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Impact of informal caregiving on depressive symptoms among a national cohort of men

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ABSTRACT

Background There is evidence that unpaid caregiving can have negative effects on the mental health of female caregivers; however, evidence of impacts on male caregivers is limited. This study addressed this gap by examining associations between becoming a caregiver and depressive symptoms among men.

Methods We used data from waves 1–2 (2013, 2016) of the Longitudinal Study of Australian Male Health (Ten to Men). Effects of incident caregiving on depressive symptoms were estimated using augmented inverse probability treatment weighting, with adjustment for potential confounders. Incident caregiving was assessed as a binary variable (became a caregiver vs not), and depressive symptoms were measured using the Patient Health Questionnaire (moderate to severe depressive symptoms; yes, no). Main analysis was prospective, drawing on wave 1 (caregiving) and wave 2 (depressive symptoms), and sensitivity analyses modelled cross-sectional associations.

Results In the main analysis, incident caregiving in wave 1 was associated with depressive symptoms in the subsequent wave, with an average treatment effect of 0.11 (95% CI 0.06, 0.17) and equating to a risk ratio of 2.03 (95% CI 1.55, 2.51). Associations were robust to several sensitivity analyses, with cross-sectional associations supporting the main prospective analyses.

Conclusion These results provide evidence of the association between caregiving and depressive symptoms among male caregivers. This has important implications for policy and support programmes. As we seek to shift caregiving responsibilities toward a more gender-equal distribution of care, policy must recognise that, like female caregivers, male caregivers also experience mental health impacts related to their caregiving role.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ With growing demands for care across societies globally, there is increasing attention on the supply of informal (unpaid) care. There is evidence that informal care impacts the health and well-being of caregivers, particularly their mental health. However, given that worldwide, most informal caregivers are women, current evidence largely pertains to women. Understanding of the impacts of informal caregiving on mental health among male caregivers is limited.

WHAT THIS STUDY ADDS

⇒ Most studies examining this relationship have been carried out on women, and where men have been included, inadequate sample sizes, cross-sectional and non-prospective approaches limit evidence. Drawing on a representative sample of Australian men and applying robust causal methods, this study provides evidence that becoming a carer is associated with poorer mental health among men.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Gender equality approaches are paying increasing attention to the disproportionate level of caregiving carried out by women, with growing calls to shift the distribution of care, and for men to take on more caregiving roles. Initiatives that seek to redistribute care responsibilities must recognise that, like female caregivers, male caregivers experience mental health impacts related to their caregiving role. Most fundamentally however, this study highlights the need to increase recognition of, and support for, informal carers.

INTRODUCTION

A substantial proportion of global populations are informal caregivers, providing unpaid care to another person who is an older adult, or who has a disability, mental illness or health condition. In 2020, it was estimated that about 2.8 million Australians were informal caregivers, a figure that had grown by 5.5% since 2018.[1] Informal caregivers contribute substantially to global economies, and are considered to be a 'first line of defense against the need for institutionalization' (Vitaliano *et al*, p205)[2] or other formal care provision. This informal care delivery has impacts on many elements of caregivers' lives. Many caregivers reduce their time in the paid labour force—or opt out entirely—with full-time employment among primary caregivers being 23.7% compared with 47.3% in the general population.[1] The replacement cost of informal care provision to the Australian economy in 2020 was estimated to be $77.9 billion.[1] This is what the economy would be paying the formal care sector if there was no informal care provision. This has financial implications for informal caregivers, with the foregone earnings for their caregiving estimated to be $15.2 billion.

