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ORIGINAL ARTICLES AND REVIEWS

Pain prevalence and severity in an Italian university hospital: a cross-sectional study

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Abstract

Background. Pain is highly prevalent among hospitalised adults, and in Italy Law 38/2010 mandates its assessment and relief. We aimed to estimate pain prevalence and severity among adult inpatients and identify factors associated with moderate-to-severe pain and satisfaction with pain management in a university hospital.

Methods. We conducted a cross-sectional survey in May 2023 at IRCCS Policlinico San Donato using a structured questionnaire in adult inpatients hospitalised for at least 24 hours. Multivariable logistic regression explored factors associated with pain severity and satisfaction.

Results. Among the 229 patients interviewed, 84% reported pain at the time of the interview, with 52.4% experiencing moderate pain and 9.6% severe pain. Pain in the previous 24 hours was associated with moderate-to-severe pain at the time of the interview and lower satisfaction with care. Thirty-two percent were aware of Law 38/2010, and awareness was associated with lower pain severity and higher satisfaction.

Conclusions. Pain remains highly prevalent among adult inpatients. Experiencing pain in the previous 24 hours was associated with greater severity and lower satisfaction, suggesting the importance of timely and consistent pain assessment and relief throughout hospitalisation.

Key words

- pain
- prevalence
- pain measurement
- patient satisfaction

INTRODUCTION

Pain is an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage [1]. Several studies have shown that pain is a common health issue across European countries [2-9]. The World Health Survey (WHS) [10] reported a pain prevalence of 34% in Europe. Persistent pain can lead to adverse health outcomes, including depression [11, 12], cognitive decline [13-15], premature death [16], and negatively impact quality of life [17].

Pain is also a common symptom among hospitalised patients, with up to 36% of adult patients reporting severe pain [18]. Beyond causing personal suffering, pain is associated with prolonged hospital stays, increasing the burden on healthcare systems [19-21]. A Swedish cross-sectional study by Wadenstern *et al*. [22] revealed that 65% (494/759) of hospitalised patients experienced pain during the previous 24 hours, with 42% rating the intensity as severe. Another cross-sectional study, conducted at two Swedish hospitals in 2014, found that 65.2% of 710 patients experienced pain, while 34% (243/710) reported both pain and fatigue distress with a score greater than 3 on an 11-point numerical rating scale (NRS) at the time of survey. More recently, a cross-sectional study conducted in a Spanish university hospital documented a pain prevalence of 52.9% (145/274) during the hospitalisation [23]. Furthermore, evidence from outside Europe indicates that pain is a pervasive issue in hospitals worldwide [24]. A recent retrospective study conducted in Taiwan reviewed the medical records of 73,814 inpatients, finding a pain prevalence of 48.1% during the hospitalisation period and of 46.5% on the day of discharge [25]. This underscores that pain is a global challenge in healthcare.

Despite its clinical relevance, few studies have evaluated the prevalence of pain among hospitalised patients in Italy, where pain assessment and management are

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mandatory. Additionally, these studies were limited to specific geographical areas or particular patient groups [26, 27]. Visentin conducted the first national survey on 4,523 hospitalised patients in 20 hospitals predominantly located in Northern Italy, finding that 91% of patients (3,575/3,931) reported pain at interview, with 46.6% experiencing severe pain. A few years later, Costantini conducted a regional cross-sectional survey, reporting a prevalence of pain at 43.1% among adults (1,750/4,064) at the time of the interview, with 11.7% (477/4,064) reporting a pain score ≥7 on the NRS. However, even after the introduction of Law 38/2010 [28], which "guarantees citizens the right to access palliative care and pain management", few studies have assessed the prevalence and management of pain in Italian hospitals [29]. This lack of data limits the ability to assess the effectiveness of the law in improving pain control and management in hospitalised patients.

This study aimed to estimate the pain prevalence and severity, and to identify factors associated with moderate-to-severe pain, as well as patient satisfaction with pain management among hospitalised adults in an Italian university hospital, following the implementation of Law 38/2010.

