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Child Indicators Research
https://doi.org/10.1007/s12187-025-10237-7

Adverse Childhood Experiences (ACEs) in Young Adult Carers Relative to Non-carer Peers and Relations with Mental Health, Caregiving and Socio-demographics

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Accepted: 23 March 2025

Abstract
Young adult carers (YACs) report poorer mental health than their peers. Adverse childhood experiences (ACEs) constitute a mental health risk factor. Prior quantitative research has not investigated ACEs in YACs. Hence, this study explores ACEs in YACs and aims to: (1) compare ACEs in two groups of YACs (chronically ill parent and chronically ill non-parent family member contexts) with non-carer peers; (2) examine relations between caregiving and ACEs; (3) explore relations between socio-demographics and ACEs; (4) examine relationships between ACEs and mental health (depression, anxiety, well-being). A total of 1,823 Italians aged 18–29 completed an online survey. Of these, 1,458 reported no ill family member (non-carers) and 365 reported an ill family member (YACs); 268 with an ill parent, 97 with an ill non-parent family member. As predicted, YACs reported significantly higher ACEs than non-carers regardless of care context. Most reported ACEs in YACs: emotional neglect, emotional abuse, household mental illness, separation-divorce. Unexpectedly, caregiving was not significantly correlated with ACEs. Lower socio-economic status was correlated with higher ACEs. As hypothesised, higher ACEs predicted higher depression and anxiety and lower well-being. Results show that YACs are at greater risk of ACEs than non-carer peers, and that higher ACEs predict poorer mental health, hence supports should be developed that mitigate the harmful mental health effects of ACEs in YACs.

Keywords Adverse childhood experiences · Young adult carers · Youth caregiving · Youth mental health · Youth well-being

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Published online: 01 April 2025

1 Introduction

It is estimated that 349 million people worldwide are dependent on care (World Health Organization, 2017). Family members provide up to 80% of this care (Yghemonos, 2023). Where there are children, adolescents and young adults living in households with chronic illness, there is often a practical need, or filial obligation, for them to assist in caregiving tasks (D'Amen et al., 2021). When young people take on caregiving responsibilities for a family member with a chronic physical or mental illness, disability, or serious health issue relating to old age, they are referred to as young carers (<18 years) or young adult carers (18–29 years; YACs) (Landi et al., 2022d). However, definitions for young and young adult carers are ambiguous, with some researchers considering all young people who undertake caregiving responsibilities under the age of 25 to be young carers (Walker et al., 2024). For clarity, in this paper we use the terms young carers and young adult carers (YACs) to refer to young people with caring responsibilities under the age of 18, and between the ages of 18–29, respectively.

Young adulthood is a critical developmental period, characterized by complex patterns of identity exploration, instability, transition, and possibilities (Arnett et al., 2014). For YACs, a myriad of additional social, developmental and educational challenges makes navigating this period more complex, leading to an increased risk of poor mental health. YACs report higher rates of mental health issues (Fleitas Alfonzo et al., 2022; King et al., 2021) including depression (Bowman Grangel et al., 2024; Landi et al., 2022d; Lacey et al., 2024; Gallagher et al., 2022) and anxiety (Landi et al., 2022c; Greene et al., 2017) compared to their peers. Moreover, in response to life stressors, such as the COVID-19 pandemic, YACs had worse mental health outcomes than their peers (Landi et al., 2022d; Nakanishi et al., 2022). As such, the association between caregiving in young adulthood and poor mental health has become a global public health concern, sparking research into mental health risk factors in this population (Bowman Grangel et al., 2024).

One well-established risk factor for the development of mental disorders in adulthood is exposure to adverse childhood experiences (ACEs) (Felitti et al., 1998). ACEs are traumatic events that occur within a child's family or social environment that result in distress or harm and pose a disruption to current and future health and development (Kalmakis & Chandler, 2014). ACEs range from physical, sexual and psychological abuse or neglect to family dysfunction (e.g., family conflict, domestic violence, and disorganization). Research shows that ACEs are associated with future risk of poorer mental health, including anxiety, post-traumatic stress disorder, depression (Daníelsdóttir et al., 2024) and suicide attempts in adults (Choi et al., 2017) and young adults (Park et al., 2021). For context, ACE exposure is assessed by multi-item scales which enable the measurement of individual ACEs (e.g., exposure to physical abuse or emotional neglect), as well as the calculation of a composite score (Park et al., 2021).

Regarding research into ACEs in young carers, a small-scale mixed-methods study ($n=22$) found that children (age 8–18) caring for chronically ill parents reported elevated exposure to ACEs (Spratt et al., 2018). The authors noted that the findings merited further examination with a larger sample, but to our knowledge, there have been no published large-scale quantitative studies to date which address ACEs in young carers or young adult carers. While few studies on young carers and none on YACs explicitly examine ACE exposure, some research evidence suggests that they are likely to be at greater risk of exposure to ACEs over the duration of their caregiving role. For example, the U.S. Centers for Disease Control and Prevention (2024) has identified families with young carers as a risk factor for ACEs. Studies on young carers of parents with HIV show high exposure to traumatic events, such as caring for a dying or ill parent, parental separation, caregiver changes, abuse and exploitation (Ezell et al., 2021). In addition, the siblings of chronically ill children report feelings of abandonment, invisibility, a lack of stability, and frequent emotional distress (Havill et al., 2019). As such, we propose several pathways through which the presence of a seriously ill family member and youth caregiving are linked with ACE exposure.

