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The effect of informal caring on mental health among adolescents and young adults in Australia: a population-based longitudinal study

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Summary

Background Young carers are people aged up to 25 years who provide unpaid care to a relative or a friend living with a long-term condition or a disability. Providing informal care is associated with poor mental health. Longitudinal evidence on this relationship among young people is scarce. To address this gap, we assessed the mental health of people aged 15–25 years when providing informal care compared with when not providing informal care.

Methods We conducted a population-based longitudinal study using 20 years of data between 2001 and 2020 from the Household Income and Labour Dynamics in Australia (HILDA) survey. We included observations of participants aged 15–25 years with at least two observations across 20 waves of HILDA. Informal care was categorised as 0 h per week, 1–19 h per week, and 20 or more h per week. Mental health was measured using the Mental Health Inventory (MHI-5) from the 36-Item Short Form Survey (SF-36). Multivariate linear fixed-effects regression models were fitted to assess within-person changes in mental health when providing different levels of informal care.

Findings Of 44 663 people with 410 658 observations who participated in HILDA waves 1 to 20, 32 726 were excluded with 351 445 observations. 11 937 young people (with 59 213 observations) were deemed eligible for this study and, of these, 8996 participants with 43 231 observations were included in the complete case analytical sample. When caring for 1–19 h per week, young carers had an MHI-5 score of –1·98 points (95% CI –3·06 to –0·89) compared with when caring for 0 h per week. Mental health was worse when caring for 20 or more h per week, with participants displaying an MHI-5 score of –3·47 points (95% CI –6·02 to –0·92) compared with when caring for 0 h per week. Our findings were consistent across sensitivity tests.

Interpretation Our findings suggest potential mental health effects of informal care in young people, particularly when providing an intense amount of caregiving. Reducing young caring loads could be a possible avenue for intervention.

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Introduction

Adolescence and youth are crucial periods of development that involve substantial social, behavioural, and psychological changes.[1] Most lifetime mental health disorders (about 75%) start in the period of adolescence and youth.[2] Research attention has been dedicated to understanding the determinants of youth mental health and identifying young people at risk of poor psychological outcomes.[3] Two groups that warrant research attention are young and young adult carers. To date, there has been little focus on their mental health.[4,5] Young and young adult carers represent a substantial proportion of the population in industrialised countries, with about 2–8% of youth taking on informal caring roles.[6] Although informal care is known to affect the mental health of working age caregivers,[7] longitudinal evidence is needed to quantify the mental health effects of informal care in younger people.[4,5]

There are multiple ways in which young people (aged up to 25 years) who provide informal care are defined. Young carers are typically described as children and adolescents (younger than 18 years) who provide unpaid and informal assistance to a relative or a friend living with a long-term health condition or disability. The term young adult carers distinguishes people aged between 18 and 25 years who engage in these caring roles.[8] Acknowledging the extended period of adolescence,[9] this Article uses the term young carers in reference to children, adolescents, and young adults who provide unpaid informal care.

The COVID-19 pandemic underscored the vulnerabilities and limitations of a resource-strained formal care sector.[10] As the population ages and chronic disease prevalence continues to increase,[10] reliance on unpaid informal carers is expected to rise.[10,11] Changes in family

Research in context

Evidence before this study

Most lifetime mental health disorders (75%) start in the period of adolescence and youth. As such, research attention has been dedicated to identifying young people at risk of developing poor mental health outcomes. A group that warrants attention is that of young caregivers—that is, young people who provide unpaid assistance to a relative living with a long-term health condition or disability. We searched MEDLINE, Embase, PsychInfo, and Web of Science using the following terms: ((Young carer* or young caregiver* or caregiving youth or young caregiver* or young adult carer* or young adult caregiver* or child carer* or child caregiver* or child care giver*) OR ((Caregiver*) AND ("Young adult" or Adolescent or Child))) AND (Mental health or psychological* or depressi* or depression or anxiety or anxiety disorders or Stress Disorders, Post-Traumatic or Posttraumatic Stress Disorder or Post traumatic Stress Disorder or Post-traumatic Stress Disorder or Stress, Psychological or Stress or Psychological Stress). No date or language restrictions were applied to the search. The last search was done on March 17, 2021. Peer-reviewed studies were included if they compared mental health outcomes of young carers (aged up to 25 years) and their non-caring peers using a quantitative methodology. We identified ten eligible studies and summarised these in a systematic review. Seven studies were cross-sectional and three longitudinal. Informal care among young people was consistently associated with poor mental health outcomes, but there was a paucity of high-quality longitudinal evidence that comprehensively accounts for confounding and the different levels of complexity of the caregiving role.

