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Have we improved pain control in cancer patients? A multicenter study of ambulatory and hospitalized cancer patients.

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Abstract

Background: Pain in cancer patients is recognised as a major health problem yet few studies of both inpatient and outpatient populations have been carried out.

Objective: To assess the frequency, type, and characteristics of pain in adult cancer patients, including both inpatients and outpatients.

Design and setting: Cross-sectional study of 1,064 adult cancer patients (437 outpatients and 627 inpatients) from 44 hospitals and/or long-term-care centres in Catalonia, Spain. Cancer patients suffering from pain of any aetiology for ≥ 2 weeks and/or under analgesic treatment ≥ 2 weeks were enrolled.

Measurements: Demographic and pain data were collected. The Spanish version of the Brief Pain Inventory was used to assess pain.

Results: Pain frequency was 55.3%.Pain was less frequent in outpatients than inpatients (41.6% vs. 64.7%; $p < 0.001$), although median pain duration was longer in outpatients (20 vs. 6 weeks; $p < 0.001$). Pain was assessable in 333 patients, and intensity was similar in both out- and in-patients ; however, outpatients reported less improvement, less pain interference with daily life, and less pain related to the cancer *per se*. In both groups, patients with multiple myeloma (73%), breast (65%), and lung cancer (61%) were most likely to report pain.

Conclusions: Pain in cancer patients, both ambulatory and hospitalised, remains a challenge for health-care professionals, health administrators, and stakeholders. Our study reveals the high level of pain and distress that cancer patients continue to suffer, a problem that is particularly notable in outpatients due to the intensity and duration of the pain.

Key words: pain, neoplasm, palliative care, prevalence

Introduction

Cancer patients suffer from a wide variety of different pain syndromes[1], most of which are related to metastatic spread or health status.[2] Multiple concurrent factors can cause pain, leading to pain syndromes that are usually chronic and can last for months, years, or even for the patient's entire life. Cancer encompasses a wide spectrum of tumours (both solid and haematological) and the pain associated with many of these cancers negatively affects both performance status and mood.[3.4]

Pain in cancer patients has been recognised as a major health problem that impacts both quality of life and health care provision. Many studies have assessed the prevalence and impact of pain in different cancer patient populations, [5.6.7] although relatively few studies have been carried out in Southern Europe. [8.9.10.11.12] In Spain, although several epidemiological studies have been conducted to assess particular aspects of pain (e.g., breakthrough pain[13] or neuropathic pain[14]), to our knowledge, no comprehensive pain studies (whether national or regional) have been carried out in a cancer patient population. Moreover, data is lacking on differences in pain between adult cancer outpatients and inpatients.

This knowledge gap, together with the need to better understand pain in cancer patients in our context, led us to design and carry out the comprehensive epidemiological pain study presented here. The aim of the study was to assess the frequency, type, and characteristics of pain in adult cancer patients, including both inpatients and outpatients.

Material and Methods

This cross-sectional study enrolled a sample of ambulatory and hospitalised cancer patients ≥18 years of age with a histological diagnosis of solid or haematological

neoplasms. All recruited patients were in treatment at the oncology and/or palliative care (PC) service of acute care hospitals in Catalonia, or at a long-term-care (LTC) centre with dedicated PC resources, all of which are form part of the public, universally-accessible National Health System of Catalonia, Spain.

To obtain a representative sample of patients, we estimated that patients from 44 hospitals and LTCs were needed. According to the Catalonian Healthcare Services 2002 Directory, these 44 centres provided coverage for >80% of cancer patients in the region. Assuming a cancer pain frequency of 50%, with a 5% absolute precision and 95% confidence interval (95%CI), statistical calculations indicated that a minimum of 624 inpatients and 435 outpatients would be needed to estimate the pain frequency in both populations. Since outpatient clinics are mostly tumour-type specific, the outpatient sample was restricted to the eight most common neoplasms (colorectal, lung, breast, prostate, bladder, leukaemia, non-Hodgkin's lymphoma, and multiple myeloma) to avoid potential bias in pain frequency related to over- or under-representation of particular tumour types. The number of cases needed for each of these tumour types was calculated according to the incidence rate in our region[15]. Hence, each hospital (based on the estimated tumour incidence) was expected to enrol a specific number of patients of each tumour type. Finally, patients were randomised for enrolment according to the weekly list of patient consultations.

