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Under the radar: a longitudinal exploration of mental health among children and adolescents experiencing parental and caregiver death during the COVID-19 pandemic in South Africa

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Background: Death of a caregiver during childhood can have profound influences on child wellbeing and later trajectories. Globally, child and adolescent mental health is an increasing area of concern with widespread negative implications. These data provide the first comprehensive exploration of the mental health of children experiencing COVID-19-associated orphanhood over time, as well as risk and protective factors for their mental health. **Methods:** Data are drawn from a longitudinal cohort study of children and adolescents (9–18 years) residing in South Africa who had experienced COVID-19-associated parent or caregiver death (n = 211), and a control group (no loss; n = 210). Mental health data were gathered at two timepoints utilising validated instruments. Data are stratified according to orphanhood status and biological sex. Mixed-effect regression modelling is undertaken—identifying associations between sociodemographic predictors and mental health status. **Results:** Among those experiencing orphanhood, prevalence of poor mental health increased between baseline and follow-up, indicating greater mental health burden over time compared to the control group. Females experiencing orphanhood reported a higher prevalence of poor mental health, a finding that persisted over time. Identified probable risk factors for likely mental disorder include older age (OR: 1.15 [95% CI: 1.03–1.28]), food insecurity (OR: 2.91 [95% CI: 1.07–7.92]) and exposure to domestic violence (OR: 1.74 [95% CI: 1.03–2.93]). Increased access to necessities (OR: 0.83 [95% CI: 0.71–0.97]) was identified as a protective factor for mental health. **Conclusion:** This is the first longitudinal investigation of mental health in the context of COVID-related orphanhood. In measuring both prevalence and intensity of mental health symptoms, we identified multiple factors relating to poor mental health including living in poverty and experiencing early adversities alongside loss. Females experiencing orphanhood were at an increased risk of poor mental health. Tailoring existing mental health provision for children and adolescents within low- and middle-income countries may be required. Policy and programming focusing on poverty and violence alleviation may be of benefit.

Key Practitioner Message

What is currently known?

- There are increasing calls for more focused attention on children and adolescents in low-resource settings, where both research and service delivery are limited
- Children and adolescents exposed to multiple adversities are likelier to have poorer mental health, which can change over time depending on their experiences and access to resources

What has been shown?

- In measuring both prevalence and intensity of mental health symptoms longitudinally, we identified multiple overlapping factors related to poor mental health among children and adolescents experiencing COVID-19 related orphanhood (a never before studied group) related to living in poverty and experiencing early adversities alongside loss
- Females experiencing orphanhood were at an increased risk of poor mental health

What is the significance of this for clinical practice?

- Tailoring existing mental health provision for children and adolescents within low- and middle-income countries may be of benefit
- Programming focusing on poverty and violence alleviation within such context may be advantageous

Keywords: Mental health; orphans; poverty

Introduction

The mental health of children and adolescents is a growing area of concern globally, and there are increasing calls for more focused attention on children and adolescents in low-resource settings, where both research and service delivery are limited (Benton, Boyd, & Njoroge, 2021; Laurenzi et al., 2022). By age 14, an estimated 34.6% of individuals experience the emergence of a mental health disorder (Solmi et al., 2022), and recent estimates show a larger burden in low- and middle-income countries (LMICs) (Lovero et al., 2023). Poor mental health affects individuals, families and societies, and can shape human development, educational and employment opportunities, and health and well-being over the life course (Knapp & Wong, 2020).

Children and adolescents exposed to multiple adversities are likelier to have poorer mental health, which can change over time depending on their experiences, their support networks and their access to resources (Juwariah et al., 2022; Kumar et al., 2022). While certain early adverse experiences may enable adaptive responses to develop, exposure to poverty, family conflict and other resource deprivation can also intensify mental health risk and impede cognitive development over time (Russell, Heyn, Peverill, DiMaio, & Herringa, 2024). The effects of these experiences vary based on their timing, frequency and intensity, as well as when they occur along the child's developmental trajectory (Bhutta, Bhavnani, Betancourt, Tomlinson, & Patel, 2023).

Importantly, children navigating high levels of adversity may struggle to cope with additional shocks, including the loss of a parent or primary caregiver (both referred to in this paper as 'caregivers'). Children experiencing the loss of a caregiver in the context of other adversities may have difficulty coping with multiple, concurrent changes —which can include change of caregiver, household, and/or school, reduced income and caregiving instability (Aynsley-Green, Penny, & Richardson, 2012; Sherr, Croome, Clucas, & Brown, 2014). All-cause orphanhood is poorly monitored and addressed (Villaveces et al., 2025), and children experiencing loss require more sustained, dedicated service provision. Younger children who experience loss of a caregiver have been found to experience increased incidence of common mental disorders over time, and children and adolescents with symptoms prior to a caregiver's death may face elevated risks (Pham et al., 2018). These shifts can also be subtler, reshuffling children's support networks and friends at critical developmental periods and adding grief to the typical experiences of emotional flux and self-discovery that accompany adolescence.

The COVID-19 pandemic provided a critical opportunity to better understand these multiplicative impacts. Global estimates indicate that approximately 10.5 million children and adolescents experienced the death of a caregiver as a result of COVID-19 (Hillis et al., 2021; Unwin et al., 2022). In South Africa, surveillance data showed 102,595 COVID-related deaths (World Health Organization, 2023). However, incorporating all-cause mortality and considering high numbers of excess deaths during the period from early 2020 to early 2022, it is possible that COVID-19 deaths were 2.5–3 times the reported number (Bradshaw, Dorrington, Moultrie, Groenewald, & Moultrie, 2022).