Added value of this study

This Article fills evidence gaps in young carer research by drawing on 20 years of data from the Household Income and Labour Dynamics in Australia survey and applying a fixed-effects regression approach to the research question "Does providing informal care at 25 years or earlier affect young people's mental health?". In doing so, our analyses provide robust estimates that account for measured and unmeasured time-invariant confounding, maximising the comparability of exposed and unexposed observations. Moreover, we disentangle the mental health effects of intense (20 h or more of care per week) and non-intense caregiving (1–19 h of care per week) according to the extent of caring demands. We identified that young caregiving is associated with poorer mental health, with mental health differences being larger when caring for 20 or more h per week.

Implications of all the available evidence

Previous evidence shows that young carers (aged up to 25 years) display poorer mental health outcomes than their non-caring peers. Our study substantiates this finding using a longitudinal sample of Australians aged 15–25 years. Although small from a clinical standpoint, these differences are of public health importance as on average they represent potential changes in mental health outcomes of young carers at the population level. Little is known about the longer-term consequences for people who provided informal care among this group. However, previous evidence establishes adolescent mental health as an important determinant of mental and physical health over the life course. Without adequate support, the mental health differences attributed to informal care might place young carers at a disadvantage relative to their non-caring peers. Although more evidence is needed to advance this field of research, reducing the number of hours of care among young carers could potentially improve their mental health.

structures—characterised by increased divorce rates and delayed parenthood—might lead to a growing number of younger carers.[12] Positioned at a crucial development point, young carers' life course stage is central to how their caring role could affect their wellbeing.[12] Although many young carers take pride in their roles and report positive aspects of their caring,[13] providing care can impact their social, educational, and economic development.[13–16]

A recent systematic review evaluated quantitative evidence of the association between informal care and mental health among adolescents and young adults.[4] Although the authors reported that young carers consistently showed poorer mental health than their non-carer peers, the review highlighted that evidence on this association is largely cross-sectional.[4] From the few studies analysing longitudinal data, one from Australia found that informal care in adolescence increased the risk of psychological distress after 4 years of follow-up.[14] Another limitation of the available evidence is the use of between-person comparisons. This is an important limitation because time-fixed individual characteristics such as early childhood psychosocial experiences[15]—experiences that can influence the mental health impact of informal care—are often unmeasured or difficult to ascertain. This means that between-person comparisons are at risk of yielding biased effect estimates related to these unmeasured confounders.[16] One way of accounting for unmeasured time-invariant characteristics is examining within-person differences.[16] Although within-person differences in mental health associated with changes in informal care have been established among older carers,[17] no previous study has undertaken this methodology using a sample of people aged 25 years or younger.

Another methodological gap identified in the systematic review was a significant focus on binary definitions of caregiving.[4] Young carers' roles can be described on a continuum of low to high caring responsibilities, with higher responsibilities likely to produce greater psychological strains.[6] Comprehensive measures that account for the type and extent of support provided by young carers are needed to identify young carers who are most vulnerable to poor mental health. The number of hours spent on the caregiving role is a marker of the complexity and chronicity of care.[18] In older adults, the mental health effects of informal care are exacerbated among those caring for more than 20 h per week (intense caregiving).[19,20] The implications of providing intense care when age 25 years or younger for people's mental health have not been explored using large longitudinal population-based data.

This Article draws on 20 years of longitudinal data from the Household, Income and Labour Dynamics in Australia (HILDA) survey to fill the current evidence gaps. This study aimed to assess the longitudinal changes in mental health when young people are in different caregiving categories, and examine whether the mental health effect of young caring varies by the extent of weekly caring activities (0 h, 1–19 h, and 20 or more h).

Methods

Study design and participants

We conducted a population-based longitudinal study using the HILDA survey. HILDA is a panel survey of Australian households following more than 17 000 Australians aged 15 years and older.[21] A description of HILDA and the analytical sample can be found in the appendix (p 5).[22,23] In brief, HILDA is a probabilistic cohort that started data collection in 2001 with yearly data collection waves including data on social, demographic, and economic characteristics and health conditions. The initial response rate of HILDA was 66%, and the cohort retention rates from waves 2–20 ranged from 86·9% to 97·0%. Detailed information about the cohort is presented in the appendix (p 5).

