

Head and neck cancer pain

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Abstract

Background: Pain is a condition that often occurs in patients with head and neck cancer. Pain in patients with malignancy occurs mostly due to metastatic processes.

Method: This research is a cross-sectional descriptive study to measure variables using the VAS, BPI, HADS, and LANSS questionnaires.

Result: 127 subjects met the inclusion and exclusion criteria. Most patients were male (63.8%), with the most ages being in the 46–55 year group (33.9%). Most patients were in stage III (48%), with the most diagnosed being nasopharyngeal malignancy (42.5%). About 60.6% of patients have received pain management according to WHO Step 2 and most suffered from neuropathic pain (65.8%) with the most pain intensity being moderate pain (53.5%). Pain interfered most with activities (91.3%) and as many as 64.6% experienced depression.

Conclusion: A description of pain in head and neck patients is needed for good management of malignancy and pain management.

Keywords

Pain, head and neck malignancy, VAS, BPI, HADS, LANSS

Introduction

Head and neck malignancy is a prevalent form of cancer, ranking sixth worldwide (Aupérin 2020). It affects various areas such as the sinonasal region, oral cavity, larynx, and salivary glands. In 2019, there were around 890,000 new cases reported (Keam et al. 2021).

Pain is a common issue for these patients, with 50% to 90% experiencing it, predominantly caused by metastasis (Mercadante et al. 2021). Studies show that 45.15% of head and neck malignancy patients in the US reported pain, with 11.5% describing it as severe (Cramer et al. 2018). The International Association for The Study of Pain defines pain as an unpleasant sensory and emotional experience linked to tissue damage (Tribius et al. 2018). It can stem from the cancer itself

or as a treatment side effect. Various factors contribute to pain, including tissue damage and nerve fiber infiltration. It can be acute or chronic, with patients often experiencing both.

The head and neck region is particularly sensitive to pain due to its dense innervation (Bianchini et al. 2019). Around 50.42% of patients feel pain due to tumor invasion. Accurate pain assessment is crucial for appropriate management as untreated pain can lead to psychological and emotional disturbances. More than half of patients still have unresolved pain issues.

This study aims to describe pain in head and neck cancer patients. Understanding the pain characteristics helps guide treatment decisions. Comprehensive approaches are necessary for effective pain management, including pharmacological and non-pharmacological

therapies. Research on pain profiles can aid in the evaluation, diagnosis, and management of head and neck malignancy patients.

Methods

The research design employed for this study is cross-sectional and descriptive, enabling the simultaneous measurement of variables. The research utilizes a set of questionnaires, including the Visual Analog Scale (VAS), Brief Pain Inventory (BPI), Hospital Anxiety and Depression Scale (HADS), and Leeds Assessment of Neuropathic Symptoms and Signs (LANSS), all administered through interview sessions.

This study focuses on patients diagnosed with head and neck malignancies, identified through histopathological examinations, who went to the ORL-HNS Oncology Clinic and were admitted to the inpatient ward of Hasan Sadikin Hospital Bandung. The study was conducted from February to April 2023 and includes adult patients aged above 18 years. Exclusion criteria were established for patient selection, excluding individuals with impaired consciousness and those facing communication disorders from participating in the research.

Data collection techniques encompass two main approaches: an examination of patient medical records to extract relevant information and comprehensive interviews conducted with patients to supplement data not present in the medical records. The Statistical Package for the Social Sciences (SPSS) version 24.0 for Windows is utilized for data processing. Patient characteristics and status are methodically organized and presented in tabular formats. Descriptive statistical analysis, featuring counts (n) and percentages (%), is employed to effectively summarize the data. Patient-specific details from the questionnaires are consolidated into a table illustrating essential characteristics, such as age, gender, education, socio-economic background, working diagnosis, pain intensity scores, and cancer location. Subsequent analysis of subject characteristics and pain intensity employs Fisher's Exact Test.

Result

General characteristics of research subjects

The research was conducted from February to April 2023 in the ORL-HNS Oncology Clinic and the inpatient ward of Hasan Sadikin Hospital Bandung. A total of 132 patients with head and neck malignancies sought treatment at Hasan Sadikin Hospital from February to April 2023. Out of these 132 patients, 5 did not meet the inclusion criteria as they were under 18 years of age. Therefore, 127 research subjects met the inclusion criteria and consented to participate in the study. The research was conducted

Table 1. Characteristics subjects.

