

QUALITY OF LIFE OF CENTRAL NERVOUS SYSTEM TUMOR PATIENTS WITH CANCER PAIN

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ABSTRAK

Nyeri kanker merupakan gejala utama yang dialami pasien tumor susunan saraf pusat (SSP) dan sangat memengaruhi kualitas hidup. Penelitian potong lintang di RSUP Dr. Mohammad Hoesin Palembang (Maret – Juni 2025) melibatkan 89 pasien dengan metode consecutive sampling. Data diperoleh dari rekam medis dan wawancara terstruktur, kualitas hidup dinilai menggunakan EORTC QLQ-30, sedangkan intensitas nyeri dengan NPRS. Mayoritas pasien adalah perempuan (56,2%), berusia <60 tahun (75,3%), dengan tumor sekunder (55,1%) dan intrakranial (76,4%). Sebagian besar mengalami nyeri ringan (56,2%) dan mendapat terapi non-opioid (70,8%). Hasil menunjukkan kualitas hidup sedang, dengan fungsi kognitif relatif tinggi, namun intensitas nyeri berkorelasi negatif dengan kualitas hidup ($r = -0,321$; $p = 0,002$). Nyeri berat meningkatkan risiko kualitas hidup buruk 4,7 kali, sedangkan jenis tumor meningkatkan risiko 5,1 kali. Temuan ini menegaskan bahwa manajemen nyeri yang efektif, pemilihan analgesik yang tepat, serta terapi definitif berperan penting dalam memperbaiki kualitas hidup pasien tumor SSP.

ABSTRACT

Cancer pain is the main symptom experienced by patients with central nervous system (CNS) tumors and significantly affects quality of life. A cross-sectional study at Dr. Mohammad Hoesin General Hospital, Palembang (March – June 2025) involved 89 patients using consecutive sampling. Data were obtained from medical records and structured interviews. Quality of life was assessed using the EORTC QLQ-30, while pain intensity was assessed using the NPRS. The majority of patients were female (56.2%), aged <60 years (75.3%), with secondary (55.1%) and intracranial (76.4%) tumors. Most experienced mild pain (56.2%) and received non-opioid therapy (70.8%). Results showed a moderate quality of life, with relatively high cognitive function, but pain intensity was negatively correlated with quality of life ($r = -0.321$; $p = 0.002$). Severe pain increased the risk of poor quality of life 4.7-fold, while tumor type increased the risk 5.1-fold. These findings confirm that effective pain management, appropriate analgesic selection, and definitive therapy play an important role in improving the quality of life of CNS tumor patients.

INTRODUCTION

The incidence of CNS tumors continues to increase. Cancer is a leading cause of death worldwide, with many patients experiencing complications such as cancer pain, which can

significantly reduce their quality of life. Cancer pain is a common symptom with a high prevalence, especially in the advanced stages of the disease. Untreated pain can negatively impact a patient's quality of life, affecting physical, emotional, and social aspects and hindering treatment and recovery. Measuring quality of life is crucial for evaluating the effectiveness of therapy and offering guidance for optimal pain management. Rodriguez C. et al. in the journal *Cancer Pain and Quality of Life* show that approximately 61% of cancer patients report pain as a major factor contributing to a decline in their quality of life⁽¹⁾. Report from the World Health Organization (WHO), in 2020, cancer caused around 10 million deaths worldwide, and this figure is expected to increase to 70% by 2030⁽²⁾. In addition to the high mortality rate, cancer patients also often experience a decreased quality of life due to the emergence of pain associated with the disease. Cancer pain is one of the most common complications found in oncology patients. The prevalence of pain in cancer patients is quite high, ranging from 20–50% when first diagnosed, increasing to around 50% during therapy, and reaching 75–90% in the advanced phase of the disease.