In South Africa, multigeneration households, migrant labour and governmental social support grants for both children and older persons contribute to alternative caregiving arrangements (Jennings, Farrell, & Kobayashi, 2021). As many as half of children who did not live with one or more parents in 2015 were living with a grandparent (Statistics South Africa, 2017). Consequently, children and adolescents in South Africa and countries with similar family and social arrangements were likelier to bear the brunt of COVID-related mortality and disruption.

We recruited a cohort of children and adolescents aged 9–18 years in 2021 to more closely examine these concerns. This study is the first to examine experiences and outcomes for children and adolescents who experienced COVID-related caregiver loss (Roberts et al., 2023). Paired with a control group that did not experience loss, this cohort enables us to explore the consequences of experiencing early loss on mental health and well-being in the context of a global pandemic. We present longitudinal analyses comparing mental health and associated risk and protective factors between children and adolescents who experienced COVID-19 related loss, and those who did not.

Methods

Participants and procedures

We recruited children and adolescents between the ages of 9 and 18 years living in underresourced peri-urban settlements on the outskirts of Cape Town, South Africa who had experienced the loss of a parent or primary caregiver from COVID-19 (n = 211). Simultaneously, we recruited a comparison group of children and adolescents who did not experience loss (n = 210). Power calculations based on meaningful change on validated mental health scales (Patient Health Questionnaire and Generalised Anxiety Disorders Scale) were used to generate a sample size of 200 children experiencing COVID-19-associated orphanhood and caregiver loss. Calculations were informed by the clinical context and use of such measures among adolescents in the South African context (e.g. Marlow et al., 2023). Power calculations were made using the G*Power software (Faul, Erdfelder, Lang, & Buchner, 2007).

Participants were recruited through existing studies, led by the project's principal investigator, in the same geographical area; referral from community linkages; and via schools and non-government organisations providing services to children in the

area. We supplemented recruitment with snowball sampling. Participants were interviewed at two timepoints. Trained data collectors administered tablet-based questionnaires to participants individually, in a private setting. Questionnaires focused on sociodemographic characteristics, experiences of COVID-19, health, mental health, education, caregiving experiences and relationships. Study measures were piloted with 10–15 participants prior to the study. Participants were able to complete interviews in Xhosa or English, and all items appeared in both languages. Informed written consent was obtained from the caregivers of all children and adolescents under age 18. Participants who were 18 years of age provided written informed consent, and minor participants under age 18 provided informed assent. Ethical approvals were obtained from the Health Research Ethics Committee at Stellenbosch University (N22/04/040). The study's protocol included referrals to relevant services in cases where participants required additional support. A resident social worker was available during data collection.

Baseline data was collected between July 2022 and May 2023, and follow-up data was collected between July 2023 and May 2024 (92.4% retention rate at follow-up [n = 389]). Data from 389 children and adolescents are included in these analyses. Additional details relating to study methodology are published in the protocol (Roberts et al., 2023).

Measures

Analyses utilised longitudinal data obtained from two timepoints. COVID-19-associated orphanhood and caregiver loss were assessed at study recruitment and verified at follow-up via participant and caregiver report. A single item in the study questionnaire was also utilised to confirm orphanhood status.

Sociodemographic characteristics were gathered during baseline and follow-up interviews. *Child age in years* and *biological sex* were captured. *Housing status* was defined by whether the participant lived in formal or informal housing, and number of people in the household. *Socioeconomic status* was defined collectively by food security (using the Household Food Insecurity Access Scale) (Coates, Swindale, & Bilinsky, 2007), access to basic necessities (capturing the presence/absence of 8 basic necessities), household employment (whether any adult was earning an income in the household) and if they received a government grant. These items were taken from the 2011 South African National Census (Statistics South Africa, 2011). Additional measures included *relationship status*; *caregiving responsibilities* undertaken by the child or adolescent (any/none); *access to support* (by a person or organisation); *access to community provision* (such as youth centre, youth club/homework club, singing group, sports team, performance group, volunteering, career development/advice); *experience of bullying* (such as name calling/hitting/on social media; yes/no); *social risk behaviour score* (measured by the 17-item social risk subscale of the Child Behaviour Checklist) (Achenbach, 2000); *experience of domestic violence* (yes/ no, e.g. been hit, threats of violence, threats to send away, called names, withheld meals); *experience of community violence* (yes/no, i.e. experiencing assault, witnessing shooting or stabbing outside of home) and *parental monitoring score* (measured by the 16-item Alabama Parenting Questionnaire) (Essau, Sasagawa, & Frick, 2006).

