

Research Article

Prevalence of Cancer Pain, Health-Related Quality of Life, and Its Associated Factors among Patients with Cancer at the National Cancer Institute, Sri Lanka: A Cross-Sectional Study

Varatharaja, M.¹, Almeida, P.D.K.N.¹, Fasleem, M.M.¹, Ibbas, A.N.F.¹,
Madhurangi, W.G.M.¹, Padmasiri, B.K.H.N.K.¹, Sandamali, M.V.I.¹, Siyam, S.M.¹,
Priyadarshani, U.G.N.² & Edirisinghe, N.P.^{*3}

¹Faculty of Nursing, University of Colombo, Sri Lanka

²Department of Clinical Nursing, Faculty of Nursing, University of Colombo, Sri Lanka

³Department of Fundamental Nursing, Faculty of Nursing, University of Colombo, Sri Lanka

Abstract

Background: Cancer pain is prevalent, undertreated, and profoundly impairs health-related quality of life (HRQOL), particularly in low- and middle-income countries. Despite the global burden, population-level data from Sri Lanka remain scarce. This study estimated the prevalence and severity of cancer pain, described HRQOL, and identified independent predictors of HRQOL among adult patients with cancer attending Apeksha Hospital, Maharagama, Sri Lanka.

Methods: A cross-sectional study recruited 309 adult patients with cancer attending oncology outpatient clinics between December 2023 and April 2024. Data were collected using the Sinhala-validated Short-Form Brief Pain Inventory (BPI-SF) and the EORTC QLQ-C30 (version 3; scored 0–100 across five functional scales, nine symptom scales, and a global health status/HRQOL scale), supplemented by a structured sociodemographic and clinical questionnaire. Descriptive statistics, Mann–Whitney U tests, Chi-square tests, Spearman rank-order correlations, and multiple linear regression were performed.

Results: A total of 309 adult cancer patients participated (mean age 51.2 years, SD 10.2; 72.8% female). The prevalence of cancer pain was 58.6% (n = 181); among patients with pain, 77.3% reported mild, 13.3% moderate, and 9.4% severe pain. The mean global HRQOL score (EORTC QLQ-C30) was 53.99 (SD 23.91). Patients with pain reported significantly lower HRQOL than those without (mean 50.32 vs. 59.18; Mann–Whitney U = 8,914.50; Z = -3.451; p < 0.001). In the multivariable linear regression, pain presence ($\beta = -0.165$, p = 0.005) and low household income ($\beta = -0.132$, p = 0.022) were independent predictors of poorer HRQOL, explaining 3.1% of the variance of global HRQOL (adjusted R² = 0.031).

Conclusions: The prevalence of cancer pain was 58.6%, with the majority (77.3%) reporting mild pain. The mean global HRQOL score was 53.99, indicating moderate impairment. Cancer pain is independently associated with poorer HRQOL, along with financial hardship. Routine validated pain screening, guideline-concordant multimodal pain management, and targeted socioeconomic support are urgently needed within Sri Lankan oncology services.

Keywords: Associated Factors, Cancer Pain, Health-related Quality of Life, Prevalence, Sri Lanka

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Correspondence: Edirisinghe N.P., Department of Fundamentals of Nursing, Faculty of Nursing, University of Colombo, Sri Lanka.

Email: niroshae@fnd.cmb.ac.lk

 <https://orcid.org/0000-0002-1546-2705>

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Introduction

Cancer remains a leading cause of morbidity and mortality worldwide. In 2020, The Global Cancer Observatory (GLOBOCAN), reported over 19 million new cases globally, with the greatest projected increases occurring in low- and middle-income countries (LMICs) (Sung et al., 2021). In Sri Lanka, national cancer registry data indicate more than 30,000 new diagnoses annually, reflecting a rapidly growing national burden (National Cancer Control Programme, 2022). Apeksha Hospital, located in Maharagama, Western Province, serves as the sole dedicated national cancer treatment centre, managing the majority of these cases and treating patients from all provinces of the country.

Pain in cancer is multifactorial, arising from tumour progression, treatment-related toxicity, or a combination thereof (Haroun et al., 2023). Cancer pain is a multidimensional phenomenon that encompasses physical, psychological, social, and spiritual dimensions, a concept encapsulated in Dame Cicely Saunders' framework of "total pain," which recognises that suffering extends beyond nociception to include emotional distress, social isolation, and existential concerns (Saunders, 1964). In clinical assessment, cancer pain is characterised by two primary measurable domains: pain severity and pain interference.