Given the focus on mental health effects of informal care in Australian youth, the sample was restricted to observations of participants aged 15–25 years across 20 waves of HILDA. Therefore, our analytical sample comprises observations of young Australians between 2001 and 2020 who contributed to at least two waves of data.

HILDA is conducted by the Melbourne Institute of Applied Economic and Social Research at the University of Melbourne and meets the ethical standards highlighted in the National Statement on Ethical Conduct in Research Involving Humans, ensuring its performance fulfils the ethical requirements set in the Declaration of Helsinki. Respondents provided written informed consent to participate in the HILDA surveys. The undertaking of the initial HILDA survey and follow-up waves was approved by the Human Research Ethics Committee at the University of Melbourne. The present project utilises secondary data and poses minimal risk to participants. However, independent ethics approval was sought and obtained from the Office of Research Ethics and Integrity at the University of Melbourne (reference number 2021–20333–16440–3).

Procedures

Data was extracted by LFA. Informal care information was extracted from the time use questions of HILDA's self-completion questionnaire.[24] Responses to the time use questions of HILDA demonstrate good validation against nationally representative time diary estimates from the Australian Bureau of Statistics.[20] The current paper uses participants' reports of total amount of hours spent "caring for a disabled spouse or disabled adult relative, or caring for elderly parents or parents-in-law" in a typical week over the 20 waves. Aligned with previous work on informal care, hours of care were categorised as 0 h per week (non-caring comparator), 1–19 h per week, and 20 or more h per week.[19,25]

The outcome variable of mental health was measured using the five items of the Mental Health Inventory (MHI-5), derived from the Short Form-36 (SF-36) general health measure over 20 waves. MHI-5 and SF-36 have shown high validity in the Australian context and among people aged 15 years and older.[22] MHI-5 is a validated measure of psychological morbidity and demonstrates good correlations with clinical diagnosis of mood disorders, such as depression and anxiety.[23] MHI-5 measures symptoms of depression and anxiety (nervousness, sadness, and depression) as well as positive aspects of mental health (happiness and peacefulness). Participants were asked to rate their frequency of mental health experiences in the past month using the following response options: all of the time, most of the time, a good bit of time, some of the time, a little of the time, or none of the time.[23] The items were summarised into a continuous score ranging from 0 to 100, with lower scores indicating worse mental health.[26]

See **Online** for appendix

Demographic data, including gender, country of birth and Indigenous identity, were collected from participants through a questionnaire when they first joined the survey.

Several factors were identified as common causes of informal care and mental health, and these are presented in the appendix (p 4). We adjusted for the following time-varying confounding factors: age (as a continuous measure), household structure (couple with no children, couple with children, lone parent with children, lone person, and other), number of children in household, children younger than 5 years in the household (no or yes), disability in household (no or yes), survey year, and area level of remoteness (major city or regional, remote, or very remote). Data for these variables were collected over the 20 waves. Due to the limited number of caregiving observations from remote and very remote areas, observations in this category were grouped with those living in regional Australia. All these measures were self-reported by the participants through structured face-to-face or telephone-assisted interviews.[19]

Statistical analysis

We conducted a set of descriptive analyses to assess the distribution of time-invariant and time-variant sociodemographic factors as well as mental health across observations according to informal care categories. Linear fixed-effects regression analyses, adjusted for the aforementioned confounding factors and a time dummy for the survey year, were fitted to assess within-person changes in mental health scores attributed to variations in hours of weekly care. This approach contrasts individual mental health scores when participants are exposed and unexposed. The beta coefficient (β) from the linear fixed-effects models represents the average within-person mental health differences between years exposed and unexposed to caring, with negative values indicating poorer mental health. Because participants act as their own control, fixed-effects analyses effectively account for time-fixed confounding factors (such as gender and ethnicity).[16] We specified the individual respondent identification as the panel variable and the survey wave as the time variable. We conducted a Hausman test to compare estimates between the fixed-effects and the random-effects model. This test assesses whether individual characteristics are correlated with the variables included in the model.[27] On the basis of this comparison, we concluded that the fixed-effects model was more appropriate. In addition to this, we conducted a modified Wald test to assess heteroskedasticity and concluded that groupwise variance was not constant. We therefore, utilised the vce(robust) subcommand to control for heteroskedasticity and serial correlation.