Mental health status was assessed using three validated mental health scales. Published cut-off scores were used to ascertain prevalence estimates of likely mental disorder. Two measures of mental health status were utilised in analyses. Participants were classified as experiencing any likely mental disorder (CMD) if they scored above the cut-off on any mental health measures in the study (depressive, anxiety, suicidality symptoms). Participants were classified as experiencing two or more likely mental disorders if they scored above the cut-off on *two or more* of these measures. *Depressive symptomatology* was measured using the 9-item Patient Health Questionnaire (PHQ-9) (Johnson, Harris, Spitzer, & Williams, 2002; Marlow et al., 2023), which has been used extensively in the study site and was recently validated with the target age group and population (Marlow et al., 2023). Items were scored 0–3 (total score range 0–27). A cut-off of 10 (indicating clinically relevant symptoms) was used to indicate depressive symptoms. *Anxiety symptomatology* was measured using the 7-item Generalised Anxiety Disorders scale (GAD-7) (Spitzer, Kroenke, Williams, & Lowe, 2006), using the same scoring as above (total score range 0–21). A cut-off of 6 was used to indicate anxiety symptoms, in line with recommendations from the same recent validation study (Marlow et al., 2023). *Suicidality/self-harm symptomatology* was measured using the 5-item Mini International Neuropsychiatric interview for children and adolescents (MINI-KID) (Sheehan et al., 2010a). Items asked about suicidal ideation, plans or attempts; participants were classified as experiencing suicidality if they responded yes to any of these items. The MINI-KID has been used extensively globally, with good internal consistency and good test–retest reliability (Sheehan et al., 2010b). *Self-esteem* was measured using the 10-item Rosenberg Self-Esteem Scale (Rosenberg, 1965), with higher scores indicating higher self-esteem.

Statistical analyses

Analyses were undertaken using STATA v.18 (StataCorp, 2023). A five-step approach to analyses was undertaken. First, X^2 and t-tests were used to explore baseline and follow-up sociodemographic characteristics of the sample according to orphanhood status. Second, X^2 and t-tests were used to explore univariate change in mental health status over time according to orphanhood status. Third, univariate change in mental health status over time was also explored according to both orphanhood and biological sex. Fourth, sociodemographic predictors of mental health status over time (identified as relevant within existing literature) were assessed for collinearity using a correlation matrix (utilising a cut-off for collinearity of 0.8) and corroborated using regression modelling and variance inflation factor (using a cut-off of 10). Factors identified as being collinear were excluded from subsequent analyses. Finally, using repeated measures data from both timepoints, mixed effect regression modelling (accounting for correlations in data collected from the same individuals over two time periods and clustering within families) was undertaken to identify associations between previously identified sociodemographic predictors and mental health status (logistic regression modelling: any likely mental disorder vs. none and linear regression modelling: self-esteem score). The sample size was deemed sufficient for the inclusion of multiple covariates. To enhance the parsimony and interpretability of the final model, covariates were only included if they were theoretically or clinically relevant. Missing data was minimal in the study, given this complete case analysis was utilised where appropriate and missingness reported. Based on the variables utilised in this analysis, there was no missing data and thus complete case analysis was used.

Results

Sociodemographic characteristics

Table 1 reports baseline and follow-up sociodemographic characteristics disaggregated according to orphanhood status. At baseline, participants' mean age was 12.6 years (*SD* 2.3), and 49.9% were female. Food insecurity was high (91.5%), and participants experiencing orphanhood reported greater food insecurity compared to nonorphans (94.4% vs. 88.6%, $X^2 = 4.19$, $p = .04$). Social risk scores were higher among participants experiencing orphanhood compared to nonorphans (3.5 vs. 2.7, $t = -2.12$, $p = .03$). At baseline, all other sociodemographic characteristics were similar regardless of orphanhood status. The average number of people living in each household was 5.2 (*SD* 2.8). Approximately half (49.4%) of participants had access to all eight basic necessities, with a sample-wide average of 6.9 (*SD* 1.6) necessities. Household employment was 80.0%, and most households received a grant (89.2%). Nearly one third of participants (28.6%) identified as

Table 1. Baseline and follow-up participant characteristics disaggregated by orphanhood status

	Baseline				Follow-up		
Sample characteristics	Total sample (n = 389)	Orphanhood (n = 196)	No orphanhood (n = 193)	t/X^2, p-value	Orphanhood (n = 196)	No orphanhood (n = 193)	t/X^2, p-value
Age (years)	12.6 (2.3)	12.7 (2.4)	12.6 (2.1)	−0.18, .86	13.6 (2.4)	13.6 (2.2)	−0.03, .97
Sex (female)	194 (49.9%)	105 (53.6%)	89 (46.1%)	2.16, .14	106 (54.6%)	90 (46.2%)	2.80, .09
No. people in household	5.2 (2.8)	5.5 (3.1)	5.0 (2.6)	−1.71, .09	5.1 (3.0)	4.7 (2.4)	−1.56, .12
Food insecure	356 (91.5%)	185 (94.4%)	171 (88.6%)	4.19, **.04**	176 (90.7%)	167 (85.6%)	2.41, .12
Access to all basic necessities	192 (49.4%)	97 (49.5%)	95 (49.2%)	0.003, .96	89 (45.9%)	95 (48.7%)	0.32, .58
Basic necessities score (0–8)	6.9 (1.6)	6.7 (1.8)	7.0 (1.4)	1.85, .06	6.8 (1.5)	7.0 (1.3)	1.59, .11
Household employment	311 (80.0%)	156 (79.6%)	155 (80.3%)	0.03, .86	151 (77.8%)	171 (87.7%)	6.63, .01
Any grant	347 (89.2%)	171 (87.2%)	176 (91.2%)	1.57, .21	169 (87.1%)	182 (93.3%)	4.27, **.04**
In a relationship	111 (28.6%)	59 (30.1%)	52 (27.1%)	0.43, .51	73 (37.6%)	51 (26.2%)	5.90, **.02**
Caregiving responsibilities	277 (71.2%)	146 (74.5%)	131 (67.9%)	2.08, .15	192 (99.0%)	195 (100%)	2.02, .16
Access to support	143 (36.8%)	70 (35.7%)	73 (37.8%)	0.19, .67	58 (29.9%)	53 (27.2%)	0.35, .55
Access to community provision	338 (87.1%)	169 (86.2%)	169 (88.0%)	0.28, .60	156 (80.4%)	162 (83.1%)	0.46, .50
Experiencing bullying	275 (70.9%)	134 (68.4%)	141 (73.4%)	1.21, .27	115 (59.3%)	110 (56.4%)	0.33, .57
Social risk score (0–34)	3.1 (4.1)	3.5 (4.8)	2.7 (3.2)	−2.12, **.03**	2.2 (2.5)	2.0 (2.7)	−0.86, .39
Any domestic violence	159 (41.2%)	82 (42.3%)	77 (40.1%)	0.19, .67	70 (36.1%)	63 (32.3%)	0.62, .43
Any community violence	280 (72.2%)	136 (69.4%)	144 (75.0%)	1.52, .22	94 (48.5%)	93 (47.7%)	0.02, .88
Parental monitoring score	41.3 (7.0)	41.0 (6.9)	41.7 (7.2)	0.99, .32	41.0 (6.6)	40.9 (6.3)	0.02, .98