European Organization for Research and Treatment of Cancer (EORTC) is a multidimensional parameter of quality of life in tumor patients that has been validated in Indonesian^(3,4). The Numeric Pain Rating Scale (NPRS) is a parameter to assess pain intensity. In Indonesia, data on the relationship between cancer pain in CNS tumor and quality of life is still very limited. This study was conducted to analyze the relationship between cancer pain and quality of life in patients with central nervous system tumors at Dr. Mohammad Hoesin General Hospital, Palembang, using the EORTC QLQ-C30 instrument, which has been validated for its reliability.

METHOD

This cross-sectional study was conducted on CNS tumor subjects With Cancer Pain at Mohammad Hoesin General Hospital, Palembang, Indonesia. The research was conducted in outpatient and inpatient installations using the Consecutive sampling method. Inclusion criteria were participants who experienced cancer pain with radiology and histologically confirmed CNS between March and June 2025. Decreased consciousness or aphasia, and an unwillingness to participate, are exclusion criteria. This study was approved by the Health Research Ethics Committee of Mohammad Hoesin General Hospital, Palembang, No.DP .04.03/D.XVIII.2.3/0142/2025.

The data collected consist of socio-demographic data (age, gender, occupation, marital status), clinical characteristics (neurological deficit, pain intensity, analgesics, definitive therapy), and characteristics of the tumor (tumor type and tumor location). Quality of life assessments were assessed using the EORTC QLQ-30 and have been validated in Indonesia⁽³⁾ and NPRS for pain assessment. For characteristic data, QoL is classified based on EORTC QLQ 30, where a score of <500 is poor QoL, 500-1000 is moderate QoL and >1000 is good QoL. This study examined scores on each of the three scales of the EORTC QLQ-30 questionnaire: the global health scale, the functional scale, and the symptom scale. Scores on each scale were assessed using a standardized formula⁽³⁻⁵⁾. In bivariate analysis, the total quality of life score was divided into ≤ 750 for poor QoL and > 750 for good QoL. Divide into 2 categories to make the assessment of bivariate analysis easier. The classification of NPRS interpretation ≤ 5 is mild intensity, and NPRS > 5 is high intensity.

Descriptive statistics summarized the subject's characteristics, including sociodemographic, clinical, treatment, tumor, and QOL characteristics. Associations between cancer pain and QOL were determined using the chi-square test or Fisher's exact test. A p-value < 0.05 was

considered statistically significant. multivariate test using the logistic regression test. Correlation was tested using the Spearman test.

RESULTS

Eighty-nine participants were included 67 subjects were under 60 years old (75,3%), 50 women (56,2%), 48 employee (53,9%), 78 Married (87,6%)

Table 1: Distribution of Sociodemographic Characteristics

Variable	Amount (n)	Percentage (%)
Age		
≥ 60 Years	22	24,7
< 60 Years	67	75,3
Gender		
Man	39	43,8
Woman	50	56,2
Occupation		
Not Working	41	46,1
Employee	48	53,9
Marital Status		
Unmarried/Divorced	11	12,4
Married	78	87,6

Table 2. Distribution of Clinical Characteristics and Therapy

Variables	Amount (n)	Percentage (%)
Neurological Deficit*		
Motor Function	88	98,9
Sensory Function	24	27,0
Cranial Nerves	61	69,3
Autonomic Function	11	12,4
Pain Intensity		
Severe	21	23,6
Moderate	18	20,2
Mild	50	56,2
Analgesics		
Opioids	26	29,2
Non-Opioids	63	70,8
Definitive Therapy**		
Single Surgery	18	20,2
Chemotherapy	17	19,1
Radiation	7	7,9
Combination	47	52,8

Note:

