


Psychological distress and resilience in a multicentre sample of adolescents and young adults with cancer during the COVID-19 pandemic

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Clare Jacobson¹, Nicola Miller², Rebecca Mulholland³, Laura Baker⁴, Daniel Glazer⁵, Emily Betts⁶, Louise Brown⁷, Vera Elders⁸, Robert Carr¹, Olufunmilola Ogundiran⁹ and Lee D Hudson⁹ 

¹Guy's and St Thomas' NHS Foundation Trust, London, UK

²NHS Greater Glasgow and Clyde, Glasgow, UK

³Sheffield Teaching Hospitals NHS Foundation Trust, Sheffield, UK

⁴University Hospitals Bristol NHS Foundation Trust, Bristol, UK

⁵University College London Hospitals NHS Foundation Trust, London, UK

⁶Oxford University Hospitals NHS Foundation Trust, Oxford, UK

⁷Royal Cornwall Hospitals NHS Trust, Truro, UK

⁸NHS Grampian, Aberdeen, UK

⁹GOS UCL Institute of Child Health, London, UK

Abstract

Understanding impact of the coronavirus pandemic (COVID-19) on Adolescents and Young Adults (AYA) with cancer is important to inform care. Online survey of 16–24 year olds receiving cancer treatment at eight cancer centres in the UK. We measured: self-perceived increased anxiety since COVID-19, impact of COVID-19 on treatment, life and relationships, PHQ-8, GAD and the two-item Connor–Davidson Resilience Scale (CD-RISC). 112 AYA participated. 59.8% had previous mental health difficulties. 78.6% reported COVID-19 having a significant impact on life. 79% reported experiencing increased anxiety since COVID-19. 43.4% had moderate-severe PHQ-8 scores and 37.1% GADS-7 scores. Impact on life was associated with moderate-severe PHQ-8 scores (OR 5.23, 95% CI 1.65–16.56, $p < 0.01$), impact on relationships with moderate-severe GADS-7 and PHQ-8 score (OR 2.89, 95% CI 1.11–7.54, $p = 0.03$; OR 3.54, 95% CI 2.32–15.17, $p < 0.01$; OR 2.42, 95% CI 1.11–5.25, $p = 0.03$). Greater resilience was associated with lower mod-severe

Corresponding author:

Lee D Hudson, UCL GOS Institute of Child Health 30 Guilford St, London WC1N 1EH, UK.

Email: l.hudson@ucl.ac.uk

GADS-7 and PHQ-8 scores (OR 0.58, 95% CI 0.41–0.81, $p < 0.01$; OR 0.55 95% CI 0.4–0.72, $p < 0.01$; OR 0.52, 95% CI 0.38–0.69, $p < 0.01$). We found high levels of psychological distress. Perceived impact of COVID-19 on relationships and life was predictive of poorer mental health, with resilience a protective factor.

Keywords

cancer, young adult, adolescent, psychological distress, mental health, resilience, COVID-19, SARS-CoV-2

Background

The coronavirus pandemic (COVID-19), caused by SARS-CoV-2 has led to over 230 million infections globally, and over 4.8 million deaths (World Health Organization, 2021). Though the highest risk factor for severe physical complications from SARS-CoV-2 infection in patients with cancer has been age, adolescents and young adults (AYA) with cancer have faced significant challenges as a result of the pandemic. As for many patients with cancer, care has been disrupted (Kutikov et al., 2020) and for some, initial presentations and diagnoses appear to have been delayed (Kaufman et al., 2020). Concerns that AYA with cancer may be more at risk for severe complications of COVID-19, in particular those in treatment with immunocompromise (Belsky et al., 2021), has led to some patients being advised to shield. Together with the broader population public health ‘lockdowns’, this has potentially led to isolation and loneliness (Loades et al., 2020) and household income and food insecurity (Morales et al., 2020). Indeed, AYA patients with cancer form part of age group who have been disproportionately affected by economic and educational impacts of ‘lockdowns’ with potentially significant knock-on effects on mental health (Ganson et al., 2021).