The delivery of informal care has also been associated with health outcomes. Among adults, caregiving is associated with poorer physical health outcomes and processes including elevated stress hormones, weaker immune responses and poorer

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self-reported health,[3] and more intensive caregiving is associated with higher incidence of cardiovascular disease (relative to non-caregivers).[4] Associations between caregiving and mental health have also been observed among adult caregivers, with greater levels of psychological distress observed among caregivers relative to non-caregivers in a US study.[2] Among a cohort of working adults in Thailand, transitions into caregiving were associated with increased risk of psychological distress.[5] A systematic review of 13 international studies found that informal care consistently had negative associations with the mental health of adult women.[6] Results for men were less consistent, with this being at least partly attributable to an overall lack of studies including male caregivers.[6]

As in many other countries, Australia is facing a widening caregiver gap, with the demand for informal caregivers outpacing supply. This demand for informal care has significant implications for social welfare systems worldwide.[7] The caregiver gap (supply–demand misalignment) is due to a range of factors including population ageing, medical advances that extend the lives of people with medical conditions and changes in social structures such as more women entering paid employment (and being less available to deliver informal care).

Notwithstanding the growing number of women employed in paid work, the vast proportion of formal and informal caregivers are women. The dearth of studies on male caregivers largely reflects these gendered patterns in the provision of care; there are more studies on female caregivers because women carry out the vast proportion of informal care.[8] The gendered distribution of care remains a focus of gender equality initiatives worldwide,[9 10] and increasing numbers of men are providing informal care.[9] As countries seek to redistribute caregiving and enable more men to share informal, unpaid care responsibilities, there is a need to examine the extent to which men experience the same mental health consequences of care as women. Gender norms associated with care may lead to different associations for men. Male caregivers could face greater mental health challenges for deviating from traditional gender roles, or conversely, they may receive more support for challenging these norms.

This research aimed to address these research gaps by using a population representative study of Australian men to assess associations between becoming an informal caregiver and depressive symptoms.

METHOD

Data from the Australian Longitudinal Study on Male Health (Ten to Men) were used. Ten to Men is a longitudinal cohort study that was established in 2011 to study the health of Australian men and boys.[11] Details of the Ten to Men design and sampling approach have been published elsewhere.[12] Briefly, the first wave of data collection occurred in 2013–2014, with a sample of 16 021 males included in the sample. Wave 2, collected in 2016, comprised 11 936 participants, 75% of the wave 1 sample. In 2021, wave 3 data were collected, with almost half of the original sample (49%, 7919) participating.[13]

Exposure variable: incident caregiving

The following question was posed to participants: 'In the past 12 months, have you experienced any of the following events?' One of the possible responses was 'becoming a carer for someone'. From this response, we created a measure to determine whether someone had newly taken on a caregiving role in the past year to derive a measure of incident caregiving. We derived a binary variable at each wave: began caregiving; did not begin caregiving.

Outcome variable: depressive symptoms

Depressive symptoms were assessed using the Patient Health Questionnaire (PHQ-9).[14] The PHQ-9 assesses self-reported depressive symptoms, asking individuals to rate how much they have experienced nine problems over the past 2 weeks. Examples of these items include: 'feeling tired or having little energy' and 'having trouble concentrating on things'. Respondents are asked to choose from four response options: not at all (0), several days (1), more than half the days (2), nearly every day (3). Scores were summed and dichotomised with scores ≥10 indicating moderate or severe depression, and scores <9 indicating no or mild levels of depressive symptoms.[15]

Covariates

Covariates that could act as confounders of the relationship between caregiving and depressive symptoms were identified a priori. All covariates were measured at wave 1, and included age (years: 18–24, 25–34, 35–44, 45–55, 55–64), education (year 12 or higher, less than year 12 (year 12 is the highest year of secondary schooling in Australia)), country of birth (Australia, elsewhere), area of residence (metropolitan, inner regional, outer regional), area-level disadvantage (quintiled) and relationship status (married/partnered, not currently married/partnered).

Income and employment were included in sensitivity analyses. A combined household income variable was included, scored from 1 representing $3840 or more per week ($200 000 or more per year) to 12 representing $1–189 per week ($1–9999 per year), and employment status (employed, unemployed, not in labour force).

Sample

The eligible sample was defined as those with complete PHQ-9 data in wave 2 (n=10 497). Of these, n=615 had missing caregiving data reported in wave 1, and a further n=166 had missing covariate data. This resulted in an analytical sample of 9716 males with complete wave 1 caregiving, wave 2 PHQ-9 and covariate data.

