The efficacy of Oxycodone on pain relief in patients with cancer according to personality types

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Pain in patients with cancer has significant biological differences with the pain of other diseases and the use of analgesics for these patients is ineffective. Evaluation of the efficacy of oxycodone on the reduction of cancer pain according to the personality type. This is a pilot study with a one-group pretest–posttest design. The number of samples was considered 30 patients based on inclusion and exclusion criteria. Purposefully, Samples were selected from patients with moderate to severe Numeric pain Rating Scale (NRS) ≥6 chronic pain and referred to hospitals and oncology clinics. After the administration of the initial dose of oxycodone, the pain levels were measured at appropriate intervals, and the dose increased until reaching NRS≤3. Characteristic data, the dosage of the drug, and pain levels were included in the pre-designed form. Personality type data collected with Friedman et al. Personality Briefcase questionnaire. The severity of pain in patients in the first month (day 30) was significantly lower than the basal pain; and in the second month (day 60) compared to baseline and first month (day 30 treatment), significant effect seen (p< 0.05 and 0.01). Also 80% of patients have personality type A and 20% personality type B. however, drug therapy is more effective for patients with B-type personality. The personality type of patients as a moderating variable affects the efficacy of the treatment. So it is recommended that oncology specialists, along with drug therapies, get help from psychologists to take psychotherapy according to the types of personality patients have.

Keywords: Neoplasms, Oxycodone, Personality, Pain

INTRODUCTION

Pain is a common symptom of cancer and 30-50% of people with cancer experienced moderate to severe pain that can have a negative effect on their quality of life. Therefore, pain relief should be considered as a part of comprehensive pattern of care for the physical, mental, and social aspects of the patient (Wiffen 2017 and Portenoy 1999). Most of cancer-related pains respond to oral analgesic drugs, but some of them are uncontrollable with these medications (Corli et al. 2019). As well as neuropathological pain in these patients is difficult to control (Vranken 2005). Also most pain-affected patients have several types of pain with different roots, so the use of opioid analgesics in these patients and other patients with chronic pain is inevitable (Kalso 2004).

One of the factors that can interfere with the effects of the drug is the personality traits of the patient (Kissen 1962). Regarding the researches

performed, the assessment of the personality type of patients can be effective as a moderator variable in treatment (Bagby 2016). Scientists have presented various views and categorized about personality types, and one of them belongs to Friedman (1978). According to his view, people who have personality traits such as Tyranny, supportive, sentimental, tolerance ambiguity, worry, need for progress, violence, energetic, competing, ambitious, militant, etc. are in the A-type personality group. In front of them B-type personality people who are calm, patient and moderate, self-discipline, independent and self-respecting (Grossarth-Maticek 1995) (Grossarth and Eysenck 1995)

. According to recent studies, features such as anger and nervousness are risk factors for physical disorders (Smith 2006). The results of some studies indicate the relationship between A-type personality and psychosomatic disorders (Grossarth-Maticek 1995, Smith 2006 and Schmitz 1992). There is a study found among patients with gastric cancer, optimist people reported less pain and had better performance in different areas of their life. The study by Reynold et al. showed a relationship between expressing excitement and increasing the disease's recovery in patients with cancer (Reynolds et al. 2000). So the study of personality characteristics of chronic patients, especially cancer, can have an effective role in treatment efficacy (Zhou 2016).

In a study, the effect of high dose oxycodone-naloxone on patients with severe pain during the first visit Numeric pain Rating Scale (NRS) ≥ 7 was investigated. It showed the high dose of oxycodone-naloxone is very effective in reducing the pain of patients with chronic pain and is well tolerated by patients. The combination of an agonist-antagonist reduces pain quickly and is effective on lifestyle, reducing episodes of pain, and improving side effects (Webster 2013 and Ahmedzai 2015). Another study examined the role of oxycodone and naltrexone in controlling cancer pain and intestinal function. The study was noted that if the oxycodone with a controlled dose is prescribed to the patient, it has fewer side effects and the patient can tolerate the medication (Leppert 2010).

In this study we examined the efficacy of oxycodone in reducing the chronic pain associated with cancer and the appropriate dose of the medication for better efficacy and less side effects. In addition, we evaluated the role of personality traits of patients in the efficacy of treatment.

MATERIALS AND METHODS

This is a pilot study with a one-group pretest-posttest design. A sample of patients with moderate-to-severe (NRS≥6) chronic pain (over 6 months) who referred to hospitals and oncology clinics were selected purposefully. Patients with physical and rheumatic pains, chronic liver and/or kidney disease, and drug abuse were excluded. Finally 30 patients evaluated in the study and all specimens entered the study with full satisfaction.

During the first visit, patient information including type of pain, analgesic drugs used by the patient, side effects, pain attacks interval and pain levels using a Numeric pain Rating Scale (NRS) were recorded in a pre-designed form.

