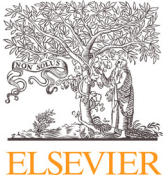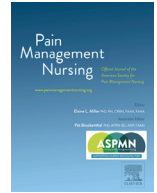Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Pain Management Nursing

Original Research

Pain and Self-Management Status Among Chinese Patients With Cancer During the COVID-19 Pandemic

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ABSTRACT

Background: To investigate the pain and self-management status of patients with cancer and the influencing factors of pain and self-management status during the COVID-19 pandemic.
Methods: A cross-sectional design was used. Eighty-one Chinese patients with cancer were recruited in December 2020. The Brief Pain Inventory, the Pain Management Inventory, and the Pain Self-efficacy Questionnaire were used to evaluate patients' pain and self-management status. Descriptive statistical analysis and multiple linear regression models were conducted for the research aims.
Results: Two thirds of the participants experienced moderate to severe pain. Cancer pain had moderate to severe interference on 90.12% of patients' lives. Self-management of pain in these participants was low. The most commonly used methods of pain management included adjusting activity intensity to avoid fatigue, using distraction techniques, and massaging the sore area. The most effective methods to manage pain included taking analgesics prescribed by doctor, taking over-the-counter analgesics, and massaging the sore area. Fifteen patients (18.5%) believed that the COVID-19 pandemic had an impact on pain management and 26 patients (32.1%) needed support. Pain education, pain interference on sleep, chemotherapy, and payment status were significantly associated with cancer patients 'pain self-management.
Conclusions: During the COVID-19 pandemic, patients with cancer had moderate to severe pain intensity with low levels of self-management and self-efficacy towards that pain.
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According to the World Health Organization's (WHO) International Agency for Research on Cancer (IARC) (WHO, 2020), there were 19.29 million new cancer cases and 9.96 million deaths worldwide in 2020, among which, there were 4.57 million new cancer cases and 3 million cancer deaths in China, accounting for 30% of the total number of cancer deaths. More than half of cancer patients experience moderate to severe pain, which often occurs in multiple sites and has different etiologies and underlying mechanisms (Caraceni & Shkodra, 2019). Inappropriate management of pain has a serious impact on patients' quality of life (QOL) (Cheville, Moynihan, Herrin, Loprinzi, & Kroenke, 2019) and many psychosocial responses are associated with cancer pain (Charalambous, Giannakopoulou, Bozas, & Paikousis, 2019). Patients have reported that pain prevented them from concentrating or thinking, performing normal daily activities (Breivik et al., 2009). In a randomized controlled trial, patients with increased pain have been confirmed with higher levels of anxiety, fatigue, and depression, as well as a lower QOL (Cheville et al., 2019).

The 3-step pain ladder developed by the WHO includes using a nonopioid (paracetamol) for mild pain, a weak opioid (codeine) for moderate pain, and a strong opioid (morphine) for severe pain (Greco et al., 2014); however, many patients with cancer were undertreated for moderate and severe pain (Induru & Lagman, 2011; Reis-Pina, Lawlor, & Barbosa, 2017; Wilkie & Ezenwa, 2012). There is a growing awareness of the limitations of medical approaches to cancer pain management and a growing focus on the role of self-managed interventions (Koller, Gaertner, De Geest, Hasemann, & Becker, 2018). Self-management refers to the ability of an individual to effectively manage their own symptoms and manage the changes in function, mental state, and life state caused by the disease, particularly in the course of chronic dis-

ease (Allegrante, Wells, & Peterson, 2019). Appropriate and effective self-management can alleviate pain, improve treatment compliance, reduce anxiety and depression, improve QOL, and subsequently reduce the utilization of health care resources or services (Mehlsen et al., 2017).

On March 11, 2020, the WHO declared the novel 2019 coronavirus disease (COVID-19) a global pandemic. Patients with cancer were at particularly high risk for a COVID-19 infection due to their diagnoses mostly at an older age, immune suppressed status, comorbidities (e.g., chronic lung disease, diabetes, and cardiovascular disease), and frequent hospital admissions and visits. Therefore, in the novel coronavirus era, the international guidelines recommend that oncologists carefully weigh the risk/benefit of treatment when planning cancer treatment and follow-up appointments (Tartarone & Lerose, 2020). Under the constraints of the COVID-19 pandemic, the methods of cancer pain management and best practices included adapting to the remote medical consultation to identify, assess, and manage cancer pain, ensuring auxiliary drug safety and responsible use of analgesics, understanding and responding to the overall care needs and addressing total pain needs, ensuring the continuity of pain management and strategy, observing the anesthetic drug laws and regulations, and ensuring the safety of patients and health care provider (Damani et al., 2020). Pain and self-management of patients with cancer during the COVID-19 pandemic is not well studied.

