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Incidence and Predictors of Wasting Among Pediatric Cancer Patients at the University of Gondar Comprehensive and Specialized Hospital (UoG- CSH), Ethiopia: Retrospective Cohort Study (2020– 2024)

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Research Article

Keywords: Pediatric cancer, Wasting, Incidence, Predictors, Ethiopia

Posted Date: March 8th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-8611243/v1

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Additional Declarations: No competing interests reported.

Abstract

Introduction: Globally, more than 400,000 new cases of pediatric cancer are diagnosed each year. Wasting, an acute form of malnutrition, is a frequent yet under-recognized complication that adversely affects treatment outcomes and survival. Despite the increasing burden of pediatric cancer in Ethiopia, evidence regarding the incidence and determinants of wasting is limited. This study aimed to assess the incidence and predictors of wasting among pediatric cancer patients at the University of Gondar Comprehensive and Specialized Hospital (UoG-CSH), Northwest Ethiopia.

Methods: A facility-based retrospective follow-up study was conducted among pediatric cancer patients treated between January 2020 and December 2024. Data were collected from May 16 to June 15, 2025. A total of 342 patients were selected using simple random sampling. The incidence rate of wasting was estimated, and Kaplan–Meier survival analysis was applied to determine the median time to wasting and survival probability. Predictor variables with $p < 0.20$ in the bivariable analysis were included in a multivariable shared Cox proportional hazards model. Adjusted hazard ratios (AHR) with 95% confidence intervals (CI) were reported, and statistical significance was declared at $p \leq 0.05$.

Main Findings: More than half (52.6%) of the children developed wasting during follow-up, corresponding to an incidence rate of 4.6 per 1,000 child-days. The median time to develop wasting was 155 days. The presence of comorbidities (AHR = 1.79; 95% CI: 1.10–3.00), poor nutritional intake (AHR = 1.96; 95% CI: 1.13–3.41), mucositis (AHR = 1.67; 95% CI: 1.24–2.26), and receiving chemotherapy combined with surgery (AHR = 2.18; 95% CI: 1.39–3.18) were significant predictors of wasting.

Conclusions: The incidence of wasting among pediatric cancer patients was notably high. Comorbidity, mucositis, poor dietary intake, and combined treatment modalities were

independent predictors. Integrating routine nutritional screening and intervention into pediatric oncology care especially for children with treatment-related complications—could substantially improve clinical outcomes. The retrospective design and reliance on secondary data were key limitations that may have led to underestimation of some risk factors.

Introduction

Pediatric cancer remains a major cause of morbidity and mortality among children globally, with more than 400,000 new cases diagnosed each year (1). Despite advances in cancer therapy, survival rates vary widely between regions—exceeding 80% in high-income countries but remaining around 20% in low- and middle-income countries (LMICs)(2). Undernutrition contributes significantly to this disparity, as many children in LMICs present with compromised nutritional status at diagnosis, increasing their vulnerability to treatment toxicity and poor outcomes (2).

Among the forms of undernutrition, wasting a severe manifestation of acute malnutrition characterized by rapid depletion of body mass is particularly concerning in pediatric oncology.

Worldwide, studies have reported a broad range of wasting incidence during cancer therapy, from 6% to 50%, (3) influenced by disease type, treatment intensity, and socioeconomic context. Wasting negatively affects treatment tolerance, immune response, and survival, while also prolonging hospitalization and reducing quality of life (4). European studies have shown that malnutrition and weight loss within the first three to six months of treatment significantly increase the risk of infection and mortality, with cumulative malnutrition rates rising from 22% after 30 days to 47% after 120 days of treatment (5, 6).

In sub-Saharan Africa, the burden of malnutrition among children with cancer is particularly high and contributes to poor treatment outcomes (1). In South Africa, 31.7% of pediatric cancer patients were malnourished, while 17.3% were wasted. Similarly, a study from Uganda reported that 34.6% of children with cancer were acutely malnourished at diagnosis, with nearly half experiencing severe wasting (7). These findings underscore the rapid onset and clinical severity of malnutrition in resource-limited settings.