Cancer is an important health burden for AYA globally (Fidler et al., 2017), and around 2500 16–24 year olds diagnosed with cancer per year in the United Kingdom (UK, 2021). As a group, AYA with cancer are known to have high levels of psychological distress compared to both healthy peers and older adult cancer patients (Barnett et al., 2016; Kosir et al., 2019) as well as patients of a similar age with other medical conditions (McDaniel et al., 1997). Psychological distress in AYA cancer patients is associated with both increased morbidity and reduced concordance with treatment regimes which can adversely affect quality of life and potentially prognosis (Park & Rosenstein, 2015; Zebrack et al., 2010).

How additional pressures during the SARS-CoV-2 pandemic have impacted on the psychological wellbeing of AYA with cancer is therefore an important question, and where there is currently limited published data. A recent multi-disciplinary position paper has called for timely research to understand the effect of COVID-19 on mental health as well as better understanding possible risk and protective factors (Holmes et al., 2020). This information is needed urgently to inform current AYA cancer patient needs and appropriate service delivery in the context of the pandemic. We studied psychological wellbeing in AYA cancer patients in the United Kingdom during COVID-19 using a longitudinal online survey, and present complete baseline data here.

Methods

We recruited AYA patients who received a cancer diagnosis between the ages of 16–24 years, and were currently engaged with cancer services at eight United Kingdom centres to participate in an

online study (Guy's and St Thomas' NHS Foundation Trust, London, University College London Hospitals NHS Foundation Trust, London, Sheffield Teaching Hospitals NHS Foundation Trust, Oxford University Hospitals NHS Foundation Trust, University Hospitals Bristol NHS Foundation Trust, Royal Cornwall Hospitals NHS Trust, NHS Grampian, Aberdeen and NHS Greater Glasgow and Clyde, Glasgow). To be eligible, participants needed to have undergone treatment within the last 2 years, and we included patients aged up to 30 years (but diagnosed between 16–24 years) to capture those who were still on long initial treatment protocols and those who had relapsed. All eligible patients meeting these criteria were identified by local teams (by a lead in each centre) and invited to take part via text message or email from a member of their NHS treating team. The study is a longitudinal survey with three time points spanning 6 months: currently only baseline data is available which we present here. We used the online survey platform online surveys (Jisc), open for 2 weeks (9th–23rd December 2020). The content of the online survey is available in [Supplementary Appendix A](#).

We asked participants to provide demographic information on: age group, age group at diagnosis, ethnicity, gender, eligibility in the past for free school meals (as a proxy for deprivation), living arrangements, diagnosis, treatment type and stage, whether they had been advised to shield, whether they were diagnosed or received active treatment during the pandemic, and whether they have a pre-existing mental health condition.

We used two validated self-report measures for psychological well-being (The eight-item patient health questionnaire (PHQ-8) and the 7-item Generalised Anxiety Disorder Scale (GADS-7)). The PHQ-8 is established as a valid and reliable tool for assessing current depression in the general population and non-clinical settings (Kroenke et al., 2009; Pressler et al., 2011). Further, studies have demonstrated a good internal consistency (cronbach alpha = 0.82) in outpatient studies (Pressler et al., 2011). The eight items of the PHQ-8 each yield a score ranging from 0–3, providing a total severity score of 0–24. Cut-offs for moderate distress is a total score of 10–14, moderately-severe 15–19 and severe 20–24. The GADS-7 has demonstrated high validity and reliability in the general population in assessing generalised anxiety disorder (Spitzer et al., 2006). GADS-7 was also a reliable screening measure amongst cancer patients (Esser et al., 2018). The seven items of the GADS-7 each yield a score ranging from 0–3, providing a total severity score of 0–21. Total raw scores of 5, 10 and 15 represent cut-off points for mild, moderate, and severe anxiety, respectively. We asked participants to report whether they had experienced more, less or no change in anxiety since COVID-19 began. We also asked participants to respond to a series of statements using a 6-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree and strongly agree). Statements were (1) overall, COVID-19 has had a significant impact on my life. (2) COVID-19 has made having or having had cancer/a brain tumour harder than it otherwise would have been. (3) COVID-19 has made me feel anxious about returning to hospital for appointments or treatment. (4) COVID-19 has had an impact on my treatment and/or care. (5) COVID-19 has had a significant impact on my key relationships.

