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Submission date: 01-Apr-2023 09:26AM (UTC+0700)

Submission ID: 2052594849

File name: JMCS_Volume_6_Issue_6_Pages_1204-1215.pdf (848.76K)

Word count: 6536

Character count: 29664



Original Article

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The Association of Pain with Depression and Quality of Sleep in Indonesian Cancer Patients

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ARTICLE INFO

Article history

Receive: 2022-08-23

Received in revised: 2022-09-12

Accepted: 2022-11-29

Manuscript ID: JMCS-2208-1662

Checked for Plagiarism: Yes

Language Editor:

Dr. Nadereh Shirvani

Editor who approved publication:

Dr. Khosro Khajeh,

DOI:10.26655/JMCHMSCI.2023.6.1

KEYWORDS

Cancer pain

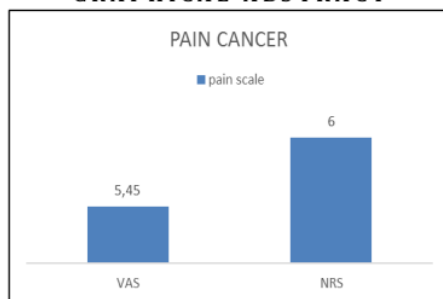
Depression

Quality of sleep

ABSTRACT

8
Pain symptoms could affect the quality of life of cancer patients. Quality of life and depression were two considerable parameters associated with quality of life. Cancer patients with pain as symptoms would have a higher probability of experiencing depression which might affect sleep quality. This was an observational research with a cross-sectional study conducted in Haji Ad Malik General Public Hospital from April-September 2021. The severity of depression and quality of sleep was measured with Patient Health Questionnaire (PHQ-9) and Pittsburgh Sleep Quality Index (PSQI), respectively. There was significant relationship between pain and depression based on the Visual Analogue Scale (VAS) and Numerical Rating Scale (NRS) with $p < 0.05$. A significant relationship was also seen between pain and the ability to perform activities (symptom related difficulty) based on the VAS and NRS scale with $p < 0.05$. However, no significant relationship was found between pain and quality of sleep of the patients in VAS and NRS scales. Furthermore, there was no significant difference in pain scale between VAS and NRS. Pain symptom was one of the factors associated with depression and the ability to perform activities in cancer patients. More comprehensive interview is required to assess the possible causes of poor sleep quality experienced in most cancer patients.

GRAPHICAL ABSTRACT



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Introduction

Cancer pain often persists and contributes to chronic pain, which could affect patients' moods and lead to depression. In the long run, patients would suffer from total pain. Total pain is a condition that affects every physical, psychological, social, and spiritual aspect, as well as the ability to live [1]. Some research stated that chronic pain could generally trigger stress levels which could lead to depression [2-4], and 85% of patients suffered from severe depression, which arose from chronic pain [5, 6]. Furthermore, depression will also lower the pain threshold; thus, prevention and treatment for depression are required.

Clinically, not every cancer patient will experience depression. Another study showed that 69% of cancer patients experienced pain, while 16.4% suffered from severe depression and 17.4% from subthreshold depression [7]. In addition to pain and depression, sleep disorders such as insomnia are other symptoms that should also be brought to attention in cancer patients. Generally, insomnia was seen in 30 - 50% of cancer patients [8]. In breast cancer patients, insomnia was found in about 20-70% of the patients [9].

The association between pain, depression, and poor sleep quality could be theoretically described. However, more research is required to observe possible correlation between those factors in practice. Understanding the correlation would allow researchers to use intervention on pain, depression, or sleep quality of patients so that the main objective of cancer pain management, which was an improvement of quality of life, could be achieved. This study was done to analyze the relationship between pain in cancer patients with depression and quality of sleep and to observe whether they are significant.

Materials and Methods

An analytical observational study with a cross-sectional design was conducted in Medan city, Indonesia, from April to September 2021, where sampling was done in Haji Adam Malik General Hospital (RSUP HAM). The study commenced following the approval from the

Ethical Research Committee of the Faculty of Medicine, Universitas Sumatera Utara (No. 810/KEP/USU/2021). This study used the visual Analogue Scale (VAS) and Numeric Rating Scale (NRS) as measurement instruments. Measurement for the severity of depression and quality of sleep was done with Patient Health Questionnaire (PHQ-9) and Pittsburgh Sleep Quality Index (PSQI), respectively.

Clinical protocol and participant

Data were collected from cancer patients currently being treated and those who visited the outpatient clinics at RSUP HAM. There were 100 research subjects obtained through consecutive sampling in accordance with the criteria for inclusion and exclusion. Criteria for inclusion include patients between 19-60 years of age, cancer patients confirmed through pathological anatomy reports, ability to communicate verbally, and willingness to participate in the research. Criteria for exclusion include patients unwilling to take part in the research and unable to fill the questionnaires independently. The severity of depression and quality of sleep was measured with Patient Health Questionnaire (PHQ-9) and Pittsburgh Sleep Quality Index (PSQI), respectively.

Statistical analysis

Data obtained were analyzed statistically with IBM SPSS ver 23.0. Data on patients' characteristics were presented in n (%). Kruskal-Wallis test was used to analyze the relationship between pain and depression, while the Kolmogorov-Smirnov test was used to analyze the relationship between pain and quality of sleep. The difference in pain scale between VAS and NRS was analyzed with the Mann-Whitney test.