Principal analyses drew on caregiving reported in wave 1 and depressive symptoms reported in wave 2, with associations examined prospectively because we sought to specify the causal ordering of exposure and outcome.

Wave 3 data collection occurred during 2021, when COVID-19 continued to impact the world, and some states in Australia were subject to lockdown restrictions for different periods. These events impacted both caring responsibilities and mental health, and thus this wave was excluded from analyses.

Statistical analysis

All analyses were conducted in Stata/SE V.17.

Descriptive analyses were first conducted. We used augmented inverse probability weighting (AIPW) to estimate the average treatment effect (ATE) of incident caregiving ('treatment') on depressive symptoms. This enabled us to estimate the potential outcome means (POMs) for each treatment group (began caregiving vs did not begin caregiving).

AIPW methods create a pseudo-population where every individual is considered both incident caregiver (exposed) and non-incident caregiver (unexposed). In this way, treatment status (began caregiving or not) is independent of measured confounders—effectively blocking the relationship between the confounders and the exposure.

AIPW estimation involves a two-step process. In the first step, a propensity score model is fitted. This is done by estimating

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Table 1 Wave 1 sample characteristics (n=9716)

Sample characteristic	Began caregiving (n=285)	Did not begin caregiving (n=9431)
Country of birth		
Australia	210 (73.7)	7393 (78.4)
Elsewhere	75 (26.3)	2038 (21.6)
Relationship status		
Living with partner	200 (70.2)	6681 (70.8)
Not living with partner	85 (29.8)	2750 (29.2)
Education		
Completed year 12	149 (52.3)	5847 (62.0)
Did not complete year 12	136 (47.7)	3584 (38.0)
Age group		
18–24 years	16 (5.6)	1135 (12.0)
25–34 years	59 (20.7)	1962 (20.8)
35–44 years	71 (24.9)	2929 (31.1)
45–54 years	133 (46.7)	3176 (33.7)
55–64 years	6 (2.1)	229 (2.4)
Region of residence		
Major cities	166 (58.3)	5550 (58.9)
Inner regional	62 (21.8)	2166 (23.0)
Outer regional/remote	57 (20.0)	1715 (18.1)
Area disadvantage		
Quintile 1 (most disadvantaged)	59 (20.7)	1580 (16.7)
Quintile 2	80 (28.1)	1752 (18.6)
Quintile 3	63 (22.1)	2187 (23.2)
Quintile 4	42 (14.7)	2018 (21.4)
Quintile 5 (least disadvantaged)	41 (14.4)	1894 (20.1)
Employment status*		
Employed	205 (71.9)	8279 (87.9)
Unemployed	34 (11.9)	611 (6.5)
Not in labour force	46 (16.1)	530 (5.6)
Annual household income ($A)		
≥150 000	34 (13.7)	1952 (23.2)
100 000–149 999	47 (18.9)	2323 (27.6)
50 000–99 999	98 (39.4)	2868 (34.1)
30 000–49 999	31 (12.5)	826 (9.8)
1–29 999	39 (15.7)	448 (5.3)

*n for employment status and income lower than main sample (noting that these variables were not included in main analyses).

Table 2 Incident caregiving across waves*

	Total participants	Began caregiving (n=285)	Did not begin caregiving (n=9420)
Wave 1	9716	285 (2.9%)	9431 (97.1%)
Wave 2	9641	284 (3.0%)	9357 (97.0%)

*n for each wave slightly different due to sample attrition.

the probability of treatment assignment (began caregiving vs did not begin caregiving) conditional on observed characteristics at baseline. The second step involves fitting two separate logistic regression models that estimate the outcome, depressive symptoms, under both conditions (began caregiving vs did not begin caregiving). In each of these models, the outcome is weighted by the propensity score derived in step 1.[16] Estimated using this approach, the ATE can be interpreted as the difference in risks that would be observed if all men in the sample were both unexposed (did not begin caregiving) and exposed (began caregiving), optimising causal inference—that is, the average effects of becoming a caregiver on depressive symptoms within the sample.