The study was approved by the ethics committees of all participating centres. All patients signed informed consent forms. The participating hospitals and the local investigators are listed in the Appendix.

Patients were screened between January 2009 and December 2010, inclusive. The clinical records of a randomized group of patients were reviewed by a specially-

trained health-care professional interviewer (doctor or nurse)—assisted, in most cases, by the patient's treating physician—to identify the patients with pain.

Patients were considered to have pain if they reported any pain (regardless of aetiology) and/or the medical records showed that the patient was under analgesic treatment lasting ≥2 weeks. Patients with pain were invited to participate and asked to sign the informed consent form.

Cognitive status was checked by the Spanish version of the Mini-Mental Status Examination (MMSE) before the pain assessment[16]. Patients with cognitive failure were excluded from further assessment in this study.

Given the inherent differences between inpatients and outpatients (different patient profiles, treatment regimens, and schedules), two distinct groups were considered: inpatient sampling was performed randomly whereas outpatients were stratified by tumour type. Demographic, clinical and pain variables collected are shown in Table 1.

Statistical analyses:

Categorical variables are shown as percentages with 95% CIs. Continuous variables are presented as means and standard deviations (SD) or as medians and interquartile range. Categorical data were compared using Pearson's χ^2 and Fisher's exact test, while the linear-by-linear χ^2 test was used for trends. Continuous variables were compared using the Student's *t*-test or Mann-Whitney tests depending on the distribution (normal or non-normal). A value of $p<0.05$ was considered statistically significant. All analyses were performed with the SPSS package (v. 13 for Windows).

Results

Of the 1064 patients initially screened, 588 (55.3%) met the study criteria for pain, with a significantly lower percentage of outpatients vs. inpatients meeting these criteria(41.6% vs. 64.7%; $p < 0.001$). Of the 588 patients, 373 provided informed consent and 333 of these were cognitively intact and, therefore, eligible for pain assessment (**Figure 1**).

As shown in **Table 2**, patients in LTCs reported significantly more pain than those in acute hospitals. Similarly, patients under PC care reported more pain than those in Medical/Radiation Oncology, and Haematology services. Pain was more frequent in women. No significant differences in pain were observed by age. Pain frequency increased significantly in relation to Karnofsky score (KPS) decline and cancer spread in both solid and haematological malignancies. We observed no significant association between pain frequency and time-elapsed since cancer diagnosis. Pain was more common in patients being treated with radiotherapy and less frequent in those receiving chemotherapy. The tumour types (in both inpatients and outpatients) with the highest percentage of patients with pain were multiple myeloma (73%), breast cancer (65%), and lung cancer (61%). In contrast, tumours with the lowest pain frequency were lymphoma (40%) and leukaemia (25%) (data not shown).

When comparing the 333 patients assessable for pain by place of assessment (**Table 3**), we found that ambulatory patients had a significantly better performance status, less advanced disease, longer time with cancer, and longer duration of pain than inpatients. Notwithstanding these findings, no significant differences in pain intensity, assessed according to average and worst pain, were observed.

Mean pain intensity and interference are shown in **Table 4.** Even though mean pain interference was lower in outpatients than inpatients, there were no significant between-group differences in pain intensity. On the whole, men experienced more pain

interference in their 'relations with others' and more pain interference with 'sleep' than women (data not shown). No differences were found on other pain dimensions. Patients with a KPS ≤50 reported significantly more pain interference than those with KPS >50. Patients with metastatic disease also presented significantly more pain interference than those without metastasis. All Brief Pain Inventory (BPI) interference dimensions were more significantly affected in patients with KPS ≤50, and in patients with metastases.