We also used the two-item Connor–Davidson Resilience Scale (CD-RISC) as a brief self-rating questionnaire of resilience. The CD-RISC has demonstrated good reliability and validity in a number of populations, which includes cancer patients and a non-clinical sample of teenage and young adult students (Markowitz & Peters, 2014). A total raw score ranging from 0–8 is yielded with a higher score indicating greater resilience.

Analyses were conducted using STATA (version 16). We report summary descriptive data as proportions or averages (means with standard deviations (*SD*) for normally distributed data and median and IQR for non-parametric data). We generated binary variables for (1) Likert agreement statements divided into any degree of agreement vs. any degree of no agreement, (2) GADS-7 and

PHQ-8 above moderate to severe cut-offs vs. mild or none; (3) a little or a lot more anxious since COVID-19 vs. same or less. We used logistic regression models (thus reporting odd's ratios (OR) with 95% confidence intervals) to test for associations between potential predictors of (1) GADS-7mod to severe, (2) PHQ-8 mod to severe and (3) more anxious since COVID-19. Multivariable logistic regression models were used to include variables found to have significant univariable associations.

The study received ethical approval by the London Central Health Research Authority (reference 285,244) and was approved within the Research and development departments at all eight centres. Informed consent was obtained from all participants.

Results

We recruited 112 participants from 628 eligible patients across the eight centres at the time of the survey (17.8%). Baseline participant characteristics are shown in [Table 1](#).

The sample contained a greater proportion of females ($n = 71$, 62.8%) and the most common age group was 21–24 years ($n = 76$, 67.3%). 18 (15.9%) of participants had been eligible for free school meals. Ethnicity was 83% white, 8.9% black or Asian, 0.9% Chinese and 7.2% mixed or other.

The main diagnostic groups were haematological, neurological, head and neck, and skin cancers (see [Table 1](#)). 68.8% were advised to shield and 59.8% had previously experienced mental health difficulties requiring psychological input. 67.9% received cancer treatment during the pandemic and 33.9% were diagnosed during the pandemic. 78.6% reported COVID-19 having a significant impact on their life, 55.4% on their key relationship and 39.3% on their treatment. [Figure 1](#) shows 79% of the sample ($n = 88$) reported experiencing some degree of increased anxiety since COVID-19. 37.1% ($n = 42$) scored in the moderate-severe range on the GADS-7 and 43.4% of the sample ($n = 48$) scored in the same range on the PHQ-8. 38.0% ($n = 43$) reported that having cancer/brain tumour had given them skills to cope better with COVID-19. 53.1% ($n = 59$) reported that COVID-19 had made their experience of cancer/brain tumour harder. The median CD-RISC score was 6 (interquartile range 4–7).