The AIPW estimator has a 'doubly robust' property, meaning that results are robust even if one of the two logistic regression models fitted in step 2 is correctly specified while the other one is not.[16 17]

AIPW was carried out using the *teffects* command (see StataCorp manual for full details of the estimation procedure).[18]

For ease of interpretation, we also calculated risk ratios using the post-estimation *lincom* command.

In the analyses carried out here, both the outcome and the treatment models adjusted for covariates collected in wave 1.

Sensitivity analyses

While income and employment could potentially be confounders and mediators (and potentially effect modifiers) of the relationship between incident caregiving and depressive symptoms, we judged that both would more plausibly mediate this relationship. Including them as confounders in models could therefore introduce bias; thus, main models do not include income as a confounder.

To test the robustness of estimates, we carried out sensitivity analyses in which we adjusted for household income (model b), employment (model c) and baseline depressive symptoms (model d). Additional sensitivity analyses were carried out cross-sectionally for each wave of data collection (online supplemental material).

RESULTS

Table 1 displays the sample characteristics. Only a small proportion of the wave 1 sample reported that they had commenced caregiving in the past year (n=285, 3% of sample). Compared with those who did not begin caregiving, the group who began caregiving contained a higher proportion of participants who had been born outside Australia, did not complete year 12 (secondary schooling) and were living in the most disadvantaged area quintiles (quintiles 1 and 2). Relative to those who did not begin caregiving, a higher proportion of incident caregivers were aged 45–54 years and were unemployed or not working. Household income was also lower for incident caregivers.

Across the two waves included here, a similar number of participants reported becoming a caregiver in the previous 6 months (table 2).

Table 3 displays the proportion of the sample reporting moderate to severe depressive symptoms at each wave by incident caregiver status. At each wave, over one-fifth of incident caregivers reported moderate to severe depressive symptoms (over 20%), approximately twice the proportion of those who did not become caregivers.

Table 4 presents the marginal POMs, ATE and risk ratios for depressive symptoms for caregivers and non-caregivers. In our main analyses (model a) compared with those who did not become caregivers, a higher proportion of those who became caregivers in wave 1 reported moderate/severe depressive symptoms in wave 2 (ATE=0.11; 95% CI 0.06 0.17), equating to a risk ratio of 2.03 (1.55, 2.51).

Models controlling for household income (model b), employment (model c) and baseline depressive symptoms (model d) supported the main findings. Modelling the associations cross-sectionally for wave 2 variables and controlling for baseline depressive symptoms (model e) also supported the main findings.

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Table 3 Proportion with moderate/severe depressive symptoms for each wave*

	Began caregiving		Did not begin caregiving	
	Moderate/severe depression n (%)	No/low depressive symptoms n (%)	Moderate/severe depression n (%)	No/low depressive symptoms n (%)
Wave 1	62 (22.5)	214 (77.5)	1095 (11.8)	8166 (88.2)
Wave 2	70 (24.6)	214 (75.4)	1049 (11.2)	8308 (88.8)

*As tabulations are cross-sectional, totals differ to analytical sample.

Sensitivity analyses in which associations were modelled cross-sectionally also aligned with the main findings (see online supplemental files).

DISCUSSION

Using observational data from a national cohort of men, we estimated that taking on a caregiving role is associated with depressive symptoms among men. On average, a higher proportion of men who took on a caregiving role in wave 1 had depressive symptoms in wave 2 compared with those who did not take on a caregiving role. Results were consistent across multiple forms of sensitivity analyses.

The associations observed here are aligned with a significant body of work demonstrating adverse associations between informal care provision and depressive symptoms among a range of caregivers including women,[19 20] young caregivers[21–23] and older caregivers.[20 24] While some studies have reported adverse associations for men,[25 26] evidence has been less clear.[6] While ATEs calculated on the absolute scale appear small, they represent an approximate difference in depressive symptoms of about 12%, with the POM for caregivers indicating that approximately 23% of caregivers reported depressive symptoms, compared to about 11% of non-caregivers. Calculated on the relative scale, this equates to risk ratio of 2.03, indicating that those reporting that they commenced caregiving had a 103% increase in risk of depressive symptoms 2–3 years later relative to those who did not. This represents a substantial increase in risk of depressive symptoms for those becoming caregivers.

