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Original Article

Depression, associated factors, and coping mechanisms among caregivers of children with cancer at mobile hospice Mbarara, Uganda. A cross-sectional study.

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Abstract

Background

Caregivers of children with cancer experience substantial psychological, emotional, and socioeconomic challenges that increase their risk of depression. This study assessed the prevalence of depression, factors associated with depression, and coping mechanisms among caregivers of children with cancer attending Mobile Hospice Mbarara, Uganda.

Methods

A cross-sectional study was conducted among 117 caregivers of children with cancer attending Mobile Hospice Mbarara, consecutively recruited and interviewed using a structured questionnaire. Depression was assessed using the Patient Health Questionnaire-9 (PHQ-9), with a score of ≥10 indicating depression. Factors associated with depression were identified using modified Poisson regression with robust standard errors, with results presented as crude and adjusted prevalence ratios (CPR/APR) and 95% confidence intervals (CI). Statistical significance was set at $p<0.05$.

Results

The prevalence of depression is 35.9% (42/117; 95% CI: 27.2–45.3%). Male sex (APR=1.68, 95% CI: 1.20–2.35), lack of emotional support (APR=1.61, 95% CI: 1.04–2.50),
hopelessness (APR=2.67, 95% CI: 1.58–4.52), late-stage cancer (APR=3.00, 95% CI: 1.99–4.54), terminal prognosis (APR=1.59, 95% CI: 1.08–2.34), providing care for more than 12 hours per day (APR=2.28, 95% CI: 1.30–4.01), lack of caregiving training (APR=1.69, 95% CI: 1.03–2.76), and irregular meal intake (rarely: APR=3.01, 95% CI: 1.38–6.55; sometimes: APR=2.62, 95% CI: 1.15–6.01) were independently associated with a higher prevalence of depression. Prayer, talking to family, seeking information, relaxation, and music or hobbies were universal coping strategies (100%), while exercise was the least frequently reported (36.8%).

Conclusions

More than one in three caregivers of children with cancer at Mobile Hospice Mbarara experienced depression. Inadequate emotional support and prolonged caregiving hours were independently associated with depression

Recommendation

Psychosocial support, caregiver training, and nutritional counselling in pediatric oncology and palliative care services may improve caregiver mental health and strengthen the quality of care provided to children with cancer.

Keywords: *Depression; caregivers; pediatric cancer; coping mechanisms; palliative care; Uganda*
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Background

Cancer is a major cause of morbidity and mortality worldwide. An estimated 19.3 million new cancer cases and nearly 10 million cancer deaths occurred globally in 2020, with projections indicating a rise to 28.4 million cases by 2040 (Sung et al. 2021). In sub-Saharan Africa, cancer incidence is projected to double by 2040 owing to limited early-detection capacity, late-stage presentation, and inadequate treatment infrastructure(Bray et al. 2018). Pediatric cancers including Burkitt's lymphoma, Wilms' tumor, retinoblastoma, and leukemia constitute a significant and often underappreciated component of this burden; five-year survival for childhood acute lymphoblastic leukemia is approximately 10–30% in Africa, compared with over 90% in the United States (Atun et al. 2016).

In Uganda, Burkitt's lymphoma is the most common childhood cancer, accounting for up to 50% of pediatric malignancies in some series (Orem et al. 2007). Although the WHO Global Initiative for Childhood Cancer targets 60% survival for six priority childhood cancers by 2030, Uganda continues to face diagnostic delays, unaffordable treatment costs, a limited oncology workforce, and inadequate palliative care infrastructure (World Health Organization, 2025).

Depression affects an estimated 280 million people globally (World Health Organization 2023) and is particularly prevalent among caregivers of cancer patients, with a pooled global prevalence of 42.08% (Bingham et al. 2022) and a pooled African prevalence of 47.21%(Wassie, Azagew, and Bifftu 2022). Caregivers of children with cancer face elevated risk relative to caregivers of adult patients, owing to the emotional intensity of pediatric illness and the disruption of family and developmental trajectories (Lewandowska et al. 2024). Depressed caregivers are less likely to adhere to treatment protocols, maintain follow-up schedules, or provide adequate emotional support, compromising treatment outcomes and the child's quality of life (Ozdemir Koyu and Tas Arslan 2021).