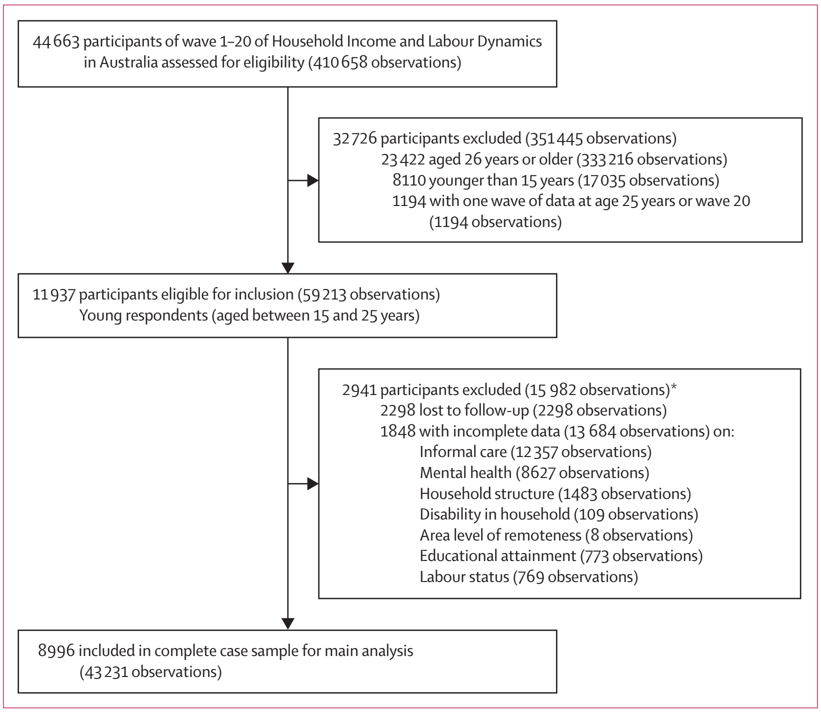

***Figure:* Study profile**
*Note that some participants are included in both the lost-to-follow-up category and the incomplete data category.

We conducted a series of sensitivity tests to account for variations in educational attainment (bachelor's degree or diploma or certificate, year 12, or school not completed), labour status (employed, unemployed, not in the labour force), and quintiles of household income (ranked from lowest to highest). We judged that weekly hours of informal care could affect education, employment, and household income for young people,[28] placing these variables on the causal pathway between informal care and mental health. If these variables are mediators, controlling for them as confounders could introduce bias, thus we excluded them from main analyses and included them as confounders in sensitivity analyses. Additionally, we conducted a set of sensitivity analyses restricted to participants with changing caring status. An additional set of sensitivity analyses accounted for household level cluster. Finally, we compared sociodemographic characteristics and relevant time-varying covariates between observations in the analytical sample and those in the eligible sample (appendix p 13). We also compared participants with complete and incomplete follow-up (appendix p 14). We identified differential attrition and missingness (appendix p 6). To address potential selection bias, all analyses were repeated on an imputed sample.

We approached multiple imputation to attribute participants' values for missing information (within-wave imputation);[29] details are provided in the appendix (p 15). We performed imputation using chained equations with 100 replications to construct the imputed dataset. All the covariates and informal care and the mental health outcome were included in the model, as well as the following ancillary variables that were strongly correlated with missingness: gender, country of birth, Indigenous identity, age, household income, and area level of remoteness (appendix p 13). All analyses were done with Stata 16.

Role of the funding source

The funders of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

Results

A total of 44 663 people, with 410 658 observations, participated in HILDA waves 1 to 20. Of these, 32 726 participants were excluded with 351 445 observations. 11 937 young people, contributing to 59 213 observations, were deemed eligible for this study. Observations with incomplete data on informal care, mental health, and relevant covariates were censored (list-wise deletion), yielding a total sample of 8996 individual participants with 43 231 observations included in the complete case analytical sample (figure). On average, participants contributed a mean of 6·70 years of observations (SD 2·81) with a minimum of 2 years to a maximum of 11 years.