Bold fonts indicate p values ($p \leq 0.05$).

being in a romantic or sexual relationship, and 71.2% reported household or caregiving responsibilities. Most participants reported accessing community provision (87.1%), and 36.8% had access to a support person/organisation. Regarding violence, 70.9% of participants reported experiencing some form of bullying; 41.2% reported domestic violence in the home; and 72.2% reported experiences of community violence.

At follow-up, food insecurity remained high, although it did not differ according to orphanhood status. Most participants still received household grants; however, those experiencing COVID-19-related orphanhood were now less likely to be receiving grants compared to children not experiencing loss (87.1% vs. 93.3%, X^2 = 4.27, p = .04). Those in the orphanhood group were likelier to report being in a romantic or sexual relationship at follow-up compared to nonorphans (37.6% vs. 26.2%, X^2 = 5.90, p = .02). Almost all participants had household or caregiving responsibilities (99.0% and 100%, respectively, for orphans and nonorphans), an increase from baseline. Lower violence exposure was reported at follow-up compared to baseline, with participants in both groups reporting less bullying, domestic violence and community violence.

Prevalence of likely mental disorder and change in mental health status over time

Table 2 shows differences in mental health over time for all participants and according to orphanhood status. For all participants, prevalence of any likely mental disorder was lower at follow-up than baseline, as were symptom scores for both depression and anxiety; prevalence of depression and anxiety symptoms; suicidality, suicidal ideation and attempts; and two or more likely mental disorders. No difference was identified between suicidality symptom scores at baseline and follow-up, despite lower prevalence of suicidality, suicidal ideation and attempts being identified over time. Self-esteem scores increased at follow-up.

Among children and adolescents experiencing orphanhood, there was an increase in the prevalence of any likely mental disorder, depressive symptoms and suicidal ideation and attempts between baseline and follow-up. In this group, the prevalence of anxiety symptoms, any suicidality symptoms and two or more likely mental disorders decreased between baseline and follow-up. Scores for depressive symptoms, anxiety symptoms, suicidality symptoms and self-esteem were all similar at baseline and follow-up.

The control group had decreases in the prevalence of likely mental disorder between baseline and follow-up. Depressive and anxiety symptom scores, prevalence of depressive and anxiety symptoms, suicidal ideation and attempt, and two or more likely mental disorders were all lower at follow-up compared to baseline. Self-esteem scores also increased between timepoints. Suicidality scores were similar between timepoints, and there was

Table 2. Changes in mental health status over time stratified according to orphanhood status