Results and Discussion

In this study, most participants were male, with 59 subjects (59%) and the age range of the participants was mainly 41-60 years (47%). Most subjects were high school graduates (52%) and those working as an entrepreneur (42%). Sixty-

six subjects (66%) had a normal body weight according to BMI classification. Rectum cancer was the most diagnosed cancer type found in the study, with 20 subjects (20%). The main symptoms reported during the hospital visit were pain (85%), and most patients had not undergone surgery (67%). Twenty-five percent of the visiting patients had never used analgesics for pain relief. In contrast, the remaining patients had previously used various types of analgesics such as paracetamol only (19%), paracetamol + opioid analgesics only (8%), and a combination of paracetamol, morphine, and amitriptyline (32%).

Based on the VAS scale, patients mainly experienced moderate (40%) and severe (36%) pain. A similar trend was also seen on the NRS scale, with the difference being the percentage of patients experiencing moderate and severe pain, which were 40 and 42%, respectively. Most patients experienced various levels of depression, observed in 89 subjects (89%) and 75 subjects (75%) experienced various levels of symptom-related difficulty in performing activities. Poor quality of sleep was observed in 82 subjects (68%). A summary of the subject characteristics can be seen in Table 1 below.

Table 1: Demographic data

| Characteristics of subjects | n (%) |
|-----------------------------|-----------|
| Gender | |
| Male | 59 (59.0) |
| Female | 41 (41.0) |
| Age (years) | |
| 2-10 | 2 (2.0) |
| 11-19 | 6 (6.0) |
| 20-40 | 24 (24.0) |
| 41-60 | 47 (47.0) |
| > 60 | 21 (21.0) |
| Education level | |
| Primary school | 18(18.0) |
| Junior high school | 20(20.0) |
| Senior high school | 52(52.0) |
| Diploma 1 | 1(1.0) |
| Undergraduate | 8(8.0) |
| Postgraduate | 1(1.0) |
| Occupation | |
| Housewife | 23(23.0) |
| Entrepreneur | 42(42.0) |
| Farmer | 13(13.0) |
| Civil servant | 7(7.0) |
| Laborer | 2(2.0) |
| Others | 13(13.0) |
| BMI classification | |
| Underweight | 17 (17.0) |
| Normoweight | 66 (66.0) |
| Overweight | 16 (16.0) |
| Obesity | 1 (1.0) |
| Cancer type | |
| Rectum | 20(20.0) |
| Colon | 5(5.0) |
| Lung | 11(11.0) |
| Breast | 6(6.0) |
| Vulvar | 6(6.0) |
| Testicular | 8(8.0) |
| Ovarium | 4(4.0) |

| | |
|------------------------------------|----------|
| Bladder | 4(4.0) |
| Prostate | 6(6.0) |
| Penile | 4(4.0) |
| Nasopharyngeal Carcinoma (NPC) | 2(2.0) |
| Osteosarcoma | 2(2.0) |
| Non-Hodgkin Lymphoma (NHL) | 3(3.0) |
| Others | 19(19.0) |
| Main symptoms | |
| Pain | 85(85.0) |
| Difficulty breathing | 4(4.0) |
| Blood in stool | 2(2.0) |
| Fatigue | 2(2.0) |
| Others | 7(7.0) |
| History of surgery | |
| Have not undergone surgery | 67(67.0) |
| Have undergone surgery | 33(33.0) |
| History of analgesics use | |
| None | 25(25.0) |
| Paracetamol | 19(19.0) |
| Paracetamol + NSAID | 7(7.0) |
| Paracetamol + Morphine | 6(6.0) |
| Paracetamol + Codeine | 2(2.0) |
| Morphine | 2(2.0) |
| Paracetamol+Morphine+Amitriptyline | 32(32.0) |
| Others | 7(7.0) |
| VAS scale | |
| No pain | 5(5.0) |
| Mild | 19(19.0) |
| Moderate | 40(40.0) |
| Severe | 36(36.0) |
| NRS scale | |
| No pain | 5(5.0) |
| Mild | 13(13.0) |
| Moderate | 40(40.0) |
| Severe | 42(42.0) |
| PHQ_9 (Level of Depression) | |
| None | 11(11.0) |
| Minimal | 27(27.0) |
| Mild | 37(37.0) |
| Moderate | 11(11.0) |
| Moderate-severe | 6(6.0) |
| Severe | 8(8.0) |
| PHQ_9 (Symptom-related difficulty) | |
| Not difficult at all | 25(25.0) |
| Somewhat difficult | 48(48.0) |
| Very difficult | 22(22.0) |
| Extremely difficult | 5(5.0) |
| PSQI_Quality of sleep | |
| Good | 18(18.0) |
| Poor | 82(82.0) |

In this study, we analyzed the relationship between different variables with a pain scale based on VAS using a VAS-based pain scale. Most female cancer patients experienced moderate pain (62.5%), while severe pain was observed in most males (52.8%). Nineteen subjects (47.5%) had moderate pain, and 18 (50%) had severe pain in patients aged 41-60 years. Based on education level, 20 subjects (50%) had moderate pain, and 20 (55.6%) had severe pain in the senior high school category. Patients working as entrepreneurs who experienced moderate and severe pain were 19 (47.5%) and 10 (27.8%) subjects, respectively. In patients with normal body weight, 25 (62.5%) had moderate pain, and 25 (69.5%) had severe pain. In patients with rectum cancer, 9 (22.5%) had moderate pain, and 7 (19.4%) had severe pain. Thirty-six (90%) and 33 (91.7%) subjects with pain as the main symptoms reported to had moderate and severe pain, respectively, and there was a relationship between the symptoms and pain

scale based on VAS ($p < 0.05$). In patients who had not undergone without surgery, 28 (70%) had moderate pain, and 22 (61.1%) had severe pain. In patients with analgesics combination of paracetamol, morphine, and amitriptyline, 11 (27.5%) had moderate pain and 15 (41.7%) had severe pain. Thirty-six (90%) and 34 (94.4%) patients with depression had moderate and severe pain, respectively. There was a significant relationship between the level of depression and the VAS pain scale ($p < 0.05$). Based on symptom-related difficulty, 26 (65%) and 33 (91.7%) subjects experienced moderate and severe pain. A significant relationship was seen between the level of symptom-related difficulty and the pain scale based on VAS ($p < 0.05$). In patients with poor sleep quality, 32 (80%) had moderate pain, and 32 (88.9%) had severe pain, although no significance was observed between sleep quality and the VAS scale. The relationship between research subjects' characteristics and pain scale based on VAS can be seen on in Tables 2.