The sociodemographic characteristics of the sample according to categories of informal care are presented in table 1. From the 43 231 observations included, most participants reported providing 0 h of weekly care (41 978 observations [97·1%]), while only a small proportion reported engaging in caring activities for 1–19 h

	0 h of care per week (n=41 978 observations)	1–19 h of care per week (n=1027 observations)	20 h or more of care per week (n=226 observations)	Overall (n=43 231 observations)
Time-invariant sociodemographics				
Gender				
Male	19 764 (47·1%)	501 (48·8%)	93 (41·2%)	20 358 (47·1%)
Female	22 214 (52·9%)	526 (51·2%)	133 (58·8%)	22 873 (52·9%)
Country of birth				
Australia	38 590 (91·9%)	946 (92·1%)	211 (93·4%)	39 747 (91·9%)
Other	3388 (8·1%)	81 (7·9%)	15 (6·6%)	3484 (8·1%)
Indigenous identity				
Non-Indigenous Australian or born overseas	40 165 (95·7%)	972 (94·6%)	204 (90·3%)	41 341 (95·6%)
Aboriginal or Torres Strait Islander	1813 (4·3%)	55 (5·4%)	22 (9·7%)	1890 (4·4%)
Time-variant sociodemographics				
Age, years	19·9 (3·1)	20·3 (3·0)	20·8 (3·1)	19·9 (3·1)
Educational attainment				
Bachelor's degree, diploma, or certificate	11 079 (26·4%)	288 (28·0%)	40 (17·7%)	11 407 (26·4%)
Year 12	14 108 (33·6%)	311 (30·3%)	83 (36·7%)	14 502 (33·5%)
School not completed	16 791 (40·0%)	428 (41·7%)	103 (45·6%)	17 322 (40·1%)
Labour status				
Employed	27 767 (66·1%)	645 (62·8%)	74 (32·7%)	28 486 (65·9%)
Unemployed	3887 (9·3%)	110 (10·7%)	31 (13·7%)	4028 (9·3%)
Not in labour force	10 324 (24·6%)	272 (26·5%)	121 (53·5%)	10 717 (24·8%)
Household structure				
Couple with no children	6528 (15·6%)	162 (15·8%)	30 (13·3%)	6720 (15·5%)
Couple with children	21 911 (52·2%)	492 (47·9%)	93 (41·2%)	22 496 (52·0%)
Lone parent with children	6422 (15·3%)	192 (18·7%)	67 (29·6%)	6681 (15·5%)
Lone person	4598 (11·0%)	82 (8·0%)	12 (5·3%)	4692 (10·9%)
Other	2519 (6·0%)	99 (9·6%)	24 (10·6%)	2642 (6·1%)
Disability in household				
No	37 663 (89·7%)	875 (85·2%)	168 (74·3%)	38 706 (89·5%)
Yes	4315 (10·3%)	152 (14·8%)	58 (25·7%)	4525 (10·5%)
Children aged <5 years in the household				
No	38 855 (92·6%)	942 (91·7%)	198 (87·6%)	39 995 (92·5%)
Yes	3123 (7·4%)	85 (8·3%)	28 (12·4%)	3236 (7·5%)
Children aged <15 years in the household	0·12 (0·4)	0·13 (0·4)	0·23 (0·6)	0·12 (0·5)
Quintiles of household income				
1 (lowest)	5861 (14·0%)	199 (19·4%)	74 (32·7%)	6134 (14·2%)
2	7475 (17·8%)	229 (22·3%)	74 (32·7%)	7778 (18·0%)
3	9542 (22·8%)	226 (22·0%)	35 (15·5%)	9803 (22·7%)
4	10 843 (25·8%)	219 (21·3%)	24 (10·6%)	11 086 (25·6%)
5 (highest)	8257 (19·7%)	154 (15·0%)	19 (8·4%)	8430 (19·5%)
Area level of remoteness				
Major city	27 215 (64·8%)	651 (63·4%)	118 (52·2%)	27 984 (64·7%)
Regional, remote, or very remote	14 763 (35·2%)	376 (36·6%)	108 (47·8%)	15 247 (35·3%)
Outcome				
MHI-5 scores	71·7 (17·5)	66·6 (19·6)	60·8 (19·7)	71·6 (17·6)

The 41 978 non-carers were nested in 8945 participants, the 1027 observations of those who cared for 1–19 h per week were nested in 715 participants and the 226 observations of young people caring for 20 h or more per week at least once over the study period were nested in 155 participants. MHI-5=Mental Health Inventory-5. Household Income and Labour Dynamics in Australia collects data on sex in the household form and available options are male, female, or other.