Univariable logistic regression models from the sample for predicting (a) more anxiety since COVID-19 (b) mod-severe GADS-7 score and (c) mod-severe PHQ-8 score are shown in [Table 2](#). No significant associations were found between age group, gender, ethnicity or free school meals and increased anxiety, mod-severe GADS-7 or PHQ. There were no significant associations found between the most common type of cancer (haematological) and increased anxiety, moderate-severe GADS-7 or PHQ. Presence of previous mental health difficulties was associated with greater odds both moderate-severe GADS-7 and PHQ-8 scores (OR 5.93, 95% CI 2.32–15.17, $p < 0.01$; OR 5.92, 95% CI 2.46–14.26, $p < 0.01$, respectively). Agreement that COVID-19 had impacted on life was associated with reporting being more anxious since COVID-19 and a moderate-severe PHQ-8 score (OR 3.64, 95% CI 2.52–19.40, $p < 0.01$; OR 5.23, 95% CI 1.65–16.56, $p < 0.01$, respectively) but not moderate to severe GADS-7score. Agreement that COVID-19 had impacted on relationships was associated with reporting being more anxious since COVID-19 and a moderate-severe GADS-7and PHQ-8 score (OR 2.89, 95% CI 1.11–7.54, $p = 0.03$; OR 3.54, 95% CI 2.32–15.17, $p < 0.01$; OR 2.42, 95% CI 1.11–5.25, $p = 0.03$). The association between COVID-19 affecting life and moderate to severe PHQ-8 was robust when attenuated in a multivariable model with previous mental health difficulties (OR 5.31, 95% CI 1.58–17.92, $p < 0.01$). Associations between COVID-19 affecting relationships with both moderate-severe GADS-7and PHQ-8 were robust when attenuated in a multivariable model with previous mental health difficulties (OR 3.81, 95% CI 1.55–9.36, $p < 0.01$; OR 2.48, 95% CI 1.06–5.77, $p = 0.04$). There was a positive association between

Table 1. Demographics and cancer specific information.

		Percentage (frequency)
Gender	Female/male/non-specific	62.8/32.7/2.7% (71/37/3)
Current age group	16–19 years	18.6% (21)
	21–24 years	67.3% (76)
	25–30 years	13.3% (16)
Ethnicity	White	83% (93)
	Black or Asian	8.9% (10)
	Chinese	0.9% (1)
	Mixed or other	7.2% (8)
Eligibility for free school meals	Low SES	15.9% (18)
	Diagnosed during covid	Yes/no
Active treatment during COVID-19	Yes/no	67.3%/31.0% (76/35)
Advised to shield	Yes/no/don't know	68.1/15.9/15.0% (77/18/17)
Previous psychological treatment	Yes/no	60.2/39.8% (67/45)
Diagnostic group % (n)	Haematological	49.1% (55)
	Neurological	13.5% (15)
	Skin	8.1% (9)
	Head and neck	7.1% (8)
	Endocrine	2.7% (3)
	Urology	4.5% (5)
	Gynaecological	2.7% (3)
	Breast	4.5% (5)
	Sarcoma	4.5% (5)
	Other	2.7% (3)
Diagnosed during COVID	Yes/No (%)	33.9/66.9% (n = 38/74)
Require mental health support prior to cancer diagnosis	Yes	59.8% (n = 67)
	No	40.2% (n=45)
COVID has affected treatment or care % (n)	Agree	39.6 (44)
	Neither agree nor disagree	27.9 (31)
	Disagree	32.4 (36)
COVID- 19 has affected personal Relationship	Agree	55.4 (n = 62)
	Neither agree nor disagree	28.6% (n = 32)
% (n)	Disagree	16.1% (n = 18)
	Agree	78.6% (n = 88)
Life	Neither agree nor disagree	12.5% (n = 14)
	Disagree	8.9% (n = 10)

reporting that COVID-19 had made having or having had cancer harder with reporting being more anxious since COVID-19 and both moderate-severe GADS-7 and PHQ-8 score (OR 20.3, 95% CI 4.45–92.43, $p < 0.01$; OR 2.56, 95% CI 1.14 to 5.72, $p = 0.02$; OR 2.5, 95% CI 1.14–5.45, $p = 0.02$, respectively). Greater CD-RISC score was associated with lower odds of the reporting of being more anxious than before COVID-19, and with lower odds of both mod-severe GADS-7 and PHQ-8 scores (OR 0.58, 95% CI 0.41–0.81, $p < 0.01$; OR 0.55 95% CI 0.4–0.72, $p < 0.01$; OR 0.52, 95% CI 0.38–0.69, $p < 0.01$)