Mobile Hospice Mbarara (MHM), the largest Hospice Africa Uganda site by active patient enrolments (542 new patients in 2024/2025), provides holistic palliative care including pain management, psychosocial support, home visits, and community

outreach across Mbarara City and the surrounding districts of Bushenyi, Isingiro, and Rwampara. A mixed-methods study of 161 family caregivers at Hospice Africa Uganda, MHM's parent organization, found a 46% prevalence of depressive symptoms, with education status and religious affiliation significantly associated with depressive symptomatology(Dipio et al. 2022). More broadly in Uganda, Nuwamanya et al. (2023) reported a depression prevalence of 8.2% among caregivers of cancer patients at urban tertiary facilities, but this estimate was not disaggregated by patient age and did not capture caregivers within a palliative care setting. No published study has specifically examined depression, its associated factors, or coping mechanisms among caregivers of children with cancer in western Uganda's palliative care context. This study addressed that gap by determining the prevalence of depression, identifying associated factors, and documenting coping mechanisms among caregivers of children with cancer at MHM.

Methods

Study design, setting, and population

This facility-based cross-sectional study was conducted at Mobile Hospice Mbarara (MHM), Mbarara City, southwestern Uganda, from June to July 2026. MHM is one of three sites operated by Hospice Africa Uganda (HAU), the pioneering provider of palliative care on the continent, alongside HAU's headquarters in Kampala and a second site in Hoima. Rather than operating as an inpatient facility with a fixed bed capacity, MHM delivers a home-based, community outreach model of palliative care including pain management, psychosocial support, home visits, and community-based follow-up supplemented by facility-based consultations, consistent with HAU's established model of extending morphine access and palliative support to patients unable to reach urban hospital-based cancer services. MHM is the largest HAU site by active patient enrolments, having registered 542 new patients in the 2024/2025 financial year, and its catchment area extends across Mbarara City and the neighboring districts of Bushenyi, Isingiro, and Rwampara.

The study population comprised adult caregivers (aged ≥18 years) who were the primary caregiver of a child (aged 0–17 years) with a confirmed cancer diagnosis and who were actively receiving palliative care at MHM during the study period.

Bias and Quality Control

Several measures were taken to minimize potential sources of bias. Selection bias was minimized by using consecutive sampling to enroll all eligible caregivers in the order in which they presented, rather than a convenience or purposive approach, reducing the risk that caregivers with more or less severe depressive symptoms would be systematically over- or under-represented. Information and interviewer bias were minimized by using a structured, interviewer-administered questionnaire built around a validated instrument (PHQ-9), administered in the participant's preferred language using validated Runyankole-Rukiga or Luganda versions, and by pre-testing the full tool among 15 caregivers with comparable characteristics at Mbarara Regional Referral Hospital, a site excluded from the main study, so that ambiguous or culturally inappropriate items could be identified and revised. Research assistants received standardized training on interview technique, neutral probing, and confidentiality assurances prior to data collection, to reduce interviewer-introduced variability and encourage honest disclosure, thereby limiting social- desirability bias. Recall bias was minimized by anchoring questions to current or recent (two-week) symptoms and caregiving circumstances rather than requiring distant recall.

Sample size and sampling technique

A minimum sample size was calculated using Cochran's (1977) formula for a finite population (N=250 accessible caregivers), based on an anticipated depression prevalence of 8.2% (Nuwamanya et al. 2023), a 4% margin of error, a 95% confidence level, and a 10% non-response adjustment. The calculation proceeded as follows:

Step 1. Initial estimate

$n_0 = Z^2p\,(1-p)/e^2$, where Z = 1.96 (95% confidence level), p = 0.082, and e = 0.04. $n_0 = (1.96)^2 * 0.082 * 0.918 / (0.04)^2 = 3.8416 * 0.0753 / 0.0016 = 181$

Step 2. Finite population correction (N=250)

$n = n_0 / [1 + (n_0-1)/N] = 181 / [1 + 180/250] = 181/1.72 = 105$

Step 3 .non-response adjustment (10%)

final = n / (1−0.10) = 105/0.90 =117

A minimum sample size of 117 caregivers was therefore required and was achieved.

In the absence of an enumerable sampling frame, a non-probability consecutive sampling technique was used: all eligible caregivers presenting at MHM during the study period were approached sequentially, in the order in which they presented, until the target sample size was attained.