Table 1: **Distribution of sociodemographic characteristics and MHI-5 scores across observations, stratified by weekly hours of care**

per week (1027 observations [2·4%]) and 20 or more h per week (226 observations [0·5%]). The mean age of observations was 19·9 years (SD 3·1), with negligible differences across caring categories. Most participants were born in Australia and were from a non-Indigenous background. Although the gender distribution of informal care was similar for males and females providing 1–19 h of care per week (501 [48·8%] of 1027 observations *vs* 526 [51·2%] of 1027 observations), females were over-represented when caring for 20 h or more (93 [41·1%] of 226 observations and 133 [58·8%] of 226 observations for males and females, respectively). A higher proportion of observations from participants providing 0 h of care per week were employed (27 767 [66·1%] of 41 978), and 121 (53·5%) of 226 observations of those providing care for 20 h or more were not in the labour force. Caregiving observations were over-represented in single-parent households (18·7% [192 observations] when caring for 1–19 h per week; 29·6% [67 observations] when caring for 20 h or more) and in households in lower quintiles of income compared with non-caring observations (15·3% [6422 observations]; table 1). The distribution of observations for living with someone with a disability was also higher when providing 1–19 h (152 [14·8%] of 1027) and 20 h or more of care per week (58 [25·7%] of 226) than for those caring for 0 h per week (4315 [10·3%] of 41 978).

Linear fixed-effects regression analyses examining within-person changes in mental health in relation to changes in informal care adjusted for age, household structure, number of children in the household, children younger than 5 years in the household, household disability, survey year, and area level of remoteness are presented in table 2. When caring for 1–19 h per week, informal carers had lower mental health scores (–1·98 [95% CI –3·06 to –0·89]) than when caring for 0 h per week. The mental health difference was more pronounced when caring for 20 h or more per week, with a mental health score of –3·47 (95% CI –6·02 to –0·92]) compared with when providing no care. There were non-substantial variations in these estimates when adjusting for educational attainment, labour status, and quintiles of household income (table 2).

Our analyses were also consistent across sensitivity analyses restricted to individuals with changing caring status and accounting for household level cluster (appendix p 16). Finally, the imputed analysis showed a similar trend to the complete case analyses, displaying slightly larger mental health differences between caring and non-caring observations (appendix p 17).

Discussion

Our results provide robust evidence of the effect of caregiving roles on young carers' mental health. Although mental health was poorer when caring relative to not caring, the average mental health differences were larger when caring for 20 hours or more, consistent with a dose–response relationship (mental health scores were lower when providing more hours of weekly care). These findings were robust across sensitivity tests accounting for the confounding effect of time changes in education, employment, and household income. Considering that our analyses are the result of contrasting individuals' mental health scores when caregiving with scores when not caregiving, these results reflect psychological effects in the short term.

This Article fills important gaps in evidence.[4,5] To our knowledge, this is the first study to apply a fixed-effects approach to this research question, accounting for time-invariant confounding and maximising comparability. Moreover, this study disentangled the mental health effects of informal care according to the extent of caring demands, evidencing a dose–response relationship. This is an important distinction when targeting interventions and identifying groups at higher risk of poor mental health.

Our results align with previous longitudinal findings on the mental health effects of informal care in adults.[17] More importantly, our findings corroborate that the mental health costs of informal care are more substantial for those undertaking high caring loads.[14] Together, these findings highlight that the time strains imposed by caring demands could underlie the mental health effect among young carers.