Ethiopia also faces a high burden of pediatric undernutrition, with studies reporting prevalence rates ranging from 41% to 68% among children with cancer(8). For instance, at the University of Gondar, 67.6% of pediatric oncology patients were reported to be stunted, wasted, or underweight (9). However, the incidence of wasting and its predictors in this population remain poorly understood. Factors such as prolonged hospitalization, comorbid infections, low socioeconomic status, poor feeding practices, and chemotherapy-induced toxicities—including vomiting, diarrhea, mucositis, and appetite loss—have all been linked to wasting, yet their roles in Ethiopian pediatric oncology remain inadequately defined (1, 4, 10)

Traditional anthropometric indicators such as body mass index (BMI)-for-age and weight-for-height have limited accuracy in assessing nutritional status in children with cancer, as tumor mass and organomegaly can mask true body composition changes. Mid-Upper Arm Circumference (MUAC) also offers a more reliable measure of muscle and fat reserves, less influenced by tumor-related weight distortion. Nevertheless, few studies have applied MUAC to pediatric cancer populations, and standardized nutritional screening tools are lacking (1, 4, 11).

Given these challenges, this study aimed to determine the incidence and predictors of wasting among pediatric cancer patients attending the University of Gondar Comprehensive and Specialized Hospital (UoG-CSH). By using weight for height for hematological malignance and MUAC used for nutritional assessment of solid tumors, the study provides a more accurate estimate of wasting and identifies key determinants influencing its development. The findings are expected to inform targeted nutritional interventions and guide policy strategies to improve the care and survival of children with cancer in Ethiopia.

Methods

Study Area

The study was conducted at the University of Gondar Comprehensive Specialized Hospital (UoG- CSH), located in Gondar city, Amhara Region, Ethiopia, 750 km northwest of Addis Ababa. Established in 1954, UoG-CSH is a multidisciplinary tertiary hospital with 550 beds, serving over five million people annually. The hospital has dedicated pediatric and adult oncology wards. The pediatric oncology unit has 35 beds and serves over 700 children and adolescents annually. The unit is staffed with two subspecialty oncologists, four pediatricians, eleven BSc nurses, and temporary residents and interns. Nutritional care and support have been provided routinely for pediatric cancer patients since 2020(12).

Study Design and Period

An institution-based retrospective cohort study was conducted among pediatric cancer patients who initiated treatment between January 1, 2020, and December 31, 2024. Data were collected from medical records between May 16 and June 15, 2025.

Source and Study Population

- **Source Population:** All pediatric cancer patients diagnosed and treated at the Pediatric Oncology-Hematology Unit at UoG-CSH.
- **Study Population:** Pediatric cancer patients who initiated treatment at the Pediatric Oncology-Hematology Unit during the study period.

Inclusion and Exclusion Criteria

- **Inclusion:** Pediatric patients (<18 years) diagnosed with cancer and under follow-up at UoG- CSH between January 1, 2020, and December 31, 2024.
- **Exclusion:** Patients who were already wasted at baseline, older than 18 years, or had incomplete medical records.

Sample Size and Sampling Procedure

The sample size was determined using the Schoenfeld formula for survival analysis and Cox proportional hazards modeling, accounting for a 95% confidence interval, 80% power, and 20% incomplete records. Based on hazard ratios from prior studies, the final calculated sample size was 342. Participants were selected using simple random sampling from eligible medical records. The largest sample size from multiple objectives was selected to ensure adequate statistical power.

Study Variables

- **Dependent Variable:** Wasting (Yes/No)
- **Independent Variables:**

- Socio-demographic: Age, sex, residence
- Cancer type: Hematological malignancies, solid tumors
- Stage of cancer: I, II, III, IV
- Type of treatment: Chemotherapy alone, chemotherapy with surgery
- Nutritional factors: Vomiting, mucositis, poor intake, constipation, diarrhea
- Comorbidities: Yes/No

Operational Definitions

- **Wasting:** was defined as weight-for-height z-score < −2 SD or BMI-for-age between −3 and −2 SD for children with hematological malignancies, and MUAC below age-specific cut-offs for children with solid tumors.
- **Event:** Occurrence of wasting during follow-up.
- **Time to Wasting:** Duration from treatment initiation to first occurrence of wasting.
- **Censored:** Patients lost to follow-up, transferred, died before wasting, or remained event-free.
- **Comorbidity:** Coexisting medical conditions, e.g., infections, anemia, HIV, chronic illnesses.
- **Poor Intake:** Reduced appetite, feeding difficulties, or refusal to eat.

Data Collection

Data were extracted retrospectively from patient medical records using Kobo Toolbox. Five BSc oncology nurses collected the data under the supervision of an MSc nurse. Data included socio- demographics, cancer type, treatment modality, clinical characteristics, and nutritional status. A two-day training session was provided to ensure understanding of study objectives, standard definitions, and proper abstraction procedures.

Data Quality Assurance

A pre-test was conducted on 5% of records outside the main sample to ensure clarity and consistency. The principal investigator and supervisors conducted continuous checks for completeness, accuracy, and internal consistency.