Eligibility criteria Inclusion criteria

- Adult (aged ≥18 years)
- Primary caregiver of a child (aged 0–17 years) with a confirmed cancer diagnosis
- Actively receiving palliative care at MHM during the study period
- Willing and able to provide written informed consent

Exclusion criteria

- Acutely ill, cognitively impaired, or in severe emotional distress at the time of data collection
- Providing simultaneous primary care to more than one child with cancer
- Previously documented severe mental illness
- Participation in the instrument pre-test

Study variables and data collection

Data were collected using a structured, interviewer-administered

questionnaire programmed in Kobo Toolbox, covering socio-demographic characteristics; psychosocial factors (emotional support, feeling overwhelmed, hopelessness); patient-related factors (cancer type, stage, symptom severity, prognosis); caregiving-related factors (duration, hours per day, sole-caregiver status, prior training); health-system and economic factors; lifestyle factors (sleep, exercise, substance use, meal regularity); and coping mechanisms.

The dependent variable, depression, was measured using the Patient Health Questionnaire-9 (PHQ-9), a validated nine-item screening instrument corresponding to DSM-5 criteria for major depressive disorder, administered in the participant's preferred language using validated Runyankole-Rukiga or Luganda versions (Miller et al. 2021); a score of ≥10 was classified as depression. The questionnaire was adapted from previously validated instruments and pre-tested among 15 caregivers at Mbarara Regional Referral Hospital, a site with a comparable caregiver population that was excluded from the main study.

Data analysis

Data were exported from Kobo Toolbox to Microsoft Excel for cleaning and analyzed in Stata version 18.0 (StataCorp LLC, College Station, TX, USA). Categorical variables were summarized as frequencies and percentages, and continuous variables as means with standard deviations. Depression prevalence was estimated with 95% confidence intervals. Because depression was a common outcome, a modified Poisson regression model with a log link and robust standard errors was used at bivariate level to estimate crude prevalence ratios (CPRs); variables with $p<0.20$ at bivariate analysis were entered into a multivariable modified Poisson regression model to estimate adjusted prevalence ratios (APRs) with 95% CIs. Statistical significance was set at $p<0.05$. Coping mechanisms were summarized descriptively as frequencies and percentages.

Analysis of quantitative variables

Continuous quantitative variables (caregiver age and PHQ-9 total score) were summarized as means and standard deviations, and their distributions were reviewed prior to modelling. For regression analysis, selected continuous and ordinal variables were categorized into contextually meaningful groups to aid interpretability and to accommodate potentially non-linear relationships with the outcome. Caregiver age was grouped into 20–29, 30–39, and 40–58 years, reflecting broadly comparable life-stage bands represented in the sample. Hours of caregiving per day were categorized as 4–8, 9–12, and >12 hours, with >12 hours capturing a caregiving burden exceeding a standard working day, consistent with categorizations used in prior caregiver-burden literature (Kassa et al. 2023). Meal regularity was categorized as always, sometimes, or rarely, based on the response options in the structured questionnaire. The PHQ-9 total score was analyzed both continuously (mean ± SD) and categorically, using standard severity bands (minimal, mild, moderate, moderately severe) for descriptive purposes and the validated binary cut-off of ≥10 to define depression for regression modelling.

Ethical considerations

Ethical approval was obtained from the Bishop Stuart University Research Ethics Committee (BSU-REC-2026-1993) on 15/07/2026 with administrative clearance from Mobile Hospice Mbarara prior to data collection. The study was conducted in accordance with the Declaration of Helsinki (2013). Written informed consent was obtained from all participants in their preferred language. Confidentiality was maintained using unique identification numbers and password-protected electronic files accessible only to the research team. Caregivers who screened positive for depression (PHQ-9 ≥10) were referred to the MHM psychosocial support team for further assessment and management.

Results Participant flow

Figure 1 summarizes the flow of participants through recruitment. Of the caregivers accessible at MHM during the study period (N=250), caregivers were approached consecutively, in order of presentation, until the pre-calculated minimum sample size of 117 was reached. All 117 caregivers approached met the eligibility criteria and consented to participate; none declined or was excluded, and none of the completed questionnaires had missing data, giving a 100% response rate (117/117) and a final analytic sample of 117.