The first pathway is via the impacts of chronic illness on family functioning. Chronic illness in a family member can adversely affect family functioning through two key mechanisms: family role redistribution and family identity disruption (Pedersen & Revenson, 2005). Families often respond to illness demands by the redistribution of roles, which can lead to family members feeling overburdened by their increased responsibilities and strained family relations (Pakenham & Cox, 2012). Additionally, the illness may be perceived as a serious threat to the ill member's life and thereby disrupt the family identity, such that transactions among family members become reorganized around the illness. In this way, illness may compromise the normative identity development and transactional processes of the family system (Reiss et al., 1993). Evidence of the adverse effects of a family member's illness on family functioning is indicated by findings showing that families with ill family members report experiencing fragmentation, altered relationships, strain and distress (Årestedt et al., 2014; Pedersen & Revenson, 2005). Importantly, a recent review identified poor family functioning as a major risk factor for a range of adverse experiences, including domestic violence, divorce, parental psychopathology, and abuse (Scully et al., 2020).

A second pathway is via the boundary dissolution between child and parents that can occur when the child takes on adult caregiving roles. As mentioned, the presence of illness alters family functioning through a redistribution of normative roles, which often involves children having to function as caregivers (Thompson et al., 2024). A process of parentification (i.e., where a child takes on responsibilities ordinarily carried out by a parent, or adult) results in boundary dissolution between children and parents, which can reduce the developmentally appropriate emotional and instrumental support the child receives from the parent, which in turn increases the risk of externalizing and internalizing behaviors in the child (Thompson et al., 2024).

The risk of ACE exposure is likely to be exacerbated when the ill family member is a parent. Family functioning is not only impacted through the parents' difficulties in fulfilling their parental responsibilities, which as described, results in role redistribution and boundary dissolution, but also via parental distress (Pedersen & Revenson, 2005). Parental distress is a risk factor for ACE exposure (Crouch et al., 2019). Moreover, parental illness and distress may adversely impact the quality of the parent-child relationship as well as the frequency of parental monitoring and supervision (Kotchick et al., 1997), which increase the risk for ACE exposure (Centers for Disease Control and Prevention, 2024). In addition to these risk factors, parents with chronic diseases and disabilities are often inadequately supported to remain in employment (Silvaggi et al., 2020), placing young carers at risk of poverty (Vizard et al., 2019).

Another pathway to ACE exposure is through the nature of the caregiving carried out by young carers. Certain caregiving responsibilities fundamentally increase the risk of exposure to adverse experiences. For example, administering personal care, engaging in strenuous physical activity, administering medication, providing emotional support, and managing finances are all considered inappropriate tasks for children under the UK Care ACT 2014 (Gowen et al., 2021). However, research shows that young carers regularly carry out these caregiving activities (Gowen et al., 2021). These care tasks are considered beyond the psychological and physical capabilities of a child or adolescent and therefore place high burden and strain on the young person, negatively impacting their mental health and increasing the risk for adverse exposures (King et al., 2023).

Regardless of how proficient young carers are at carrying out the abovementioned tasks, providing care to an ill family member inherently yields uncertainty and unpredictable situations (Mauseth & Hjälmhult, 2016), which can be extremely distressing, including seemingly random episodes of severe deterioration in health, parental intoxication, illness-related crises such as seizures (Gowen et al., 2021). Understandably, the challenges associated with youth caregiving can elicit anger and resentment in youth towards their caregiving role and related obligations (Landi et al., 2022a). As such, young carers take on excessive mental stress and must manage their own emotions as well as the emotions of other family members, placing further strain on their psychological resources and increasing their risk of exposure to adverse experiences (Gowen et al., 2021). Finally, caregiving can compromise the normative development of social connections and proficiencies outside the home (Pedersen & Revenson, 2005), impeding a child's opportunities for peer engagement and socializing, leaving young carers isolated and at risk for ACEs (Fleitas Alfonzo et al., 2022).

For young carers, their caregiving responsibilities do not end when they become adults and may even intensify as they transition into adulthood (Blake-Holmes 2020). As such, ACE exposure associated with caregiving before 18 may be an important mental health risk factor in YACs. YACs with ACEs are likely to suffer adverse mental health outcomes due to the stress related to their prolonged caregiving and the cumulative effects of ACEs. As such, one way to understand the link between ACEs, young adult caregiving and mental health outcomes is through the lens of stress theory.

It is theorized that childhood adversity is linked with chronic disease via dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis, or the stress response system, which increases the risk of chronic mental and physical health conditions (Dempster et al., 2021). Similar impairments have been observed in younger and older adult family caregivers (Gallagher, 2021), particularly where carers experience high distress and burden (Whittaker & Gallagher, 2019). Moreover, in a sample of adult caregivers, those who reported ACEs were found to have higher levels of inflammatory cytokines and shorter telomeres, indicating a shorter lifespan and a greater risk of depression relative to those not reporting ACEs (Kiecolt-Glaser et al., 2011). Research shows that the perception of a situation as stressful is an important predictor of caregiver burden and distress (Haley et al., 1987), and there is evidence to suggest young adults with prior exposure to ACEs have lower stress thresholds (Kalia & Knauft, 2020; Manyema et al., 2018). Extrapolating from these findings, YACs with ACE exposure may be increasingly vulnerable to the adverse physiological and psychological effects of cumulative life stressors, making them more likely to suffer from poorer mental health. In support of this proposal, a recent study found that adult life stress mediates the relationship between ACEs and psychological distress in young adults (Manyema et al., 2018). As such, given the above research, we sought to examine the association between ACE exposure and mental health outcomes in YACs.

Although beyond the research focus of this study, it is important to bring a broader perspective on the adverse impacts of ACEs in the context of youth caregiving and family illness by noting the role of protective factors such as social support and benefit finding. Protective factors mitigate the negative effects of risk factors on mental health. For example, a study found that the adverse effects of the risk factor youth caregiving on offspring in a parental illness context were reduced by higher levels of social support and benefit finding (Pakenham & Cox, 2018).