Characteristics	Total	%	Description
1. Gender			
Male	81	63.8	
Female	46	36.2	
2. Age			
18–25	9	7.1	Mean = 48.24
26–35	10	7.9	Median = 50
36–45	28	22	Standard Deviation = 13.04
46–55	43	33.9	Range = 19–78
56–65	28	22	
≥66	9	7.1	
3. Education Level			
Elementary School	7	5.5	
Junior High School	37	29.1	
Senior High School	62	48.8	
Tertiary Education	8	6.3	
4. Socioeconomic Status			
4 mm	4	3.1	
High	48	37.8	
Moderate	52	40.9	
Low	23	18.2	
5. Clinical Stage			
Stage I	0	0	
Stage II	40	31.5	
Stage III	61	48	
Stage IV	26	20.5	
6. Diagnosis			
Nasopharynx	54	42.5	
Larynx	22	17.3	
Oropharynx	19	15	
Hypopharynx	0	0	
Sinonasal	23	18.1	
Thyroid	5	3.9	
Trachea	0	0	
Parotid Glands	2	1.6	
Esophagus	0	0	
Skin	0	0	
Ear	2	1.6	
7. Pain Management			
Not yet treated	4	3.2	
Step 1	32	26.8	
Step 2	77	60.6	
Step 3	12	9.4	
8. Types of Pain			
Neuropathic	83	65.4	
Non-Neuropathic	42	34.6	
9. Pain Intensity			
Mild	26	20.5	
Moderate	65	53.5	
Severe	33	26	
10. Side Effects			
Interferes with activities	114	8.7	
Does not interfere with activities	11	91.3	
11. Psychological Distress			
Depression	82	64.6	
Not Depressed	43	35.4	

after the patients signed the consent form provided by the researcher.

Based on Table 1, the majority of head and neck malignancy patients were male (63.8%), with the most common age group being 46–55 years (33.9%). The average age of the subjects was 48.24 years, with a range of 19–78 years. The highest level of education among the subjects

was high school (48.8%), and the majority had a moderate income level (40.9%). Most of the head and neck malignancy patients were at clinical stage III (48%), with the most common diagnosis being nasopharyngeal malignancy (42.5%). In this study, there were no patients with clinical stage I, and diagnoses such as hypopharyngeal, tracheal, esophageal, and skin malignancies were not found.

The characteristics of pain in head and neck cancer

Pain characteristics encompass pain type, pain intensity, pain management, side effects, and psychological distress. All patients with head and neck malignancies in this study reported experiencing pain. A total of 60.2% have received pain management following WHO Step 2 guidelines. Pain type was assessed using the LANNS questionnaire, revealing that 65.4% of subjects experienced neuropathic pain, while 34.6% had non-neuropathic pain. Pain intensity was measured using the VAS, and it was found that 53.5% had moderate pain, 26% had severe pain, and 20.5% had mild pain. Pain side effects were evaluated using the BPI questionnaire, with 91.3% reporting interference with their activities. Psychological distress was assessed using the HADS questionnaire, revealing that 64.6% experienced depression.

The study found that a significant proportion of males (35.8%) experienced severe pain, while 6.44% of females experienced moderate pain. The percentage of severe pain increased with age, with 44.4% of individuals aged ≥ 66 years experiencing severe pain intensity.

Patients with stage III head and neck malignancies experienced moderate pain in 88.5% of cases, while those with stage IV head and neck malignancies had 100% reporting severe pain intensity. Severe pain intensity was most commonly experienced by patients with head and neck malignancies in the laryngeal region, followed by those with nasopharyngeal and oropharyngeal malignancies. Patients with depression experienced higher pain intensity ($n=33$) in the moderate ($n=49$) and severe ($n=33$) categories compared to patients without depression.

As shown in Table 2, significant associations were found between gender ($p=0.003$), socioeconomic status ($p<0.001$), clinical stage ($p<0.001$), diagnosis ($p=0.003$), side effects ($p<0.001$), and psychological distress ($p<0.001$) with pain intensity.