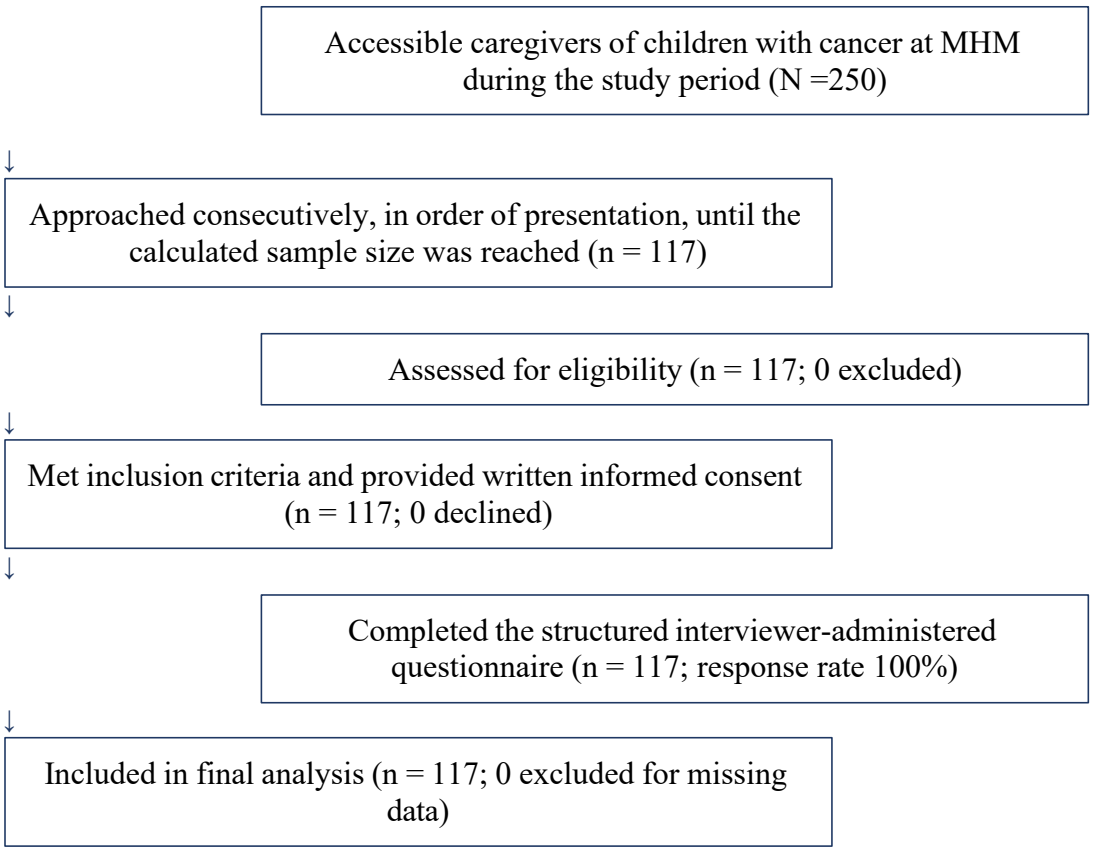

Figure 1: Socio-demographic Characteristics of caregivers of Children with Cancer

Socio-demographic characteristics of caregivers

Most caregivers were aged 40–58 years (46, 39.3%), followed by 30–39 years (38, 32.5%) and 20–29 years (33, 28.2%). Females comprised 66 (56.4%) of participants. Regarding marital status, 43 (36.8%) were widowed, 40 (34.2%) were married, and 34 (29.1%) were single. Educational attainment was comparable across secondary (41, 35.0%), primary (40, 34.2%), and tertiary (36, 30.8%) levels. Most caregivers were formally employed (34, 29.1%), while the distributions of monthly income and relationship to the patient were relatively similar across categories (**Table 1**).

Table 1: Socio-demographic Characteristics of caregivers of children with cancer

Variable	Category	N	%
Age group (years)	20–29	33	28.21
	30–39	38	32.48
	40–58	46	39.32
Sex	Female	66	56.41
	Male	51	43.59
Marital status	Married	40	34.19
	Single	34	29.06
	Widowed	43	36.75
Education level	Primary	40	34.19
	Secondary	41	35.04
	Tertiary	36	30.77
Occupation	Business	26	22.22
	Casual	32	27.35
	Employed	34	29.06
	Farmer	25	21.37
Monthly income (UGX)	<100,000	30	25.64
	100,000–300,000	28	23.93
	300,000–500,000	31	26.50
	>500,000	28	23.93
Relationship to patient	Child	29	24.79
	Other	26	22.22
	Parent	24	20.51
	Sibling	20	17.09
	Spouse	18	15.38

Note. N = 117.