Data Processing and Analysis

Data were exported to Microsoft Excel for cleaning and coding, then analyzed in STATA v17. Descriptive statistics summarized baseline characteristics. The Kaplan–Meier survival function estimated the incidence and median time to wasting. Anthropometric data were standardized using WHO Anthro (<5 years) and WHO Anthro Plus (5–18 years). Multicollinearity was assessed using variance inflation factors (VIFs). Cox proportional hazards regression identified predictors of wasting. Variables with $p<0.2$ in bivariable analysis were included in the multivariable model, with statistical significance set at $p\leq0.05$. Proportional hazards assumptions were evaluated using Schoenfeld residuals (global test $p=0.776$). Results are reported as adjusted hazard ratios (AHR) with 95% confidence intervals (CI).

Results

5.1 Sociodemographic and Clinical Characteristics

5.1.1 Sociodemographic Characteristics

A total of 342 pediatric cancer patients were included. The majority were male (186/342, 54.4%), with females accounting for 156/342 (45.6%). Participants had a mean age of 4.59 ± 1.14 years (range: 2–6 years). Age distribution was as follows: infants (<1 year), 9 (2.6%); toddlers (1–<3

years), 68 (19.9%); preschoolers (3–<6 years), 64 (18.7%); school-age (6–<12 years), 115

(33.6%); adolescents (12–18 years), 86 (25.1%). Most children (207/342, 60.5%) resided in rural areas.

Variable	Category	Frequency (n)	Percentage (%)
Sex	Female	156	45.6
	Male	186	54.4
Age Group (year)	Infant (<1 yr.)	9	2.6
	Toddler (1-<3 yrs.)	68	19.9
	Preschool (3 - <6 yrs.)	64	18.7
	School-age (6-<12 yrs.)	115	33.6
	Adolescent (12-18 yes)	86	25.1
Residence	Urban	135	39.5
	Rural	207	60.5

5.1.2 Cancer Type

Among the participants, 236 (69.0%) were diagnosed with hematological malignancies, whereas 106 (31.0%) had solid tumors. Hematological malignancies predominated across all age groups.

Figure 2. Distribution of cancer types among pediatric cancer patients at the University of Gondar Comprehensive and Specialized Hospital (UoG-CSH), Ethiopia (2020–2024).

Hematological malignancies: 236 (69%), Solid tumors: 106 (31%)

5.1.3 Stage and Type of Treatment

Clinical characteristics of patients are summarized in Table 3. The majority of children (265/342, 77.5%) received high-risk chemotherapy, with most (251/342, 73.4%) treated for ≥12 months. Three chemotherapy cycles were completed by 288 patients (84.2%). Regarding treatment modality, 217 (63.5%) received chemotherapy only, while 125 (36.5%) underwent combined chemotherapy and surgery. Treatment frequency was every three weeks for 187 (54.7%), weekly for 153 (44.7%), and monthly for 2 (0.6%). Comorbid conditions were present in 292 children

(85.4%). Cancer status was stable in 230 (67.3%), recurrent in 27 (7.9%), remission in 2 (0.6%),

and uncertain in 83 (24.3%). Treatment interruptions occurred in 94 children (27.5%).

Table 3. Stage and Type of Treatment Among Pediatric Cancer Patients (N=342)

Variable	Category	Frequency (n)	Percentage (%)
Chemo Risk	High risk	265	77.5
	Moderate risk	63	18.4
	Low risk	14	4.1
Chemo Duration Group	1–3 months	44	12.9
	3–6 months	17	5.0
	6–12 months	30	8.8
	≥12 months	251	73.4
Cycle Group	1 cycle	3	0.9
	2 cycles	51	14.9
	3 cycles	288	84.2
Treatment Type	Chemo only	217	63.5
	Chemo with surgery	125	36.5
Treatment Frequency	Every week	153	44.7
	Every three weeks	187	54.7
	Every month	2	0.6
Comorbidity	No	50	14.6
	Yes	292	85.4
Cancer Status	Remission	2	0.6
	Recurrence	27	7.9
	Stable	230	67.3
	Not sure	83	24.3
Treatment Interrupted	No	248	72.5
	Yes	94	27.5
Stage Group	Early	127	36.8
	Late	215	63.2

5.1.4 Nutritional and Treatment-Related Factors

Nutritional and treatment-related factors of the study participants are summarized in Table 4.

Poor dietary intake was reported in 297 children (86.8%), mucositis in 170 (49.7%), constipation in 55 (16.1%), vomiting in 196 (57.3%), weight loss in 253 (74.0%), and diarrhea in 127 (37.1%).