Before the intervention, the personality type questionnaire (Friedman et al. Personality Briefcase (1987)) was filled. Also, to increase the validity of the questionnaire, it was completed by the parents or a companion of the patient who knows the patient well. The correlation between response of patients and their companions was higher than 90%, which indicates the high validity of patients' response. In addition, one study reported the reliability of the questionnaire 0.87. In another study, the Cronbach's alpha for male was 0.464 and for female was 0.72, and for the whole sample was 0.62; and in another study, the parameter was reported 0.89. Friedman et al. Personality Briefcase (1987) has 25 questions and the average score is 13. A score of more than 13 is assigned to personality type A and a score of less than 5 to personality type B (Friedman 2010).

After the initial administration of oxycodone, the pain level was measured at appropriate intervals and the dose of the drug has increased to reach the NRS≤3. In case of need to increase/decrease the dose of the drug, up to 25% of the daily dose it could change. Duration of the intervention was 60 days and the dosage and patient pain was recorded in the pre-designed form. Also, medications are completely identical in terms of place and time of production.

In this study, the severity of pain was considered as a dependent variable and oxycodone as an independent one. Personality type was a moderator variable and body mass index, stage of cancer, maintenance dose of medication and type of pain were control variables. The analysis have performed by the software SPSS V.18 using T-test and Chi-square statistical tests

RESULTS

A total of 30 patients with cancer were evaluated, which 73.3% were over 51 years of age, 20% were between 41 and 50 years old, and 6.66% were under 40 years of age. The sex distribution is 46.7% males and 53.3% females. The mean BMI in males and females is 24.26 and 23.53, respectively. The highest BMI in patients is 32.42 and the least is 16.82. 70 %(n=21) of patients reported severe pain and 30%(n=9) had moderate pain. At the first day, 5 mg Oxycodone was prescribed for all patients; however, in the first week, patients with severe pain were received more than 20 mg and they had moderate pain received less than 20 mg per day.

In this study, male patients have an average body mass index of 24.96 and female patients have an average of 23.53, the highest body mass in patients is 32.42 and the lowest is 16.82 Table 1

Results show that about 73.3% of patients are over 51 years old, 20% are between 41 and 50 years old, and only 6.66% are under 40 years old Table 2.

80% of patients have personality type A and 20% have personality type B. In type A, all types of cancer are visible; however, in personality type B, only colon, stomach, prostate, and endocrine cancer were observed Table 3.

After 2 weeks of taking the medication, all of the 4 patients with mild pain score were received more than 20 mg of medication. 11 out of 18 patients with moderate pain and 3 out of 8 patients with severe pain received less than 20 mg of the medication. Overall 14 patients (46.7%) received less than 20 mg in the second week of the treatment. Data analysis showed no significant difference between the dose of medication and the pain level (p>0.05) at the end of 2 weeks treatment.After 30 days, among 4 patients who had mild pain score 1 patient received more than 20 mg and 3 patients received less than 20 mg of Oxycodone. Of the 21 patients with moderate pain, 8 patients received more than 20 mg, and 13 patients received less than 20 mg of the drug; and in 5 patients with severe and persistently reported pain levels all of them received more than 20 mg of the drug. The results of the data analysis showed there is a significant difference between the dose of Oxycodone and the level of pain (p = 0.029) in 30 days of treatment. After 60 days of drug administration, 25 patients had mild pain levels, of which 17 (56.7%) had received more than 20 mg. As well, all of 5 patients with moderate pain level were received more than 20 mg of medication. Data analysis showed there is a significant difference between the Oxycodone's dose and the pain level (p = 0.001) in 60 days of treatment. During the first and second weeks, treatment has not been effective. However, after 30 and 60 days of drug administration, the severity of pain significantly decreased. At the 30th day of the treatment, 16.7% of patients showed mild pain, 69% had moderate pain and 16.7% reported severe pain. At the 60th day of the treatment, 83.3% of the patients had mild pain, 16.7% had moderate pain and no severe pain was reported Table 4-5.

The results of Z distribution showed Oxycodone was significantly effective after 30 (p = 0.042) and 60 days (p = 0.001). However, for the first and second week, treatment has not been effective Table 6.

In the third week of treatment, 13 patients had side effects that 53.9% had nausea, 30.77% had drowsiness, 70.7% had constipation and 70.71% of them had vomiting. However, there is no statistically significant relationship between amount of drug consumption and side effects Table 7.

On the day 60 of treatment 8 patients reported side effects, of which 50% had nausea, 37.5% had drowsiness and 12.5% had constipation. As in the third week, there is no significant relationship between amount of drug consumption and side effects Table 8.