1.1 The Current Study

The purpose of this study is to investigate exposure to ACEs in YACs as a mental health risk factor and to shed light on some of the correlates of ACEs including caregiving and socio-demographics. It is well documented that young carers are not a homogenous group (Janes et al., 2022), and outcomes vary depending on caregiving context factors, such as the relationship to the care-recipient including age and gender (Bowman Grangel et al., 2024; Pakenham & Cox, 2015). Hence, the first aim is to examine ACE exposure in two groups of YACs: carers of chronically ill parents, and carers of chronically ill non-parent family members, compared to non-carers. We hypothesized that both groups of YACs will report greater exposure to ACEs than peer non-carers (*Hypothesis 1*). The second study aim is to examine the relationship between caregiving and ACE exposure. We hypothesized that higher caregiving will be associated with greater ACE exposure (*Hypothesis 2*). In the absence of prior research into ACEs in YACs we explore the relationships between socio-demographic factors and ACE exposure, which constitutes the third aim. Finally, the fourth aim is to examine relationships between ACE exposure and three mental health outcomes (depression, anxiety, and well-being) in YACs. We hypothesized that greater exposure to ACEs will be associated with poorer mental health outcomes, operationalized as higher anxiety and depression and lower well-being (*Hypothesis 3*). Importantly, consistent with the dual factor model of complete mental health (Keyes et al., 2002), we include both distress and well-being. In contrast, the broader literature on ACEs has focused on the impacts of ACEs on distress and neglected their effects on well-being in young adults (Park et al., 2021).

2 Methods

2.1 Participants and Recruitment Procedure

Ethical Approval was granted by the Ethics Committee of the University of Bologna to conduct a large scale, longitudinal survey examining psychological resilience in an Italian sample during the COVID-19 pandemic. Participants were recruited using social media and a snowball sampling approach. The initial survey, which took 15–20 min to complete, was designed and conducted using Qualtrics software. Here, we use this cross-sectional survey, where data on caregiving, ACE exposure and mental health were collected. This survey was completed by 3,626 participants in 2021. After removing data from participants who failed up to one of two attention checks (i.e., responded incorrectly "To demonstrate your attention, select the answer agree a little", and/or "To demonstrate your attention, select the answer never."), complete data from 3,341 remained, with 1,823 of these being young adults aged 18–29 years making up the present sample.

To date, the majority of YAC research has focused solely on YACs aged 18–25 years (Walker et al., 2024). However, we use a broader age range of 18–29 years, aligning with the widely used and accepted theory of emerging adulthood (Arnett et al., 2014). According to this theory, when a person turns 18 years old, they enter a crucial developmental stage referred to as young, or emerging, adulthood. In high income countries, this developmental stage is prolonged due to the extended time spent in education delaying entry into the workforce and marriage (Arnett et al., 2014).

Moreover, in contrast to most published studies on YACs, this study utilizes data from members of the general community. Most of the research on YACs has been conducted on samples recruited from formal organizations supporting carers or higher education institutes, requiring young people to self-identify as carers. Given that young people undertaking caregiving responsibilities often do not self-identify as carers (Pakenham et al., 2006), these studies potentially exclude a substantial sample of YACs. Participants were not required to self-identify as carers in this study, instead completing caregiving and family health status measures to indicate caregiver status. This ensures YACs in the general population who do not self-identify are represented in the sample.

2.2 Measures

Family Health Status Participants were asked to indicate if there was an individual residing in their household with a serious physical or mental health condition and what their relationship to this individual was. Two variables were created which indicated whether the participant had an ill parent (0 = *no*; 1 = *yes*), or another ill family member (0 = *no*; 1 = *yes*). In total, 20.02% (n = 365) reported living with an ill family member which comprised the YACs group, while the remaining 79.98% (n = 1,458) did not live with an ill family member, comprised the non-carer group. Of the YACs, 73.42% (n = 268) had a parent with a serious health condition (parental illness; PI), while 26.6% (n = 97) had an ill non-parent family member (grandparents 50.5%

[$n=49$], siblings 42.3% [$n=41$], aunts/uncles/cousins 7.2% [$n=7$]) which constituted the other ill family member (OIFM) group. The remaining made up the non-carer group. To validate categorization of participants with an ill family member as carers (YACs) and participants with no ill family member as non-carers, we compared the YACs group with the non-carer group on caregiving and report on the results of these analyses in the Results section.

Socio-demographics Information was collected on participants' gender, age, education, marital status, occupation, socio-economic status (SES), and nationality. Participants also indicated if they had a physical or a mental health condition (0 = *no*; 1 = *yes*). They also reported the illness type (i.e., physical and/or mental) of the ill family member.

Adverse Childhood Experiences (ACEs) The Adverse Childhood Experiences (ACEs) Questionnaire (Felitti et al., 1998) assesses exposure to adversity experienced before 18 years. Ten items tap various childhood traumas classified as follows: abuse (i.e., physical, emotional, sexual), neglect (i.e., physical and emotional), and household dysfunction (i.e., household domestic violence, substance use, and mental illness, parental separation or divorce, incarcerated household member). Responses are dichotomized (*yes* = 1; *no* = 0) to indicate exposure and summed to create an ACE score (range, 0–10), with higher scores indicating greater exposure to adversity. Observed McDonald's omega = 0.74.

Caregiving Youth caregiving was assessed by the 7-item caregiving responsibilities subscale of the validated Italian version (Landi et al., 2022a) of the Young Carer of Parents Inventory-Revised (Cox & Pakenham, 2014; Pakenham et al., 2006). This scale assesses caregiving duties. Respondents indicate their level of agreement with each item on a 5-point scale. Sample items include: "My parent(s) relies on me to help them with household chores", and "My parent(s) expects me to help care for them". An average score is generated, with higher scores indicating greater caregiving responsibilities. Both the original subscale (Cox & Pakenham, 2014; Pakenham et al., 2006) and the Italian version (Landi et al., 2022a) have shown good internal consistency and validity. Observed McDonald's omega = 0.82.