Table 5 shows the main pain types (and their pathophysiology). No statistically significant between-group differences (gender, age, KPS, time-from-cancer diagnosis and cancer stage) were observed in terms of the pain types and probable pathophysiological mechanisms.

The percentage of patients with tumour-related pain was significantly higher in the inpatient group vs. outpatients (81.3% *vs*. 50.4%; $p < 0.001$) (data not shown). Conversely, outpatients reported higher levels of pain unrelated to the tumour or the anti-tumour treatment. Moreover, in patients with metastatic disease, tumour-related pain was significantly greater than in patients with no evidence of cancer or loco-regional spread of the disease; 80% *vs.* 49.6% $p < 0.001$, respectively.

Discussion

The present study evaluated the largest sample to date of an unselected population of both ambulatory and hospitalised cancer patients in Southern Europe suffering from pain. To our knowledge, it is the first such study carried out in Spain. The findings confirm that the pain frequency in our region (55.3%) is in-line with rates reported in other countries[10, 22, 23, 24, 25,26]. This result is also consistent with those from a large meta-analysis of 52 studies, which reported an overall pain prevalence of 53%[24]. In addition, our data agree with previous reports indicating that pain frequency was

higher in patients with poor functional status[10] and in patient with advanced disease. Taken together, the data suggest that, on average, half of all cancer patients will experience pain.

Some authors[27] have suggested that the percentage of patients reporting severe pain (NRS ≥7) in the 'average' and 'worst pain' categories could be used as an indirect indicator of poor pain control. In our sample, these percentages were 13.2% and 61.6%, respectively, without significant differences between in- and out-patients. Caraceni et al[2] reported similar findings. In their study, those authors found 20% had severe 'average pain' while 67% presented severe 'worst pain'. It appears that these percentages have not changed substantially in the time that has passed since Caraceni et al. published their report, eleven years ago. Consequently, this suggests that pain in cancer patients may not have improved as much in Europe and in Spain as some authors have claimed.[5,28]

In our study, the prevalence of moderate-severe pain (NRS >5) was 31.5% which is in agreement with authors who have reported a range from 20-45%.[22,23,24,29,30]

In most studies, the mean pain duration ranges from 6 months to 1 year.[2, 18] Interestingly, inpatients had a shorter median pain duration (6 weeks) than outpatients (20 weeks); however, the period of pain was protracted in both groups, and this is indicative of the amount of pain that patients in our study sample had to tolerate.

With regard to patients' reported pain relief, the mean improvement was slightly more than 61%, similar to the pain improvement (65%-68%) found in other studies.[3,31] Pain interference in our sample was similar to the rates reported by Daut[3] and Strassels.[32] Of note is that both inpatients and outpatients in our study reported similar rates of mean 'average' pain; however, outpatients reported significantly less pain interference and pain relief. It is not clear if this finding represents an adverse impact

(or dissatisfaction) associated with extended periods of pain, although pain intensity has been recognised as the major predictor of pain interference with daily-life activities[3]. Nevertheless, it is well-known that the reported intensity varies in response to factors such as the meaning of pain,[3,33] breakthrough pain,[34] psychological distress,[35] and pain education.[36] Although several studies have described multiple reasons underlying inadequate cancer pain management in outpatients,[37,38,39] those same studies have also indicated that this is a complex, multi-factorial problem. In the present study, we too found it difficult to pinpoint the reasons for poor pain alleviation in our outpatient group. For this reason, it is evident that further research into this complex topic is warranted; however, it is important physicians, nurses, and health authorities be aware of the existence of this issue.