Table 4. Nutritional and Treatment-Related Factors (N=342)

Variable	Category	Frequency (n)	Percentage (%)
Poor Intake	No	45	13.2
	Yes	297	86.8
Mucositis	No	172	50.3
	Yes	170	49.7
Constipation	No	287	83.9
	Yes	55	16.1
Vomiting	No	146	42.7
	Yes	196	57.3
Weight Loss	No	89	26.0
	Yes	253	74.0
Diarrhea	No	215	62.9
	Yes	127	37.1

5.2 Incidence and Time to Wasting

During follow-up, 180 children (52.6%) developed wasting, while 162 (47.4%) were censored. The cumulative incidence of wasting was 52.6% (95% CI: 47.3–57.9%), with an overall incidence rate of 4.6 per 1,000 child-days (95% CI: 3.96–5.30). The median time to wasting was 155 days (range: 6–240 days), indicating that half of the events occurred around five months after enrollment.

5.3 Kaplan–Meier Survival Estimates

The Kaplan–Meier survival curve showed a gradual decline in the probability of remaining free from wasting over time, with a more pronounced decline after 200 days of follow-up (Figure 3). The decline was more pronounced after 200 days, indicating an increased risk among children with longer treatment durations.

5.3.1 Survival by Predictor Variables

Children receiving combined chemotherapy and surgery and those experiencing vomiting had lower survival probabilities and a higher risk of wasting, as illustrated in Figure 4. (higher risk of wasting) than those without vomiting or receiving chemotherapy only.

5.4 Proportional Hazard Assumption

The proportional hazards assumption for the Cox regression model was assessed using Schoenfeld residuals, and the results are presented in Table 5.

The Cox proportional hazards model adequately fit the data (Likelihood Ratio χ^2 (19) = 48.80, p

= 0.0002). Schoenfeld residuals confirmed the proportional hazards assumption (global test p = 0.776). No significant multi collinearity was observed (VIF < 1.20 for all variables).

Table 5. Proportional-Hazard Test for Predictor Variables

Variable	ρ (rho)	χ² (Chi-square)	df	p-value
Sex	0.0332	0.22	1	0.6401
Residence	0.0380	0.27	1	0.6040
Age group	0.0391	0.32	1	0.5731
Chemotherapy risk	0.0710	0.94	1	0.3314
Chemotherapy group	-0.0044	0.00	1	0.9526
Cycle group	0.0146	0.04	1	0.8342
Treatment type	0.0466	0.47	1	0.4927
Frequency category	0.0741	0.95	1	0.3306
Comorbidity	0.1236	3.10	1	0.0782
Poor intake	-0.1069	2.09	1	0.1486
Weight loss	0.0013	0.00	1	0.9860
Diarrhea effect	0.0308	0.21	1	0.6465
Vomiting effect	0.0334	0.21	1	0.6476
Mucositis effect	0.1094	2.33	1	0.1267
Constipation	-0.0653	0.86	1	0.3550
Cancer status	0.0474	0.39	1	0.5343
Treatment response	-0.0510	0.51	1	0.4749
Cancer type	-0.0117	0.03	1	0.8663
Stage group	-0.0472	0.42	1	0.5189
Global test		**14.12**	**19**	**0.7766**

5.5 Predictors of Wasting

In the multivariable Cox regression analysis, combined chemotherapy and surgery (AHR = 2.10, 95% CI: 1.38–3.17, p = 0.001), presence of comorbidities (AHR = 1.79, 95% CI: 1.06–3.00, p = 0.028), poor dietary intake (AHR = 1.96, 95% CI: 1.13–3.41, p = 0.017), and mucositis (AHR = 1.67, 95% CI: 1.24–2.26, p = 0.001) were identified as independent predictors of wasting. Conversely, having a solid tumor was associated with a lower risk of wasting compared to hematological malignancies (AHR = 0.48, 95% CI: 0.30–0.75, p = 0.002). Other variables such as vomiting, constipation, and cancer stage were not

significantly associated.

Table: bi variable and Multivariable cox proportional hazard for Wasting among Pediatric Cancer Patients at university of Gondar Compressive and specialized Hospital, 2020- 2024, (N = 342).

