Note: In separate analyses, Carer takes value 1 if respondents are existing caregivers, or if they are new caregivers and 0 if they are never-carers.
**** p<0.01, ** p<0.05, * p<0.1 ++ indicates that the variables are projected from the mainstage waves*
Robust standard errors in parenthesis, clustered at primary sampling unit

DD with multiple time periods: Results

Fig. 3

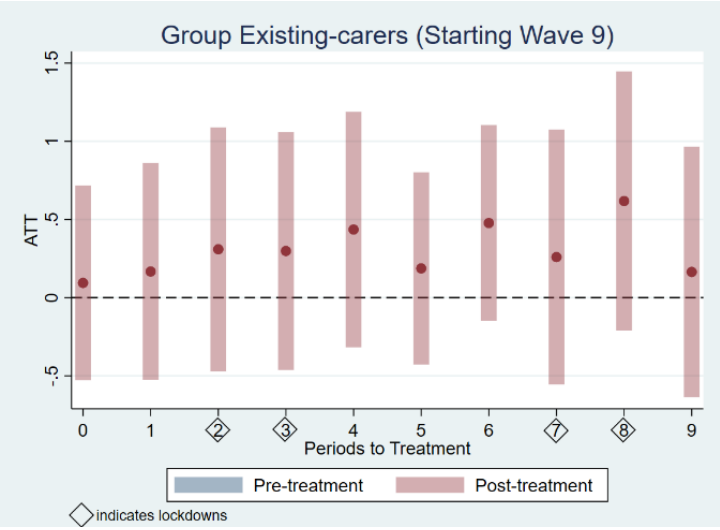


Fig. 4

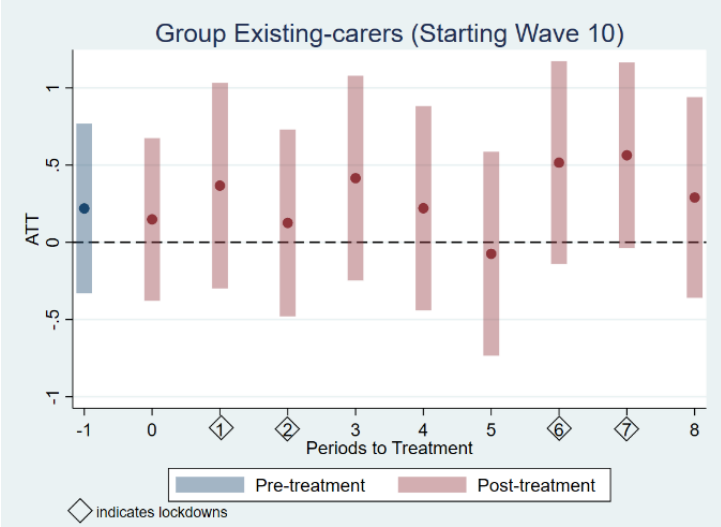
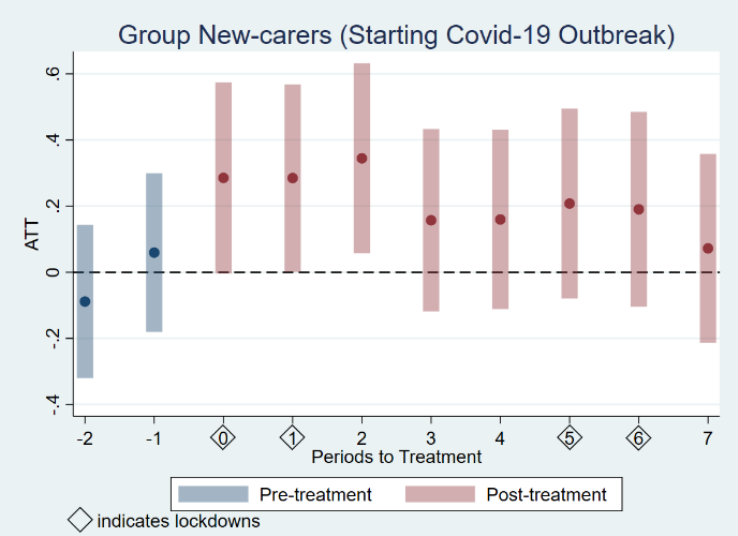


Fig. 5



Limitations:

1. Only external informal caregivers are investigated: lower bound estimates
2. GHQ-12 is a self-assessed indicator: same results with other outcomes?
3. Intensity of care is not examined: we looked at the duration of care
4. Representative sample of UK adults: other countries?

Conclusion:

Psychological well-being fluctuated according to social restrictions, but:

- New carers were the most affected, especially during lockdowns
- Psychological support for informal caregivers is needed, especially at the start of care provision

Thank you for listening!
Any questions?