Mental Health Outcomes Mental health was operationalized with three outcomes: depression, anxiety, and well-being. Depression and anxiety symptoms were assessed with the Italian validated versions of the Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001) and the General Anxiety Disorder Scale (GAD-7; Spitzer et al., 2006), respectively. Participants are asked to indicate (on a 4-point scale) how often during the past 2 weeks they experienced depressive/anxiety symptoms. Item scores are summed to create a composite score, with higher scores indicating greater depressive/anxiety symptomology. Observed McDonald's omegas: depression 0.88 and anxiety 0.90. Well-being was assessed with the Italian validation version of the Mental Health Continuum Short Form (MHC-SF) (Keyes et al., 2008). Participants indicate to what extent they experienced each 14-item using a 7-point scale with the last month as the timeframe. Higher scores indicate greater well-being. Observed McDonald's omega = 0.91.

2.3 Data Analysis Approach

Descriptive statistics, reliabilities, Chi-Square Tests and one-way ANOVAs were conducted in IBM SPSS 24 while other analyses with missing data were run in *Mplus* 8.4 with the robust maximum likelihood estimator (MLR) (Muthén & Muthén, 1998). The overall percentage of missing data was 3.16%. Little's Missing Completely at Random test (Little, 1988) on the variables of interest yielded a normed χ^2 (χ^2/df) of 0.01. This index, which can be used to correct for sensitivity of the χ^2 for large samples, is low and suggests that data are missing completely at random.

To investigate the first aim, one-way Analysis of Variance (ANOVA) tests were conducted to examine differences in ACEs across YACs and non-carers as well as across the two groups of YACs (PI and OIFM). ANOVAs were conducted controlling for any socio-demographic variables that significantly differed among the three groups (PI, OIFM, non-carers). Effect sizes for ANOVAs were quantified with partial eta-squared (η^2), with values defined as small (0.01), medium (0.06), and large (0.14). We also explored differences in ACEs across these groups at the ACE item level using Chi-square analyses, using Cramér's Phi (ϕ) as a measure of effect size, with values defined as small (0.10), medium (0.30), and large (0.50).

To examine the second and third aims, we conducted correlations between caregiving and socio-demographic and ACEs in the PI, OIFM, YACs, and non-carer groups. Spearman's correlations were conducted on dichotomous socio-demographic variables and Pearson correlations were conducted on pairs of continuous variables. We inspected whether significant correlation coefficients in the non-carer group differed from the corresponding correlation coefficients in the PI, OIFM or YACs groups as well as whether significant correlation coefficients in the PI group differed from the corresponding correlation coefficients in the OIFM group. These comparisons between pairs of correlation coefficients were performed using the Fisher's z-test with Bonferroni correction (Sheshkin, 2004). In this procedure, correlation coefficients are transformed using Fisher's Z transformations, which approximates the normal distribution. The null hypothesis that the correlations coefficients from separate samples are equal was tested while adjusting for the unequal sample sizes of these groups.

To explore the fourth aim, three multivariate linear regressions were conducted to examine the association between ACEs and mental health outcomes in the PI, OIFM, and YACs groups. The dependent variables tested simultaneously were the three mental health outcomes (i.e., depression, anxiety, and well-being), while the independent variable was the ACE score together with the confounders (i.e., socio-demographics significantly correlated with ACEs in YACs).

3 Results

3.1 Preliminary Data Analysis

The total sample consisted of 1,823 young adults (71.75% female; *M*age = 24.41, *SD*age = 2.84). Of these, 14.03% reported living with an ill family member who had a physical illness, while 11.07% reported living with an ill family member with a mental illness (which included substance misuse). Other socio-demographics are presented in Table 1.

We investigated whether the YACs and non-carer groups differed on socio-demographics. To identify meaningful differences in Chi-square statistics, we focused on differences where standardized residuals were greater than 2. Groups differed on the following variables: age, $F(1, 1821) = 7.90$, $p = 0.01$, being single $\chi^2(2, 1823) = 47.29$,

Table 1 Socio-demographic characteristics in the parental illness (PI), other ill family members (OIFM), total young adult carers (YACs), and non-carer groups, and total sample

	PI (n=268)	OIFM (n=97)	YACs (n=365)	Non-carers (n=1,458)	Total sample (N=1,823)
Variable	% (n)	% (n)	% (n)	% (n)	% (n)
Gender: female	74.25 (199)	72.16 (70)	73.70 (269)	71.26 (1,039)	71.75 (1,308)
Age years[a]	24.03 (2.72)	24.02 (2.80)	24.03 (2.74)	24.50 (2.86)	24.41 (2.84)
Education:					
primary school levels	3.10 (3)	2.20 (6)	2.47 (9)	4.05 (59)	3.73 (68)
secondary school levels	47.40 (46)	47.00 (126)	47.12 (172)	42.04 (613)	43.06 (785)
bachelor's degree	44.30 (43)	46.60 (125)	46.03 (168)	49.93 (728)	49.15 (896)
postgraduate course	5.20 (5)	4.10 (11)	4.38 (16)	3.98 (58)	4.06 (74)
Marital status:					
Single	96.27 (258)	92.78 (90)	95.34 (348)	86.97 (1,168)	88.65 (1,616)
Married or living with a partner	3.73 (10)	7.22 (7)	4.66 (17)	12.83 (187)	11.19 (204)
Currently studying	65.67 (176)	62.89 (61)	64.93 (237)	56.24 (820)	57.98 (1,057)
Currently working	25.00 (67)	28.87 (28)	26.03 (95)	37.72 (550)	35.38 (645)
Not in education, employment, or training	10.82 (29)	11.34 (11)	11.96 (40)	9.12 (134)	9.54 (174)
Socio-economic status (mean family income):					
< €15,000	19.80 (53)	15.50 (15)	18.60 (68)	16.60 (242)	17.00 (310)
€15,001–36,000	42.20 (113)	42.30 (41)	42.20 (154)	42.90 (626)	42.79 (780)
€36,000–70.000	29.90 (80)	33.00 (32)	30.70 (112)	29.30 (427)	29.57 (539)
€70,000–100.000	5.20 (14)	5.20 (5)	5.20 (19)	7.90 (115)	7.35 (134)
> €100.000	3.00 (8)	4.10 (4)	3.30 (12)	3.30 (48)	3.29 (60)
Italian nationality	98.51 (264)	98.97 (96)	98.73 (360)	97.74 (1,425)	97.92 (1,785)
Presence of physical health condition	10.82 (29)	14.43 (14)	11.78 (43)	8.30 (121)	8.99 (164)