The efficacy of the treatment according to the patients' personality type is different. The mean pain severity in personality type A before intervention was 6.30 and after intervention was 4.79; and in personality type B, it was 7.01 and 3.30, respectively. The mean difference between patients with personality type A and B is significant. Also, the severity of pain remarkably decreased in patients with type B personality. So that after intervention, the mean pain severity in patients with type B personality was 2.289 and in type A was 4.846 (Table 9).

There is a significant difference between the subjects in the group (personality types) after the adjustment of the pre-test scores (f=3.951; p=0.001<0.05; partial $\eta^2 = 0.226$). In other words, the personality type can affect the efficacy of the treatment by 22.6% on the cancer associated pain reduction Table 10.

Table 1: Body Mass Index (BMI)

Gender	N	Mean	SD	Min	Max
Male	%46/7(14)	24/96	2/81	20/20	31/25
Female	%53/3(16)	23/53	4/65	16/82	32/42
Total	%100(30)	24/20	3/90	16/82	32/42

Table 2: Age based on cancer severity

Age	Stage			Total
	2	3	4	
20-30	%0/0(0)	%0/0(0)	%3/3(1)	%3/3(1)
31-40	%0(0)	%0/0(0)	%3/3(1)	%3/33(1)
41-50	%0(0)	%3/33(1)	%16/7(1)	%20/0(6)
<51	%3/3(1)	%23/3(7)	%46/7(14)	%73/3(22)
Total	%3/3(1)	%26/7(8)	%70/0(21)	%100(30)

Table 3: type of cancer and personality types

Type of cancer	Personality type		Total
	A	B	
colon	%36/7(11)	%6/7(2)	%43/3(13)
Blood	%6/7(2)	%0(0)	%6/7(2)
Stomach	%13/3(4)	%6/7(2)	%20/0(6)
Endocrine	%3/3(1)	%3/3(1)	%6/7(2)
Ovarian	%3/3(1)	%0/0(0)	%3/3(1)
Prostate	%3/3(1)	%3/3(1)	%6/7(2)
Lung	%6/7(2)	%0/0(0)	%6/7(2)
Breast	%3/3(1)	%0(0)	%3/3(1)
Esophagus	%3/3(1)	%0/0(0)	%3/3(1)

Table 4: The frequency of pain level and the amount of drug intake after 2 weeks, 30 days and 60 days

Pain severity	2 weeks		30 days		60 days	
	<20 $_{mg}$	20 $_{mg}$ <	<20 $_{mg}$	20 $_{mg}$ <	<20 $_{mg}$	20 $_{mg}$ <
Mild	0.0% (0)	13.3% (4)	10.0% (3)	3.3% (1)	26.7% (8)	56.7% (17)
Moderate	36.7% (11)	23.3% (7)	43,3% (13)	26.7% (8)	0.0% (0)	16.7% (5)
Severe	10.0% (3)	16.7% (5)	0.0% (0)	16.7% (5)	0.0% (0)	0.0% (0)
	46.7% (14)	53.3% (16)	53.3% (16)	46.7% (14)	26.6% (8)	73.4% (22)

Table 5: frequency of treatment efficacy in patients

Time	Level of pain at the onset		Level of pain after medication consumption		
	Moderate	Sever	Mild	Moderate	Sever
First week	%70/0(21)	%30/0(9)	%13/3(4)	%60/0(18)	%26/7(8)
Second week	%70/0(21)	%30/0(9)	%13/3(4)	%60/0(18)	%26/7(8)
Day 30	%70/0(21)	%30/0(9)	%16/7(5)	%69/0(20)	%16/7(5)
Day 60	%70/0(21)	%30/0(9)	%83/3(25)	%16/7(5)	-

Table 6: Comparison of pain level with base pain in normal distribution

Duration of treatment	Z	P-Value
1 week	0.104	0.917
2 weeks	0.191	0.849
30 days	2.292	0.042
60 days	3.196	0.001

Table 7: Frequency of drug complications based on dose of drug in third week

Dose/Day	Complications				Total
	Nausa	Drowsiness	Constipation	Vomiting	
15 mg	%07/70 (1)	-	%07/70 (1)	%07/70 (1)	%23/10 (3)
20 mg	%07/71 (1)	%07/71 (1)	-	-	%15/38 (2)
30 mg	%07/71 (1)	%15/38 (2)	-	-	%23/07 (3)
45 mg	%30/77 (4)	%07/71 (1)			%38/42 (5)
Total	%53/9 (7)	%30/77 (4)	%07/70 (1)	%07/70 (1)	%100 (13)
Significance level = 0.604		Agreed coefcient = 0.710			

Table 8: Frequency of drug complications based on dose of drug in day 60

Dose/Day	Complications			Total
	Nausa	Drowsiness	Constipation	
15 mg	%12/5 (1)	%12/5 (1)	%12/5 (1)	%37/5 (3)
20 mg	-	%12/5 (1)	%12/5 (1)	%25/0 (2)
30 mg	%12/5 (1)	-	-	%12/5 (1)
45 mg	%25/0 (2)	-	-	%25/0 (2)
Total	%50/0 (4)	%25/0 (3)	%12/5 (1)	%100 (8)
Significance level = 0.350		Agreed coefcient = 0.791		