It is unclear whether the associations observed reflect the impact of the transition into caregiving, are indicative of the sustained effects of persistent caregiving, or reflect other changes in circumstances of life events such as bereavement. One previous study has reported that the transition into caregiving was associated with an increase in psychological distress for women, with no associations for persistent caregiving.[27] Other research in the UK however reported that while there were no associations for men, long-term caregiving of 3 years or more was associated with increased symptoms of psychological distress for women, with no associations observed for those providing episodic caregiving (caregiving at one wave or two consecutive waves).[19] Further research is needed on datasets that enable the assessment of the impacts of the transition into caregiving and the simultaneous assessment of the persistence of effects.

Worldwide, care systems—formal and informal —are facing major changes in terms of who cares and who is being cared for.[8] Ageing populations in many countries mean there are fewer people to care for an increasing number of people who need care. In addition to this, increased female labour force participation means that fewer women are available to provide the informal care that they traditionally provided.[8] Running parallel to these social shifts, advances in the understanding of gender equality are focusing attention on women's inequitable caregiving activities. With calls for welfare systems to support more men to share unpaid care responsibilities,[9 28 29] there are increasing initiatives supporting a redistribution of caregiving responsibilities to men. Such initiatives are largely focused on supporting men to share caregiving responsibilities in early childhood parenting. Scandinavian countries have seen significant shifts in participation of men in caregiving roles, this being driven by social and welfare policy that has incentivised male caregiving.[30 31] Male caregiving is therefore likely to continue to increase, and this underscores the importance of examining mental health impacts of informal care provision on men.

Different theoretical frameworks have been proposed to describe the impact of caregiving on caregivers. Sorensen *et al*[32] integrated the stress process model[33] and the appraisal model[34] in a model of carer stress and burden.[32] This model conceives primary stressors (type and intensity of care recipient symptoms, task intensity and duration) as causing secondary stressors (financial pressures, impacts on caregivers' employment, loss of caregiver leisure time). Caregivers' subjective appraisal of these stressors and their situation determines behavioural outcomes (healthy/unhealthy behaviours), physiological and physical outcomes and psychosocial outcomes (depressive symptoms,

Table 4 Average of treatment effect (ATE) of caregiving on depressive symptoms

	Potential outcome means			
	Began caregiving	Did not begin caregiving	ATE (95% CI)	Risk ratio (95% CI)
Primary analyses				
Model a	0.23	0.11	0.11 (0.06, 0.17)	2.03 (1.55, 2.51)
Sensitivity analyses				
Model b	0.21	0.11	0.10 (0.04, 0.15)	1.92 (1.38, 2.45)
Model c	0.20	0.11	0.09 (0.04, 0.14)	1.77 (1.32, 2.21)
Model d	0.18	0.11	0.06 (0.02, 0.10)	1.53 (1.17, 1.90)
Model e	0.21	0.11	0.10 (0.05, 0.15)	1.89 (1.47, 2.31)

Models adjusted for country of birth, relationship status, education, age group, status, region and area disadvantage.
a: caregiving wave 1—depressive symptoms wave 2; b: caregiving wave 1—depressive symptoms wave 2, controlling for household income; c: caregiving wave 1—depressive symptoms wave 2, controlling for employment; d: caregiving wave 1—depressive symptoms wave 2, controlling for baseline depressive symptoms; e: caregiving wave 2—depressive symptoms wave 2, controlling for baseline depressive symptoms.

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mental health).[33] Other background factors (sociodemographic factors such as age, gender, race/ethnicity) may impact on the caregivers' appraisal, and exacerbating and ameliorating factors (eg, personality, resources, physical health, self-efficacy) may also modify the relationship between the different components of the model.[33] More recently, the Informal Caregiving Integrative Model has been proposed.[35] This model incorporates the model of carer stress and burden[32] and elements of the Job Demands-Resources Model[36] to describe impacts of caregiving on caregiver burnout.