*Subject may had more than one neurological deficit symptom

**Subject may undergo more than one definitive therapy

Table 3: Distribution of Tumor Type Characteristics

Variables	Amount (n)	Percentage (%)
Tumor Type		
Primary	40	44,9
Secondary	49	55,1
Tumor Location*		
Intrakranial	68	76,4
Spinal	31	34,8
Intracranial Tumor		
Primary Intracranial Tumor		
Meningioma	17	25,0
Schwanoma	3	4,4
Ependimoma	0	0,0
High Grade Glioma	6	8,8
Low Grade Glioma	12	17,6
Intracranial Metastatic Tumor	30	44,1
Spinal Cord Tumor		
Primary Spinal Cord Tumor		
Meningioma	0	0
Schwanoma	2	6,5
Ependimoma	0	0,0
High Grade Glioma	0	0,0
Low Grade Glioma	0	0,0
Tumor Metastase Medula Spinalis	29	93,5
Primary Tumor		
Lungs	20	22,5
Breasts	14	15,8
Cervix	2	2,2
Liver	3	3,4
Ovaries	1	1,1
Lymph Nodes	2	2,2
Nasopharynx	2	2,2
Thyroid	2	2,2
Bones	2	2,2
Bladder	1	1,1
Extra CNS Metastasis**		
Lymph nodes	9	10,1
Lungs	3	3,4
Kidneys	2	2,2
Rectum	1	1,1
Bladder	1	1,1

Note:

*Subject may had intracranial and spinal cord metastases.

**Subject may had metastases in more than one organ.

The average functional scale score was 246.85 ± 150.89 , with the highest cognitive function score at 72.55 ± 25.42 . A high functional scale contributes to a high quality of life score. For the symptom scale, the subjects in this study had an average score at 353.53 ± 213.06 . Pain was the

most significant symptom affecting quality of life (59.66 ± 30.16), followed by fatigue (56.75 ± 35.09), and diarrhea (8.69 ± 21.75). The subjects were also found to have an average global health status score at 53.60 ± 28.26 .

Table 4. Quality of Life and Pain NPRS Scores in CNS Tumors

Variables	Rata-Rata $\pm$ SD
Functional Scale	246,85 $\pm$ 150,89
Physical Functioning	36,63 $\pm$ 41,27
Role Functioning	37,71 $\pm$ 42,58
Emotional Functioning	56,97 $\pm$ 30,33
Cognitive Functioning	72,55 $\pm$ 25,42
Social Functioning	43,00 $\pm$ 40,19
Global Health Status	53,60 $\pm$ 28,26
Symptom Scale	353,53 $\pm$ 213,06
Fatigue	56,75 $\pm$ 35,09
Nausea and Vomiting	20,78 $\pm$ 28,98
Pain	59,66 $\pm$ 30,16
Breathlessness	29,28 $\pm$ 32,98
Insomnia	48,88 $\pm$ 41,43
Loss of Appetite	36,40 $\pm$ 33,03
Constipation	38,00 $\pm$ 39,98
Diarrhea	8,69 $\pm$ 21,75
Financial Difficulties	55,28 $\pm$ 38,32
Quality of Life Score	846,12 $\pm$ 369,23
NPRS Score	4,00 $\pm$ 2,59

Table 5: Association between Sociodemographic Characteristics and Quality of Life

Variables	Quality of Life		P Value
	Poor	Good	
Age			
≥60 years	14 (63,6%)	8 (36,4%)	0,293 ^a
<60 years	34 (50,7%)	33 (49,3%)	
Gender			
Male	23 (59,0 %)	16 (41,0 %)	0,399 ^a
Female	25 (50,0 %)	25 (50,0%)	
Occupation			
Not working	20 (48,8%)	21 (51,2%)	0,367 ^a
Employed	28 (58,3%)	20 (41,7%)	
Marital Status			
Single	7 (63,6%)	4 (36,4%)	0,490 ^a
Married	41 (52,6%)	37 (47,4%)	