Pain types assessed in this study were categorized as neuropathic and non-neuropathic pain. The majority of both males ($n=57$) and females ($n=26$) experienced neuropathic pain (Table 3). The age group of 46–55 years had the highest incidence of neuropathic pain, with most cases occurring at clinical stage III. The nasopharyngeal diagnosis had the highest incidence of neuropathic pain ($n=35$). Neuropathic pain was most common in the group with moderate socioeconomic status ($n=34$) and a high

school education level ($n=47$). Among the 52 respondents with depression, 75 experienced neuropathic pain, while 30 respondents had non-neuropathic pain. Neuropathic pain significantly affected the activities of 75 respondent

A significant relationship was found between the clinical stage variable ($p < 0.001$) and pain type (Table 3). However, no significant relationships were observed between the following variables and pain type: gender ($p = 0.1$), age ($p = 0.9$), education level ($p = 0.08$), socioeconomic status ($p = 0.08$), diagnosis ($p = 0.06$), side effects ($p = 0.05$), and psychological distress ($p = 0.5$) concerning pain type.

Table 2. Table of subject characteristics based on pain intensity.

Characteristics	Pain intensity			P	CI 95%		
	Mild	Moderate	Severe				
Gender							
Male	14(17.3%)	38(46.9%)	29(35.8%)	0.003	0.002–0.004		
Female	12(26.7%)	29(64.4%)	4(8.9%)				
Age							
18–25	3(33.3%)	4(44.4%)	3(33.3%)	0.7	0.7–0.6		
26–35	2(20%)	8(80%)	2(20%)				
36–45	6(21.4%)	15(53.6%)	6(21.4%)				
46–55	12(27.9%)	23(53.5%)	12(27.9%)				
56–65	6(21.4%)	15(53.6%)	6(21.4%)				
≥ 66	4(44.4%)	3(33.3%)	4(44.4%)				
Education Level							
No Education	4(30.8%)	7(53.8%)	2(15.4)	0.06	0.06–0.04		
Elementary School	0(0%)	3(42.9%)	4(57.1%)				
Junior High School	10(27%)	22(59.5%)	5(13.5%)				
High School	12(19.4%)	29(46.8%)	21(33.9%)				
College/University	0(0%)	7(87.5%)	1(12.5%)				
Socioeconomic Status							
Very High	0(0%)	2(50%)	2(50%)	<0.001	0–0.5		
High	7(14.6%)	32(66.7%)	9(18.8%)				
Moderate	3(5.8%)	30(57.7%)	19(36.5%)				
Low	16(69.6%)	4(17.4%)	3(13%)				
Clinical Stage							
Stage I	0(0%)	0(0%)	0(0%)	<0.001	0–0.24		
Stage II	26(65%)	14(35.0%)	0(0%)				
Stage III	0(0%)	54(88.5%)	7(11.5%)				
Stage IV	0(0%)	0(0%)	26(100%)				
Diagnosis							
Nasopharynx	15(27.8%)	30(55.6%)	9(16.7%)	0.003	0–0.24		
Larynx	1(4.3%)	7(30.4%)	14(63.6%)				
Oropharynx	3(15.8%)	10(52.6%)	6(31.6%)				
Hypopharynx	0(0%)	0(0%)	0(0%)				
Sinonasal	7(30.4%)	12(52.2%)	4(17.4)				
Thyroid	0(0%)	5(100%)	0(0%)				
Trachea	0(0%)	0(0%)	0(0%)				
Parotid	0(0%)	2(100%)	0(0%)				
Esophagus	0(0%)	0(0%)	0(0%)				
Skin	0(0%)	0(0%)	0(0%)				
Ear	0(0%)	2(100%)	0(0%)				
Pain Type							
Neuropathic	17(20.5%)	45(54.2%)	21(25.3%)			0.96*	0.7–0.9
Non-Neuropathic	9(20.5%)	23(52.3%)	12(27.3%)				
Side Effects							
Does Not Interfere with Activities	10(90.9%)	1(9.1%)	0(0%)	<0.001	0–0.24		
Interferes with Activities	16(13.8%)	67(57.8%)	33(28.4%)				
Psychological Distress							
Depression	0(0%)	49(59.8%)	33(40.2%)	<0.001*	0–0.24		
Non-Depression	26(57.8%)	19(42.2%)	0(0.0%)				

Table 3. Table of subject characteristics based on pain type.