We found that, compared to men, a significantly higher proportion of women reported pain. A recent review concluded that women appear to have lower pain thresholds, greater ability to discriminate painful sensations, higher pain ratings, and lower tolerance of pain.[40] As in other studies, we did not observe differences in pain prevalence in relation to age.[22,23,24]

In our study, the proportion of patients on chemotherapy who reported pain was lower than those not receiving chemotherapy, regardless of cancer stage. This finding should not be interpreted as cause and effect, since many confounders can be involved and because this was an incidental finding of the present study, it is difficult to determine the reasons for this difference. To date, very few studies have assessed the potential analgesic role of chemotherapy, and further research is needed.[41,42,43] It is well-known that pain prevalence is higher in patients receiving radiotherapy vs. those without radiotherapy[43] and our findings confirm this. However, as other authors have

noted, this higher prevalence may be due to the preference to use radiotherapy for pain palliation.

We found that nearly 70% of pain was directly related to the cancer itself. Hospitalised patients were more affected by cancer-related pain than outpatients, a finding that is consistent with other reports.[10,31] However, these findings must be contextualised, as differences in patient characteristics between different studies can impact the results: in our study sample, only about 50% of patients had metastatic disease vs. 70% in the study by Caraceni et al[2].

Anti-tumour treatment is another source of pain in cancer patients. Previous estimations have suggested that treatment-related pain accounts for 17-20% of pain[2, 3, 44]. We found, in contrast, that treatment-related pain accounted for only 6.6% of all pains in our sample. Conversely, for non-cancer related pain, we found that nearly 20% of all pains were due to this pain type, a finding that contradicts other studies [2, 3] in which non-cancer related pain ranged from 2.3-9%. The reason for this divergence is not clear, although it could be due to the bias in better KPS in ambulatory patients (median KPS of 80%), 11.9% of whom were cancer-free. Nevertheless, outpatients in our sample experienced significantly more treatment-related pain (and the sequelae thereof) compared to inpatients, in addition to more pain unrelated to the disease or its treatment. However, it is important to note that non-cancer related pains can be just as intense as cancer-related pains and can have an equal or even greater interference on daily-life activities, depending on the nature of the pain.[3]

In our study, around 40% of patients experienced pain of mixed origin, a percentage that is similar to the 43% reported in other studies.[2] Neuropathic pain was less common in our study (5.2%) compared to the Caraceni et al[2] study (7.7%). If overall pain with neuropathic component is pooled, the frequency of neuropathic pain

rises to 30% in our study, similar to the figure reported in a recent multi-centre study (33%).[14]

Limitations worth noting. First, patients were considered to have prolonged pain—and this was an inclusion criterion—when the pain lasted for ≥ 2 weeks or the patient was under analgesic treatment ≥2 weeks. This cut-off point could be controversial because, according to the International Association for the Study of Pain (IASP) [45], chronic pain in non-malignant conditions is defined as pain lasting 3 or more months. However, as that same report notes, a 3 month cut-off value is excessive in cancer patients, many of whom may have a life-expectancy that is shorter than this period. As a result, we believe the cut-off point should be adjusted by clinical experience. In our experience, a 2-week cut-off point allows us to rule out acute and transient pain conditions, and thus a pain duration ≥ 2 weeks seems appropriate to classify a pain as prolonged in this specific patient population. A second potential limitation of our study is the relatively low participation rate, which was approximately 60% for the inpatient group. This was due to the fact that some patients simply did not wish to participate. However, other similar multi-centre studies present similar participation rates ranging from 51%[5] to 66%.[22] A third and final potential limitation is that our sample did not include all possible tumour types (notably head and neck cancers) in which pain is highly prevalent[46].Neverthess, we did include the most common cancer types and although it would have been desirable to assess more cancers, doing so would have been impractical due to the large number of patients required and because the present study was not designed to assess the pain prevalence for each cancer type (even though the data obtained accurately characterises pain prevalence in the study population.