^aChi-square test

Table 6. Association between CNS Tumor and Quality of Life

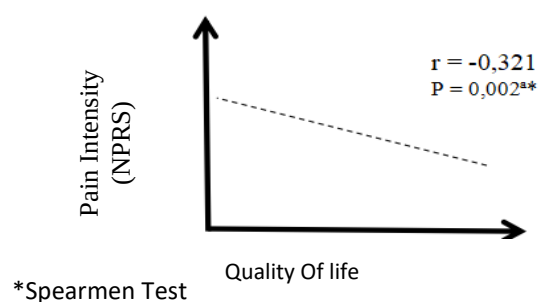
Variables	Quality of Life		P Value
	Poor	Good	
Tumor Location			
Intracranial and Spinal Tumors	9 (90,0%)	1 (10,0%)	0,001 ^{a*}
Spinal Tumors	16 (76,2%)	5 (23,8%)	
Intracranial Tumors	23 (39,7%)	35 (60,3%)	
Tumor Type			
Secondary Tumor	36 (73,5%)	13 (26,5%)	<0,001 ^{a*}
Primary Tumor	12 (30,0%)	28 (70,0%)	
Definitive Therapy			
Operative	12 (32,4%)	25 (67,6%)	0,001 ^{a*}
Nonoperative	36 (69,2%)	16 (30,8%)	
Neurological Deficit			
Motor Deficit			
Yes	47 (53,4%)	41 (46,6%)	1,000 ^b
No	1 (100,0%)	0 (0,0%)	
Sensory Deficit			
Yes	17 (70,8%)	7 (29,2%)	0,052 ^a
No	31 (47,7%)	34 (52,3%)	
Cranial Nerve Deficit			
Yes	32 (52,5%)	29 (47,5%)	0,681 ^a
No	16 (59,3%)	12 (42,9%)	
Autonomic Deficit			
Yes	9 (81,8%)	2 (18,2%)	0,057 ^a
No	39 (50,0%)	39 (50,0%)	

^aChi-Square test, ^bFischer's Exact test *significant (p≤0,05)

Table 7 Association between Characteristics Cancer Pain and Quality of Life

Variable	Quality of Life		P Value
	Poor	Good	
Pain Intensity			
NPRS > 5	20 (83,3%)	4 (16,7%)	0,001 ^{a*}
NPRS ≤ 5	28 (43,1%)	37 (56,9%)	
Analgesic			
Opiods	19 (73,1%)	7 (26,9%)	0,020 ^{a*}
Non Opioid	29 (46,0%)	34 (54,0%)	

^aChi-Square test, *significant (p≤0,05)

Graph 1. Correlation coefficient value

In the correlation coefficient of this study, it was found that the NPRS of cancer pain in CNS tumor patient was negative ($p = 0.002$; $r = 0.321$). The meaning is a significant correlation ($p = 0.002$) where the p value < 0.05 indicates that the relationship between these two variables is statistically significant. The negative direction ($r = -0.321$) means that when the pain score (NPRS) increases, the quality of life tends to decrease.

Multivariate analysis using logistic regression test revealed that two variables significantly influenced patient quality of life: tumor type ($p = 0.001$) and pain intensity ($p = 0.016$). Tumor type was 5.102 times more likely to experience poor quality of life, and pain intensity >5 was 4.670 times more likely to experience poor quality of life.

Tabel 8 Multivariate Analys Test

Variable	B	Nilai p	Exp (B)
Tumor type	1,630	0,001	5,102
Pain Intensity	1,541	0,016	4,670
Constant	-1,072	0,004	0,342

DISCUSSION

This study explored the relationship between cancer pain and quality of life in CNS tumor patients. Pain intensity was significantly associated with QOL. This study aligns with Angela et al.'s findings of a significant relationship between pain levels and quality of life. A negative correlation coefficient indicates that increasing pain intensity is directly proportional to a decrease in quality of life⁽⁶⁾. Heydarnejad's study, which used the EORTC QLQ-C30 questionnaire in cancer patients, also demonstrated a statistically significant association ($p < 0.05$) between pain and quality of life in cancer patients⁽⁷⁾. Similar results were obtained by Rafli et al about studied palliative radiotherapy for bone metastases, which resulted in a 50-80% reduction in cancer pain. Palliative radiotherapy was primarily administered to patients experiencing opioid toxicity or in cases where pain had not yet fully resolved⁽⁸⁾. This study reported a significant improvement in Global Health Status after radiotherapy ($p < 0.001$). The reduction in pain and improved emotional well-being contributed to patients' positive perceptions of their quality of life. In addition to the improvement in Global Health Status, the study also demonstrated significant improvements in all aspects of the functional scale. These results align with the findings of Zang et al., who reported improvements in patients' physical function and role after one month of radiotherapy. The pain experienced by patients previously often limited daily activities, disrupted rest, and reduced the ability to perform social and family roles due to the pain experienced⁽⁹⁾.