Table 2: Relationship between characteristics and VAS pain scale

| Variables | VAS | | | | | P-value |
|------------------------|-----------|----------|-----------|-----------|-----------|--------------------|
| | Total | No pain | Mild | Moderate | Severe | |
| | n (%) | n (%) | n (%) | n (%) | n (%) | |
| Gender | | | | | | |
| Male | 59 (59.0) | 3 (60.0) | 14 (73.7) | 25 (62.5) | 17 (47.2) | 0.268 ^a |
| Female | 41 (41.0) | 2 (40.0) | 5 (26.3) | 15 (37.5) | 19 (52.8) | |
| Age (years) | | | | | | |
| 2-10 | 2 (2.0) | 1 (20.0) | 0 | 0 | 1 (2.8) | 0.825 ^b |
| 11-19 | 6 (6.0) | 1 (20.0) | 2 (10.5) | 1 (2.5) | 2 (5.6) | |
| 20-40 | 24 (24.0) | 0 | 6 (31.6) | 8 (20.0) | 10 (27.8) | |
| 41-60 | 47 (47.0) | 3 (60.0) | 7 (36.6) | 19 (47.5) | 18 (50.0) | |
| > 60 | 21 (21.0) | 0 | 4 (21.1) | 12 (30.0) | 5 (13.9) | |
| Education level | | | | | | |
| Primary school | 18 (18.0) | 1 (20.0) | 2 (10.5) | 7 (17.5) | 8 (22.2) | 0.576 ^b |
| Junior high school | 20 (20.0) | 1 (20.0) | 6 (31.6) | 7 (17.5) | 6 (16.7) | |
| Senior high school | 52 (52.0) | 3 (60.0) | 9 (47.4) | 20 (50.0) | 20 (55.6) | |
| Diploma 1 | 1 (1.0) | 0 | 0 | 0 | 1 (2.8) | |
| Undergraduate | 8 (8.0) | 0 | 2 (10.5) | 5 (12.5) | 1 (2.8) | |
| Postgraduate | 1 (1.0) | 0 | 0 | 1 (2.5) | 0 | |
| Occupation | | | | | | 0.146 ^b |
| Housewife | 23 (23.0) | 0 | 2 (10.5) | 8 (20.0) | 13 (36.1) | |
| Entrepreneur | 42 (42.0) | 2 (40) | 11 (57.9) | 19 (47.5) | 10 (27.8) | |
| Farmer | 13 (13.0) | 2 (40) | 2 (10.5) | 4 (10.0) | 5 (13.9) | |