Note. [a]*M* (*SD*)

$p = 0.00$, currently working, $\chi^2(2, 1823) = 16.96$, $p = 0.00$, and currently studying, $\chi^2(2, 1823) = 8.70$, $p = 0.01$. Specifically, compared to the non-carer group, the YACs group was younger (YACs *M*age = 24.03, non-carers *M*age = 24.50), had a higher proportion of single participants (YACs 95.34%, non-carers 86.97%), had fewer participants currently working (YACs 26.03%, non-carers 37.72%) and had more participants currently studying (YACs 64.93%, non-carers 56.24%). We controlled for these variables in subsequent analyses.

To validate our categorization of participants with an ill family member as carers (YACs) and participants with no ill family member as non-carers, we compared the YACs group with the non-carer group on caregiving after controlling for the effects of socio-demographics that the two groups differed on (age, currently single, studying, and working). Consistent with this grouping of participants, the YACs group reported significantly higher caregiving ($M = 2.17$, $SD = 0.73$) than the non-carer group ($M = 1.89$, $SD = 0.71$) (F (5,800) = 19.55, $p = 0.00$, $\eta^2 = 0.02$). The YACs subgroups, PI and OIFM, did not differ on caregiving (F (5,170) = 0.13, $p = 0.72$, $\eta^2 = 0.00$).

Regarding descriptive analysis of ACE questionnaire items, Table 2 presents the percentage and number of participants in each group who endorsed each ACE item. The four most frequently endorsed items in the YACs group were emotional neglect (40.27%), household mental illness (39.45%), emotional abuse (32.88%), and parental separation or divorce (18.80%). The same four items were also the most frequently

Table 2 Percentage and number of participants endorsing ACE items for the PI, OIFM, YACs and non-carer groups and Chi-square statistics showing differences across groups

ACE Item	PI % (*n*)	OIFM % (*n*)	YACs % (*n*)	Non-carers % (*n*)	Chi-square (ϕ) PI vs. OIFM	Chi-square (ϕ) YACs vs. Non-carers
1. Emotional abuse	32.84% (88)	32.99% (32)	32.88% (120)	21.70% (315)	0.001 (0.001)	**20.415***** (0.106)
2. Physical abuse	14.55% (39)	19.59% (19)	15.89% (58)	13.03% (190)	1.351 (0.061)	2.030 (0.033)
3. Sexual abuse	12.67% (34)	10.31% (10)	12.05% (44)	12.83% (187)	0.380 (0.032)	0.157 (0.009)
4. Emotional neglect	40.67% (109)	39.18% (38)	40.27% (147)	(377) 25.86%	0.066 (0.013)	**29.623***** (0.127)
5. Physical neglect	3.36% (9)	1.03% (1)	2.74% (10)	(27) 1.85%	1.448 (0.063)	1.157 (0.025)
6. Parental separation or divorce	17.91% (48)	21.65% (21)	18.90% (69)	(323) 22.15%	0.649 (0.042)	1.826 (0.032)
7. Household domestic violence	4.10% (11)	5.15% (5)	4.38% (16)	(44) 7.20%	0.187 (0.023)	1.711 (0.031)
8. Household substance use	16.42% (44)	15.43% (15)	16.16% (59)	7.20% (105)	0.048 (0.011)	**28.644***** (0.125)
9. Household mental illness	42.16% (113)	31.96% (31)	39.45% (144)	17.01% (248)	3.105 (0.092)	**87.107***** (0.219)
10. Incarcerated household member	3.39% (9)	3.09% (3)	3.29% (12)	2.67% (39)	0.016 (0.007)	0.403 (0.015)

Note. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. PI = parental illness ($n = 268$), OIFM = other ill family member ($n = 97$), YACs = young adult carers ($n = 365$), ϕ = Phi coefficient; bold = significant chi-square test endorsed by the non-carers, although ordering of frequency of endorsement differed to that of the YACs group:

emotional neglect (25.86%), parental divorce or separation (22.15%), emotional abuse (21.70%), household mental illness (17.01%). A total of 28.22% ($n=103$) of YACs did not endorse any ACE item, whereas 71.78% ($n=262$) endorsed one or more items (1 item 23.84% [$n=87$], 2 items 20.55% [$n=75$], 3 items 10.41% [$n=38$], 4 items 4.93% [$n=18$], 5 items 5.75% [$n=21$], 6 items 4.11% [$n=15$], more than 7 items 2.19% [$n=8$].

3.2 Differences in ACEs among Total YACs, PI, OIFM and Non-Carer Groups (Aim 1)

To investigate differences in ACEs across YACs and non-carers as well as across the two groups of YACs (PI and OIFM), one-way ANOVAs were conducted controlling for age, and currently single, studying, and working. Results demonstrated significant differences between YACs and non-carers on ACE scores, $F(5, 1817)=37.72$, $p<0.001$, $\eta^2=0.02$. Post hoc analyses using the Tukey's HSD test were used to examine differences between pairs of groups. As predicted in *hypothesis 1* both the PI ($M=1.88$, $SD=1.90$) and OIFM groups ($M=1.80$, $SD=1.27$) reported greater exposure to ACEs than the non-carer group ($M=1.27$, $SD=1.543$; $F(5, 1816)=18.95$, $p<0.001$, $\eta^2=0.20$).

Chi-square tests were used to examine differences between groups on ACE items. Results are displayed in Table 2. Compared to non-carers, YACs reported greater exposure to emotional abuse, $\chi^2(1,1823)=20.42$, $p<0.001$, $\phi=0.11$, emotional neglect, $\chi^2(1,1823)=29.63$, $p<0.001$, $\phi=0.13$, and household dysfunction. PI and OIFM groups did not significantly differ on any ACE item.