Therefore, the purposes of this study were to: (1) examine the pain and self-management status of patients with cancer; and (2) explore the main factors affecting pain and the self-management of pain in patients with cancer during the COVID-19 pandemic.

Methods

Participants and Setting

A cross-sectional study was conducted to assess pain and self-management of pain, and the influencing factors in cancer patients. All patients were recruited from three Grade-A tertiary hospitals in December 2020. These hospitals were located in the Guangdong, Shanghai, and Shandong Provinces of China. Each hospital has approximately 1,800 inpatient beds.

Eligible participants included cancer patients admitted to these three hospitals in December 2020. Inclusion criteria were: (1) aged > 18 years; (2) with a cancer diagnosis; (3) with an overall pain score of 2 or higher on the Brief Pain Inventory (BPI); and (4) hospitalized patients in the oncology units. Patients with cognitive impairment whose scores were <24 on the Mini-Mental State Examination (MMSE) (Arevalo-Rodriguez et al., 2021) assessment were excluded.

Measurements

We used the BPI (Cleeland & Ryan, 1994) to assess patients' pain, including pain site, pain intensity (worst pain, least pain, pain on average, and current pain), relief after receiving pain treatment, and pain interference on seven aspects: general activity; mood; walking ability; work (including household); relationship; sleep; and enjoyment of life. All these items are rated on 0-10 scale, where 0 means "no pain" and 10 means "the worst pain imaginable". The higher the scores, the greater the pain intensity or pain interference. The average of four items of pain severity was used as the overall pain, and the average of seven items of pain interference was used as the overall interference. Pain intensity and interference were classified into 4 levels: no pain (0), mild (1-3), moderate (4-6), and severe (7-10). The BPI has been widely used in pain assessments with good reliability and validity

(Cleeland, 1989). The internal consistency coefficient of this scale was 0.876 in our sample.

The Pain Management Inventory (PMI) (Davis & Atwood, 1996) was used to assess the patient's behaviors in regard to self-management of pain. The PMI consists of 15 pain self-management methods and the frequency and effectiveness of patients using these methods to manage their pain. The items are rated on a scale from 1-6, where 1 indicates lack of use or unhelpful use of such techniques and 6 indicates frequent and helpful utilization of self-management strategies. The data consists of 3 scores: the number of pain self-management methods used (0-15 points), the frequency of use of pain self-management strategies (15-90 points), and the effectiveness of self-management of pain (1-6 points). The internal consistency coefficient of PMI was 0.634 in this study.

The Pain Self-Efficacy Questionnaire (PSEQ) (Nicholas, 2007) was used to assess the patient's confidence in their pain management; it consists of 10 items. The items are rated from 0-6, where 0 indicates complete lack of confidence and 6 indicates complete confidence. APSEQ >40 represents a strong belief in pain management. The Chinese version of the PSEQ (Xiao, Wu, Teng, & Wang, 2013) was applied to 94 Chinese patients with chronic low back pain and proved to have good reliability and validity. The internal consistency coefficient of PSEQ was 0.905 in this study.

We used a demographic and clinical form to collect participants' demographic data (age, gender, education, marital status, occupation, income range, residence, and insurance), as well as primary diagnosis, treatment (surgery, radiotherapy, and/or chemotherapy), pain education (whether or not),and to answer the following questions as well: has COVID-19 affected your pain management and your pain intensity? Do you need any help or support? What kind of help or support do you need?

Data Analysis

All data were collected and checked by three uniformly trained nursing graduate students to ensure that the questionnaires were completed. Categorical variables were described by frequency and percentage. Continuous variables were described by mean and standard deviation (SD) for normal distributed data, median and quartile data for non-normal distributed data. Two independent samples t-test or analysis of variance were used to compare between groups. Pearson correlation was used for the analysis of continuous variables. Multiple linear regression analysis was used to explore the influencing factors of pain and self-management of pain in cancer patients. The level of significant was set at $p < .05$. SPSS version 20 was used for all the analysis.