Prevalence of depression

The prevalence of depression among caregivers, determined using the PHQ-9 (score ≥10), is 35.9% (42/117; 95% CI: 27.2–45.3%); 64.1% (75/117) of caregivers did not meet the threshold for depression. The mean PHQ-9 score was 7.91 ± 5.80, indicating mild depressive symptoms on average. By PHQ-9 severity category, 35.9% had minimal or no depressive symptoms, 28.2% had mild depression, 15.4% had moderate depression, and 20.5% had moderately severe depression **(Table 2).**

Table 2: Prevalence and severity of depression among caregivers of children with cancer

Variable	Category	n	%
PHQ-9 score	Mean ± SD	7.91 ± 5.80	—
PHQ-9 severity	Minimal (0–4)	42	35.90
	Mild (5–9)	33	28.21
	Moderate (10–14)	18	15.38
	Moderately severe (15–19)	24	20.51
Depression status	No depression	75	64.10
	Depression	42	35.90

Note. Depression was defined as a PHQ-9 score of ≥10 (moderate to moderately severe depression); participants with PHQ-9 scores <10 were classified as having no depression. This operational definition was used in all subsequent regression analyses.

Factors associated with depression

Bivariate analysis

At bivariate level, male sex (CPR=1.57, 95% CI: 0.96–2.55; p=0.071), lack of emotional support (CPR=2.52, 95% CI: 1.57–4.03; p<0.001), feeling overwhelmed, hopelessness (yes: CPR=5.07, 95% CI: 2.69–9.55; p<0.001), late-stage cancer (CPR=3.57, 95% CI: 2.08–6.13; p<0.001), terminal prognosis (CPR=2.33, 95% CI: 1.39–3.91; p=0.001), providing care for >12 hours/day (CPR=3.53, 95% CI: 1.76–7.07; p<0.001), lack of caregiving training (CPR=2.68, 95% CI: 1.58–4.55; p<0.001), alcohol or drug use (CPR=2.06, 95% CI: 1.26–3.36; p=0.004), and irregular meals (rarely: CPR=10.00, 95% CI: 3.29–30.41; p<0.001) were associated with depression (Table 3). Sex showed only a borderline, non-significant association at this stage (p=0.071); together with the other candidate factors, it was carried forward into the multivariable model.

Table 3: Bivariate analysis of factors associated with depression among caregivers of children with cancer

Variable	Category	CPR (95% CI)	p
Age group (years)	20–29	Reference	–
	30–39	0.87 (0.43–1.74)	0.691
	40–58	1.30 (0.73–2.35)	0.375
Sex	Female	Reference	–
	Male	1.57 (0.96–2.55)	0.071
Emotional support	Yes	Reference	–
	No	2.52 (1.57–4.03)	<0.001
Feeling overwhelmed	Always	Reference	–
	Never	0.15 (0.07–0.36)	<0.001
	Often	0.58 (0.39–0.88)	0.010
	Sometimes	0.19 (0.09–0.44)	<0.001
Hopelessness	No	Reference	–
	Sometimes	2.35 (1.12–4.94)	0.024
	Yes	5.07 (2.69–9.55)	<0.001
Cancer stage	Early	Reference	–
	Late	3.57 (2.08–6.13)	<0.001
Prognosis	Hopeful	Reference	–
	Terminal	2.33 (1.39–3.91)	0.001
Hours of caregiving/day	4–8 hours	Reference	–
	9–12 hours	2.40 (1.13–5.11)	0.023
	>12 hours	3.53 (1.76–7.07)	<0.001
Caregiving training	Yes	Reference	–
	No	2.68 (1.58–4.55)	<0.001
Relationship to patient	Child	Reference	–
	Other	1.49 (0.75–2.95)	0.257
	Parent	1.21 (0.57–2.56)	0.622
	Sibling	0.97 (0.41–2.30)	0.939
	Spouse	1.07 (0.46–2.52)	0.870
Alcohol/drug use	No	Reference	–
	Yes	2.06 (1.26–3.36)	0.004
Meals per day	Always	Reference	–
	Rarely	10.00 (3.29–30.41)	<0.001
	Sometimes	4.75 (1.50–15.00)	0.008

Note. CPR = crude prevalence ratio; CI = confidence interval. Variables with p < 0.20 at the bivariate analysis were considered for inclusion in the multivariable modified Poisson regression model.

Multivariable analysis

After adjustment, male sex (APR=1.68, 95% CI: 1.20–2.35; p=0.002), lack of emotional support (APR=1.61, 95% CI: 1.04–2.50; p=0.034), hopelessness (APR=2.67, 95% CI: 1.58–4.52; p<0.001), late-stage cancer (APR=3.00, 95% CI: 1.99–4.54; p<0.001), terminal prognosis (APR=1.59, 95% CI: 1.08–2.34; p=0.019), providing care for more than 12 hours/day (APR=2.28, 95% CI: 1.30–4.01; p=0.004), lack of caregiving training (APR=1.69, 95% CI: 1.03–2.76; p=0.036), and irregular meal intake (rarely: APR=3.01, 95% CI: 1.38–6.55; p=0.005; sometimes: APR=2.62, 95% CI: 1.15–6.01; p=0.022) are independently associated with a higher prevalence of depression. Caregivers who reported never, often, or sometimes feeling overwhelmed had a significantly lower prevalence of depression than those who always felt overwhelmed (p<0.05) (Table 4). Sex, non-significant at bivariate level, became a significant independent predictor after adjustment, with male caregivers at higher risk than female caregivers.