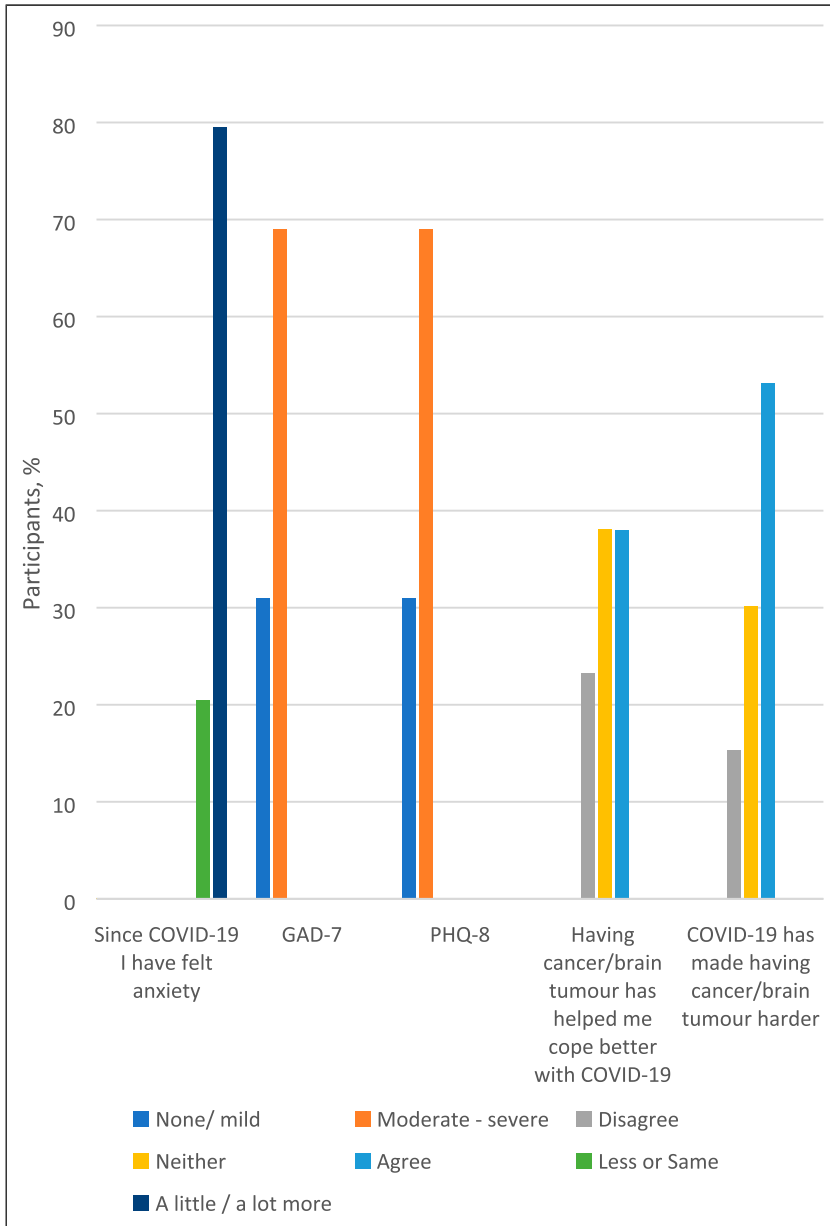


Figure 1. Graph showing proportions of participants for: (A) degree of change in perceived anxiety since COVID-19, (B) cut-off for severity of GAD-7, (C) cut-off for severity of PHQ-8, (D) agreement that cancer/ brain tumour has helped coping with COVID-19 and (E) agreement that COVID-19 has made having cancer/ brain tumour harder.

Discussion

In our sample of AYA cancer patients from eight centres in the United Kingdom, we found high levels of reported psychological distress, with around 80% of respondents reporting some degree of

Table 2. Univariable logistic regression of variables as predictors of A. little or more anxious than before COVID, B. A total GADS-7 score indicating moderate or severe anxiety and C. A total GADS-7score indicating moderate or severe depression.