| | | | | | | |
|--------------------------|-----------|-----------|-----------|-----------|-----------|----------------------|
| Civil servant | 7 (7.0) | 0 | 1 (5.3) | 3 (7.5) | 3 (8.3) | |
| Labourer | 2 (2.0) | 0 | 1 (5.3) | 0 | 1 (2.8) | |
| Others | 13 (13.0) | 1 (20) | 2 (10.5) | 6 (15.0) | 4 (11.1) | |
| BMI Classification | | | | | | |
| Underweight | 17 (17.0) | 1 (20.0) | 4 (21.1) | 6 (15.0) | 6 (16.7) | 0.822 ^b |
| Norm weight | 66 (66.0) | 3 (60.0) | 13 (68.4) | 25 (62.5) | 25 (69.5) | |
| Overweight | 16 (16.0) | 1 (20.0) | 2 (10.5) | 8 (20.0) | 5 (13.9) | |
| Obesity | 1 (1.0) | 0 | 0 | 1 (2.5) | 0 | |
| ^a Cancer Type | | | | | | |
| Rectum | 20 (20.0) | 1 (20.0) | 3 (15.8) | 9 (22.5) | 7 (19.4) | 0.803 ^b |
| Colon | 5 (5.0) | 2 (40.0) | 0 | 1 (2.5) | 2 (5.6) | |
| Lung | 11 (11.0) | 0 | 3 (15.8) | 4 (10.0) | 4 (11.1) | |
| Breast | 6 (6.0) | 0 | 0 | 5 (12.5) | 1 (2.8) | |
| Vulvar | 6 (6.0) | 0 | 1 (5.3) | 2 (5.0) | 3 (8.3) | |
| Testicular | 8 (8.0) | 0 | 1 (5.3) | 2 (5.0) | 5 (13.9) | |
| Ovarium | 4 (4.0) | 0 | 2 (10.5) | 1 (2.5) | 1 (2.8) | |
| Bladder | 4 (4.0) | 0 | 0 | 3 (7.5) | 1 (2.8) | |
| Prostate | 6 (6.0) | 0 | 1 (5.3) | 3 (7.5) | 2 (5.6) | |
| Penile | 4 (4.0) | 0 | 1 (5.3) | 2 (5.0) | 1 (2.8) | |
| NPC | 2 (2.0) | 0 | 1 (5.3) | 0 | 1 (2.8) | |
| Osteosarcoma | 2 (2.0) | 0 | 1 (5.3) | 1 (5.3) | 0 | |
| NHL | 3 (3.0) | 0 | 1 (5.3) | 1 | 1 (2.8) | |
| Others | 19 (19.0) | 1 (20.0) | 4 (21.1) | 7 (17.5) | 7 (19.4) | |
| Main symptoms | | | | | | |
| Pain | 85 (85.0) | 3 (60.0) | 13 (68.4) | 36 (90.0) | 33 (91.7) | 0.040 ^{b,*} |
| Difficulty breathing | 4 (4.0) | 1 (20.0) | 0 | 1 (2.5) | 2 (5.6) | |
| Blood in stool | 2 (2.0) | 0 | 1 (5.3) | 0 | 1 (2.7) | |
| Fatigue | 2 (2.0) | 0 | 2 (10.5) | 0 | 0 | |
| Others | 7 (7.0) | 1 (20.0) | 3 (15.8) | 3 (15.8) | 0 | |
| History of surgery | | | | | | |
| No undergone surgery | 67 (67.0) | 3 (60.0) | 14 (73.7) | 28 (70.0) | 22 (61.1) | 0.987 ^a |
| Undergone surgery | 33 (33.0) | 2 (40.0) | 5 (26.3) | 12 (30.0) | 14 (38.9) | |
| History of analgesics | | | | | | |
| None | 25 (25.0) | 5 (100.0) | 6 (31.6) | 10 (25.0) | 4 (11.1) | 0.083 ^b |
| Paracetamol | 19 (19.0) | 0 | 5 (26.3) | 8 (20.0) | 6 (16.7) | |
| Paracetamol + NSAID | 7 (7.0) | 0 | 0 | 5 (12.5) | 2 (5.6) | |
| PCT + Morphine | 6 (6.0) | 0 | 1 (5.3) | 2 (5.0) | 3 (8.3) | |
| Paracetamol + Codeine | 2 (2.0) | 0 | 0 | 1 (2.5) | 1 (2.8) | |
| Morphine | 2 (2.0) | 0 | 0 | 1 (2.5) | 1 (2.8) | |
| PCT + MO + AM | 32 (32.0) | 0 | 6 (31.6) | 11 (27.5) | 15 (41.7) | |
| Others | 7 (7.0) | 0 | 1 (5.3) | 2 (5.0) | 4 (11.1) | |
| PHQ_Level of Depression | | | | | | |
| None | 11 (11.0) | 0 | 5 (26.3) | 4 (10.0) | 2 (5.6) | 0.004 ^{b,*} |
| Minimal | 27 (27.0) | 1 (20.0) | 4 (21.1) | 16 (40.0) | 6 (16.7) | |

| | | | | | | |
|--------------------------------|-----------|----------|-----------|-----------|-----------|----------------------|
| Mild | 37 (37.0) | 4 (80.0) | 9 (47.4) | 13 (32.5) | 11 (30.6) | |
| Moderate | 11 (11.0) | 0 | 0 | 4 (10.0) | 7 (19.4) | |
| Moderate-severe | 6 (6.0) | 0 | 0 | 3 (7.5) | 3 (8.3) | |
| Severe | 8 (8.0) | 0 | 1 (5.3) | 0 | 7 (19.4) | |
| PHQ_Symptom-related difficulty | | | | | | 0.000 ^{b,*} |
| Not difficult at all | 25 (25.0) | 2 (40.0) | 6 (31.6) | 14 (35.0) | 3 (8.3) | |
| Somewhat difficult | 48 (48.0) | 3 (60.0) | 12 (63.2) | 21 (52.5) | 12 (33.3) | |
| Very difficult | 22 (22.0) | 0 | 1 (5.3) | 4 (10.0) | 17 (47.2) | |
| Extremely difficult | 5 (5.0) | 0 | 0 | 1 (2.5) | 4 (11.1) | |
| PSQI_Quality of sleep | | | | | | 1.000 ^b |
| Good | 18 (18.0) | 1 (20.0) | 5 (26.3) | 8 (20.0) | 4 (11.1) | |
| Poor | 82 (82.0) | 4 (80.0) | 14 (73.7) | 32 (80.0) | 32 (88.9) | |

^a Kolmogorov-Smirnov test, ^b Kruskal-Wallis test; *p < 0.05, statistically significant

Study, also analyzed the relationship between research subjects' characteristics on the NRS scale. In male cancer patients, 24 (60%) had moderate pain, and 22 (52.4%) had severe pain. Twenty subjects (50%) had moderate pain, and 20 (47.6%) had severe pain in the age range of 41 – 60 years. In patients with an education level of senior high school, 21 (52.5%) had moderate pain, and 22 (52.4%) had severe pain. Patients working as entrepreneurs who experienced

moderate and severe pain were 20 (50%) and 14 (33.3%) subjects, respectively. In patients with normal weight, 27 (67.5%) had moderate pain, and 28 (66.7%) had severe pain. Table 3 showed that correlation between main symptoms, history of analgesic use, level of depression, and symptom-related difficulty with pain based on the NRS scale (p < 0.05). The relationship between research subjects' characteristics and with NRS scale can be seen in Tables 3.