Table 4: Multivariable modified Poisson analysis of factors associated with depression among caregivers of children with cancer

Variable	Category	APR (95% CI)	p
Age group (years)	20–29	Reference	–
	30–39	0.71 (0.41–1.21)	0.202
	40–58	0.91 (0.57–1.46)	0.705
Sex	Female	Reference	–
	Male	1.68 (1.20–2.35)	0.002
Emotional support	Yes	Reference	–
	No	1.61 (1.04–2.50)	0.034
Feeling overwhelmed	Always	Reference	–
	Never	0.30 (0.16–0.57)	<0.001
	Often	0.55 (0.38–0.79)	0.001
	Sometimes	0.23 (0.12–0.47)	<0.001
Hopelessness	No	Reference	–
	Sometimes	1.67 (1.00–2.79)	0.049
	Yes	2.67 (1.58–4.52)	<0.001
Cancer stage	Early	Reference	–
	Late	3.00 (1.99–4.54)	<0.001
Prognosis	Hopeful	Reference	–
	Terminal	1.59 (1.08–2.34)	0.019
Hours of caregiving/day	4–8 hours	Reference	–
	9–12 hours	1.12 (0.59–2.10)	0.730
	>12 hours	2.28 (1.30–4.01)	0.004
Caregiving training	Yes	Reference	–
	No	1.69 (1.03–2.76)	0.036
Relationship to patient	Child	Reference	–
	Other	0.64 (0.38–1.08)	0.097
	Parent	1.18 (0.63–2.19)	0.607
	Sibling	1.63 (0.92–2.89)	0.096
	Spouse	1.23 (0.56–2.67)	0.607
Meals per day	Always	Reference	–
	Rarely	3.01 (1.38–6.55)	0.005
	Sometimes	2.62 (1.15–6.01)	0.022

Note. APR = adjusted prevalence ratio; CI = confidence interval. Modified Poisson regression with robust standard errors; n = 117. Reference categories: age 20–29 years, female sex, presence of emotional support, always feeling overwhelmed, no hopelessness, early-stage cancer, hopeful prognosis, 4–8 caregiving hours/day, received caregiving training, child relationship to the patient, and always having meals.

Coping mechanisms employed by caregivers

Coping mechanisms were assessed using a multi-select checklist (Questionnaire Section G), in which each of the 117 caregivers could endorse any number of adaptive and maladaptive strategies. Frequencies and percentages for every strategy, calculated against the full sample (N=117), are presented in Table 5.

Table 5: Coping mechanisms employed by caregivers of children with cancer

Coping strategy	N	%
Prayer	117	100.0
Talking to family	117	100.0
Seeking information	117	100.0
Relaxation	117	100.0
Music or hobbies	117	100.0
Counselling	56	47.9
Avoidance	56	47.9
Alcohol use	54	46.2
Support groups	52	44.4
Exercise	43	36.8

Note. N = 117. Percentages are calculated against the full sample; the checklist was multi-select, so percentages do not sum to 100%.

All percentages are calculated against the full sample (N=117), consistent with the multi-select nature of the coping-mechanisms checklist. Five strategies prayer, talking to family, seeking information, relaxation, and music or hobbies were endorsed by every one of the 117 caregivers (100%), while the remaining five strategies were more variably endorsed, ranging from 36.8% (exercise) to 47.9% (counselling and avoidance).

This finding addresses Objective 3: caregivers rely almost universally on informal, low-cost coping strategies prayer, family support, information-seeking, relaxation, and hobbies — while formal or structured supports such as counselling and support groups are used by fewer than half. The near-universal reliance on alcohol as a coping mechanism among nearly half of caregivers (46.2%) is notable given its independent association with depression identified under Objective 2, suggesting an area warranting targeted intervention.

Participant voices

Prayer and faith as coping

"When I am depressed, I look for Father Kabboy to come and pray for me. There are prayer groups that come round to the caregivers here, and that is what carries me through" (Caregiver ID80, mother, 40 years).