A. A little or more anxious than before COVID

		<i>n</i>	OR	95% CI	<i>p</i>
Age group (vs. 16–19 years)	20–24 years	112	2.73	0.94 to 7.82	0.06
	25–30 years		8.61	0.94 to 78.67	0.06
Gender		111	2.02	0.77 to 5.33	0.16
Ethnicity (vs. White)	Asian	109	0.67	0.12 to 3.62	0.64
	Mixed		0.11	0.01 to 1.31	0.64
Free school meals		112	1.88	0.39 to 9.05	0.43
Haematological malignancy		111	0.97	0.38 to 2.49	0.96
Active treatment during COVID		111	1.94	0.75 to 5.00	0.17
Diagnosis during COVID			1.22	0.45 to 3.28	0.61
Advised to shield		112	2.46	0.78 to 7.75	0.12
COVID-19 has made having or having had cancer harder		111	20.3	4.45–92.43	<0.01*
Agree or strongly agree COVID has impacted on life			3.64	2.52 to 19.40	<0.01 *
Agree or strongly agree COVID has impacted treatment		111	2.15	0.78 to 5.98	0.14
Agree or strongly agree COVID has impacted on relationships		112	2.89	1.11 to 7.54	0.03 *
Previous mental health difficulties		112	1.85	0.73 to 4.67	0.19
Resilience		112	0.58	0.41 to 0.81	<0.01 *

B. GADS-7score indicative of moderate or severe anxiety

		<i>n</i>	OR	95% CI	<i>p</i>
Age group (vs. 16–19 years)	20–24 years	112	1.45	0.53 to 4.01	0.47
	25–30 years		0.5	0.11 to 2.37	0.38
Gender		111	1.63	0.70 to 3.81	0.26
Ethnicity (vs. white)	Asian	109	0.50	0.10 to 2.63	0.42
	Mixed		0.76	0.07 to 8.65	0.82
Free school meals		112	0.86	0.29 to 2.54	0.79
Haematological malignancy		112	0.64	0.30 to 1.40	0.27
Active treatment during COVID		111	1.18	0.51 to 2.73	0.70
Diagnosis during COVID		112	1.34	0.60 to 2.99	0.47
Advised to shield		112	2.11	0.63 to 7.04	0.22
COVID-19 has made having or having had cancer harder		111	2.56	1.13 to 5.74	0.02*
Agree or strongly agree COVID has impacted on life		112	2.76	0.94 to 8.06	0.06
Agree or strongly agree COVID has impacted treatment		111	1.32	0.60 to 2.90	0.48
Agree or strongly agree COVID has impacted on relationships		112	3.54	1.54 to 8.16	<0.01*
Previous mental health difficulties		112	5.93	2.32 to 15.17	<0.01

(continued)

Table 2. (continued)

A. A little or more anxious than before COVID					
		<i>n</i>	OR	95% CI	<i>p</i>
Resilience		112	0.55	0.4 to 0.72	<0.01*
C. PHQ-8 score indicative of moderate or severe depression					
		<i>n</i>	OR	95% CI	<i>p</i>
Age group (vs. 16–19 years)	20–24 years	112	1.89	0.69 to 5.22	0.22
	25–30 years		1.0	0.99	0.25 to 4.07
Gender		111	1.43	0.63 to 3.21	0.39
Ethnicity (vs. white)	Asian	109	0.39	0.07 to 2.02	0.26
	Mixed		0.58	0.05 to 6.64	0.66
Free school meals		112	1.47	0.53 to 4.10	0.46
Haematological malignancy		111	0.96	0.45 to 2.03	0.92
Active treatment during COVID		111	1.21	0.54 to 2.73	0.64
Diagnosis during COVID		112	1.24	0.56 to 2.75	0.58
Advised to shield		112	1.95	0.63 to 6.01	0.25
COVID-19 has made having or having had cancer harder		111	2.5	1.14 to 5.45	0.02*
Agree or strongly agree COVID has impacted on life		112	5.23	1.65 to 16.56	<0.01*
Agree or strongly agree COVID has impacted treatment		111	1.00	0.46 to 2.15	0.99
Agree or strongly agree COVID has impacted on relationships		112	2.42	1.11 to 5.25	0.03*
Previous mental health difficulties		112	5.92	2.46 to 14.26	<0.01
Resilience		112	0.52	0.38 to 0.69	<0.01*