CONCLUSION

The present study adds substantial new and comprehensive epidemiological information about the pain suffered by cancer patients in our country, both in- and outpatients. Although the importance of cancer pain relief has become more widely recognized, cancer-pain remains a major problem, despite the considerable efforts made by health-care providers in recent decades to improve pain alleviation.

Our study reveals the high level of pain and distress that cancer patients in our region still suffer, a problem that is particularly concerning for outpatients due to the intensity and duration of the pain. More efforts need to be made to increase awareness of this problem and to find better solutions.

Disclosures

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Conflict of interest

None

Appendix

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Table 1. Variables

Type of variable	Variable	Options	Definitions
Demographic Data	Type of institution	Acute hospital LTC	 Long-Term-Care
	Care service	Medical Oncology Radiation Oncology, Clinical Haematology Palliative Care	
	Age	20-45 years 45-65 66-85 >85 years	Adults Middle-aged Aged Elderly.
	Gender	Male / Female	
	Performance status by Karnofsky Performance Score (KPS)		
	Solid Tumour stage	No evidence Local tumour Regional tumour Metastatic tumour	
	Haematological neoplasms classifications	Localized	Leukaemia: 0 or 1 (Rai scale[17]) Lymphoma: stages I-II (Ann Arbor Staging[18]) Multiple Myeloma:stages I-II (Durie-Salmon Staging[19])
		Disseminated	Leukaemia: 2 to 4 (Rai scale[17]) Lymphoma: stages III-IV (Ann Arbor Staging[18]) Multiple Myeloma: stage III (Durie-Salmon Staging[19])
	Anti-tumour treatment	Positive Negative	when administered ≤ 4 weeks prior to inclusion when administered > 4 weeks prior to inclusion
Pain Data	Numbers of pains		Defined as the number of pain sites that the patient referred when asked
	Pain location		Defined as the pain site; in cases with multiple pain locations, the most painful pain site was selected.

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Type of pain		Determined by the trained interviewer based on the patient's description in conjunction with the clinical records or the diagnostic criteria of the treating physician.
Pain intensity by BPI [20] Numeric Rating Scale [NRS]	Worst pain Best pain, Right-now pain Average pain	no pain NRS=0 [21] mild pain NRS=1-4 moderate pain NRS=5-6 severe pain NRS=7-10
Pain relief by BPI		NRS 0% to 100%
Pain interference by BPI	General activity; Mood; Walking ability; Working; Personal relations; Sleep; Enjoyment of life	NRS 0 to 10

BPI: Brief Pain Inventory; NRS: Numeric rating Scale

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Table 2. Pain frequency by patient characteristics.

		TOTAL	N (%)	95%CI	p-value
Centre type	Acute hospital[a]	903	461 (51.1%)	46.5- 55.6	<0.001
	Long-term-care (LTC)[a]	161	127 (78.9%)	71.8- 86	
Hospital service / department	Medical & RadiationOncology	602	287 (47.7%)	41.9- 53.5	<0.001
	Haematology	148	53 (35.8%)	22.9 – 48.7	
	Palliative care	314	248 (79.0%)	73.9 – 84.1	
Gender	Male	611	302 (49.4%)	43.8 – 55.1	<0.001
	Female	453	286 (63.1%)	57.5 – 68.7	
Age groups	20-45	90	49 (54.4%)	40.5 – 68.4	0.549
	46-65	381	210 (55.1%)	48.4 – 61.8	
	66-85	544	297 (54.6%)	48.4 – 60.3	
	>85	49	32 (65.3%)	48.8 – 81.8	
Karnofsky performance status	10-20	63	55 (87.3%)	78.5 – 96.1	<0.001
	30-40	119	88 (73.9%)	65.0 – 83.0	
	50-60	247	170 (68.8%)	61.9 – 75.8	
	70-80	294	164 (55.8%)	48.2 – 63.4	
	90-100	341	111 (32.6%)	23.8 – 41.3	
Time-from-cancer diagnosis	≤ 3 months	185	97 (52.4%)	42.5 – 62.4	0.601
	3-6 months	165	93 (56.4%)	46.3 – 66.4	
	6 months-1 year	164	93 (56.7%)	46.6 – 66.8	
	1-3 years	295	170 (57.6%)	50.2 – 65.1	
	3-5 years	103	41 (39.8%)	24.8 – 54.8	
	> 5 years	152	94 (61.8%)	52.0 – 71.7	
Cancer stage *	No evidence	86	24 (27.9%)	10.0 – 45.9	<0.001
	Loco-regional	340	166 (48.8%)	41.2 – 56.4	
	Metastatic	621	387 (62.3%)	57.5 – 67.1	
Anti-tumour	Any	548	276 (50.4%)	44.5 – 56.3	0.001