3.3 Correlations between Caregiving and ACEs (Aim 2)

Results of correlations between caregiving and ACEs in the PI, OIFM, YACs, and non-carer groups are reported in Table 3. There was a significant correlation between caregiving and ACEs in the non-carer group ($r=0.14$, $p<0.01$). However, contrary to our prediction (*hypothesis 2*), there was no significant correlation between caregiving and ACEs in the YACs group ($r=0.06$, $p>0.05$), or in the PI ($r=0.07$, $p>0.05$) and OIFM groups ($r=0.07$, $p>0.05$). In addition, results of Fisher's z-tests with Bonferroni correction showed that the significant correlation coefficient between ACEs and caregiving in the non-carer group, did not differ in magnitude from the corresponding non-significant correlation coefficient in the YACs, PI, and OIFM groups.

We conducted further investigations into the distribution of caregiving scores. In the YACs group caregiving scores exhibited negative skewness (−3.31) and platykurtic kurtosis (−1.19), indicating that most scores were concentrated at the higher end with fewer low scores, exhibiting a generally flatter distribution than typically expected in a normal curve. In contrast, caregiving scores in the non-carer group showed a more symmetric distribution with skewness and kurtosis near zero: 0.03 and −0.03, respectively. Therefore, we repeated the Pearson correlation analysis examining the relationship between transformed caregiving scores (with both the quare root and the

Table 3 Correlations between caregiving and socio-demographics with adverse childhood experiences (ACEs) in the parental illness (PI), other ill family member (OIFM), total young adult carers (YACs), and non-carer groups

	Adverse Childhood Experiences (ACEs)			
	PI (n=268)	OIFM (n=97)	YACs (n=365)	Non-carers (n=1,458)
Caregiving	0.066	0.066	0.057	0.143**
Socio-demographics				
Gender (1 = female) ¥	−0.004	0.096	0.019	−0.057*
Age	−0.063	−0.047	−0.060	−0.008
Low education (1 = secondary school or below) ¥	0.000	0.052	0.008	0.080*
Currently single ¥	0.018	−0.082	0.004	0.029
Currently working ¥	0.256	−0.104	0.193	0.144*
Currently studying ¥	0.221	−0.088	0.175	0.112
Not in education, employment, or training ¥	0.184	−0.175	0.105	0.109*
Low SES (1= < €15,000) ¥	0.134*	0.338**	0.179**	0.175***
Nationality (1 = Italian) ¥	0.096	−0.048	0.059	0.077
Presence of a physical health condition ¥	−0.006	0.159	0.033	0.024

Note. * $p<0.05$, ** $p<0.01$, *** $p<0.001$. ¥ Spearman's correlations for categorical variables dummy coded as 1 = *yes*, 0 = *no*. † Corresponding pairs of correlation coefficients that significantly differ ($p<0.05$ Bonferroni correction) between PI/OIFM/YACs and non-carers, based on Fisher's Z transformation

inverse transformations) and ACEs in the YACs group. However, once again the correlations were non-significant ($r=0.01$, $p>0.05$, and $r=0.03$, $p>0.05$, respectively).

3.4 Correlations between Socio-demographics and ACEs (Aim 3)

Results of correlations between ACEs and socio-demographics across the three groups are presented in Table 3. Five socio-demographics emerged as significant correlates of ACEs in the non-carer group: gender, low education status, currently working, not in education, employment or training, and low SES in the non-carer group. In the total YACs sample and in the PI and OIFM groups, only low SES emerged as a significant correlate of greater exposure to ACEs ($r=0.18$, $p<0.01$).

Results of Fisher's z tests with Bonferroni correction showed that the magnitude of the significant correlation coefficients between ACEs and gender, low education, currently working, not in education, employment or training and low SES in the non-carer group did not significantly differ from the corresponding correlation coefficients in the PI, OIFM, and YACs groups. In addition, the magnitude of the significant correlation coefficient between ACEs and low SES in the PI group did not significantly differ from the corresponding significant correlation coefficient in the OIFM groups.

3.5 Associations between ACEs and Mental Health Outcomes in Total YACs, PI and OIFM Groups (Aim 4)

Table 4 presents the results of the multivariate regression analysis used to examine associations between ACEs and mental health outcomes controlling for SES in

Table 4 Multivariate regression of ACEs predicting mental health outcomes in the parental illness (PI), other ill family member (OIFM), and total young adult carer (YAC) groups

	Depression			Anxiety			Wellbeing		
	PI	OIFM	YACs	PI	OIFM	YACs	PI	OIFM	YACs
	β	β	β	β	β	β	β	β	β
	(*SE*)	(*SE*)	(*SE*)	(*SE*)	(*SE*)	(*SE*)	(*SE*)	(*SE*)	(*SE*)
ACEs	0.293*** (0.056)	0.372*** (0.108)	0.317***(0.049)	0.209*** (0.058)	0.390*** (0.087)	0.263*** (0.049)	−0.184** (0.067)	−0.308** (0.101)	−0.227*** (0.056)
Confounder									
Low SES	0.114 (0.061)	0.165 (0.108)	0.131* (0.053)	0.056 (0.060)	0.141 (0.094)	0.086 (0.050)	−0.045 (0.069)	−0.218* (0.096)	−0.098 (0.057)
R-squared	0.106	0.205	0.131	0.050	0.207	0.084	0.038	0.186	0.068

Note. * $p<0.05$, ** $p<0.01$, *** $p<0.001$. PI = parental illness ($n=268$), OIFM = other ill family member ($n=97$), YACs = young adult carers ($n=365$), β = standardized beta coefficient; *SE* = standard error the total YACs sample. As predicted (*hypothesis 3*), greater exposure to ACEs significantly predicted higher depression and anxiety ($\beta = 0.32$, $p < 0.001$, and $\beta = 0.26$, $p < 0.001$, respectively), and lower well-being ($\beta = -0.23$, $p < 0.001$). The regression model accounted for a significant portion of the variation in depression (13.1%), anxiety (8.4%), and well-being (6.8%). Similarly, the same multivariate regression analysis was conducted in the PI and OIFM groups and an identical pattern of results emerged in each group.