Globally, an estimated 40–55% of patients undergoing active cancer treatment experience clinically significant pain, a figure that rises to approximately 66% in those with advanced or metastatic disease (van den Beuken-van Everdingen et al.,

2016). In the South Asian region, pain prevalence ranges from 24% to 50% across studies, with disparities driven by differences in healthcare access, opioid availability, and cultural norms around pain reporting (Walters et al., 2017). Sri Lankan data are sparse, but available evidence suggests that cancer pain is prevalent and undertreated, with consequent impairment of HRQOL across functional, emotional, and social domains (Edirisinghe et al., 2021; Weeratunga et al., 2022).

Beyond survival, patient-reported outcomes, particularly pain and health-related quality of life (HRQOL), are central to high-quality cancer care. HRQOL is a multidimensional construct encompassing physical, emotional, cognitive, role, and social functioning, as well as symptom burden. In cancer populations, pain is among the strongest independent determinants of impaired HRQOL, reducing functional capacity, emotional wellbeing, and social engagement (Boström et al., 2003). Routine HRQOL assessment using validated instruments is essential for patient-centred cancer care. Pain severity, commonly assessed via 0–10 numeric rating scales, reflects the intensity of the pain experience (Sekiyama et al, 2011). Pain interference describes the extent to which pain disrupts daily functioning, including general activity, mood, walking ability, normal work, relationships, sleep, and enjoyment of life (Expósito-Vizcaino et al, 2020). High levels of pain interference are independently associated with impaired functional status, psychological distress, reduced HRQOL, and increased healthcare utilization (Joshy et al, 2023). Persistent, unrelieved pain is further linked to social

isolation, fatigue, depression, and diminished treatment adherence (Turk et al., 2016).

Despite a substantial and growing global literature on cancer pain epidemiology and its impact on HRQOL, Sri Lankan data remain limited in scope and methodological rigour. Available studies have been small, cross-sectional, or restricted to single tumour types, without systematically quantifying pain prevalence, severity, and interference, or examining their independent contribution to HRQOL through multivariable analysis (Edirisinghe et al., 2021; Weeratunga et al., 2022). Addressing this evidence gap is critical for guiding evidence-based pain management policy and reducing socio-economic disparities in cancer outcomes at the national level.

Therefore, the present study aimed to identify the prevalence and severity of cancer pain, assess HRQOL, and identify sociodemographic and clinical predictors of HRQOL among adult patients attending Apeksha Hospital in Sri Lanka.

Methods

Study design and setting

A descriptive cross-sectional study was conducted between December 2023 and April 2024 at adult oncology outpatient clinics in Apeksha Hospital, Sri Lanka's sole dedicated tertiary oncology facility, which serves as the national referral centre for cancer and treats patients from all provinces.

Participants

Adults aged 18–65 years with a confirmed cancer diagnosis attending oncology

outpatient clinics during the study period were included in the study. Participants were excluded if they had pain attributable solely to a non-cancer condition, post-surgical pain unrelated to the malignancy, psychiatric illness, or cognitive impairment precluding informed consent, or if they declined to participate. Consecutive sampling was applied across all oncology outpatient clinics operating at Apeksha Hospital during the study period. At each clinic session, eligible patients presenting sequentially in the waiting area were approached by the principal investigator and invited to participate. Recruitment continued across all concurrent clinic sessions until the cumulative target sample of 309 participants was reached.

Sample size calculation

The required sample size was estimated using the formula for a single proportion: $n = Z^2P(1-P) / d^2$, where $Z = 1.96$ (95% confidence level), $P = 0.55$ (van den Beuken-van Everdingen et al. (2016) and $d = 0.05$ (acceptable margin of error). This yielded a crude estimate of 380. A finite population correction was applied using the total number of eligible adult cancer patients registered at Apeksha Hospital in 2022 ($N = 1,810$; obtained from hospital administrative data), producing an adjusted estimate of 281. Accounting for a 10% anticipated non-response rate, the final target sample size was 309.

Data collection tools

A self-administered questionnaire comprised of several sections was used for data collection. For participants with lower

literacy levels or older age, one of the investigators read the questionnaire aloud and recorded responses verbatim, without influencing or interpreting the participant's answers.