Table 9: Mean pain intensity before and after intervention and adjusted average after intervention

Personality type	Time of intervention	Mean	SD
Type B	Before	7.01	1.78
	After	3.33	0.516
Type A	Before	6.30	1.14
	After	4.79	1.35

Table 10: summary of covariance analysis test

Source of changes	Total square	df	Mean square	F	Significance level	Eta coefficient
Intercept	6/036	1	6/036	3/938	0/057	0/127
Interaction effect	12/113	2	6/056	3/951	0/031	0/226
Error	41/387	27	1/533			
Total	661/00	29				

Table 11: summary of the results of paired tests after adjusting the effects of the pre-test

Personality type (I)	Personality type (J)	Adjusted Mean	Differences of Means	Significance level	Result
Type B	Type A	2/289	-0/155	0/009	Confirmed
Type A	Type B	4/846	0/155	0/009	Confirmed

The results show that the difference of means is significant and significantly reduced the mean pain intensity in cancer patients with personality type B. So that patients with personality type B have been estimated to have an average pain intensity of 2.289 and type A 846/4 after the intervention Table 11.

DISCUSSION

In this pilot study, we examined the efficacy of oxycodone on pain relief in 30 patients with cancer according to the personality types. The results of the study showed 46.7% of the patients were male and 53.3% were female. The mean BMI in males is 24.26 and in females is 23.53; and the highest amount of BMI is 32.22 and the lowest 16.82. Seventy percent of patients had severe and thirty percent had moderate pain. Also, in the study population colon (43.3%) and stomach (20%) cancer are the most frequent types of cancer.

The severity of pain in the first month (day 30) was significantly lower than basal pain, and in the second month (day 60), compared to baseline pain and day 30. The severity of pain in the first and second weeks was lower than basal pain, but the differences were not statistically significant. However, for the first and second months, the efficacy of the treatment was statistically significant at alpha level of 0.05 and 0.01, respectively, which suggests that the oxycodone drug is effective in reducing chronic and severe cancer pain.

Since the side effects can have a negative effect on the patient's quality of life, the importance of side effects is not less than pain relief. In the third week of treatment, 13(43.3%) and in 60th day, 8 (26.6%) patients had side effects, and nausea was the most frequent. Of course, according to previous studies, symptoms such as constipation, nausea, sweating, anorexia and etc. are cancer-associated symptoms (Portenoy and Ahmed E 2018). Also, before the intervention, physical symptoms were evaluated in these patients and it was shown 40% of the patients had nausea and 40% had constipation.

As a result, it is estimated that the symptoms of nausea and constipation are not caused by the side effects of the drug.

There is a study indicated oxycodone was prescribed by daily titration of 10-20 mg every 12 hours, but there was no significant difference in pain relief compared to the control group. However, it has been shown that the administration of rectal oxycodone has analgesic effects similar to oral administration, but it has fewer side effects. So it provides more clinical value. Especially in patients who have dyspepsia or are unable to tolerate oral medication. Other studies have suggested the use of methadone and ketamine. Although these medications have somewhat contributed to the reduction of pain, it has intolerable side effects for many patients (Bell 2017, Nicholson 2017 and Oosterling 2016).

In the evaluation of the personality types of the study population, 80% of the patients had personality type A and 20% personality type B. Also, the results of the efficacy of the treatment according to the personality type of the patient showed the personality type indirectly effects on the efficacy of the treatment by 22.6%. In addition, the pain severity in patients with personality type B was significantly reduced compared to type A. Therefore, patients with personality type B after the intervention had an adjusted average pain severity of 289.2 and type A 846/4. Therefore, the result suggests psychological characteristics can contribute to the effect of the drug and affect the physical pain of the patients. There is no research on the efficacy of the drug according to the personality type, and only studies have done are about vulnerability of Type A personality to psychosomatic and physical disorders. Among these studies, we can refer to the research of Grossarth and Eysenck, and Schmitz (Grossarth-Maticek 1995, Smith 2006 and Schmitz 1992).

CONCLUSION

Oxycodone is an effective medication for chronic and severe cancer-associated pain that should use for at least one month (30 days) to show its therapeutic effect. As well, the personality type of patients as a moderating variable affects the efficacy of the treatment.

Based on the positive effect of this psychological feature, it is recommended to oncologists, along with somatic drugs, get help from psychiatrists and, if necessary, Psychotherapy and psychiatric medications be used for the patients. Cancer prevention regarding to recognition of individuals' characteristics is one of the other suggestions for physical and mental health in society.

CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

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