Table 3: Relationship between subjects' characteristics with NRS scale

| Variables | NRS | | | | | P-value |
|--------------------|-----------|---------|----------|----------|----------|--------------------|
| | Total | No pain | Mild | Moderate | Severe | |
| | n (%) | n (%) | n (%) | n (%) | n (%) | |
| Gender | | | | | | 1.000 ^a |
| Male | 59 (59.0) | 3(60.0) | 10(76.9) | 24(60.0) | 22(52.4) | |
| Female | 41 (41.0) | 2(40.0) | 3(23.1) | 16(40.0) | 20(47.6) | |
| Age (years) | | | | | | |
| 2-10 | 2 (2.0) | 1(20.0) | 0 | 0 | 1(2.4) | 0.868 ^b |
| 11-19 | 6 (6.0) | 1(20.0) | 1(7.7) | 2(5.0) | 2(4.8) | |
| 20-40 | 24 (24.0) | 0 | 6(46.2) | 8(20.0) | 10(23.8) | |
| 41-60 | 47 (47.0) | 3(60.0) | 4(30.8) | 20(50.0) | 20(47.6) | |
| > 60 | 21 (21.0) | 0 | 2(15.4) | 10(25.0) | 9(21.4) | |
| Education level | | | | | | |
| Primary school | 18 (18.0) | 1(20.0) | 2(15.4) | 4(10.0) | 11(26.2) | 0.471 ^b |
| Junior high school | 20 (20.0) | 1(20.0) | 4(30.8) | 9(22.5) | 6(14.3) | |

| | | | | | | |
|----------------------------|--------------|----------|----------|----------|----------|---------------------|
| Senior high school | 52 (52.0) | 3(60.0) | 6(46.2) | 21(52.5) | 22(52.4) | |
| Diploma 1 | 1 (1.0) | 0 | 0 | 0 | 1(2.4) | |
| Undergraduate | 8 (8.0) | 0 | 1(7.7) | 5(12.5) | 2(4.8) | |
| Postgraduate | 1 (1.0) | 0 | 0 | 1(2.5) | 0 | |
| Occupation | | | | | | |
| Housewife | 23 (23.0) | 0 | 1(7.7) | 8(20.0) | 14(33.3) | 0.294 ^b |
| Entrepreneur | 42 (42.0) | 2(40.0) | 6(46.2) | 20(50.0) | 14(33.3) | |
| Farmer | 13 (13.0) | 2(40.0) | 2(15.4) | 4(10.0) | 5(11.9) | |
| Civil servant | 7 (7.0) | 0 | 1(7.7) | 3(7.5) | 3(7.1) | |
| Laborer | 2 (2.0) | 0 | 1(7.7) | 0 | 1(2.4) | |
| Others | 13 (13.0) | 1(20.0) | 2(15.4) | 5(12.5) | 5(11.9) | |
| BMI classification | | | | | | |
| Underweight | 17 (17.0) | 1(20.0) | 4(30.8) | 4(10.0) | 8(19.0) | 0.845 ^b |
| Normoweight | 66 (66.0) | 3(60.0) | 8(61.5) | 27(67.5) | 28(66.7) | |
| Overweight | 16 (16.0) | 1(20.0) | 1(7.7) | 8(20.0) | 6(14.3) | |
| Obesity | 1 (1.0) | 0 | 0 | 1(2.5) | 0 | |
| Cancer type | | | | | | |
| Rectum | 20 (20.0) | 1(20.0) | 1(7.7) | 10(25.0) | 8(19.0) | 0.581 ^b |
| Colon | 5 (5.0) | 2(40.0) | 0 | 1(2.5) | 2(4.8) | |
| Lung | 11 (11.0) | 0 | 1(7.7) | 6(15.0) | 4(9.5) | |
| Breast | 6 (6.0) | 0 | 0 | 5(12.5) | 1(2.4) | |
| Vulvar | 6 (6.0) | 0 | 1(7.7) | 2(5.0) | 3(7.1) | |
| Testicular | 8 (8.0) | 0 | 1(7.7) | 2(5.0) | 5(11.9) | |
| Ovarium | 4 (4.0) | 0 | 1(7.7) | 2(5.0) | 1(2.4) | |
| Bladder | 4 (4.0) | 0 | 0 | 1(2.5) | 3(7.1) | |
| Prostate | 6 (6.0) | 0 | 1(7.7) | 1(2.5) | 4(9.5) | |
| Penile | 4 (4.0) | 0 | 1(7.7) | 2(5.0) | 1(2.4) | |
| NPC | 2 (2.0) | 0 | 1(7.7) | 0 | 1(2.4) | |
| Osteosarcoma | 2 (2.0) | 1(20.0) | 1(7.7) | 0 | 0 | |
| NHL | 3 (3.0) | 0 | 1(7.7) | 1(2.5) | 1(2.4) | |
| Others | 19 (19.0) | 1(20.0) | 3(23.1) | 7(17.5) | 8(19.0) | |
| Main symptoms | | | | | | |
| Pain | 85 (85.0) | 3(60.0) | 9(69.2) | 34(85.0) | 39(92.9) | 0.026 ^{b*} |
| Difficulty breathing | 4 (4.0) | 1(20.0) | 0 | 1(2.5) | 2(4.8) | |
| Blood in stool | 2 (2.0) | 0 | 0 | 1(2.5) | 1(2.4) | |
| Weakness | 2 (2.0) | 0 | 2(15.4) | 0 | 0 | |
| Others | 7 (7.0) | 1(20.0) | 2(15.4) | 4(10.0) | 0 | |
| History of surgery | | | | | | |
| Have not undergone surgery | 67 (67.0) | 3(60.0) | 10(76.9) | 31(77.5) | 23(24.8) | 1.000 ^a |
| Have undergone surgery | 33 (33.0) | 2(40.0) | 3(23.1) | 9(22.5) | 19(45.2) | |
| History of analgesics use | | | | | | 0.018 ^{b*} |
| None | 25 (25.0) | 5(100.0) | 4(30.8) | 12(30.0) | 4(9.5) | |
| Paracetamol | 19 | 0 | 4(30.8) | 9(22.5) | 6(14.3) | |