Our study revealed that patients using opioids predominantly had a poor quality of life. Opioids are the first line of treatment for moderate-to-severe cancer pain. As many as 30% to 50% of all cancer patients will experience moderate to severe pain⁽¹⁰⁾. This pain level is even higher, at 66% in patients with metastatic disease, and tends to worsen with progression⁽¹¹⁾. Pain can occur at any time during disease progression, but its frequency and intensity tend to increase as the cancer progresses. As cancer progresses, it not only worsens the clinical condition but also significantly reduces the patient's quality of life through increased physical symptoms, psychological distress, and limitations in social functioning.

In this study, patients who received opioids experienced a poor quality of life. Opioids are used as the primary analgesic therapy to control moderate to severe pain in patients with spinal

metastases⁽¹²⁾. Opioid therapy remains essential for the management of severe acute and chronic pain⁽¹²⁾. This is supported by clinical reports that metastases from solid tumors cause progressive pain with neuropathic characteristics, as well as worsening neurological impairment without treatment^(13,14). The use of opioids is effective in helping to control pain with NPRS > 5 in these patients and is standard clinical practice, given that the pain is related to tumor invasion of the spinal cord and is often difficult to manage with other therapies. Using appropriate analgesics tailored to the patient's condition can help control pain and improve the outlook and quality of life for cancer patients. Optimal pain management is achieved when pain control is made a primary goal in cancer management, without compromising the primary therapy for the disease. Opioids are often prescribed to patients with a low quality of life due to the progression of the cancer within the patient's body^(15,16).

This study found a significant association between definitive therapy and quality of life. This finding aligns with research by Nicholas Chiu, who evaluated the quality of life for individuals with various types of brain tumors⁽¹⁷⁾. Patients with primary brain tumors had better social and functional well-being than those with metastatic brain tumors, who rated social aspects and daily functioning worse in patients with secondary/metastatic brain tumors compared to primary brain tumors^(18,19). Research by McDonald et al. found that patients experienced improved emotional functioning after undergoing radiotherapy. Pain relief contributed to reduced levels of stress, depression, and anxiety. In patients with complications such as fractures, more severe pain led to limited mobility and increased dependence on family support. According to Hazard, in the study cited by Angela, each patient's pain response is influenced by their individual perception of pain and their level of stress, both of which play a crucial role in determining a patient's functional status⁽⁶⁾. Our research indicates that tumor type and NPRS intensity are correlated with quality of life. This suggests that we can consider providing appropriate therapy based on the WHO stepladder management, which can suppress cancer pain, improve quality of life, and reduce stress and depression.

CONCLUSION

Our study confirmed that pain intensity, tumor type, tumor location, analgesics, and definitive therapy were significantly associated with QoL. Pain intensity and tumor type influenced QoL. The higher the pain intensity, the lower the QoL. Multimodal pain management to improve patients' physical, emotional, and social functioning. Applying the WHO analgesic ladder can reduce pain intensity and improve QoL⁽²⁰⁾. Multidisciplinary collaboration (including oncology, neurology, and palliative care) is essential for achieving realistic targets, such as pain reduction and improved function. A larger study with a cohort design and adding other potentially influential variables such as the length of time since tumor diagnosis, side effects of therapy, psychological status, and social support is needed.

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