Variable	Category	Status			CHR (95% CI)	AHR (95% CI)	p- value
		Wasted n (%)	Censored n (%)	Total n			
Treatment type	Chemo + surgery	74 (58.3)	53 (41.7)	127	1.19 (0.89–1.61)	2.10 (1.38 – 3.17).	0.001 *
	Chemo only	106 (49.3)	109 (50.7)	215	1	1	1
Comorbidity	Yes	164 (56.2)	128 (43.8)	292	2.00 (1.20–3.35)	1.79 (1.06–3.00)	0.028 *
	No	16 (32.0)	34 (68.0)	50	1	1	1
Poor intake	Yes	166 (55.9)	131 (44.1)	297	2.19 (1.27–3.79)	1.96 (1.13–3.41)	0.017 *
	No	14 (31.1)	31 (68.9)	45	1	1	1
Vomiting	Yes	110 (56.1)	86 (43.9)	196	1.23 (0.91–1.66)	1.06 (0.78–1.44)	0.701
	No	70 (47.9)	76 (52.1)	146	1	1	1
Mucositis	Yes	106 (62.1)	64 (37.9)	169	1.70 (1.26–2.29)	1.67 (1.24–2.26)	0.001 *
	No	74 (43.4)	98 (56.6)	173	1	1	1

Constipation	Yes	23 (41.8)	32 (58.2)	55	0.71 (0.46–1.10)	0.68 (0.44–1.07)	0.096
	No	157 (54.7)	130 (45.3)	287	1	1	1
Cancer type	Solid tumor	50 (46.5)	56 (53.5)	106	1.23 (0.89–1.66)	0.48(0.30 0.75)	0.002 *
	Hematological malignancy	130 (55.2)	106 (44.8)	236	1	1	1
Stage group	Late	118 (54.6)	97 (45.4)	215	1.21 (0.89–1.65)	1.30 (0.95–1.77)	0.101
	Early	62 (49.2)	65 (50.8)	127	1	1	1

HR=Hazard Ratio, CI=Confidence interval,

*indicates that the variables significantly associated with the outcome at 95% level of significant (P < 0.005).

le 6. Bi-variable and Multivariable Cox Proportional Hazards for Wasting (N=342)

*CHR = Crude Hazard Ratio; AHR = Adjusted Hazard Ratio; *p<0.05

Discussion

This study assessed the incidence and predictors of wasting among pediatric cancer patients at the University of Gondar Comprehensive Specialized Hospital. The overall incidence of wasting was 52.6% (180/342), with an incidence rate of 4.46 events per 1,000 child-days and a median time to onset of 155 days. These findings indicate that over half of pediatric cancer patients develop wasting within approximately five months of treatment initiation, highlighting a substantial burden of malnutrition in this population.

The observed incidence aligns with reports from Switzerland, where 47% of pediatric patients with metastatic disease experienced malnutrition during anticancer therapy (6). However, it is

lower than reports from Northern India, where the incidence reached 69.9% (13), and higher than a study in Rome reporting 28% of patients at risk of severe malnutrition during the initial treatment phase (5). Such variations may reflect differences in sample size, measurement tools, healthcare access, nutritional support programs, and socioeconomic conditions.

Regarding predictors, children with hematological malignancies exhibited nearly twice the hazard of wasting compared to those with solid tumors (AHR = 0.48, 95% CI: 0.30–0.75). This is consistent with previous reports from developing countries showing higher nutritional risk in hematological cancers due to early treatment-related complications and greater metabolic demands(1, 14). Contrasting evidence from India and Malaysia suggests variability by region and healthcare infrastructure, indicating that cancer type alone may not universally predict malnutrition risk (5, 12, 13). These findings underscore the importance of early nutritional monitoring, particularly for patients with hematologic malignancies.

Poor dietary intake and oral mucositis were significant predictors of wasting, increasing the hazard by approximately twofold (AHR = 1.96, 95% CI: 1.13–3.41) and 67% (AHR = 1.67, 95% CI: 1.24–2.26),

respectively. These findings corroborate previous studies showing that chemotherapy-induced mucositis, vomiting, diarrhea, and feeding difficulties are major drivers of undernutrition in pediatric cancer populations (15, 16). Studies from Mexico, Turkey, and the Netherlands similarly reported high prevalence of feeding difficulties and inadequate oral intake, further supporting the link between treatment-related complications and nutritional decline (15-17).

Comorbidities also significantly increased the risk of wasting (AHR = 1.79, 95% CI: 1.06–3.00), highlighting the compounded effect of concurrent illnesses on nutritional status. This finding aligns with previous
studies in the United States, which reported higher hospitalization rates and morbidity in pediatric cancer patients with additional health conditions such as infections, chronic diseases, or malnutrition (18).

Children receiving combined chemotherapy and surgery had a more than twofold higher risk of wasting compared to those receiving chemotherapy alone (AHR = 2.10, 95% CI: 1.39–3.18), likely reflecting increased treatment intensity, advanced disease stage, and higher exposure to treatment-related toxicities. This observation emphasizes the need for tailored nutritional support in patients undergoing multimodal therapy.