| | | | | | | |
|--|--------------|---------|---------|----------|----------|--------------------|
| | (19.0) | | | | | |
| Paracetamol + NSAID | 7 (7.0) | 0 | 0 | 4(10.0) | 3(7.1) | |
| Paracetamol + Morphine | 6 (6.0) | 0 | 0 | 3(7.5) | 3(7.1) | |
| Paracetamol + Codeine | 2 (2.0) | 0 | 0 | 1(2.5) | 1(2.4) | |
| Morphine | 2 (2.0) | 0 | 0 | 1(2.5) | 1(2.4) | |
| Paracetamol+Morphine+ Amitriptyline | 32 (32.0) | 0 | 4(30.8) | 9(22.5) | 19(45.2) | |
| Others | 7 (7.0) | 0 | 1(7.7) | 1(2.5) | 5(11.9) | |
| PHQ Level of Depression | | | | | | 0.002b,* |
| None | 11 (11.0) | 0 | 4(30.8) | 5(12.5) | 2(4.8) | |
| Minimal | 27 (27.0) | 1(20.0) | 3(23.1) | 15(37.5) | 8(19.0) | |
| Mild | 37 (37.0) | 4(80.0) | 5(38.5) | 16(40.0) | 12(28.6) | |
| Moderate | 11 (11.0) | 0 | 0 | 3(7.5) | 8(19.0) | |
| Moderate-severe | 6 (6.0) | 0 | 0 | 1(2.5) | 5(11.9) | |
| Severe | 8 (8.0) | 0 | 1(7.7) | 0 | 7(16.7) | |
| PHQ Symptom-related difficulty | | | | | | |
| Not difficult at all | 25 (25.0) | 2(40.0) | 5(38.5) | 14(35.0) | 4(9.5) | 0.000b,* |
| Somewhat difficult | 48 (48.0) | 3(60.0) | 7(53.8) | 23(57.5) | 15(35.7) | |
| Very difficult | 22 (22.0) | 0 | 1(7.7) | 2(5.0) | 19(45.2) | |
| Extremely difficult | 5 (5.0) | 0 | 0 | 1(2.5) | 4(9.5) | |
| PSQI Quality of sleep | | | | | | 0.357 ^a |
| Good | 18 (18.0) | 1(20.0) | 4(30.8) | 9(22.5) | 4(9.5) | |
| Poor | 82 (82.0) | 4(80.0) | 9(69.2) | 31(77.5) | 38(90.5) | |

^a Kolmogorov-Smirnov test, ^b Kruskal-Wallis test; *p < 0.05, statistically significant

From Tables 2, 3, it could be seen that there was a difference in the variables which had significance to pain based on VAS or NRS scale. A significant relationship was observed between main symptoms, level of depression, and level of symptom-related difficulty on the VAS scale. Meanwhile, significance was seen in main symptoms, history of analgesic use, level of depression, and difficulty in NRS. Based on these results, it could be said that pain scaling with NRS seemed to be more sensitive than VAS. Thus, the difference in pain scaling between VAS and NRS scales was observed and reported in Table 4.

Most of the patients being studied (85%) came with cancer pain symptoms. This study used VAS and NRS scales to assess whether both measurements differed when used in clinical practices. When used in patients with cancer

3 pain, there was no statistically significant difference in both scales, with a p-value > 0.05, which was 0.435. This suggested that VAS or NRS scale would have had similar scores when used on the same patients. In this study, 36% and 40% of patients had severe and moderate pain, respectively, with the VAS scale. However, by using the NRS scale, it was found that 42% had severe pain while 40% had moderate pain. These findings aligned with a study in 100 low back pain (LBP) patients [10]. Furthermore, in another study in 94 cancer patients [11], no significant difference was observed between VAS and NRS scales, although patients reported the practicality of using NRS compared to VAS and can be used in less than one minute [12-14]. In this study, it could be seen that VAS was more useful in observing patients with a severe degree of pain

Table 4: Difference in pain scale between VAS and NRS scale

| Type | Pain Scale | | | P-value |
|------|------------|-----|-----|--------------------|
| | Median | Min | Max | |
| VAS | 5.45 | 0 | 10 | 0.435 ^c |
| NRS | 6.00 | 0 | 10 | |

^a Kolmogorov-Smirnov test, ^b Kruskal-Wallis test; * $p < 0.05$, statistically significant

clinically. However, a VAS in its application was relatively more difficult as patients were only given a view of a fixed straight line.

Despite the widespread usage of analgesics, cancer patients with pain symptoms were still commonly found. This happens as pain is related to multifactorial interactions, including non-tissue elements, such as psychological factors, which might include depression, poor quality of sleep, and quality of life of patients, in addition to affecting tissue. This study found that 75% of patients had used analgesics, and only 25% had not. This was aligned with a previous study on cancer patients, which stated that 39% had cancer pain and 55% had pain during cancer therapy, and 64% in terminal cancer [13, 15]. Cancer pain left untreated would affect the lives of cancer patients. A high incidence of depression in patients with cancer pain had been linked with increasing age, although other studies suggested that no correlation was observed between depression and age, as well as economic status and gender in cancer patients [17]. Patients who tend to have depression are those with a previous history of psychiatric disease and a tendency to blame themselves [18]. The severity of depression was dependent on the support from closely related people [19]. In this study, the PHQ-9 questionnaire was used to assess the level of depression in cancer patients and was deemed relatively reliable and valid [20, 21]. In this study, more than half of the patients (68%) were above 40 years of age, and 89% of those patients had a level of depression between mild to severe. A meta-analysis of cancer patients showed that the average prevalence of depression ranged between 8-24% [22]. The relationship between the degree of pain with the level of depression in both the VAS and NRS scales showed a statistically significant result with a p -value < 0.05 , which was 0.04 and 0.02, respectively. In clinical practice, these depression

symptoms should not just be neglected as they could affect the quality of life, adherence to the treatment plan, psychological perception from other physical symptoms, and most importantly, the prognosis of the disease.