	Total sample (n = 389)		t/X^2,	Orphanhood (n = 196)		t/X^2,	No orphanhood (n = 193)		t/X^2,
	Baseline	Follow-up	p-value	Baseline	Follow-up	p-value	Baseline	Follow-up	p-value
Any likely mental disorder	151 (38.8%)	106 (27.3%)	10.48, **<.001**	81 (41.3%)	69 (35.2%)	10.14, **.001**	70 (36.3%)	37 (19.2%)	0.96, .33
Two or more likely mental disorders	75 (19.3%)	49 (12.6%)	46.22, **<.001**	44 (22.5%)	36 (18.4%)	23.30, **<.0001**	31 (16.1%)	13 (6.7%)	21.38, **<.0001**
Depressive symptom score (0–30)	5.8 (5.1)	4.9 (4.6)	2.86, **.005**	6.1 (5.4)	5.8 (5.0)	0.80, .43	5.4 (4.8)	4.1 (4.1)	3.53, **.0005**
Depressive symptoms (above cut-off)	91 (23.4%)	62 (15.9%)	16.72, **<.0001**	51 (26.0%)	45 (23.0%)	7.97, **.005**	40 (20.7%)	17 (8.8%)	7.87, **.005**
Anxiety symptom score (0–21)	4.1 (4.1)	3.2 (3.6)	4.01, **.0001**	4.4 (4.4)	3.8 (3.7)	1.78, .07	3.9 (3.9)	2.7 (3.3)	3.94, **.0001**
Anxiety symptoms (above cut-off)	116 (29.8%)	78 (20.1%)	18.98, **<.0001**	64 (32.7%)	51 (26.0%)	12.90, **<.0001**	52 (26.9%)	27 (14.0%)	4.88, **.03**
Suicidality symptom score (0–5)	0.26 (0.92)	0.24 (0.93)	0.55, .58	0.36 (1.1)	0.36 (1.1)	0.06, .95	0.17 (0.65)	0.11 (0.63)	0.93, .35
Any suicidality symptoms	40 (10.3%)	29 (7.5%)	40.5, **<.001**	24 (12.2%)	21 (10.7%)	35.26, **<.001**	16 (8.3%)	8 (4.2%)	3.07, .08
Suicidal ideation/ attempt	23 (5.9%)	21 (5.4%)	54.46, **<.0001**	15 (7.7%)	16 (8.2%)	32.12, **<.0001**	8 (4.2%)	5 (2.6%)	16.60, **<.0001**
Self-esteem score (0–30)	19.3 (3.6)	19.9 (3.7)	−2.98, **.003**	18.9 (3.6)	19.3 (3.9)	−1.33, .18	19.7 (3.6)	20.5 (3.5)	−3.01, **.003**

Bold fonts indicate p values ($p \leq 0.05$).

lower prevalence of any suicidality symptoms at follow-up.

Prevalence and scores relating to poor mental health symptoms (any likely mental disorder, two or more likely mental disorders, depression, anxiety, suicidality) were higher in the orphanhood group compared to the nonorphanhood group, a pattern which persisted over time (see Figure 1; Table 2).

Changes in mental health status over time stratified according to orphanhood status, and biological sex

Table 3 presents change in mental health over time according to orphanhood status and biological sex. When stratified according to biological sex, there is a decrease in the prevalence of and scores relating to poor mental health over time.

Among females not experiencing loss, there was decrease in the prevalence of any likely mental disorder, and two or more mental disorders over time. Depressive, anxiety, suicidality and self-esteem scores, and depressive and anxiety symptoms, were similar over time among females not experiencing loss. There was an increase in suicidal ideation attempts over time among this group (3.4% vs. 4.5%; $X^2 = 6.02$, $p = .01$; see Table 3).

Females experiencing orphanhood had increases in prevalence of and scores relating to poor mental health over time (any likely mental disorder, depressive symptoms score, any depressive symptoms, any anxiety symptoms, any suicidality symptoms, suicidal ideation or attempts, two or more mental disorders). Anxiety symptom scores, suicidality symptom scores and self-esteem scores were similar over time among this group.

Risk and protective factors for poor mental health symptoms

Table 4 presents a series of multivariable mixed effect regression models exploring the associations between hypothesised risk and protective factors for mental health among participants. Probable risk factors for likely mental disorder include older age, food insecurity and exposure to domestic violence. Probable protective factors for likely mental disorder include increased access to basic necessities, and a trend was identified in relation to receipt of household grants. Identified probable risk factors for self-esteem scores include experiencing orphanhood, female biological sex, food insecurity, no access to community provision and experience of bullying. Identified probable protective factors for self-esteem scores include increased access to basic necessities, and receipt of household grants. Probable risk and protective factors for individual mental health disorder symptoms are presented in Table S1.

Discussion

To the best of our knowledge, these analyses present the first longitudinal investigation into the mental health of children and adolescents affected by COVID-related caregiver loss and orphanhood. In measuring both prevalence and intensity of mental health symptoms, we found multiple factors related to poor mental health, including living in poverty and experiencing early adversities alongside loss.