Ethical Approval

Ethical approval for this study was acquired from the Institutional Review Board of the participants' hospitals. The purpose and procedures of the study were described in writing to ensure voluntary participation, confidentiality, and privacy.

Results

Characteristics of Participants

A total of 103 questionnaires were sent out and 103 were returned (100%), 22 patients with an overall pain intensity score <2 were excluded, and 81 patients with an overall pain score ≥2 were included in the study. Mean age was 59.48 ± 12.70 years (range 25-85). The primary diagnoses included: liver cancer (26; 32.10%), lung cancer (15; 18.51%), colon cancer (11; 13.58%), gastric cancer (7; 8.64%), breast cancer (6; 7.41%), ovarian cancer (4; 4.94%), rectal

Table 1
Demographic Details of Patients With Cancer (N = 81)

Variables		Frequency	Percentage
Sex	Male	50	61.73
	Female	31	38.27
Education	Illiterate	26	32.10
	Primary	24	29.63
	Secondary school	19	23.46
	College or university	12	14.81
Income range	<1,000	9	11.11
	1,000-2,999	28	34.57
	3,000-4,999	25	30.86
	≥5,000	19	23.46
Occupation	No	23	28.40
	Yes	58	71.60
Insurance status	Basic medical insurance	33	40.74
	Rural cooperative medical care	48	59.26
Residence	Urban	39	48.15
	Rural	42	51.85
Pain education	No	64	79.01
	Yes	17	20.99
Surgery	No	31	38.27
	Yes	50	61.73
Radiotherapy	No	62	76.54
	Yes	19	23.46
Chemotherapy	No	28	34.57
	Yes	53	65.43
Marital status	Single	2	2.47
	Married	76	93.83
	Divorced	2	2.47
	Widowed	1	1.23

Table 2
Pain Intensity and Pain Interference of Cancer Patients

Pain intensity/interference	M (P25, P75)	Minimum	Maximum
Worst pain	7 (6, 9)	4	10
Least pain	1 (0, 2)	0	8
Average pain	2 (1, 4)	1	10
Current pain	4 (3, 5)	0	10
General activity	6 (5, 8)	1	10
Mood	5 (3, 7)	0	10
Walking ability	7 (5, 8.5)	0	10
Normal work (including household)	7 (5, 8)	0	10
Relationship	4 (2.5, 6)	0	10
Sleep	7 (5, 8)	2	10
Enjoyment of life	5 (3, 8)	1	10

cancer (4; 4.94%), lymph cancer (4; 4.94%), and other cancers (4; 4.94%). Only 17 (20.99%) patients received pain education, such as psychological adjustment, knowledge of analgesics, and pain relief methods. Characteristics of the patients were described in Table 1.

Fifteen patients (18.25%) believed that the COVID-19 pandemic had an impact on pain management; six patients (7.41%) believed that the COVID-19 pandemic had an impact on pain intensity. When the patient was asked if he or she needs help or support, 55 said no. Twenty-six patients (32.10%) needed support or help. Nine patients wanted to simplify the admission process, shorten the waiting time, and get timely treatment. Six patients wanted family support and social support, 5 patients wanted relief from pain, 2 patients wished to receive financial support, 2 patients wished to receive rehabilitation guidance, and 2 patients wished to improve their sleep.

Pain Status: Site, Intensity, Interference, and Treatment

Based on the BPI, the primary pain sites were the abdomen (50; 61.73%), chest (7; 8.63%), lower waist (6; 7.41%), shoulders (6; 7.41%), limbs (4; 4.94%), whole body (4; 4.94%), back (2; 2.47%), and head (2; 2.47%).

We found that 65.43% of the patients with cancer experienced moderate to severe pain and 90.12% of those patients stated that the pain had a moderate to severe impact on their life. The median of overall pain score was 3.75 (range 3-4.5), the overall interference score was 5.68 ± 1.78. The proportions of mild, moderate, and severe pain were 34.57%, 60.49%, and 4.94%, respectively. The proportions of mild, moderate, and severe pain related interference were 9.88%, 69.14%, and 20.98%, respectively. The top 3 interferences were walking ability, sleep, and work (including household). Main characteristics of the pain intensity and pain interference were described in Table 2.