Nevertheless, depression in cancer patients was often neglected and had not been well managed [16]. This study also showed that 75% of the patients had difficulty in performing daily activities due to persistent symptoms. There was a statistically significant relationship between pain and the ability to perform daily activities based on VAS and NRS with a p -value of 0.000. The difficulty in performing activities such as praying, showering and putting on clothes would lower the patients' quality of life, which could then affect the cancer prognosis. Improving patients' quality of life would depend on the quality of sleep, reduced pain and depression, the ability to perform daily activities, and family support. Generally, quality of sleep was also an indicator of successful pain treatment, as patients would have had trouble sleeping in the presence of pain [23].

In addition to depression, the high prevalence of poor quality of sleep would also require proper attention [24]. Poor quality of sleep was found in 82% of patients with cancer pain. However, no significant difference was observed between this quality and pain on the VAS and NRS scales, with a p -value of 1.000 and 0.375, respectively ($p > 0.05$). Quality of sleep was one indicator of successful pain management as patients with cancer pain and depression would have trouble in getting a good sleep quality. Sleep quality would depend on the number of days patients awakened at night [25]. Other studies stated that about 7 – 86% of patients with chronic pain had difficulty sleeping [26-28]. However, this study had no significance between pain and sleep quality. This suggested that quality of sleep was not only affected by pain but also other factors

such as level of anxiety, depression, fatigue, and lower quality of life. Meanwhile, improvement in quality of sleep could be regarded as an indicator of the lowered degree of pain.

Conclusion

Most cancer patients experience moderate to severe degrees of pain, depression, and poor sleep quality. Pain, as the main symptom in these patients, could induce various levels of depression (moderate – severe) and symptoms-related difficulty (somewhat-extremely difficult). Analgesics combination treatment with paracetamol, opioid analgesics, and Tricyclic Antidepressants (TCA) was insufficient to relieve the pain in patients. Pain measurements in cancer patients could be done with VAS or NRS scale. There was a significant relationship between pain with the level of depression and difficulty in performing activities. At the same time, no significance was observed between pain and quality of sleep, although, clinically, pain could have a strong correlation with sleep quality. Further analysis and research on the factors affecting the patients' poor sleep quality are required. More research on various molecular parameters to relieve cancer pain is needed to establish an effective multimodality therapy.

Acknowledgments

The authors would like to express their gratitude to College of Medicine at Al-Iraqia University and all the participants in this research.

Funding

This research has received funding from the TALENTA grant under the 2021 Young Lecturer Scheme by University Sumatera Utara (No. 810/KEP/USU/2021).

Authors' contributions

All authors contributed to data analysis, drafting, and revising of the paper and agreed to be responsible for all the aspects of this work.

Conflict of Interest

We have no conflicts of interest to disclose.

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References

- [1]. Raja S.N., Carr D.B., Cohen M., Finnerup N.B., Flor H., Gibson S., The revised International Association for the Study of Pain definition of pain: concepts, challenges, and compromises, *Pain*, 2020, **161**:1976 [Crossref], [Google Scholar], [Publisher]
- [2]. Von Knorring L., Perris C., Eisemann M., Eriksson U., Perris H., Pain as a symptom in depressive disorders. II. Relationship to personality traits as assessed by means of KSP, *Pain*, 1983, **17**:377 [Crossref], [Google Scholar], [Publisher]
- [3]. Lee P., Zhang M., Hong J.P., Chua H.C., Chen K.P., Tang S.W., Chan B.T.M., Lee M.S., Lee B., Gallagher G.L., Dossenbach M., Frequency of painful physical symptoms with major depressive disorder in Asia: relationship with disease severity and quality of life, *The Journal of Clinical Psychiatry*, 2009, **70**:83 [Crossref], [Google Scholar], [Publisher]
- [4]. Aguera-Ortiz L., Failde I., Mico J.A., Cervilla J., Lopez-Ibor J.J., Pain as a symptom of depression: prevalence and clinical correlates in patients attending psychiatric clinics, *Journal of Affective Disorders*, 2011, **130**:106 [Crossref], [Google Scholar], [Publisher]
- [5]. Bair M.J., Robinson R.L., Katon W., Kroenke K., Depression and pain comorbidity: a literature review, *Archives of Internal Medicine*, 2003, **163**:2433 [Crossref], [Google Scholar], [Publisher]
- [6]. Williams L.S., Jones W.J., Shen J., Robinson R.L., Weinberger M., Kroenke K., Prevalence and impact of depression and pain in neurology outpatients, *Journal of Neurology, Neurosurgery, and Psychiatry*, 2003, **74**:1587 [Crossref], [Google Scholar], [Publisher]
- [7]. Alemayehu M., Deyessa N., Medihin G., Fekadu A., A descriptive analysis of depression and pain complaints among patients with cancer in a low-income country, *PLOS ONE*. 2018, **13**:e0193713 [Crossref], [Google Scholar], [Publisher]