MATERIAL AND METHODS

Study design and setting

This cross-sectional study was conducted at IRCCS Policlinico San Donato, a large high-specialisation teaching hospital in Northern Italy. Data collection was carried out on three non-consecutive days starting on 12 May 2023. The hospital's three main inpatient wards – surgery, medicine, and rehabilitation – encompassed over 270 beds and represented the target setting for data collection. All patients aged 18 years or older, hospitalised for at least 24 hours, and able to participate in an interview were considered eligible. Exclusion criteria included cognitive impairment, significant sensory-motor deficits, linguistic barriers, and admission to critical care units or the emergency department. Participation was voluntary, and all data were collected anonymously and treated confidentially. The study protocol was approved by the Ethics Committee of San Raffaele Hospital on 15 March 2023 (CE: 34/INT/2023). The research was carried out according to the Declaration of Helsinki.

Survey instrument

A structured questionnaire was developed to assess patients' pain experience, satisfaction with pain control, and to identify specific needs for pain relief during hospitalisation. The tool included 15 items organised into two sections. The first section collected socio-demographic information such as age group, gender, ethnicity, marital status (single, married, divorced, widowed), educational attainment (none, primary school, middle school, high school, university), area of residence (urban, rural), and awareness of Italian Law 38/2010 [28] on the right to palliative care and pain relief (yes/no). The second section assessed clinical characteristics including length of hospital stay (days), ward of admission, pain intensity at the time of the interview (NRS), presence of pain in the past 24 hours (yes/no), the primary reason for hospitalisation, and satisfaction with pain control (5-point Likert scale). A multiple-choice item also asked patients what they would need at that moment to find relief.

The questionnaire was developed pragmatically, based on routine clinical practice in hospital pain assessment, and included items already used in previous pain prevalence surveys [22, 30]. Items were selected to ensure clarity and feasibility of administration at the patient's bedside, while capturing key aspects of the pain experience relevant to care needs.

To ensure a standardised interview process, the survey was administered in person by trained physicians, who explained the study objectives and obtained verbal informed consent from all participants, and caregivers were involved only when necessary.

Outcome measures

The primary outcomes were the presence and the severity of pain at the time of the interview. Pain intensity was self-reported using the 11-point NRS [31-33], from 0 (no pain) to 10 (worst imaginable pain). Pain was categorised as mild (1-3), moderate (4-6), and severe (7-10). Secondary outcomes included pain reported in the past 24 hours, satisfaction with pain management, awareness of Law 38/2010, and patient-reported preferences for pain relief.

Statistical analysis

Descriptive statistics were reported as frequencies and percentages for categorial variables, and as medians with first and third quartiles (Q1, Q3) for numerical variables. Group differences were assessed using the Wilcoxon rank-sum test or the Kruskal-Wallis test for continuous variables, and the Chi-square test or Fisher's exact test for categorical variables, as appropriate.

To identify factors associated with pain, logistic regression models were applied dichotomising pain severity as moderate-to-severe (NRS≥4) *versus* none-to-mild (NRS≤3). Candidate predictors were selected based on evidence from the literature and clinical plausibility, including age, gender, ethnicity, educational attainment (categorised as lower: none, primary, or middle school; and higher: high school or university), clinical ward, length of stay, and pain in the previous 24 hours. In addition, knowledge of Law 38/2010, a novel predictor hypothesised to influence pain reporting and satisfaction, was also included. The clinically driven approach was complemented by sensitivity analyses using information criteria (Akaike Information Criterion, AIC) and penalized likelihood methods, specifically least absolute shrinkage and selection operator (LASSO) regression. A similar modelling approach was applied to investigate factors associated with satisfaction with pain management. Pain satisfaction was dichotomised as high satisfaction (including *very satisfied* and *extremely satisfied*) *versus* low or no satisfaction (including *not satisfied at all*, *slightly satisfied and satisfied*). Logistic regression models were used to identify factors independently associated with high satisfaction levels. Results were expressed as odds ratios (ORs) with corresponding 95% confidence intervals (CIs). A p-value <0.05 was considered signifi-

cant. All analyses were performed using R software version 4.1.2.