4 Discussion

The purpose of this study was to investigate exposure to ACEs in YACs as a mental health risk factor and to shed light on some of the potential correlates of ACEs including caregiving and socio-demographics. In this regard, the study had four aims. The first aim was to compare ACE exposure in young adult non-carers with YACs in two care contexts: those caring for an ill parent and those caring for a non-parent ill family member. We proposed several mechanisms by which the presence of an ill family member increases the risk of exposure to ACEs for children, namely: the adverse impacts of chronic illness on family functioning, parent-child boundary dissolution resulting from youth caregiving roles, adult caregiving activities assumed by children, and in the case of an ill parent, parental distress and difficulties fulfilling parenting roles. Hence, we hypothesised that both groups of YACs would report greater exposure to ACEs than their non-carer peers. Results supported this prediction showing that regardless of care context measured in this study, YACs reported greater exposure to ACEs than non-carers. Interestingly, YACs in a parental illness context did not differ on exposure to ACEs from YACs in a non-parent ill family member context, which suggests that who in the family is ill (parent vs. non-parent) is less important than the mere presence of an ill family member with respect to ACE exposure.

Our finding on ACEs in YACs is consistent with qualitative results of the only published study into ACEs and young carers which showed that children and adolescents caring for chronically ill parents reported elevated exposure to ACEs (Spratt et al., 2018). However, here we extend on those findings by exploring differences in ACEs between YACs and non-carers at the ACE questionnaire item level. The two groups significantly differed on four ACE items. YACs reported greater exposure to emotional abuse, emotional neglect, household substance abuse and household mental illness. These findings suggest that compared to non-carers, YACs report more adverse childhood events related to emotional abuse and neglect, and household dysfunction related to mental illnesses and substance abuse.

It is possible that the greater exposure to ACEs reported by YACs compared to non-carers is inflated due to the overlap between the content of the ACE items assessing household mental illness and substance abuse and these disorders defining the categorisation of participants as young adults caring for a family member with these health conditions. However, post hoc analyses showed that YACs who reported a family member with physical illness did not differ from those who reported a family member with mental illness on ACE total and item scores. This suggests that the difference between YACs and non-carers on ACEs is not due to potential confounding between caring for a family member with mental illness and the ACE questionnaire item content related to household mental illness and substance abuse.

As mentioned, we proposed that youth caregiving was one pathway through which YACs are likely to be at greater risk of exposure to ACEs, particularly when the youth caregiving involves tasks that are normally carried out by adults (e.g., providing personal care, administering medication, providing crisis healthcare support, and managing finances). Hence, the second study aim was to investigate this proposal by examining the relationship between caregiving and ACEs. We tested the related hypothesis that higher caregiving would be associated with greater exposure to ACEs. Unexpectedly, the correlation between caregiving and ACEs was not significant in the total YACs sample and in the YACs subgroups (PI and OIFM). One explanation for this finding is the limited variation in caregiving scores in the YACs sample. The caregiving scores in the YACs group exhibited negative skewness and platykurtic kurtosis, indicating that these scores were truncated at the higher end of the caregiving continuum, which is understandable given the presence of an ill family member and the related caregiving demands. This lack of diversity in caregiving scores limits the range necessary to detect significant correlations, as most data points did not vary sufficiently to demonstrate differences in ACE exposure across the caregiving continuum. In contrast, the caregiving scores exhibited more symmetric distribution in the non-carer sample. This broader dispersion of scores, coupled with a larger sample size, enabled the detection of a significant correlation between caregiving and ACEs in non-carers. However, the magnitude of this correlation coefficient did not significantly differ from that of the corresponding non-significant correlation coefficient in the YACs group. Another possible explanation concerns the measurement of caregiving. According to the tripartite model of youth caregiving (Landi et al., 2022c), caregiving responsibilities (measured in this study) is only one of three caregiving dimensions (the others being caregiving experiences, and caregiving tasks). For example, measurement of specific caregiving tasks would provide more detailed assessment of care duties typically undertaken by adults that are likely to increase exposure to ACEs (e.g., Ireland & Pakenham, 2010). Future research should use a more comprehensive measure of caregiving. In addition, caregiving context variables were not comprehensively measured. Examination of the relationships between aspects of the care context (e.g., choice in caregiving, duration of caregiving, and severity and unpredictability of the family member's illness), may shed light on caregiving contextual factors that increase the risk of exposure to ACEs. For example, it is likely that longer duration of youth caregiving will increase the risk of exposure to and accumulation of ACEs.

The third study aim was to explore the relationships between socio-demographics and ACEs in YACs. The only significant correlate of ACE exposure in the YACs sample was SES such that lower SES was related to higher ACE scores. This finding is consistent with previous research which shows that lower SES increases the likelihood of exposure to ACEs and can be a source of ACEs (Walsh et al., 2019). Prior research shows young carers are more likely to report lower SES given the adverse impacts of family illness on employment and financial resources (Vizard et al., 2019).

The final study aim was to examine the relationships between ACE exposure and mental health outcomes (depression, anxiety, and well-being) in YACs. As predicted, greater exposure to ACEs was associated with higher anxiety and depression and lower well-being. This finding is consistent with the large body of evidence showing that greater exposure to ACEs predicts poorer mental health cross-sectionally and longitudinally in young adults (see review Park et al., 2021). Relating these findings to stress theory, this study offers provisional evidence that caregiving responsibilities in young adulthood in the context of an ill family member may further dysregulate the stress response system amongst young adults exposed to ACEs, increasing mental health issues, as has been observed amongst adult caregivers (Whittaker & Gallagher, 2019). Our results showing that YACs are more vulnerable to encountering ACEs than their non-carer peers and that greater exposure to ACEs is associated with poorer mental health, suggest that ACEs are an important mental health risk factor for YACs and as such constitute an important intervention target.