- [8]. Theobald D.E., Cancer pain, fatigue, distress, and insomnia in cancer patients. *Clinical Cornerstone* 2004, **6**:S15 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [9]. Fiorentino L., Rissling M., Liu L., Ancoli-Israel S., The symptom cluster of sleep, fatigue and depressive symptoms in breast cancer patients: severity of the problem and treatment options, *Drug Discovery Today: Disease Models*, 2011, **8**:167 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [10]. Shafshak T.S., Elnemr R., The Visual Analogue Scale Versus Numerical Rating Scale in Measuring Pain Severity and Predicting Disability in Low Back Pain, *JCR: Journal of Clinical Rheumatology*, 2021, **27**:282 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [11]. Firdous S., Mehta Z., Fernandez C., Behm B., Davis M., A comparison of Numeric Pain Rating Scale (NPRS) and the Visual Analog Scale (VAS) in patients with chronic cancer-associated pain, *Journal of Clinical Oncology*, 2017, **35**:217 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [12]. Brunelli C., Zecca E., Martini C., Campa T., Fagnoni E., Bagnasco M., Lanata L., Caraceni A., Comparison of numerical and verbal rating scales to measure pain exacerbations in patients with chronic cancer pain, *Health and quality of life outcomes*, 2010, **8**:1 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [13]. Williams A.C.C., Davies H.T.O., Chadury Y., Simple pain rating scales hide complex idiosyncratic meanings, *Pain*, 2000, **85**:457 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [14]. Gagliese L., Gauthier L.R., Rodin G., Cancer pain and depression: a systematic review of age-related patterns, *Pain Research and Management*, 2007, **12**:205 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [15]. Van den Beuken-van Everdingen M.H., Hochstenbach L.M., Joosten E.A., Tjan-Heijnen V.C., Janssen D.J., Update on Prevalence of Pain in Patients With Cancer: Systematic Review and Meta-Analysis, *Journal of pain and symptom management*, 2016, **51**:1070 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [16]. Arora A., Saini S.K., Nautiyal V., Verma S.K., Gupta M., Kalra B.P., Ahmad M., Cancer Pain, Anxiety, and Depression in Admitted Patients at a Tertiary Care Hospital: A Prospective Observational Study, *Indian Journal of Palliative Care*, 2019, **25**:562 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [17]. Walker J., Hansen C.H., Martin P., Symeonides S., Ramessur R., Murray G., Sharpe M., Prevalence, associations, and adequacy of treatment of major depression in patients with cancer: a cross-sectional analysis of routinely collected clinical data, *The Lancet Psychiatry*, 2014, **1**:343 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [18]. Else-Quest N.M., LoConte N.K., Schiller J.H., Hyde J.S., Perceived stigma, self-blame, and adjustment among lung, breast and prostate cancer patients, *Psychology and Health*, 2009, **24**:949 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [19]. Pitman A., Suleman S., Hyde N., Hodgkiss, A., Depression and anxiety in patients with cancer, *BMJ*, 2018, **361**:1415 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [20]. Kroenke K., Spitzer R.L., Williams J.B., The PHQ-9: validity of a brief depression severity measure, *Journal of general internal medicine*, 2001, **16**:606 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [21]. Hinz A., Mehnert A., Kocalevent R.D., Brahler E., Forkmann T., Singer S., Schulte T., Assessment of depression severity with the PHQ-9 in cancer patients and in the general population, *BMC Psychiatry*, 2016, **16**:22 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [22]. Krebber A.M.H., Buffart L.M., Kleijn G., Riepma I.C., de Bree R., Leemans C.R., Becker A., Brug J., van Straten A., Cuijpers P., Verdonck-de Leeuw I.M., Prevalence of depression in cancer patients: A meta-analysis of diagnostic interviews and self-report instruments, *Psychooncology*, 2014, **23**:121 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [23]. Finan P.H., Goodin B.R., Smith M.T., The association of sleep and pain: an update and a path forward, *J Pain*, 2013, **14**:1539 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [24]. Alhalal E.A., Alhalal I.A., Alaida A.M., Alhweity S.M., Alshojaa A.Y., Alfaori A.T., Effects of chronic pain on sleep quality and depression: A cross-sectional study, *Saudi Medical Journal*,

- 2021, **42**:315 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [25]. Gellman M.D., Turner J.R., Encyclopedia of Behavioral Medicine. 1st ed. New York (NY): Springer; 2013 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [26]. Husak A.J., Bair M.J., Review Chronic Pain and Sleep Disturbances: A Pragmatic Review of Their Relationships, Comorbidities, and Treatments, *Pain Medicine*, 2020, **21**:1142 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [27]. Harrison L., Wilson S., Heron J., Stannard C., Munafò M.R., Exploring the associations shared by mood, pain-related attention and pain outcomes related to sleep disturbance in a chronic pain sample, *Psychology & health*, 2016, **31**:565 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [28]. Karaman S., Karaman T., Dogru S., Onder Y., Cital R., Bulut Y.E., Tapar H., Sahin A., Arici S., Kaya Z., Suren M., Prevalence of sleep disturbance in chronic pain, *Eur Rev Med Pharmacol Sci*, 2014, **18**:2475 [[Google Scholar](#)], [[Publisher](#)]

HOW TO CITE THIS ARTICLE

Tasrif Hamdi, Siti Syarifah, Andi Muhammad Takdir Musba, Iqbal Pahlevi Nasution. The Association of Pain with Depression and Quality of Sleep in Indonesian Cancer Patients. *J. Med. Chem. Sci.*, 2023, 6(6) 1204-1216

<https://doi.org/10.26655/JMCHMSCI.2023.6.1>

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