Part A – Sociodemographic and clinical information: Age, sex, ethnicity, marital status, educational attainment, employment status, monthly household income, living arrangements, cancer type and stage, treatment modality, presence of metastasis, and comorbidities were evaluated.

Part B – Pain assessment: The Short Form Brief Pain Inventory (SF-BPI) was used. It has 0–10 numeric rating scales to assess four pain severity items (worst, least, average, and current pain) and seven pain interference items (general activity, mood, walking ability, normal work, relationships with others, sleep, and enjoyment of life), each rated from 0 (no interference) to 10 (interference completely) (Edirisinghe et al., 2021). A composite pain severity score is derived by averaging the four severity items, and a composite interference score by averaging the seven interference items. For categorical analysis, pain severity was classified as mild (1–4), moderate (5–6), or severe (7–10) according to established cut-points (Serlin et al., 1995). Participants reporting a pain severity score of zero on all four items were classified as pain-free. Questionnaires were available in Sinhala, Tamil, and English. The tool was psychometrically validated specifically among Sinhala-speaking patients with cancer pain in Sri Lanka (Edirisinghe et al., 2021). The Tamil version of the BPI-SF was translated using a forward-backward

translation protocol and reviewed by bilingual oncology clinicians. Where needed, a Tamil-speaking research assistant provided support.

Part C – Health-related quality of life: The European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire Core 30 (EORTC QLQ-C30) which is one of the most widely validated instruments for capturing HRQOL in cancer populations was used (Nolte et al, 2019). The EORTC QLQ-C30 (version 3; Sinhala-validated) is a 30-item instrument that produces a global health status/HRQOL scale (items 29–30), five functional scales (physical, role, emotional, cognitive, and social functioning), and nine symptom scales/items (fatigue, nausea/vomiting, pain, dyspnoea, insomnia, appetite loss, constipation, diarrhoea, and financial difficulties) (Jayasekara et al., 2008). All scales are linearly transformed to a 0–100 score. For the global HRQOL scale and the five functional scales, higher scores indicate better functioning; for the nine symptom scales, higher scores reflect greater symptom burden. The minimum clinically important difference for the global HRQOL scale is approximately 5–10 points (Osoba et al., 1998).

Data collection

Participants were approached in the oncology clinic waiting area. After receiving verbal and written explanations of the study, each participant was provided with a printed participant information sheet, and written informed consent was obtained. Questionnaires were administered

in the participant's preferred language (Sinhala, Tamil, or English) in a private room. Approximately 30 minutes were allocated per participant. The principal investigator verified the completeness of all questionnaires upon collection.

Statistical analysis

Descriptive statistics summarized the sample. Normality of global HRQOL scores was assessed using the Shapiro–Wilk test; distributions were non-normal in both the pain-present and pain-absent groups ($p < 0.05$), justifying the use of the Mann–Whitney U test to compare global HRQOL between patients with and without pain. Chi-square tests examined bivariate associations between categorical sociodemographic and clinical variables and dichotomized HRQOL (< 50 vs ≥ 50). Spearman's rank-order correlation assessed relationships between pain status, global HRQOL, functional scores, and symptom scores.

Multiple linear regression was performed with the global HRQOL score as the continuous dependent variable to identify independent predictors. Predictor variables were selected a priori based on clinical plausibility (even though those variables did not show significance in the univariate analysis) and bivariate significance ($p < 0.05$): pain presence, household income, cancer stage, presence of metastasis, comorbidities, age, and sex. Assumptions of linearity, independence of residuals, homoscedasticity, and multicollinearity (variance inflation factor < 5 for all predictors) were verified. Although the Shapiro–Wilk test indicated slight non-

normality of residuals ($W = 0.987$, $p = 0.006$), the large sample size ($n = 309$) ensures the robustness of ordinary least squares regression through the Central Limit Theorem. Unstandardised (B) and standardised (β) regression coefficients with 95% confidence intervals (CIs) are reported.

Data were analyzed using SPSS version 26 (IBM Corp., Armonk, NY). Statistical significance was set at $p < 0.05$.