Fifty-four patients (66.67%) received treatment or medication for pain control, which included strong opioids (24; 44.44%), weak opioids (13; 24.07%), non-steroidal anti-inflammatory drugs (15;

27.78%), and patient-controlled analgesia (2; 3.7%). Remission degree after treatment or medication was 70%, ranging from 0%-100%.

Self-Management Status of Patients with Cancer

Patients used an average of 5 methods to manage pain, with a frequency score of 32 (range 27.5, 38) and effectiveness score of 3.49 ± 0.91.The 5 most commonly used methods of pain management were: (1) adjusting activity intensity to avoid fatigue (n = 66); (2) using distracting techniques, such as watching TV (n = 64); (3) massaging the sore area (n = 53); (4) taking analgesics prescribed by their doctor (n = 50); and (5) using relaxation techniques such as meditation or guided imagination (n = 40).The 5 most effective methods to manage pain were: (1) taking analgesics prescribed by their doctor (4.89); (2) taking over-the-counter analgesics (4.11); (3) massaging the sore area (3.57); (4) adjusting activity intensity to avoid fatigue (3.56); and (5) using religious beliefs as support (3.50). The patients with cancer had low scores in pain self-efficacy, with the average score being 24.59.

Influencing Factors of Self-Management Status of Patients with Cancer

We found that pain education and pain interference on sleep were significantly associated with the number of pain self-management methods used ($p < .05$). Pain education and chemotherapy were the factors that were significantly associated with the frequency of pain self-management used ($p < .05$). Insurance was the only factor that was significantly associated with the effectiveness of pain self-management ($p < .05$) (Tables 3-5).

Discussion

Studies have shown that patients with cancer have moderate pain intensity and interference on their lives with low levels of pain self-management and pain self-efficacy. Our study showed that 33.33% of patients with cancer did not receive analgesic treatment, compared with 31.8% (Greco et al., 2014) in 2014. Although the method patients perceived to be most effective was taking analgesics prescribed by their doctor, the patients preferred avoiding fatigue, relaxation techniques, and massaging the sore area. There are many barriers to the management of cancer pain (Brant, 2010; Kwon, 2014; Scarborough & Smith, 2018), including patient-related barriers, such as the lack of pain knowledge and expression, concerns about opioid addiction and side effects, underestimation of pain, and non-adherence to treatment. Potential barriers also include issues related to health care professionals, such as the lack of knowledge about the assessment and management of cancer pain. For example, health care professionals may be cautious about prescribing opioids because of concerns about

Table 3
Comparison of Pain Management Scores Among Different Types of Patients

Variables		Method	Z	p	Frequency	Z	p	Effectiveness	Z	p
Sex	Male	5.26 ± 2.22	−0.576	.565	31.46 ± 7.01	−2.053	**.04**	3.39 ± 0.95	t = −1.28	.204
	Female	5.68 ± 2.60			34.87 ± 6.60			3.65 ± 0.83		
Insurance status	Basic medical insurance	5.50 ± 2.29	−0.672	.502	34.09 ± 6.94	−1.324	.186	3.82 ± 0.74	−3.58	**.001**
	Rural cooperative medical care	5.30 ± 2.51			31.85 ± 6.99			3.26 ± 0.96		
Residence	Urban	5.69 ± 2.62	−0.579	.562	34.26 ± 7.08	−1.728	.084	3.62 ± 0.83	−2.167	**.03**
	Rural	5.17 ± 2.11			31.38 ± 6.75			3.37 ± 0.98		
Pain education	No	4.95 ± 1.96	−2.813	**.005**	31.77 ± 6.66	−2.23	**.026**	3.48 ± 0.92	−0.836	.403
	Yes	7.18 ± 2.96			36.53 ± 7.23			3.54 ± 0.92		
Chemotherapy	No	4.61 ± 2.33	−2.484	**.013**	30.00 ± 6.22	−2.676	**.009**	3.53 ± 0.97	−0.273	.785
	Yes	5.85 ± 2.29			34.23 ± 7.03			3.47 ± 0.89		