increased anxiety since the beginning of COVID-19, and around 40% meeting moderate to severe cut-offs on both the PHQ-8 and GADS-7. This is concerning given the known impact that psychological distress has on cancer treatment in AYA with cancer (Park & Rosenstein, 2015). We believe this to be the first study to examine for participants' own perception of COVID-19 impact on their treatment, lives and relationships. A majority of participants reported that COVID-19 had made a significant impact on their lives and relationships, and made their experience of cancer harder. Impact on life and relationships were found to be associated with psychological measures of depression and anxiety, in particular a reported impact on relationships associated with 3.5 odds of a moderate or severe GADS-7 scores and 2.5 odds of a severe or moderate PHQ-8 score. Not surprisingly, previous mental health difficulties were associated with high PHQ-8 and GADS-7 scores. However, in analyses, when previous mental health difficulties were adjusted for, the relationship between impact on relationships and GADS-7 and PHQ-8 remained robust. We were surprised that neither active treatment during COVID-19 nor diagnostic group were associated with increased distress; however, we lacked data on treatment modality and this warrants further investigation. Importantly, we found reduced odds of both a report of being more anxious since COVID-19 and

both moderate to severe GADS-7 and PHQ-8 scores with greater resilience scores (CD-RISC) which represents a potentially important moderator to be considered by clinicians.

Our findings are similar to those reported by [Košir et al. \(2020\)](#) early in the pandemic from an online survey to examine depression and anxiety in AYA cancer patients in Slovenia and the United Kingdom. A higher proportion of our sample reported greater anxiety since COVID-19 and a greater proportion reported significant distress and/or anxiety. Differences could be explained by the timepoint within the pandemic (April 2020 compared to December 2020 for our study). [Casanova et al. \(2020\)](#) found increased distress in a paediatric and AYA sample was related to perceived risk of severe complications from COVID-19 for their health. Our sample did not find an association between perceived impact of COVID-19 on healthcare but it did for perceived impact of COVID-19 on life and relationships. One potential mechanism for how relationships for AYA with cancer may have been affected is that during the pandemic, family or significant others were usually unable to accompany AYAs for treatment or visit, and young people may have been separated by lockdown and shielding. This may have caused distress, longer-term relational effects and reducing 'connectedness'. Importantly, connectedness has been identified as a process that facilitates resilience ([Fergus & Zimmerman, 2005](#)), predicts young people's development of post-traumatic stress ([McDermott et al., 2012](#)) and mediates psychological adjustment in young people with cancer ([Barber & Schluterman, 2008](#)). The apparent protective effect of resilience for psychological distress in our sample is in keeping with the widely accepted concept that building patients' resilience with a cancer diagnosis is crucial in mediating the psychological distress and coping throughout the cancer experience ([Patterson et al., 2018](#)).

Study limitations

We did not formally power our sample size, aiming to recruiting as many AYA as possible. Though we recruited from eight centres and targeted all eligible patients at centres, our sample is less than 20% of eligible patients. This might mean that our sample is not adequately powered to detect small effect sizes. We also acknowledge the important limitation that almost 60% of respondents had had previous mental health problems, and this introduces a risk of bias as patients with pre-existing mental health disorders may have been more likely to take part; thus, mental health measures in our sample may be inflated against the population of eligible patients for the study. To some extent, such issues for size and representativeness are inherent to surveys and the nature of the impact of the pandemic on access to patients across services for research made them feasible methodologies for the situation. We also performed multivariable regression analyses to test for the influence of previous mental health status on univariable regression models. Our data reported here is cross-sectional and associations do not imply causation, and reported psychological measures may not have been temporally stable. That said, our study methodology is longitudinal and we will report at a future point on change over time. We used validated psychological questionnaires, alongside pragmatic questions to identify specific perceived impacts during COVID-19. There were a greater proportion of females in our sample and age group predominance was disproportionate (with the majority being aged 22–24). However, we deliberately recruited up to the age of 30 because whilst we were interested in AYA patients (16–24) we did not want to exclude data from patients who were diagnosed in this age group but continued treatment for a longer period or had relapsed. The proportion of AYA who reported being eligible for free school meals is similar to nationally reported rates (13.6% in England ([Department of Education, 2018](#))), suggesting some sample representativeness of socio-economic status.