Ethical considerations

Ethical clearance was obtained from the Ethics Review Committee, Faculty of Medicine, University of Colombo (approval reference: EC-23-131). Institutional approval was granted by hospital authorities. The study was conducted in accordance with the principles of the Declaration of Helsinki. All data were anonymized and stored securely with restricted access.

Results

Sociodemographic and clinical characteristics

A total of 309 patients participated (response rate: 100%). The mean age was 51.2 years (SD 10.2). The majority were females ($n = 225$; 72.8%), married ($n = 282$; 91.3%), Sinhala-speaking (88.7%), and residing with family. Breast cancer was the most common diagnosis (35.6%), followed by thyroid and gastrointestinal cancers. Metastatic disease was present in 26.5% ($n = 82$) of participants, and comorbidities were reported by the majority. Full socio-demographic and clinical characteristics are presented in Table 1.

Table 1: Socio-demographic characteristics of the study sample (n=309)

Socio-demographic characters	Category	Frequency	Percentage (%)
Age	Age < 53 years	160	51.8
	Age 53 years and above	149	48.2
Gender	Male	84	27.2
	Female	225	72.8
Clinic visit	First clinic visit	7	2.3
	Clinic visit from previously	302	97.7
Marital status	Married	282	91.3
	Single	27	8.7
Children	Have Children	277	89.6
	No Children	32	10.4
Preferred language	Sinhala	274	88.7
	Tamil	28	9.1
	English	7	2.3
Educational	Below Ordinary Level	188	60.8
	Ordinary Level and above	121	39.2
Employment	Employed	107	34.6
	Unemployed	202	65.4
Monthly household Income (Sri Lankan Rupees)	Equal or less than 30,000	189	61.2
	More than 30,000	120	38.8
Living arrangement	Alone	13	4.2
	With family	296	95.8
Residential status	Boarding house	18	5.8
	Home	291	94.2
Distance from the hospital	Patients are around 30 km from the hospital	114	36.9
	Patients away to 30km distance from the hospital	195	63.1
Metastasis	Yes	82	26.5
	No	227	73.5
Previous treatment	Yes	309	100.0
Comorbidities	Yes	192	62.1
	No	117	37.9
Family history of cancer	Yes	81	26.2
	No	228	73.8
Family members lost due to cancer	Yes	70	22.7
	No	239	77.3
Primary cancer type	Breast cancer	110	35.6
	Thyroid cancer	36	11.7
	Gastrointestinal cancer	36	11.7
	Uterine cancer	27	8.7
	Other types of cancers	100	32.4

Table 1: Socio-demographic characteristics of the study sample (n=309) (Cont.)

Current Treatment Category	Chemotherapy and radiotherapy	209	67.6
	Other treatments	100	32.4
Stage of cancer	Stage 1	184	59.5
	Stage 2	70	22.7
	Stage 3	44	14.2
	Stage 4	11	3.6

Table 2: SF BPI pain severity and interference scores among cancer patients with pain (n = 181)

Item	Mean	SD
Pain severity		
Worst pain	5.58	2.69
Least pain	2.57	2.09
Average pain	4.55	2.13
Pain right now	3.36	1.86
Pain interference		
General activity	3.19	2.74
Mood	4.28	2.74
Walking ability	3.42	2.91
Normal work	4.01	2.52
Relationships with others	2.93	2.57
Sleep	4.52	3.07
Enjoyment of life	4.66	2.85

Table 3: Relationships between pain status, global HRQOL, functional scores, and symptom scores (n = 309)

Variable	Pain (yes/no)	HRQOL score	Functional score	Symptoms score
Pain (yes/no)	1	-0.198** (p = .001)	-0.407** (p < .001)	0.456** (p < .001)
HRQOL score	-0.198** (p = .001)	1	0.345** (p < .001)	-0.383** (p < .001)
Functional score	-0.407** (p < .001)	0.345** (p < .001)	1	-0.794** (p < .001)
Symptoms score	0.456** (p < .001)	-0.383** (p < .001)	-0.794** (p < .001)	1

** Significant at $p < 0.01$ (2-tailed).

HRQOL Health Related Quality of Life

Prevalence and severity of cancer pain

Cancer pain was reported by 181 (58.6%) of the 309 participants. Among those with pain, the majority reported mild pain (77.3%; $n = 140$), with smaller proportions reporting moderate (13.3%; $n = 24$) and severe pain (9.4%; $n = 17$).