Family support as coping

"When I call my husband and tell him we don't have money for some of the basic things here, he makes sure he gets a loan and provides for us. That is what helps me overcome the depression" (Caregiver ID20, mother, 37 years).

Alcohol use / avoidance as coping

"For me, my medicine is alcohol. When I feel more depressed, I go to a nearby bar alone and drink to forget my problems" (Caregiver ID100, father, 45 years).

Discussion

Prevalence of depression

This study found that 35.9% of caregivers of children with cancer had depression based on the PHQ-9, indicating that more than one in three caregivers experienced clinically significant depressive symptoms. This is broadly comparable to the pooled global prevalence of approximately 42% reported in recent systematic reviews and meta-analyses (Mengesha et al. 2023), and consistent with studies from Poland and Sweden reporting substantial depressive symptoms among parents of children with cancer (Lewandowska et al. 2024). However, the prevalence was lower than the 47.2% pooled African estimate (Wassie et al. 2022) and the 54.1% reported among caregivers of adult cancer patients in Ethiopia (Demissie and Balta 2024), and substantially higher than the 8.2% reported among Ugandan caregivers of cancer patients more broadly(Nuwamanya et al. 2023) a difference plausibly attributable to the emotional intensity, prolonged caregiving demands, and anxiety about the child's future that characterize pediatric cancer caregiving specifically.

Factors associated with depression

Male sex

Male caregivers had a 68% higher prevalence of depression than female caregivers, contrary to most prior evidence identifying female caregivers as being at greater risk owing to greater emotional involvement and domestic obligations (Mengesha et al. 2023; Wassie et al. 2022). This may reflect Uganda's cultural context, where men are expected to provide financial support while simultaneously caregiving, and where norms discouraging men from expressing distress or seeking psychosocial support may compound this burden.

Lack of emotional support

Caregivers lacking emotional support had a significantly higher prevalence of depression, consistent with evidence that inadequate social support reduces emotional resilience and limits effective coping during caregiving (Nuwamanya et al. 2023).

Hopelessness

Caregivers experiencing hopelessness had nearly three times the prevalence of depression of those who did not, consistent with evidence linking maladaptive coping and spiritual distress to elevated depression risk (Dipio et al. 2022; Nuwamanya et al. 2023).

Disease severity and prognosis

Caregivers of patients with late-stage cancer had three times the prevalence of depression, and those facing a terminal prognosis had a significantly higher prevalence, consistent with evidence that greater disease severity, symptom burden, and anticipatory grief increase caregiver psychological distress (Dipio et al. 2022; Wassie et al. 2022).

Caregiving hours and training

Caregivers providing more than 12 hours of daily care had more than twice the prevalence of depression, and those without caregiving training had a significantly higher prevalence, consistent with evidence linking prolonged caregiving hours and inadequate preparation to physical exhaustion, reduced confidence, and psychological distress(Kassa et al. 2023; Munie et al. 2024; Nuwamanya et al. 2023).

Irregular meal intake and feeling overwhelmed

Caregivers who rarely or sometimes ate regular meals had a significantly higher prevalence of depression, consistent with evidence that prolonged caregiving burden compromises caregivers' own nutrition and physical wellbeing (Kassa et al. 2023). Conversely, caregivers reporting never, sometimes, or often feeling overwhelmed had a significantly lower prevalence of depression than those who always felt overwhelmed, reinforcing that cumulative, unrelieved caregiving burden is among the strongest predictors of depression in this population (Nuwamanya et al. 2023).

Coping mechanisms

All caregivers reported using prayer, talking to family, seeking information, relaxation, and music or hobbies, consistent with evidence that caregivers of cancer patients predominantly rely on adaptive strategies such as religion, emotional support, and positive reframing (Akpan-Idiok et al. 2020). The universal use of prayer likely reflects strong religious belief in Uganda. Nearly half of caregivers also reported counselling, avoidance, alcohol use, and support groups, indicating that both adaptive and maladaptive strategies are commonly used side by side (Antony et al., 2018). While counselling and support groups may promote wellbeing, avoidance and alcohol use likely provide only temporary relief and may worsen mental health over time notably, alcohol use was also independently associated with elevated depression risk at bivariate level in this study, underscoring the need for targeted intervention. Exercise was the least commonly reported strategy, likely reflecting the time constraints imposed by caregiving demands.