Clinical implications

We believe our study has important messages for the care of AYA with cancer. Though a high proportion of AYA in the sample had pre-existing mental health difficulties, our study suggests a high burden on AYA with cancer during the pandemic, which alongside existing concerns about mental health in this group is worrying. There seems to have been a general impact on anxiety levels, and on life and relationships in general for these patients. This implies an urgent need for screening and support for AYA cancer patients, to address impacts on mental health from the pandemic. Mitigating the ways in which COVID has impacted, and continues to impact, on lives should also be a key consideration in clinical settings. For example, our findings suggest that resilience may have a role in moderating the effects for AYA with cancer, and may be an area to work clinically with patients to improve mental health outcomes. This all further enforces the need for a preventative models of psychology (Holmes et al., 2020) for AYA with cancer (Barber & Schluterman, 2008). It is widely accepted that enhancing patients' resilience at the start of a cancer diagnosis is crucial in mediating psychological distress and coping throughout the cancer experience (Patterson et al., 2018). This currently informs United Kingdom strategy for universal pre-habilitation and psychological screening in newly diagnosed young adults with cancer to enable early intervention, which is key in optimising treatment outcomes for psychological distress. The awareness of multidisciplinary cancer teams of an additional predictive factor for psychological distress, impact of COVID-19 can inform individualised care models and screening for distress to facilitate early intervention.

Forty percent of young adult cancer patients (pre-pandemic) typically go onto require specialist psychological intervention during or one-year post end of treatment (Zebrack et al., 2014). This figure is likely to increase and service resource and delivery should be prepared.

Conclusion

Within the constraints of our sample size, we believe that the findings in our survey provides important information for care of AYA with cancer since the pandemic began, demonstrating high levels of impact on mental health. Our data suggests that the impact of COVID-19 on relationships and overall life may be predictive factors for poorer mental health in AYA with cancer and an area to explore with patients to look for potential solutions and opportunities is to enhance resilience as a possible protective factor. This predictive factor coupled with routine screening is likely to enable early intervention for psychological distress which is key in optimising mental health outcomes.

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Author Contributions

CJ conceived the idea, contributed to study design, supported the completion of the protocol, completed the ethical approval process, managed data entry, contributed to statistical analysis, completed the write-up and was a principle investigator at their site and oversaw participant recruitment.

NM conceived the idea, contributed to study design, completed the protocol, supported the ethical approval process and was a principle investigator at their site and oversaw participant recruitment.

RM conceived the idea, contributed to study design, supported the completion of the protocol, supported the ethical approval process and was a principle investigator at their site and oversaw participant recruitment. LB conceived the idea, contributed to study design, supported the completion of the protocol and supported the ethical approval process and was a principle investigator at their site and oversaw participant recruitment. DG was a principle investigator at their site and oversaw participant recruitment and edited the write-up. EB was a principle investigator at their site and oversaw participant recruitment. LB was a principle investigator at their site and oversaw participant recruitment and edited the write-up. VE was a principle investigator at their site and oversaw participant recruitment. RC supported the ethical approval process. LDH supported the ethical approval process, completed statistical analyses and significantly contributed to the write-up. OO completed data entry and literature searches.

Declaration of Conflicting Interests

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Availability of data and materials

The data analysed during the current study are available from the corresponding author, LDH, on request.

ORCID iD

Lee D Hudson  <https://orcid.org/0000-0003-0883-8791>

Supplemental Material

Supplemental material for this article is available online.

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