Cancer pain scores: severity and interference

Among the 181 participants reporting pain, BPI numeric rating scale scores, reflecting pain intensity on a 0–10 scale, showed a mean worst pain score of 5.58 (SD 2.69), mean least pain of 2.57 (SD 2.09), mean average pain of 4.55 (SD 2.13), and mean current pain of 3.36 (SD 1.86) (Table 2). The highest mean pain interference scores were recorded for enjoyment of life (mean 4.66, SD 2.85) and sleep (mean 4.52, SD 3.07), indicating substantial disruption to these domains. The lowest mean interference was observed for relationships with others (mean 2.93, SD 2.57).

Health-related quality of life

The mean global HRQOL score for the total sample was 53.99 (SD 23.91), indicating moderate impairment. The mean functional scale score was 66.43 (SD 21.34), and the mean symptom scale score was 32.61 (SD 20.15). The overall sample mean global HRQOL score was 53.99 (SD 23.91). Patients with pain reported significantly lower global HRQOL (mean 50.32, SD 21.34) compared with pain-free patients (mean 59.18, SD 26.35; Mann–Whitney $U = 8,914.50$; $Z = -3.451$; $p < 0.001$). Patients reporting pain ($n = 181$) had a notably lower mean global HRQOL score of 50.32 (SD

21.34) and a mean rank of 140.25, compared with pain-free patients ($n = 128$), who recorded a mean global HRQOL score of 59.18 (SD 26.35) and a mean rank of 175.86.

Relationships between pain status, global HRQOL, functional scores, and symptom scores

Spearman's correlations (Table 3) confirmed that pain status (yes/no) was negatively correlated with global HRQOL (spearman's rank correlations coefficient (r_s) = -0.198 , $p = 0.001$) and functional scores ($r_s = -0.407$, $p < 0.001$), and positively correlated with symptom scores ($r_s = 0.456$, $p < 0.001$). Global HRQOL was positively correlated with functional scores ($r_s = 0.345$, $p < 0.001$) and negatively correlated with symptom scores ($r_s = -0.383$, $p < 0.001$). The strong inverse correlation between functional and symptom scores ($r_s = -0.794$, $p < 0.001$) reflects the expected bidirectional relationship between functional decline and symptom burden in cancer.

Factors associated with HRQOL of patients with cancer

Chi-square analyses revealed that monthly household income and pain presence were significantly associated with global HRQOL. Patients with a household income below 30,000 Sri Lankan Rupees (LKR) were more likely to report HRQOL scores below 50 ($\chi^2 = 7.262$, $p = 0.007$). Patients with pain were also more likely to report lower HRQOL ($\chi^2 = 5.866$, $p = 0.015$). Cancer stage, metastasis, comorbidities, age, sex, and educational attainment were not significantly associated with HRQOL in bivariate analyses (all $p > 0.05$).

Multiple linear regression analysis with the significant variables identified through univariate analysis revealed that both the presence of pain and monthly income significantly predicted the HRQOL, as shown in Table 4. The overall model was statistically significant ($F(7, 301) = 2.416$, $p = 0.020$) and explained 3.1% of the variance in global HRQOL (adjusted $R^2 = 0.031$). All variance inflation factor values were below 1.21, confirming the absence of multicollinearity.

Pain presence was the strongest independent predictor of global HRQOL ($B = -8.01$, 95% CI: -13.52 to -2.50 ; $\beta = -0.165$, $p = 0.005$), indicating that patients with pain scored approximately 8 points lower on the global HRQOL scale compared with pain-free patients after adjustment for other variables. Low household income was the second significant independent predictor ($B = -6.45$, 95% CI: -11.97 to -0.94 ; $\beta = -0.132$, $p = 0.022$), indicating that patients earning less than 30,000 LKR per month scored approximately 6.5 points lower on global HRQOL after adjustment. Advanced cancer stage, metastasis, comorbidities, age, and sex did not attain statistical significance in the adjusted model ($p > 0.05$).

Discussion

This study provides multivariable evidence on the independent predictors of HRQOL among patients with cancer at Apeksha Hospital, Sri Lanka's national oncology centre, and represents one of the few systematic epidemiological analyses of cancer pain and HRQOL in a South Asian LMIC setting. Using culturally validated

instruments administered to a consecutively recruited sample of 309 patients, it was found that cancer pain affects nearly three in five patients and, alongside financial hardship, is an independent determinant of poorer HRQOL.