Generalizability

The findings of this study should be interpreted with caution regarding generalizability (external validity). Because MHM is a single, non-randomly recruited palliative-care site situated in a peri-urban setting in southwestern Uganda, and participants were caregivers of children specifically rather than caregivers of cancer patients in general the prevalence and associated factors reported here may not be directly generalizable to caregivers attending other, particularly urban tertiary, cancer-care facilities in Uganda, nor to informal caregivers who are not engaged with a palliative care service. However, because MHM serves a broad catchment area spanning Mbarara City and the neighboring districts of Bushenyi, Isingiro, and Rwampara, and is the largest HAU site by active enrolment, the sample is likely reasonably representative of caregivers accessing formal palliative and pediatric-oncology support services within this sub-region. Multicenter studies, as recommended below, would be required to establish generalizability across Uganda's more varied palliative-care and pediatric-oncology contexts.

Conclusions

Depression affects more than one in three caregivers of children with cancer at Mobile Hospice Mbarara. Male sex, lack of emotional support, hopelessness, late-stage cancer, terminal prognosis, prolonged caregiving hours, lack of caregiving training, and irregular meal intake were independently associated with depression, while caregivers who always felt overwhelmed carried the greatest risk. Caregivers relied almost universally on informal coping strategies such as prayer, family support, and relaxation, while formal supports such as counselling and support groups were used by fewer than half, and nearly half reported using alcohol as a coping mechanism.

Recommendations

Routine depression screening using validated tools such as the PHQ-9 should be integrated into pediatric oncology and palliative care services, with clear referral pathways to psychosocial support. Structured caregiver training covering symptom management, nutrition, and self-care and access to counselling or peer-support groups should be strengthened at facility level, with particular attention to male caregivers, who may be less likely to seek psychosocial support due to cultural norms. Caregivers should be encouraged to maintain adaptive coping strategies and adequate nutrition while being discouraged from maladaptive strategies such as alcohol use. At the policy level, the Ministry of Health should consider incorporating caregiver mental health screening and support into national cancer-care and palliative-care guidelines.

Strengths and limitations

This study is among the few conducted in Uganda examining both depression and coping mechanisms specifically among caregivers of children with cancer, using validated instruments and an appropriate modified Poisson regression approach for a common binary outcome. However, the cross-sectional design precludes causal inference; depression and coping were assessed

by self-report rather than clinical interview, introducing potential recall and social-desirability bias; and the single-facility design may limit generalizability to other palliative care settings in Uganda.

Areas for further research

Longitudinal studies are needed to establish causal relationships between caregiving factors, coping mechanisms, and depression over the course of a child's illness. Multicenter studies across different regions of Uganda would improve generalizability, and intervention studies evaluating

the effectiveness of psychosocial support, caregiver training, and adaptive-coping interventions in reducing caregiver depression are warranted. Qualitative work exploring why male caregivers in this setting show elevated depression risk relative to female caregivers contrary to much of the existing literature would also be valuable.

Abbreviations

APR……Adjusted Prevalence Ratio

BSU-REC……Bishop Stuart University Research Ethics Committee **CI**……Confidence Interval

CPR……Crude Prevalence Ratio

DSM-5……Diagnostic and Statistical Manual of Mental Disorders, 5th Edition **HAU**……Hospice Africa Uganda

MHM……Mobile Hospice Mbarara

PHQ-9……Patient Health Questionnaire-9 **SD**……Standard Deviation

WHO……World Health Organization

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Author contributions

JN conceived and designed the study, collected the data, performed the analysis and interpretation of data, and drafted the manuscript. AT and JA supervised the study design, analysis, and interpretation of data, and made critical revisions to the manuscript. All authors read, reviewed, and approved the final manuscript.

Conflict of interest

The authors declare that they have no conflict of interest.

Ethics approval and consent to participate

Ethical clearance was obtained from the Research and Ethics Committee (REC) of Bishop Stuart University (BSU-REC-2026-1993) on 15/07/2026. Administrative clearance was obtained from Mobile Hospice Mbarara. Participants voluntarily signed a consent form after being informed about the study by the investigator or a research assistant.

Privacy protection

Interviews were conducted in private at Mobile Hospice Mbarara to protect participants' privacy.

Confidentiality

Participants' names were not used on questionnaires, and information obtained was stored on password-protected devices accessible only to the research team.

Consent for publication

Not applicable.

Data availability

De-identified data supporting the findings of this study are available from the corresponding author (Jackline Ninyikiriza, jackieriza@gmail.com) upon reasonable request, subject to approval from Mobile Hospice Mbarara and the Bishop Stuart University Research Ethics Committee, given the sensitive nature of the data and the confidentiality assurances given to participants.

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