Characteristic	Pain type		P	CI 95%		
	Neuropathic	Non neuropathic				
1. Gender						
Male	57(70.4%)	24(29.6%)	0.1	0.01–0.08		
Female	26(56.5%)	20(43.5%)				
2. Age						
18–25	5(55.6%)	4(44.4%)	0.9	0.9–1		
26–35	7(70%)	3(30%)				
36–45	19(67.9%)	9(32.1%)				
46–55	28(65.1%)	15(34.9%)				
56–65	17(60.7%)	11(39.3%)				
≥66	7(77.8%)	2(22.2%)				
3. Education Level						
No Education	8(61.5%)	5(38.5%)	0.08	0.7–0.8		
Elementary School	3(42.9%)	4(57.1%)				
Junior High School	19(51.4%)	18(48.6%)				
High School	47(75.8%)	15(24.2%)				
College/University	6(75%)	2(25%)				
4. Socioeconomic Status						
Very High	2(50%)	2(50%)	0.8	0–0.8		
High	33(65.8%)	15(31.3%)				
Moderate	34(65.4%)	18(34.6%)				
Low	14(60.9%)	9(39.1%)				
5. Clinical Stage						
Stage I	0(0%)	0(0%)	<0.001	0–0.24		
Stage II	28(70%)	12(30%)				
Stage III	39(66.1%)	20(33.9%)				
Stage IV	16(61.5%)	10(38.5%)				
6. Diagnosis						
Nasopharynx	35(64.8%)	19(35.2%)	0.06	0–0.24		
Larynx	11(50%)	11(50%)				
Oropharynx	19(100%)	0(0%)				
Hypopharynx	0(0%)	0(0%)				
Sinonasal	11(47.8%)	12(52.2%)				
Thyroid	5(100%)	0(0%)				
Trachea	0(0%)	0(0%)				
Parotid	2(100%)	0(0%)				
Esophagus	0(0%)	0(0%)				
Skin	0(0%)	0(0%)				
Ear	0(0%)	2(100%)				
7. Pain Type						
Neuropathic	8(72.7%)	3(27.3%)			0.5	0–0.04
Non-Neuropathic	75(64.7,8%)	41(35.3%)				
8. Side Effects						
Does Not Interfere with Activities	52(63.4%)	30(36.6%)	0.5	0–0.24		
Interferes with Activities	31(68.9%)	14(31.1%)				

Table 4 shows that depression was most commonly experienced by males (76.5%) compared to females (43.5%). Depression was most prevalent in stage III (91.8%) and stage IV (100%). Depression was also found in 100% of parotid malignancies, 68.5% of nasopharyngeal malignancies, and 68.4% of oropharyngeal malignancies. Significant associations were found between gender ($p < 0.001$), socioeconomic status ($p < 0.001$), and clinical stage ($p < 0.001$) with psychological distress.

Pain side effects were measured using the BPI questionnaire. In this study, 86% of male respondents experienced activity disturbances, while 100% of female respondents reported activity disturbances (Table 5). Activity disturbances were also found in 100% of clinical stage III and IV cases. Across different diagnoses, activity disturbances were present in almost all cases.

Table 4. Table of subject characteristics based on psychological distress.