Caregiving—paid and unpaid—is normatively female and inherently undervalued. According to the theoretical frameworks presented above, it is possible that this normative context may impact on men's subjective appraisal of their caregiving and may compound experiences of stress and depressive symptoms among men. Recognising the value and contribution of care provision and normalising male caregiving will benefit both men and women.[37] While normative change can be slow, well-considered initiatives can induce relatively rapid and successful shifts in gender normative expectations and behaviours, as the well-funded, non-transferable leave for fathers in Norway has demonstrated.[30] To support this however, understanding and mitigating the impacts of caregiving on caregivers' health and well-being are of key importance.

Strengths and limitations

We note some strengths and limitations of this analysis. First, the prospective design and the use of data from a nationally representative study of Australian men represent a key strength of this work, bolstering the external validity of our work. Second, we applied a robust analytical approach, AIPW, which reduces bias related to confounding. Relatedly, our analyses controlled for a range of covariates that could plausibly confound the relationship between caregiving and depressive symptoms. Third, our results were consistent across multiple sets of analyses, thus supporting main findings. Fourth, the measure of caregiving used captured 'incident' caregiving, that is, caregiving that commenced in the past 12 months. It is often difficult to isolate the point of exposure in panel studies of this kind; however, the use of incident caring reduced measurement error associated with the caring measure. Finally, we use a well-validated measure of depressive symptoms.

Despite the strengths of this work, limitations include the single-item measure of incident caregiving, which does not capture the variations in caregiving intensity or frequency. There is also some possibility of bias due to exposure misclassification, with this potentially arising due to some carers not identifying as carers. Relatedly, it is possible that the exposed group may be over-represented by those for whom caregiving has been more intensive or impactful. Furthermore, we have no information on who was being cared for. This means that our analysis cannot account for the number of care recipients, who they were, what conditions or disabilities they had that necessitated care. While we included a range of covariates to adjust for potential confounding, it is possible that residual confounding biased results. We note that items used in this analysis came from self-reported responses and may be subject to misclassification and information bias,[11] and there is some evidence that some groups are under-represented. Under-represented groups include those born outside Australia and younger men. As the surveys were conducted in English, those with limited proficiency in English will also be under-represented. A higher proportion of respondents were located in non-urban areas—this reflecting a deliberate sampling strategy of the study.[11] While not a limitation, we also acknowledge that this study uses data from the Longitudinal Study of Australian Male Health, and as such, only men are included in this analysis.

It is also important to note that our caregiving measure captured incident caregiving—that is, those who became a caregiver in the previous 12 months. Our results, therefore, cannot be interpreted as evidencing the impacts of caregiving, as it is possible that some of those in our reference group (those who did not begin a caregiving role) were caregivers, nor can they be interpreted as indicative of the impacts of persistent caregiving.

CONCLUSION

This study provides evidence of a relationship between becoming a caregiver and depressive symptoms among a sample of Australian men, with those men who became caregivers in wave 1 reporting more depressive symptoms 2 years later. As societies seek to shift caregiving responsibilities toward a more gender-equal distribution of care, there is a need for policy to recognise that, like female caregivers, male caregivers also experience mental health impacts related to their caregiving role.

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Contributors TLK acquired the funding, conceived the study, carried out the analysis and wrote the paper. YT, HM and PV contributed to analytical design, interpretation of findings, and review and revision of drafts. All authors approved the final version of the manuscript. TLK is the guarantor for this work.

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Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants. Ten to Men received approval from the University of Melbourne Human Research Ethics Committee and conformed to the principles embodied in the Helsinki Declaration of 1975, as revised in 2013. All participants provided written consent to participate. This study also received ethics approval from the University of Melbourne Human Ethics Advisory Group (#1955718.1).

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Data availability statement Data may be obtained from a third party and are not publicly available. The data that support the findings of this study are available from Dataverse, managed by the Australian Data Archive. Restrictions apply to the availability of these data, and interested users may apply for data from https://dataverse.ada.edu.au/dataset.xhtml?persistentId=doi:10.26193/VTCZFF.

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