The cancer pain prevalence of 58.6% is consistent with international benchmarks. A seminal systematic review reported pain prevalences of approximately 55% during active treatment and up to 66% in advanced cancer (van den Beuken-van Everdingen et al., 2016). A more recent meta-analysis by encompassing 444 studies, identified that the overall prevalence of pain was 44.5%, and among them, moderate to severe pain was experienced by 30.6% of the patients (Snijders et al., 2022).

Approximately one in five patients reported moderate-to-severe pain, which carries important clinical implications. Mean pain scores for worst (5.58), least (2.57), and average pain (4.55) align closely with international comparators: Ortega and co-authors reported mean worst pain scores of 5.6 in oncology outpatients (Ortega et al, 2024), and Joseph and co-authors found similar patterns among U.S. cancer patients (Joseph et al., 2022). Although mild pain may appear reassuring, it is frequently undertreated and, if unaddressed, can progress to severe pain with compounding functional and psychosocial consequences.

Pain interference was most pronounced for enjoyment of life (mean 4.66) and sleep (mean 4.52), mirroring findings in Indian cancer cohorts (Kumari et al, 2017). The relatively lower interference in relationships with others (mean 2.93) may reflect the

Table 4: Multiple linear regression: independent predictors of global HRQOL score (n = 309)

Variable	B	95% CI	β	p value
Constant	63.26	48.01 – 78.52	—	< 0.001
Presence of pain (vs. absent)	-8.01	-13.52 to -2.50	-0.165	0.005
Low income (<30,000 LKR)	-6.45	-11.97 to -0.94	-0.132	0.022
Advanced stage (III/IV)	-3.39	-10.73 to 3.96	-0.054	0.365
Metastasis (yes vs. no)	-0.61	-6.96 to 5.74	-0.011	0.85
Comorbidities (yes vs. no)	1.11	-4.67 to 6.89	0.023	0.706
Age (per year)	0.01	-0.28 to 0.29	0.004	0.951
Female sex (vs. male)	-1.39	-7.44 to 4.67	-0.026	0.653

B unstandardized regression coefficient; β standardized regression coefficient; CI confidence interval

robust family and social support networks characteristic of Sri Lankan society, a factor noted in previous South Asian cancer research (Edirisinghe et al, 2025; Weeratunga et al, 2022). Importantly, interference with sleep and enjoyment of life are recognized contributors to fatigue, depression, and reduced coping capacity, all of which can further erode HRQOL and treatment adherence.

The mean global HRQOL score of 53.99 indicates moderate impairment. Comparable LMIC studies report mean global HRQOL scores of 59.3 in Ethiopia (Sibhat et al, 2019) and 66.2 in Southeast Asia (ACTION Study Group, 2017), suggesting that the Sri Lankan figure represents a meaningful burden. The significant HRQOL difference between patients with and without pain (50.32 vs. 59.18; $p < 0.001$) is consistent with evidence that pain substantially reduces perceived quality of life across cancer populations (Boström et al, 2003). This difference of approximately 9 points between the two groups, exceeds the minimum clinically important difference of 5–10 points

established for the EORTC QLQ-C30 global scale (Osoba et al., 1998), indicating that the presence of pain is associated with not only a statistically significant but also a clinically meaningful reduction in global HRQOL among cancer patients attending Apeksha Hospital.

A key contribution of this study is the multivariable regression analysis. Pain presence was the strongest independent predictor of global HRQOL ($\beta = -0.165$), confirming that pain exerts a substantial and independent negative effect on HRQOL after adjustment for income, disease stage, and other clinical variables. This strengthens the case for pain management as a core component of HRQOL improvement. The model's adjusted R^2 of 0.031 indicates that these two clinical and socioeconomic factors explain a modest proportion of the variance in HRQOL, which is consistent with HRQOL being a complex, multidimensional construct shaped by many unmeasured psychological and social factors beyond the scope of routine clinical data.