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treatment	None	516	312 (60.5%)	55.0 – 65.9	
	No chemotherapy	655	392 (59.8%)	55.0 – 64.7	<0.001
	Chemotherapy	409	196 (47.9%)	40.9 – 54.9	
	No radiotherapy	958	514 (53.7%)	49.3 – 58.0	0.001
	Radiotherapy	106	74 (69.8%)	59.4 – 80.3	
TOTAL		1064	588 (55.3%)	51.2- 59.3	

**Missing 17 patients*

a) Includes both admitted and ambulant patients

Table 3. Comparison of pain characteristics between inpatients and outpatients assessable for pain (n=333)

Characteristics	*Total*	Inpatient	Outpatient	
	N (%)	*N (%)*	*N (%)*	p-value
Patients	333	206	127	
Gender				
Male	117 (53.2)	112 (54.4)	65 (51.2)	0.574
Female	156 (48.8)	94 (45.6)	62 (48.8)	
Age (years) [Median (IQR)*	66 (55-74)	65 (54-73)	67(58-74)	0.158
Karnofsky Performance Status (%)[Median (IQR)]	70(50-90)	60 (50-80)	80(70-90)	<0.001
Cancer Stage				
No evidence	19 (5.7)	4 (2.0)	15 (11.9)	
Loco-regional	96 (29.0)	55 (26.8)	41 (32.5)	<0.001
Metastatic	216 (65.3)	146 (71.2)	70 (55.6)	
Missing 2 patients				
Time from cancer diagnosis (days) [Median (IQR)]	407 (146-966)	325 (109-759)	518 (194-1364)	0.001
Pain Duration (weeks) [Median (IQR)]	10 (4-24)	6 (4-16)	20 (8-96)	<0.001
No. of Pains [Median (IQR)]	1 (1-2)	1 (1-2)	1 (1-2)	0.392
No. of pains per patient				
1 pain	186 (55.9%)	119 (57.8%)	67 (52.8%)	
2 pains	94 (28.2%)	56 (27.2%)	38 (29.9%)	0.739
3 pains	41 (12.3%)	23 (11.2%)	18 (14.2%)	
≥ 4 pains	12 (3.6%)	8 (3.9%)	4 (3.1%)	
Pain site				
Abdomen	106 (32.3%)	76 (37.4%)	30 (24.0%)	0.032
Extremities	85 (25.9%)	44 (21.7%)	41 (32.8%)	
Spinal column	55 (16.8%)	31 (15.3%)	24 (19.2%)	
Thorax	44 (13.4%)	25 (12.3%)	19 (15.2%)	

	Head & Neck	38 (11.6%)	27 (13.3%)	11 (8.8%)	
Missing: 5 patients					
Pain intensity					
Average pain					
	None	48 (14.4%)	23 (11.2%)	25 (19.7%)	0.096
	Mild	148 (44.4%)	100 (48.5%)	48 (37.8%)	
	Moderate	93 (27.9%)	55 (26.7%)	38 (29.9%)	
	Severe	44 (13.2%)	28 (13.6%)	16 (12.6%)	
Worst pain					
	None	23 (6.9%)	13 (6.3%)	10 (7.9%)	0.068
	Mild	54 (16.2%)	27 (13.1%)	27 (21.3%)	
	Moderate	51 (15.3%)	28 (13.6%)	23 (18.1%)	
	Severe	205 (61.6%)	138 (67.0%)	67 (52.8%)	

*IQR: Inter quartile range Q1-Q3

Table 4. Pain intensity and interference divided according to patient recruitment.