One explanation for these findings relates to the caregiving role overload.[18] Young carers, especially those providing intense caregiving, not only dedicate a considerable part of their time to these roles, but they also spend a substantial amount of time and energy living in a state of constant readiness and concern.[30] The ongoing stress of the caregiving role might underpin the observed mental health effects. Informal care could also

	Model 1* β (95% CI)	Model 2† β (95% CI)	Model 3‡ β (95% CI)	Model 4§ β (95% CI)	Model 5¶ β (95% CI)
0 h caring per week	1 (ref)	1 (ref)	1 (ref)	1 (ref)	1 (ref)
1–19 h caring per week	–1·98 (–3·06 to –0·89)	–1·97 (–3·06 to –0·89)	–1·97 (–3·06 to –0·88)	–1·97 (–3·06 to –0·88)	–1·96 (–3·05 to –0·87)
20 h or more caring per week	–3·47 (–6·02 to –0·92)	–3·40 (–5·96 to –0·85)	–3·44 (–6·00 to –0·90)	–3·49 (–6·03 to –0·93)	–3·40 (–5·96 to –0·84)

*Model 1: adjusted for age, household structure, number of children in household, presence of children younger than 5 years in the household, disability in household, survey year, and area level of remoteness. Within-person model from fixed-effects analyses R^2=0·02. †Model 2: adjusted for variables in model 1 and educational attainment. Within R^2=0·02. ‡Model 3: adjusted for variables in model 1 and labour status. Within R^2=0·02. §Model 4: adjusted for variables in model 1 and quintiles of household income. Within R^2=0·02. ¶Model 5: adjusted for variables in models 1, 2, 3, and 4. Within R^2=0·02.

***Table 2:* Within-person differences in Mental Health Inventory-5 scores related to changes in informal care**

be isolating for young carers.[30] Many are forced to prioritise other obligations, such as maintaining employment and continuing their education, limiting their engagement with peers.[30] Furthermore, although most young people are afforded an extended period of adolescence,[9] caring responsibilities necessitate that young carers mature early, further marking them as different to their peers.[16] These feelings of isolation and loneliness could amplify the existing mental health strains of informal care.

Although mental health differences related to informal care observed in this study are small from a clinical standpoint,[31] these differences could indicate potential shifts in the distribution of average mental health at the population level.[32] Although little is known about the lifetime consequences of informal caring before the age of 25 years, it is generally well established that poor mental health in early life can predict adult mental health.[33,34] Evidence shows that poor mental health in youth increases the risk of adult depression, anxiety, and suicidality,[33] and predicts low educational attainment[34] and unemployment.[34] Without adequate support, the mental health differences attributed to informal care could potentially place young carers at a disadvantage relative to their non-caring peers, with possible consequences for their personal, educational, and economic development.[28]

Different avenues of support to alleviate the pressures on informal carers exist, including respite care programmes and income support payments.[35] However, overall, targeted assistance to young carers is limited.[30] This is a substantial gap in support because the needs of young carers might differ from older carers.[30] For example, time restrictions around employment and educational engagement imposed on recipients of carer payments could dissuade young carers from seeking this type of support. These payments are more appropriate to support older carers who are either close to retirement or at advanced and stable stages of their careers. Regarding young carers, limiting their employment and educational participation could restrict their economic development in an increasingly competitive labour market.[11] Furthermore, low recognition of their contribution to care work might deter young carers from help-seeking.[30] Although no single country provides an adequate level of support, Australia's position on awareness and policy responses to young carers remains stagnant at an intermediate level, with some awareness of their contributions and needs at the state and national level, but only small-scale policy responses over the past 16 years.[36–38] As such, young carers' uptake of support services remains low.[39] This is partly a consequence of the paucity of research on the topic,[4] but issues related to the identification of young carers[30,39] and the under-recognition of young people as informal care providers must be acknowledged. There is an ongoing need for governments worldwide to recognise and actively seek to identify young people who provide informal care. This identification could be done through schools, health services, and disability services,[30] although further research is needed to understand best modes of identification among this population.

Our study and analytical approach have some limitations. Although our findings are generalisable to the Australian and similar populations, they might have less generalisability to low-income and middle-income countries. Additionally, fixed-effects analyses restrict the sample to participants who move through different exposure categories (either out of or into informal caring) and drop non-varying observations. Therefore, the analysed sample represents young carers who had disengaged from their caring role (or started a new one) at least once over the 20 waves of HILDA. As such, these findings provide little information about the cumulative effect of continuous caregiving. The use of cumulative exposures could address this limitation. However, given the small sample of young carers and the inability to ascertain the start of caregiving for participants aged 15 years, we could not determine the precise extent of cumulative caregiving. This is a common issue in large population-based datasets because data are not customarily collected from people younger than 15 years.[40] Our findings also assume symmetry of change in mental health when caring starts and stops. Given that in some cases caregiving stops due to the passing of the care recipient or worsening of their health condition, our reference category (0 h of care) could include participants with low scores of mental health. The violation of this assumption can potentially mask some of the observed effects. We recommend that future research addresses these gaps.