Characteristics	Psychological distress		P	CI 95%
	Depression	Non-depression		
1. Gender				
Male	62(76.5%)	19(23.5%)	<0.001	0.02–0.04
Female	20(43.5%)	26(56.5%)		
2. Age				
18–25	5(55.6%)	4(44.4%)	0.7	0.76–0.77
26–35	6(60.0%)	4(40%)		
36–45	16(57.1%)	12(42.9%)		
46–55	31(72.1%)	12(27.9%)		
56–65	19(67.9%)	9(32.1%)		
≥66	5(55.6%)	4(44.4%)		
3. Education Level				
No Schooling	5(38.5%)	8(61.5%)	0.4	0.3–0.4
Elementary School (SD)	7(100%)	0(0%)		
Junior High School (SMP)	25(67.6%)	12(32.4%)		
High School (SMA)	38(61.3%)	24(38.7%)		
College/University (PT)	7(87.5%)	1(12.5%)		
4. Socioeconomic Status				
Very High	4(100%)	0(0%)	<0.001	0–0.5
High	38(79.2%)	10(20.8%)		
Moderate	36(69.2%)	16(30.8%)		
Low	4(17.4%)	19(82.6%)		
5. Clinical Stage				
Stage I	0 (0%)	0 (0%)	<0.001	0–0.2
Stage II	0(0%)	40(100%)		
Stage III	56(91.8%)	5(8.2%)		
Stage IV	26(100%)	0(1%)		
6. Diagnosis				
Nasopharynx	37(68.5%)	17(31.5%)	0.09	0.7–0.8
Larynx	17(31.5%)	5(22.7%)		
Oropharynx	13(68.4%)	6(31.6%)		
Hypopharynx	0 (0%)	0 (0%)		
Sinonasal	11(47.8%)	12(52.2%)		
Thyroid	2(40%)	3(60%)		
Trachea	0 (0%)	0 (0%)		
Parotid	2(100%)	0(0%)		
Esophagus	0 (0%)	0 (0%)		
Skin	0 (0%)	0 (0%)		
Ear	0 (0%)	2 (100%)		

Significant associations were observed between socioeconomic status, clinical stage, and psychological distress with pain side effects ($p < 0.001$).

Discussion

This study found that most head and neck cancer patients were male, which is consistent with previous research by Park et al. (2022) in Asia. In terms of education, contrary to Nathania's research, the majority of patients in this study had a high school education (Nathania et al. 2020). The most common age group was 46–55 years old, with an average age of 48.24 years. Steffen et al. (2020) reported a global trend of younger patients developing head and neck cancer due to lifestyle factors like alcohol consumption and smoking. A large portion of patients in this study were diagnosed at stage III, indicating delayed health-care-seeking behavior, which could be attributed to a lack of understanding of the signs and symptoms. As a tertiary

healthcare provider, RSHS often receives patients with more advanced difficulties compared to other hospitals.

Nasopharyngeal cancer accounted for 42.5% of head and neck cancers in this study. Pain management followed WHO guidelines, with 60.2% receiving Step 2 pain medications. 64.8% experienced neuropathic pain, possibly due to nerve compression or inflammation. The rich innervation in the head and neck area contributes to this high prevalence. (Purwata et al. 2015; Lemos et al. 2019; Ghodrati et al. 2021; Mercadante et al. 2021).

50.8% of respondents experienced moderate pain. Head and neck cancer patients reported pain intensity scores above 5. 89% of respondents had pain that interfered with their activities. Males (86.3%) reported more interference than females (100%). Pain side effects increased with age, with 88.9% of the 18–25 age group and 100% of 66 and above reporting activity disturbances.

Table 5. Table of subject characteristics based on pain side effects.

Characteristics	Side effects		P	CI 95%		
	Does not interfere with activities	Interferes with activities				
1. Gender						
Male	11 (13.6%)	70 (86.4%)	0.009	0.017–0.005		
Female	0(0%)	46 (100%)				
2. Age						
18–25	1(11.1%)	8(88.9%)	0.4	0.3–1		
26–35	0(0%)	10(100%)				
36–45	5(17.9%)	23(82.1%)				
46–55	3(7%)	40(93%)				
56–65	2(7.1%)	26(92.9%)				
≥66	0	9(100%)				
3. Education Level						
No Schooling	0(0%)	13(100%)	0.4	0.4–0.8		
Elementary School (SD)	0(0%)	7(100%)				
Junior High School (SMP)	4(10.8%)	33(89.2%)				
High School (SMA)	7(11.3%)	55(88.7%)				
College/University (PT)	0(0%)	8(100%)				
4. Socioeconomic Status						
Very High	0(0%)	4(100%)	<0.001	0–0.5		
High	2(4.2%)	46(95.8%)				
Moderate	1(1.9%)	51(98.1%)				
Low	8(34.5%)	15(65.2%)				
5. Clinical Stage						
Stage I	0 (0%)	0 (0%)	<0.001	0–0.24		
Stage II	11(27.5%)	29(72.5%)				
Stage III	0(0%)	61(100%)				
Stage IV	0(0%)	26(100%)				
6. Diagnosis						
Nasopharynx	10(18.5%)	44(81.5%)	0.06	0.6–0.7		
Larynx	0 (0%)	22 (100%)				
Oropharynx	0(0%)	19(100%)				
Hypopharynx	0 (0%)	0 (0%)				
Sinonasal	1(4.3%)	22(95.7%)				
Thyroid	0(0%)	5(100%)				
Trachea	0 (0%)	0 (0%)				
Parotid	0(0%)	2(100%)				
Esophagus	0 (0%)	0 (0%)				
Skin	0 (0%)	0 (0%)				
Ear	0 (0%)	2(100%)				
7. Psychological Distress						
Depression	0 (0%)	82(100%)			<0.001	0–0.24
Non-Depression	11(68.9%)	34(75.6%)				