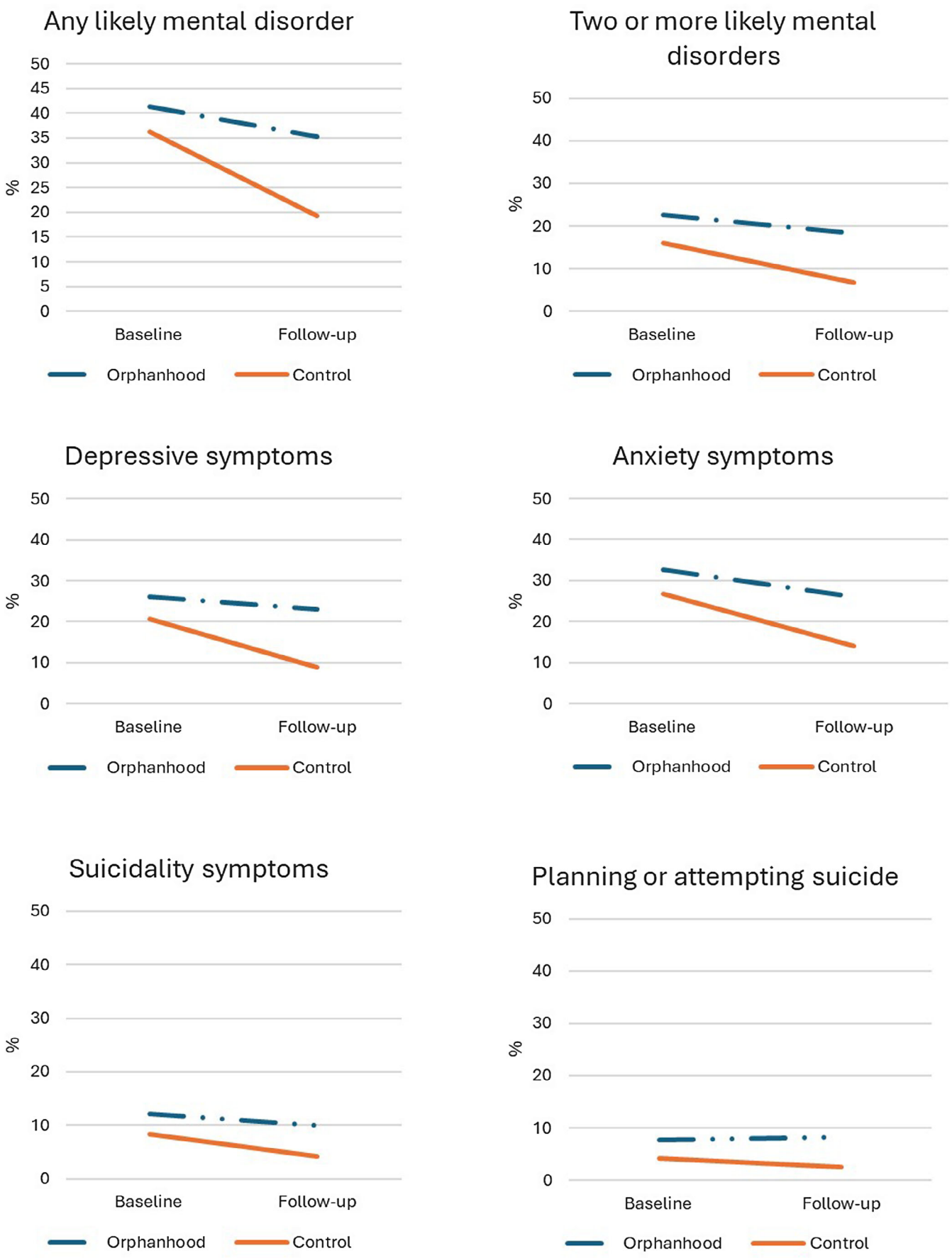

Figure 1. Prevalence of mental health symptoms over time, stratified according to orphanhood status

Table 3. Changes in mental health over time stratified by orphanhood status and biological sex

	Female (n = 194)						Male (n = 195)					
	Orphanhood (n = 105)		t/X^2,	No orphanhood (n = 89)		t/X^2,	Orphanhood (n = 91)		t/X^2,	No orphanhood (n = 104)		t/X^2,
	Baseline	Follow-up	p-value	Baseline	Follow-up	p-value	Baseline	Follow-up	p-value	Baseline	Follow-up	p-value
Any likely mental disorder	41 (39.1%)	46 (43.8%)	10.50, **.001**	29 (32.6%)	19 (21.4%)	1.00, .32	40 (44.0%)	23 (25.3%)	1.97, .16	41 (39.4%)	8 (17.3%)	0.23, .63
Two or more likely mental disorders	23 (21.9%)	26 (24.8%)	20.61, **<.0001**	11 (12.4%)	7 (7.9%)	6.52, **.01**	21 (23.1%)	10 (11.0%)	4.59, .03	20 (19.2%)	6 (5.8%)	16.84, <.0001
Depressive symptom score (0–30)	5.6 (5.2)	6.9 (5.2)	−2.13, **.04**	4.8 (4.0)	4.8 (4.4)	−0.13, .90	6.7 (5.6)	4.5 (4.4)	3.32, **.001**	6.0 (5.3)	3.4 (3.7)	4.95, **<.0001**
Depressive symptoms (above cut-off)	23 (21.9%)	31 (29.5%)	10.32, **.001**	13 (14.6%)	9 (10.1%)	2.82, .09	28 (30.8%)	14 (15.4%)	1.13, .29	27 (26.0%)	8 (7.7%)	6.02, .01
Anxiety symptom score (0–21)	4.3 (3.5)	4.4 (3.7)	−0.17, .86	3.4 (3.5)	3.1 (3.4)	0.62, .54	4.4 (4.4)	3.0 (3.5)	2.83, **.006**	4.4 (4.2)	2.3 (3.2)	4.71, **<.0001**
Anxiety symptoms (above cut-off)	35 (33.3%)	34 (32.4%)	14.70, <.0001	19 (21.4%)	13 (14.6%)	2.66, .10	29 (31.9%)	17 (18.7%)	0.83, .36	33 (31.7%)	14 (13.5%)	2.49, .11
Suicidality symptom score (0–5)	0.45 (1.2)	0.57 (1.4)	−0.90, .37	0.16 (0.6)	0.20 (0.9)	−0.46, .65	0.26 (1.0)	0.11 (0.6)	1.62, .11	0.17 (0.7)	0.04 (0.31)	2.26, **.03**
Any suicidality symptoms	16 (15.2%)	17 (16.2%)	22.32, **<.0001**	9 (10.1%)	6 (6.7%)	0.30, .58	8 (8.8%)	4 (4.4%)	8.86, **.003**	7 (6.7%)	2 (1.9%)	6.08, **.01**
Suicidal ideation/attempt	10 (9.5%)	14 (13.3%)	20.83, **<.0001**	3 (3.4%)	4 (4.5%)	6.02, **.01**	5 (5.5%)	2 (2.2%)	7.80, **.005**	5 (4.8%)	1 (1.0%)	19.99, **<.0001**
Self-esteem score (0–30)	18.7 (3.7)	18.5 (4.0)	0.70, .48	20.0 (3.5)	20.2 (3.7)	−0.47, .64	19.1 (3.5)	20.3 (3.6)	−2.67, **.009**	19.4 (3.7)	20.8 (3.4)	−3.50, **.0007**

Bold fonts indicate p values ($p \leq 0.05$).