	Total *N* = 333	**Inpatient** *N* = 206	**Outpatient** *N* = 127	**Difference 95%CI**	**P value**
	mean±SD	mean±SD	mean±SD		
Worst pain	6.7±3.0	7.0±2.9	6.2±3.0	0.2 - 1.5	0.012
Best pain	1.6±2.1	1.6±2.1	1.6±2.3	-0.5 - 0.5	0.912
Average pain	3.8±2.3	3.9±2.2	3.5±2.5	-0.1 - 0.9	0.121
Right-now pain	2.4±2.5	2.4±2.5	2.3±2.5	-0.4 - 0.7	0.656
Improvement (%)	61.3±32.5	66.8±30.9	52.3±34.7	7.1 – 21.9	<0.001
General activity	4.2±3.9	5.0±3.9	2.8±3.3	1.4 - 3.1	<0.001
Mood	4.2±3.9	5.4±3.9	3.3±3.6	1.3 - 2.9	<0.001
Walking ability	4.3±4.1	4.8±4.2	3.4±3.6	0.5 – 2	<0.001
Working	4.4±4.1	5.3±4.1	2.9±3.6	1.5 - 3.2	<0.001
Personal relations	3.2±3.8	3.8±4.0	2.2±3.2	0.8 - 2.4	<0.001
Sleep	3.3±3.7	3.8±3.9	2.3±3.4	0.6 - 2.3	<0.001
Enjoyment of life	3.6±3.9	4.4±4.0	2.3±3.3	1.3 - 2.9	<0.001
Σ interferences*	27.6±21.3	32.7±21.4	19.4±18.5	9.8 – 17.8	<0.001

* Interference score results from summing the scores obtained for each pain interfered activity, ranging from 0 to 70.

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Table 5. Types of pain and the associated pathophysiology

Characteristics	*Total*	Inpatient	Outpatient	
	N (%)	*N (%)*	*N (%)*	p-value
Patients	331	206	127	
Causes*				
Cancer involving bones and joints	66 (19.9)	46 (22.5)	20 (15.7)	
Cancer involving viscera	84 (25.4)	60 (29.4)	24 (18.9)	
Cancer involving soft tissues and miscellanea	49 (14.8)	38 (18.6)	11 (8.7)	
Cancer involving nerve structures	31 (9.4)	22 (10.8)	9 (7.1)	
Pain syndromes related with cancer treatment	22 (6.6)	7 (3.4)	15 (11.8)	<0.001
Pain unrelated to cancer and its treatment	65 (19.6)	22 (10.8)	43 (33.9)	
Unknown	14 (4.2)	9 (4.4)	5 (3.9)	
Pathophysiology **				
Somatic	109 (33.3)	57 (28.5)	52 (40.9)	1.0000
Visceral	64 (19.6)	46 (23)	18 (14.2)	
Neuropathic	17 (5.2)	14 (7)	3 (2.4)	
Somatic+visceral	47 (14.4)	30 (15)	17 (13.4)	
Somatic+neuropathic	54 (16.5)	28 (14)	26 (20.5)	
Visceral+neuropathic	9 (2.8)	6 (3)	3 (2.4)	
Somatic+visceral+neuropathic	19 (5.8)	13 (6.5)	6 (4.7)	
Unknown	8 (2.4)	6 (3)	2 (1.6)	

* *Missing: 2 inpatients; **Missing: 6 inpatients*

Figure 1. Flow chart of patients through the study