In contrast, variables such as cancer stage, vomiting, and constipation were not statistically significant predictors in this cohort, which differs from some prior reports indicating stage as a major determinant of outcome (17). These discrepancies may reflect differences in population characteristics, sample size, supportive care practices, or follow-up duration.

Overall, the high incidence of wasting and identification of modifiable predictors—poor intake, mucositis, comorbidities, intensive treatment, and hematologic cancers—underscore the urgent need for routine nutritional assessment and early intervention. Implementation of institutional guidelines, nutritional

programs, healthcare provider training, and surveillance systems could mitigate wasting, improve treatment tolerance, reduce complications, and enhance survival and quality of life among pediatric oncology patients.

Conclusion

The incidence of wasting among pediatric cancer patients in this study was high, affecting more than half of the participants. Cancer type, oral mucositis, poor dietary intake, comorbidities, and combined chemotherapy-surgery treatment were identified as independent predictors of wasting. These findings underscore the critical need for routine nutritional assessment, early intervention, and integrated supportive care for pediatric oncology patients.

Recommendation

Institutional and national guidelines should be developed to standardize nutritional care, and healthcare providers should be trained to detect and manage malnutrition effectively. Surveillance systems to monitor nutritional status during treatment are also recommended. Future research should focus on targeted interventions to manage treatment-related complications such as mucositis and poor intake, and on refining therapeutic strategies that consider comorbidity burden, with the goal of improving clinical outcomes in this vulnerable population.

8. Implication of the study

The high incidence of wasting among pediatric cancer patients underscores the urgent need for routine nutritional assessment and early intervention in clinical practice, particularly for children with poor intake, severe mucositis, comorbidities, intensive treatment regimens, or hematologic cancers. Proactive nutritional support can improve treatment tolerance, reduce complications, and enhance overall survival and quality of life. these findings highlight the importance of developing institutional and national guidelines, allocating resources for nutritional programs, training healthcare providers to detect and manage malnutrition, and implementing surveillance systems to monitor and prevent wasting in pediatric oncology populations. Together, these strategies can significantly reduce the burden of malnutrition and improve outcomes for this vulnerable group.

List of abbreviations

CDC (Center for Disease Control and Prevention), DBMN (Double Burden of Malnutrition), HFA (Height for Age z-score), LMICs (Low and Middle Income Countries), MUAC (Middle Upper Arm Circumference), NCDS (Non Communicable Disease), NS (Nutrition Statue), QoL (Quality of Life), SSA (Sub-Saharan Africa), SDI (Sociodemographic index), WAZ (Weight-for

-Age z-score), WFH (Weight for Height z-score), WHO (World Health Organization).

Declarations

Funding and Disclosure:

This study received no external funding or financial support. The author declares no conflicts of interest.

Clinical trial number: Not applicable.

Ethical approval and consent to participate

Ethical clearance for this study was obtained from the Institutional Review Board (IRB) of the University of Gondar (Ref. No: NUT/228/2017). Permission to conduct the study was also secured from the Gondar Comprehensive and Specialized Hospital prior to participant enrollment. All data were collected and handled confidentially, and personal identifiers were removed to ensure the anonymity and privacy of participants. This study was a retrospective cohort study based on routinely collected medical records. Accordingly, the requirement for informed consent to participate, including parental or legal guardian consent for participants under the age of 16 years, was waived by the Institutional Review Board of the University of Gondar in accordance with national regulations. No direct contact with patients or their parents or legal guardians occurred. All data were anonymized prior to analysis, and confidentiality and privacy of participants were strictly maintained throughout the study.

Funding

No external funding was received.

Competing interests

The author declares no competing interests

Data availability:

The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

Authors’ contributions

TDB conceived and designed the study, conducted data collection, performed data analysis, interpreted the findings, and drafted the manuscript.

GMA supported data collection and manuscript revision.

EA and BM provided substantial academic guidance, critically reviewed the manuscript for important intellectual content, and contributed to interpretation of the results. All authors read and approved the final manuscript and agreed to be accountable for all aspects of the work.

Acknowledgments

I am grateful to God for the strength and perseverance to complete this study. I sincerely thank the University of Gondar, Institute of Public Health, and the Department of Human Nutrition for providing the opportunity and support to conduct this research.