Table 4
Univariate Analysis of Factors Affecting Pain Management

	M ± SD	Method (r)	p	Frequency (r)	p	Effectiveness (r)	p
Walking ability	6.63 ± 2.53	−0.241	**.03**	−0.091	.42	0.181	0.105
Sleep	6.70 ± 2.38	0.27	**.015**	0.162	.149	0.172	0.125
Enjoyment of life	5.58 ± 2.58	−0.205	.068	−0.242	**.03**	−0.034	0.766
Pain self-efficacy	24.59 ± 11.91	−0.269	**.015**	0.188	.093	0.021	0.851

Table 5
Multiple Linear Regression Analysis of the Methods of Pain Self-management, Frequency, and Effectiveness

Variables		B	Std. error	Beta	t	p
Methods of pain self-management	Constant	6.900	0.703		9.821	**p < .001**
	Pain education	2.334	0.573	0.404	4.075	**p < .001**
	Sleep	0.294	0.098	0.296	2.986	**.004**
Frequency of pain self-management methods used	Constant	33.258	2.083		15.967	**p < .001**
	Chemotherapy	3.220	1.586	0.219	2.030	**.046**
	Pain education	3.722	1.844	0.217	2.018	**.047**
Effectiveness of pain self-management methods used	Constant	2.710	0.295		9.184	**p < .001**
	Insurance status	0.554	0.198	0.300	2.797	**.006**

side effects, tolerance, and addiction. In addition, they may think that some patients' pain was caused by emotional distress and that analgesics do not solve these problems.

We found that pain education was one of the main factors that influenced the method and frequency of pain self-management. Patients who received pain education used more types of pain management methods with higher frequency. A systematic review reported that patient-based pain education significantly improved pain knowledge and medication compliance (Oldenmenger et al., 2018). Pain education interventions significantly reduced total pain intensity, reduced people's misunderstanding of cancer pain management, improved sleep quality, improved QOL (e.g., general feeling and enjoyment of life), and promoted the use of short-acting analgesics in outpatients to treat sudden pain (Koh et al., 2018). However, in our study, the pain education was poor, with only 17 (20.99%) patients having received pain education. To improve the level of self-management and quality of life of cancer patients, it is necessary to provide pain education for cancer patients.

The interference of pain on patients' sleep was 6.70 ± 2.38 and the higher the influence score, the more the self-management methods of pain were used. According to previous research, 59% of patients with cancer had sleep disturbances (Savard, Ivers, Villa, Caplette-Gingras, & Morin, 2011). Although a bidirectional relationship has been observed between pain and sleep disturbances, evidence suggests that poor sleep is more likely to lead to more severe pain (Finan, Goodin, & Smith, 2013). In order to relieve pain, it is necessary to improve the sleep of patients with cancer.

Chemotherapy is another factor that influences the frequency of pain self-management. Patients who received chemotherapy used pain self-management methods more frequently than patients who did not receive chemotherapy. Chemotherapy, which is the most important treatment for advanced cancer patients, can kill tumor cells and normal tissue cells of the body, which causes serious side effects. More than half of cancer patients receiving chemotherapy regimens that included taxanes, platinum-based drugs, vinca alkaloids, thalidomide, or bortezomib experienced chemotherapy-induced peripheral neuropathy, which can affect hands and feet, including sensory symptoms such as numbness, tingling, and pain, including neuropathic pain caused by cold stimuli (e.g., hot/cold sensations) (Seretny et al., 2014). A multicenter, randomized controlled trial showed that exercise significantly reduced chemotherapy-induced peripheral neuropathy symptoms of hot/cold hands and feet, numbness, and tingling, especially in older men or those with breast cancer (Kleckner et al., 2018).

The pain self-management effectiveness of patients with urban resident basic medical insurance was significantly higher than those with rural cooperative medical insurance. Patients with urban resident basic medical insurance paid less for treatment than those with rural cooperative medical insurance, had less economic burden, and were more likely to seek help from a doctor for pain relief medication.

Limitations

There were several limitations to this study. The generalization of the results is limited by the convenience sampling we used. In addition, the sample size is small. Future studies should include more participants and more diverse samples.

Conclusions

During the COVID-19 pandemic, patients with cancer had moderate to severe pain intensity and interference in their lives with low levels of pain self-management and pain self-efficacy. Pain education, the interference of pain on sleep, chemotherapy, and insurance were associated with patient self-management of pain. This study suggests that patients will benefit from pain education and financial support in the event of a prolonged COVID-19 pandemic.

Declaration of Competing Interest

None.

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