Low household income ($\beta = -0.132$) was the second significant independent predictor, reflecting the financial toxicity of cancer in LMICs. In Sri Lanka, direct and indirect treatment costs, including transportation, medications, and lost earnings, constitute a substantial burden for patients and families (Kimman et al, 2015; Udayakumar et al, 2022). Financial hardship limits access to analgesics and follow-up visits, creating a cycle of unrelieved pain and worsening HRQOL. Other research has similarly identified economic characteristics as independent determinants of HRQOL among Southeast Asian cancer patients (Kimman et al, 2015; Udayakumar et al, 2022).

In contrast to the initial hypothesis, advanced cancer stage, metastasis, and comorbidities did not emerge as independent predictors in the adjusted model. This finding suggests that in the present sample, the socioeconomic burden of cancer and the direct impact of pain may dominate the HRQOL experience, potentially mediating or masking the effect of clinical severity markers. This finding warrants further investigation in larger, longitudinal cohorts.

These findings have direct relevance to cancer care in Sri Lanka. Apeksha Hospital which operates as the sole national cancer referral centre, managing high patient volumes with resource constraints characteristic of LMICs. Cultural norms around pain expression, including stoicism and reluctance to disclose pain to healthcare providers, may contribute to underreporting and undertreatment, as documented in qualitative research among Sri Lankan cancer patients (Edirisinghe et al., 2025). The

financial toxicity identified in this study is consistent with the socioeconomic realities faced by Sri Lankan families, where out-of-pocket treatment costs including transport, medications, and lost income constitute a substantial burden (Udayakumar et al., 2022).

Implications

These findings underscore the need for routine, validated pain screening at every oncology contact using tools such as the BPI-SF, which is already Sinhala-validated for this population. Guideline-concordant multimodal analgesic management addressing both pain severity and functional interference should be integrated into standard oncology practice at Apeksha Hospital. A multidisciplinary approach incorporating oncology nurses, palliative care physicians, psychologists, and social workers would better address the physical, psychological, and social dimensions of cancer pain. HRQOL monitoring using the EORTC QLQ-C30 at clinical encounters would enable early identification of deteriorating quality of life and prompt intervention.

At the policy level, these findings support the development and implementation of national cancer pain management guidelines for Sri Lanka, consistent with WHO analgesic ladder principles. Investment in training oncology healthcare professionals in pain assessment and management is essential. Expanding supportive and palliative care services beyond the national centre to regional and district hospitals would improve equitable access for patients unable to travel to Apeksha Hospital. Integration of

socioeconomic support mechanisms, including financial assistance programmes and community-based pain management services, into cancer care pathways would address the independent role of financial hardship in HRQOL impairment identified in this study.

Strengths and limitations

Strengths include the use of culturally validated, internationally recognized instruments (Sinhala BPI-SF and EORTC QLQ-C30), recruitment from the national cancer referral centre, ensuring a clinically diverse sample, a sample size calculated using a systematic formula with finite population correction, and the application of multivariable regression to adjust for potential confounders. All statistical assumptions were formally verified.

Several limitations should be acknowledged. The cross-sectional design precludes causal inference. Recruitment from a single centre, while pragmatically justified, may limit generalizability to patients managed at regional or district hospitals. The regression model explained only 3.1% of the variance in HRQOL, indicating that other unmeasured factors, such as psychological distress, coping strategies, spiritual well-being, and healthcare provider support, contribute substantially to HRQOL and warrant investigation in future studies. Finally, self-reported pain and HRQOL are subject to recall and social desirability bias, although the use of validated structured instruments mitigates these concerns.

Conclusions

The prevalence of cancer pain was 58.6% among patients attending Apeksha Hospital, and pain was identified as a robust independent predictor of poorer health-related quality of life, along with lower income, after adjustment for sociodemographic and clinical covariates.

These findings highlight the need for routine validated pain screening at every oncology contact, guideline-concordant multimodal analgesic management addressing both severity and functional interference, and integration of socioeconomic support mechanisms into cancer care pathways. Critically, strengthening supportive oncology and palliative care services, both at Apeksha Hospital and across regional healthcare facilities in Sri Lanka, is essential to ensure that all patients, regardless of geographic location or financial means, receive timely, comprehensive pain management and quality-of-life support. Future multicenter studies should be done to estimate the countrywide pain prevalence, and longitudinal studies should evaluate the impact of structured pain management programmes and explore culturally tailored approaches to overcome barriers to pain reporting and treatment in Sri Lanka and similar low- and middle-income countries contexts.

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Conflict of interest

All authors declared they have no conflicts of interest.

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