4.1 Practice Implications

In the broader ACE literature, a recent review of systematic reviews evaluating the effectiveness of interventions designed to mitigate the harmful impacts of ACEs found limited consistent review-level evidence for the effectiveness of interventions for youth exposed to ACEs (Lorenc et al., 2020). This review revealed that most of the included systematic reviews examined the effectiveness of individual-level psychological interventions and that the evidence for these is equivocal, although cognitive behaviour therapy showed the most promise for improving mental health outcomes. The review also found that there was a dearth of studies on service- or community-level interventions. Many reviews of intervention studies in the ACE field have highlighted concerns about the decontextualised way in which interventions, services and policies are designed and implemented to prevent ACEs and mitigate their harmful effects (Lester et al., 2020; Lorenc et al., 2020). The results of the present study underline the importance of context in understanding ACEs by highlighting ACEs as a mental health risk factor in the context of the presence of an ill family member. In addition, given that lower SES was an important correlate of both poorer mental health and ACEs, tailoring and targeting the interventions for those who need them most is important. Interventions and services designed to ease the harmful effects of ACEs for YACs should consider the pathways by which exposure to ACEs is increased for YACs. Such interventions and services will likely require a multifaceted wholistic approach involving individual-level (e.g., mental health promotion interventions for YACs and appropriate psychosocial and healthcare support for the ill family member), family-level (e.g., whole-of-family focused support) and community-level (e.g., flexible domiciliary healthcare) strategies. Such an approach has been recommended for dealing with the needs of young carers more broadly (e.g., Aldridge, 2018, Landi et al., 2022d).

4.2 Limitations

Interpretation of study findings should be tempered by the following methodological limitations. First, the cross-sectional survey design is unable to assess causal direction among study variables, although prior longitudinal research supports the causal link between ACEs and subsequent mental health problems in young adulthood (see review Park et al., 2021). Second, questionnaires used to assess ACEs have attracted criticism including retrospective assessment of ACEs and limited item coverage (Holden et al., 2020). Regarding the latter, potential ACEs pertinent to the YAC context are not included in ACE questionnaires (e.g., responding to life threatening health crises such as seizures, and providing intimate personal care to an ill family member due to disability). Third, online convenience sampling limits the generalizability of findings to the general population of YACs. Finally, measurement of youth caregiving and related contextual factors was limited, including the absence of a measure of caregiving duration, which may have particular relevance to ACE exposure.

To our knowledge this is the first published study to investigate the effects of ACEs on the mental health of young adults who have a family member with a serious health condition. As such, there is considerable scope for further research on this topic and findings from this study should be considered preliminary until replicated. Future research into the effects of ACEs on YACs should use longitudinal designs to test causal relationships, develop measures of ACEs that are sensitive to the YAC context including the cumulative effects of ACEs, and comprehensively assess all youth caregiving dimensions and related contextual variables. In addition, future research should also consider protective factors that can mitigate the harmful effects of ACEs on mental health. Protective factors that have been shown to reduce the adverse effects of youth caregiving in YACs and young carers include social support, benefit finding and psychological flexibility (Landi et al., 2021; Pakenham & Cox, 2018). Additionally, the mechanisms by which protective factors mitigate the negative effects of risk factors on young carer mental health should also be investigated given that they have been found to operate via direct, mediating and moderating effects models (Landi et al., 2021; Pakenham & Cox, 2018).

5 Conclusions

Given evidence showing a decline in the mental health of emerging adults over the past two decades (McGorry et al., 2024), identifying groups of young people at high risk of mental health problems and expanding our knowledge of potent risk factors that foster psychosocial vulnerability in these groups is a public health priority. Young adults who have a seriously ill family member with associated caregiving demands are at greater risk of mental health problems than their non-carer peers (see review van der Werf et al., 2022). The present study extends this literature by identifying ACEs and lower SES as compelling mental health risk factors for this vulnerable population. We found that, as predicted, YACs reported greater exposure to ACEs than non-carers. Additionally, caregiving context, with respect to who in the family was ill (parent vs. other ill family member), was unrelated to ACE exposure. Notably, 72% of YACs reported one or more ACEs. The four most commonly reported ACEs were emotional neglect, household mental illness, emotional abuse, and parental separation or divorce. Results also showed that low SES, commonly associated with youth caregiving, was related to more ACEs in YACs. Importantly, as we hypothesised, we found that greater exposure to ACEs predicted poorer mental health. Our results showing that YACs are at greater risk of exposure to ACEs than their non-carer peers and that higher ACEs predicted poorer mental health, highlight the need for supports that prevent ACEs and or mitigate the harmful effects of ACEs in YACs. Given the complexities of ACEs and the youth caregiving context, such interventions will likely require a multifaceted wholistic approach involving individual-, family- and community-level strategies.

Author Contributions CRediT authorship contribution statement. Giulia Landi: Conceptualization; Methodology; Data curation; Formal analysis; Writing– original draft; Writing– review & editing. Aoife Bowman Grangel: Writing– Original draft; Writing– review & editing. Kenneth I. Pakenham: Conceptualization; Methodology; Supervision; Writing– original draft; Writing– review & editing. Stephen Gallagher: Writing– review & editing. Silvana Grandi: Conceptualization; Supervision; Writing– review& editing. Eliana Tossani: Conceptualization; Supervision; Writing– review & editing.

Funding Open access funding provided by Alma Mater Studiorum - Università di Bologna within the CRUI-CARE Agreement.
None.

Data Availability Data will be made available upon reasonable request.

Declarations

Conflict of Interest None.

Ethical Approval and Informed Consent Ethical approval was received from the University of Bologna ethical committee, and all participants provided signed informed consent.

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