Table 4. Mixed-effect regression models exploring the associations between hypothesised risk and protective factors and mental health status among children and adolescents experiencing COVID-19-associated orphanhood and a control group

	Any likely mental disorder		Self-esteem score	
	OR (95% CI)	*p*-Value	Coef. (95% CI)	*p*-Value
Orphanhood	1.22 (0.74–2.02)	.44	−0.64 (−1.24, −0.04)	**.04**
Age (years)	1.15 (1.03–1.28)	**.01**	−0.06 (−0.19, 0.06)	.34
Sex (female)	0.78 (0.47–1.30)	.35	−0.65 (−1.23, −0.07)	**.03**
Food Insecurity	2.91 (1.07–7.92)	**.04**	−1.63 (−2.44, −0.82)	**<.0001**
No. people in household	0.98 (0.89–1.08)	.71	−0.006 (−0.11, 0.10)	.91
Access to basic necessities (0–8)	0.83 (0.71–0.97)	**.02**	0.33 (0.15, 0.50)	**<.001**
No access to community provision	1.30 (0.65–2.62)	.46	−0.73 (−1.39, −0.07)	**.03**
Household employment	0.87 (0.46–1.63)	.67	0.02 (−0.51, 0.54)	.95
Grants	0.45 (0.20–1.02)	.06	1.30 (0.44, 2.17)	**.003**
In a relationship	1.15 (0.67–1.98)	.61	0.52 (−0.05, 1.09)	.07
Access to support	0.80 (0.48–1.35)	.41	0.02 (−0.51, 0.54)	.95
Experience of bullying	1.02 (0.59–1.77)	.94	−0.64 (−1.17, −0.11)	**.02**
Social risk score (0–34)	1.02 (0.96–1.09)	.52	−0.03 (−0.11, 0.05)	.47
Domestic violence (Any)	1.74 (1.03–2.93)	**.04**	−0.46 (−1.00, 0.07)	.09
Community violence (Any)	1.58 (0.85–2.96)	.15	−0.29 (−0.83, 0.25)	.30
Caregiving responsibility	0.71 (0.39–1.27)	.25	0.46 (−0.25, 1.16)	.20
Parental monitoring score	1.02 (0.99–1.06)	.24	−0.02 (−0.05, 0.02)	.43

Bold fonts indicate *p* values ($p \leq 0.05$).

Living in poverty predicted poorer mental health, aligning with other evidence from South Africa and globally (Zaneva, Guzman-Holst, Reeves, & Bowes, 2022). Food insecurity and exposure to any violence in the household were most closely associated with poorer mental health outcomes and poorer self-esteem. Conversely, living in a household receiving a grant and having access to basic necessities acted as a protective influence for children and adolescents. While these findings are not new, they highlight the critical link between poverty and poor mental health, which for children and adolescents experiencing crises can become even more pronounced (Whitehead, Taylor-Robinson, & Barr, 2021).

Overall, participants in both groups reported elevated mental health symptomatology. Importantly, findings show a shift over time, with mental health symptoms persisting for the participants experiencing caregiver loss, while easing over the same period for the control group. While the prevalence of suicidal thoughts, behaviours and attempts was generally low, suicidality worsened over time among the group experiencing loss. This suggests that the pandemic's mental health burden generally eased over time, but not for those experiencing loss. Enduring mental health symptoms and emerging disorders may be more common, and expected, for bereaved children and adolescents (Thurman, Taylor, Luckett, Spyrelis, & Nice, 2018). Critically, the same social and environmental factors that predicted COVID-19 mortality—including poverty, overcrowded households and household economic insecurity—are likely to continue or intensify in the aftermath of a loss (Bergman, Axberg, & Hanson, 2017). These factors can further disrupt healthy developmental trajectories, complicating the transition to adulthood.

For more severe symptoms including suicidality, children and adolescents require clearer pathways to support. Some longer term impacts of caregiver loss and orphanhood emerged from our data—sustained elevated mental health burden scores, and worsening levels of suicidality—indicating greater need for longer term support services. Sustained support is costly and requires different skills and training on already-strained provision (Deng et al., 2023). However, it is crucial—especially following a global crisis where resources, healthcare services and policy decisions overlooked children (Radner, Tomlinson, Lam, & Hughes, 2025). Pandemic and crisis preparedness has become an agenda item for many governments, and they should be encouraged to include this element of provision into short- and longer term plans.