I deeply appreciate the guidance and mentorship of my advisors, Mr. Esmael Ali (Assistant Professor) and Mr. Berhanu Mengistu (MSc, Human Nutrition), whose constructive feedback and expert advice were invaluable throughout this work

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Figures

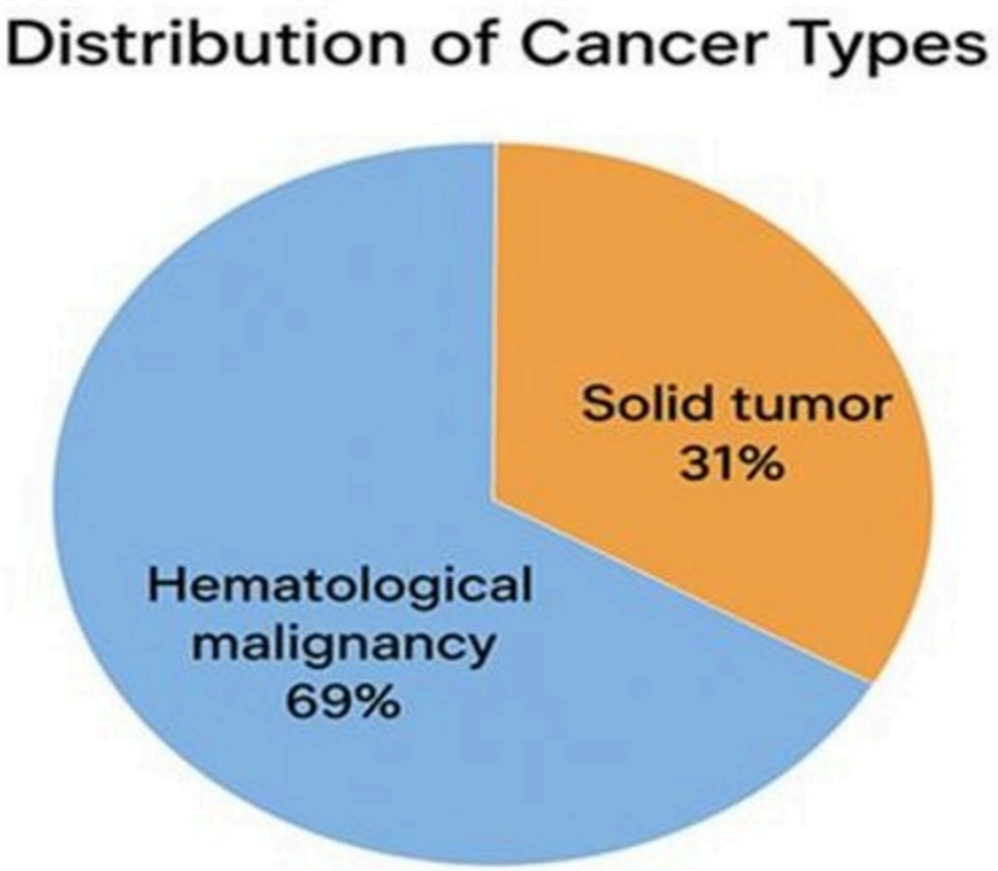


Figure 1

Figure 2. Distribution of cancer types among pediatric cancer patients at the University of Gondar Comprehensive and Specialized Hospital (UoG-CSH), Ethiopia (2020–2024).

Hematological malignancies: 236 (69%), Solid tumors: 106 (31%)