Another limitation pertains to the potential misclassification of informal care. Identifying young carers is difficult, and many do not disclose their caring roles.[12] Given that informal care was self-reported, we might have failed to capture the true extent of informal caregiving. Furthermore, the caring item was restricted to caring for a disabled adult or an older relative, which does not represent all forms of informal care that young carers might engage in (eg, sibling care). Misclassification of young carers in these ways could lead to non-differential misclassification of the exposure, attenuating the observed effects. Notably, most young carers care for a disabled parent,[41] and only a small proportion of observations are likely to be mismeasured.

The ascertainment of mental health might also be subjected to measurement error. This risk was largely minimised through the use of a highly validated mental health measure. Moreover, given that participants were unaware of the study hypothesis, if present, outcome measurement error would be non-differential. Notably, the mental health measure utilised in this study reflects subjective feelings of distress. Although this measure is highly correlated with diagnosis of internalising mental health conditions, including depression and anxiety, it does not capture externalising psychological symptomatology.

We note that information regarding the specific health conditions of the care recipients was not available. This is an important limitation because the type of support needed and delivered might vary according to the health condition and care needs of the care recipient, and the mental health impact of this on the mental health of young carers could also vary accordingly. We recommend that future research addresses this knowledge gap. Furthermore, due to the limited sample size of caregiving observations, especially among those providing 20 h or more of weekly care, we could not disaggregate data by gender. We were also unable to explore potential variations in our estimates related to country of birth. Examination of the role of gender and cultural background in this association should be another important avenue of future research.

For the **Australian Data Archive Dataverse** see https://dataverse.ada.edu.au/dataverse/DSSLongitudinalStudies

We acknowledge that the HILDA sample is slightly under-representative of men, dependent and non-dependent students, and people who are not in the labour force. However, these differences are not pronounced enough to affect generalisability.[42] Importantly, between-wave attrition does not occur at random.[21] Given that participants living in more vulnerable conditions than those in, for example, higher income households, were more likely to drop out, it is plausible that the probability of poor mental health was higher for participants who were lost to follow-up. We addressed this limitation by repeating our analyses in an imputed sample. We found that while these analyses substantiated our results, potential biases introduced by non-response might have underestimated the mental health differences associated with caregiving.

As a final note, although fixed-effect analyses are robust to confounding, this methodology does not address reverse causation (whereby mental health status influences selection into caregiving).[16] Evidence on older adults suggests that healthy individuals might be more likely to be selected into caring roles than people with long-term physical conditions.[43] Although we are unaware of any evidence indicating that young people with poorer mental health enter caring roles, recent longitudinal evidence on the effect of informal care on the mental health of Australian adolescents demonstrates robustness to baseline mental health adjustments through the use of augmented inverse probability treatment weights.[14]

In summary, this study provides robust estimates on mental health differences related to providing informal care between the ages of 15 and 25 years, substantiating existing causal evidence of this association. Furthermore, we show that young carers displayed the lowest mental health scores when involved in intense caregiving (>20 h of weekly care), indicating that the time strains imposed by caring demands could potentially underpin the observed mental health differences. Given our findings, and previous evidence on mental health effects of caring in young people, programmes and strategies that account for the unique experiences of young carers are needed.

Contributors

LFA and TK conceptualised the research question and study design. LFA carried out data requests, cleaning, and analysis; these files were corroborated by TK. LFA and TK had full access to the dataset and accessed and verified the underlying data. All authors contributed towards the interpretation of results. LFA drafted the first version of the manuscript. TK, GD, KS, and AS revised the manuscript and contributed towards the final draft. All authors approved the submitted version of the Article. All authors confirm they had access to all the data in the study and accept responsibility for the decision to submit for publication.

Declaration of interests

We declare no competing interests.

Data sharing

The underlying data that support the findings of this study are not publicly available due to the conditions of data access from the data custodians. HILDA access can be requested through the Australian Data Archive Dataverse. Once approved, data specific to this study could be requested by contacting the corresponding author.

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