Our findings also highlight differences by biological sex and age, echoing other studies conducted during COVID-19 (Racine et al., 2021). Female participants—and especially those experiencing orphanhood—had significantly poorer mental health. Gender-specific approaches to care and support, effective in other South African contexts (Thurman, Luckett, Nice, Spyrelis, & Taylor, 2017), could be important to integrate into post-grief support. Clustered risks need to also be considered, where female adolescents may be exposed to gender-specific stressors such as violence, poverty, schooling interruption and sibling care. We also found that mental health was worse as adolescents grew older. Children and adolescents may process loss differently based on the circumstances surrounding the loss, as well as their own coping strategies and support systems (Kentor & Kaplow, 2020); developmental factors may also shape how they navigate loss. As adolescents age, they are likelier to experience emergent mental health symptoms (Solmi et al., 2022). As adolescents may have to move homes, make new friends at new schools, while undergoing typical biological, social and emotional changes, their mental health challenges may be compounded (Alvis, Zhang, Sandler, & Kaplow, 2023). Within households who take in older adolescents who have recently experienced loss, new caregivers may struggle with providing both basic and more complex caregiving needs (White et al., 2021). As such, providing support for younger children and preadolescents may be more

straightforward and less tumultuous, despite the significant support needs that older children also have.

Interestingly, more caregiver monitoring was associated with slightly higher odds of poor mental health. It is possible that experiencing increased caregiver monitoring—especially for children who have recently come under the care of a new caregiver—may evoke difficult memories of the caregiver who recently died, or feelings of resentment (Alvis et al., 2023). Nonetheless, it is critical to bolster caregiver support and monitoring for children and adolescents in the adjustment period after losing a primary caregiver. While good monitoring and boundaries provide a secure environment for adolescents (Krauss, Orth, & Robins, 2020), such monitoring may lead to adolescents feeling controlled and confined, even if it is a result of challenging behaviour by the adolescent. More in-depth research is needed to understand the new patterns of parenting in reconstituted families and how this affects adolescent adjustment and well-being.

Taken together, our findings identify a critical need for mental health support and provision among children and adolescents—spanning both early intervention and ongoing support. New caregivers may also need support and guidance on how to handle these children and adolescents if they move into new home environments. This is particularly important for those experiencing COVID-19-associated orphanhood and caregiver loss, but also for those who experience loss in the context of similar epidemics and crises. Resource shortages and fragmented governance, alongside high demand, pose barriers to service provision in the communities that most need this support. Importantly, additional poverty alleviation interventions may further provide support for children, including social protection and parenting support interventions (Hillis et al., 2021; Thomas, Ahmed, Tan, & Grigorenko, 2021). Amended or adjusted parenting support for caregivers who are newly caring for a child who has experienced orphanhood may be particularly valuable (Villaveces et al., 2025).

Unsurprisingly, our data show mental health burdens similar to those experienced by children in other crises, including settings with high HIV burden and those affected by humanitarian conflict and natural disasters. Crisis preparedness policies and provisions are key to supporting global mental health and well-being, particularly for children and adolescents. In the face of limited mental health resources—and extensive reductions in foreign aid and global support for COVID-19 initiatives and other crises in low-resource settings—governments, multilateral agencies and nongovernmental organisations need to identify solutions that can enable targeted investments in protecting youth mental health, while focusing on prevention initiatives and social protection as a critical part of response planning (Patel et al., 2023).

Limitations

Our study had several limitations. These data are based on self-reported mental health symptomatology rather than through direct clinical examination. Data were mainly drawn from one large peri-urban area in South Africa's Western Cape Province, possibly restricting the generalisability of results. Creative sampling strategies were used, so no measure of refusal rates and population prevalence is possible. This points to the lack of tracking of children when adults die; children's details on death certificates may assist with visibility of these children. Certain self-report indicators among children and adolescents may also be less reliable, such as household income and grants. Children may not be aware of family support mechanisms and adult validation of such measures would have been helpful. Because no pre-COVID data on mental health were available for children and adolescents in the region, changes in mental health symptomatology status pre- and post-COVID-19 pandemic could not be directly evaluated nor inferred through broader comparisons. Additionally, these findings may differ in a more economically heterogeneous population (i.e. due to variations in access to resources) and as such this study may not fully capture the complex interplay between socioeconomic status, orphanhood and mental health, that may be apparent in different populations. Despite these limitations, we believe that our findings are robust; our data collection processes, designed to ensure quality, mitigated the effect of these limitations as best possible.

Conclusion

Our study examined the mental health burden and lived experiences of children in the Western Cape who experienced COVID-19-related orphanhood. These findings identify that mental health risks may shift and amplify over time, especially for those affected by caregiver loss in high-adversity communities. Specific challenges identified for female participants and slightly older adolescents reflect the need for tailored, adaptable responses in social service provision and for such services to be sustained and supported throughout and after crises. These findings elicit key considerations for future crises and for settings experiencing ongoing conflict, uncertainty and risk for children, adolescents and their families.

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Conflict of interest statement

The authors have declared that they have no competing or potential conflicts of interest.

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Ethical considerations

Informed written consent was obtained from the caregivers of all children and adolescents under age 18.

Participants who were 18 years of age provided written informed consent, and minor participants under age 18 provided informed assent. Ethical approvals were obtained from the Health Research Ethics Committee at Stellenbosch University (October 2022; N22/04/040).

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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Supporting information

Additional Supporting Information may be found in the online version of this article:

Table S1. Mixed-effect regression models exploring the associations between hypothesised risk and protective factors and mental health status (depression, anxiety, suicidality) among children and adolescents experiencing COVID-19-associated orphanhood and a control group.

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