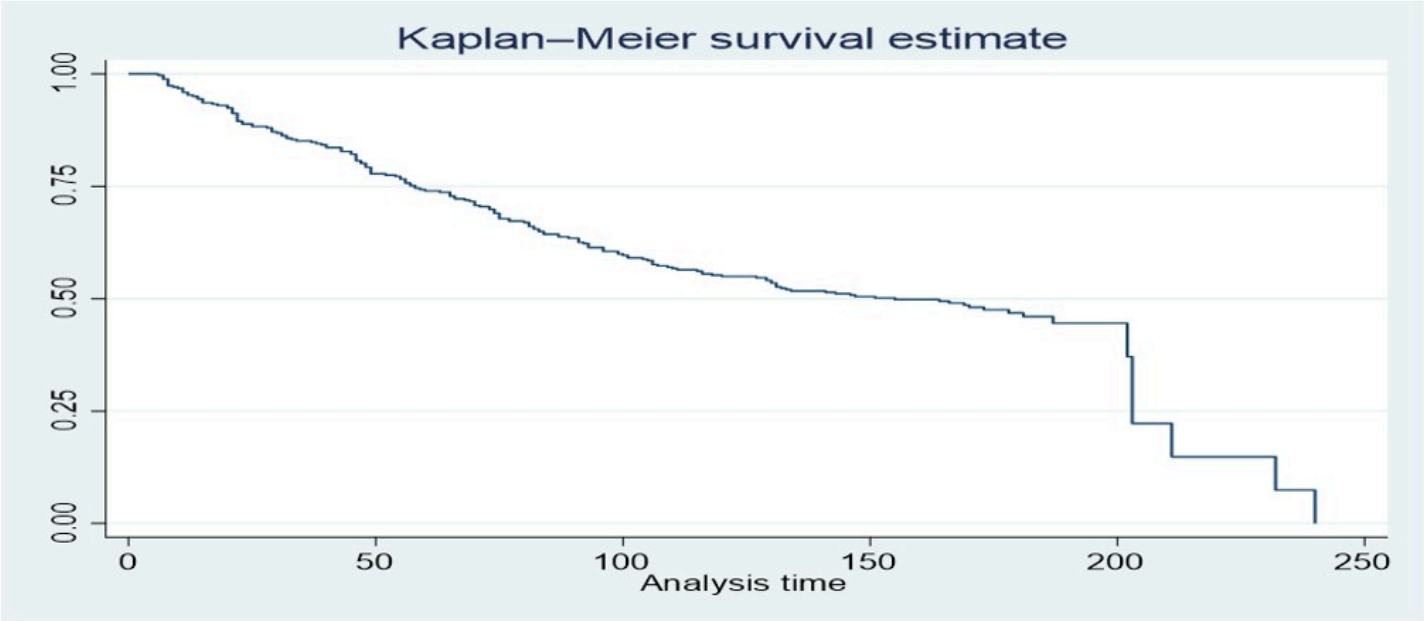


Figure 2

Figure 3. Kaplan–Meier Survival Curve of Pediatric Cancer Patients Free from Wasting

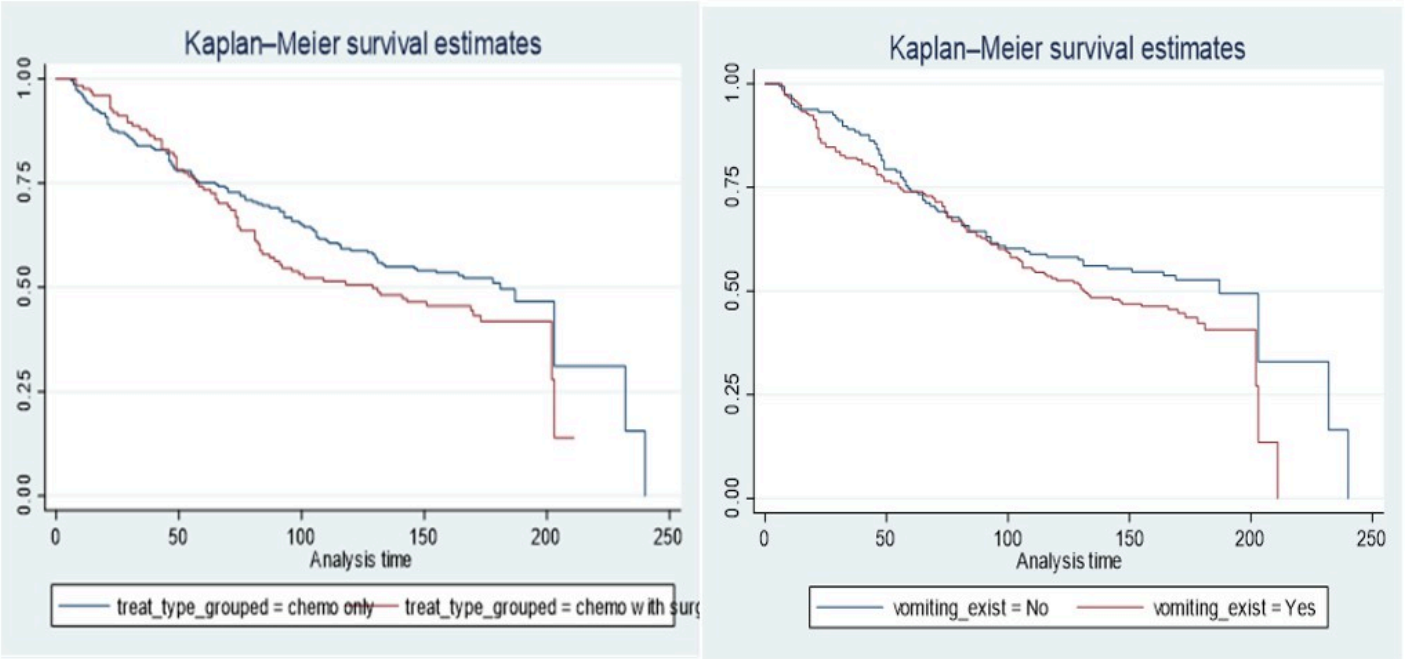


Figure 3

Figure 4. Kaplan–Meier Curves for Wasting by Treatment Type and Vomiting