The type of diagnosis also influenced activity disturbances, with oropharyngeal, laryngeal, thyroid, and salivary gland cancers (100%) causing the most activity disturbances. Ye et al. suggested that cancers in the orofacial region can significantly disrupt daily activities because of their unique pain characteristics, rich blood vessels, and innervation. (Ye et al. 2020). Orofacial regions involve organs like the mouth, tongue, lips, teeth, and jaw, which play essential roles in eating, speaking, and drinking. Pain in these areas can lead to social dysfunction and nutritional problems (Viganó et al. 1998).

The proportion of neuropathic pain was higher in males than females, which contradicts previous research. However, another study found that neuropathic pain prevalence in Indonesia was higher in males. The higher proportion of neuropathic pain in males in this study may be due to the higher incidence of head and neck cancer in males. The 40–60 age group had the highest prevalence of neuropathic pain, consistent with other findings. Nasopharyngeal cancer was associated with the highest prevalence of neuropathic pain, which is activated by a specific gene. (Wettstein et al. 2019). Depressive symptoms were more common in males, contrary to pain side effects. Age did not significantly impact pain intensity in this study, which differs from previous research. (Majedi et al. 2019). Gender, however, was significantly associated with pain intensity, with women generally having higher sensitivity and lower pain thresholds. This may be attributed to various hormonal factors and differences in nerve density.

Education level was not significantly associated with pain intensity in head and neck cancer patients, consistent with previous research. However, socioeconomic status was found to be significantly associated with pain intensity ($p=0.02$), likely due to environmental stressors faced by patients with low socioeconomic status. Among stage III patients, 88.1% experienced moderate pain, while all stage IV patients experienced severe pain, indicating a correlation between clinical stage and pain intensity ($p<0.001$). Psychological distress was also significantly related to pain intensity ($p<0.001$), with 64.1% of patients experiencing depression. Depression in these patients may be influenced by physical symptoms and poor treatment responses.

Wu et al. (2023) found a correlation between pain and depression, with higher pain levels being associated with increased depression. Conversely, depression is highly correlated with pain, as depressed patients are more sensitive to pain discomfort, leading to depressive symptoms.

In this study, there was no significant difference in pain intensity between patients with neuropathic and non-neuropathic pain. This finding contradicts Wong et al. (2018) research, which suggested that neuropathic pain has higher pain intensity and duration than other types of pain. In head and neck cancer, patients may experience multiple types of pain alternately depending on their pain management, resulting in overall high pain intensity regardless of the type of pain (Wu et al. 2023).

In this study, some patients still experienced severe pain, indicating that pain management was not entirely successful.

This suggests the need for comprehensive pain management to improve the quality of life of head and neck cancer patients, in line with WHO's goal of freedom from cancer pain. This could be due to various factors investigated in this study. Comprehensive pain management is required to enhance the quality of life for head and neck cancer patients fully.

Conclusion

In this study, it was found that patients with head and neck malignancies experienced severe pain, with the most common type of pain being neuropathic pain, which

significantly interfered with their activities. The majority of patients with head and neck malignancies also experienced psychological distress in the form of depression. About 88.1% of stage III head and neck malignancy patients experienced moderate pain, while 100% of stage IV head and neck malignancy patients had severe pain intensity. Head and neck malignancies in the laryngeal region were most commonly associated with severe pain intensity. Neuropathic pain was most frequently experienced in head and neck malignancies in the nasopharyngeal region. There was a significant relationship between gender, socioeconomic status, clinical stage, psychological distress, and the intensity of pain.

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