RESULTS

Demographic and clinical characteristics of patients

A total of 262 questionnaires were distributed to patients hospitalised in the Departments of Cardiology, Internal Medicine, Cardiac Surgery, Urology, Orthopaedics, and Rehabilitation. Twenty-eight patients were excluded due to sedation or language barriers. Of the remaining 234 patients, 229 completed the questionnaire, which yielded a response rate of 98% (229/234). Among respondents, 28.8% (66/229) completed the questionnaire independently, 64.6% (148/229) were assisted by healthcare professionals, and 6.6% (15/229) by family members. *Table 1* summarises the demographic and clinical characteristics, with further details in *Supplementary Table 1 available online*. Most respondents (59%, 136/229) were aged between 48 and 76 years, with a slight predominance of males (53.7%, 123/229). Over half were married (55.5%, 127/229), and 51% (117/229) had lower educational attainment. The sample was predominantly Caucasian (96%, 219/229). At the time of the interview, the median length of hospitalisation was 5 days (Q1-Q3: 3.0-8.0). Regarding ward distribution, 50.7% (116/229) of patients were admitted to surgical wards, 26.6% (61/229) to medical wards, and 23% (52/229) to rehabilitation wards. Cardiovascular diseases (42.9%) and musculoskeletal disorders (30.6%) were the most frequently reported primary diagnoses.

Pain prevalence, pain severity and factors associated with moderate-to-severe pain

Among the 229 patients included in the analysis, 84% (192/229) reported experiencing pain at the time of the interview (NRS>0), with 21.8% reporting mild pain, 52.4% moderate pain, and 9.6% severe pain. Conversely, 16% (37/229) reported no pain (NRS=0). Pain experienced in the past 24 hours was reported by 52% of inpatients (119/229).

Pain severity was higher among older patients (>76 years), with a median NRS score of 5 (Q1-Q3: 3-7) compared to those aged ≤76 years (median 5, Q1-Q3: 2-6; p=0.01). Similarly, patients hospitalised in surgery wards reported greater pain intensity (median 5, Q1-Q3: 3-7) than those in medical (median 4, Q1-Q3: 1-6) and rehabilitation wards (median 5, Q1-Q3: 2-6; p=0.01).

Pain levels were also higher among widowed or divorced individuals (median 6, Q1-Q3: 3-7) compared to unmarried individuals (median 4, Q1-Q3: 0-5; p=0.01), and among those with lower educational attainment (median 5, Q1-Q3: 3-7) compared to those with higher education (median 4, Q1-Q3: 1-6; p=0.03). Pain severity did not differ significantly by gender (*Table 2*). Women reported slightly higher NRS scores than men: median 5 (Q1-Q3: 2-7) *vs* 4 (1-6), p=0.11. No significant associations were found between pain severity and ethnicity or area of residence (*Table 2*).

Patients who had experienced pain in the past 24 hours reported higher pain levels (median 5, Q1-Q3: 3-7) than those who had not (median 4, Q1-Q3: 0-6; p=<0.01). Conversely, lower pain intensity was observed among patients aware of the Law 38/2010 (median 3, Q1-Q3: 1-6) compared to those unaware (median 5, Q1-Q3: 2-7; p=0.01).

Table 1
Demographic and clinical characteristics of patients

Patients' characteristics	Number of patients (N=229)	%	
Age			
18-47 years	27	12.0	
48≤76 years	136	59.0	
>76 years	66	29.0	
Gender			
Men	123	53.7	
Women	106	46.3	
Ethnicity			
Caucasian	219	95.6	
Non-Caucasian	10	4.4	
Marital Status			
Single	47	20.5	
Married	127	55.5	
Divorced/widowed	55	24.0	
Education[1]			
Higher	112	49.0	
Lower	117	51.0	
Residence			
Rural	70	30.6	
Urban	158	69.0	
Missing	1	0.40	
Wards			
Surgery	116	50.7	
Medicine	61	26.6	
Rehabilitation	52	22.7	
Disease for admission			
Cancer	9	3.90	
Cardiovascular	96	42.9	
Gastrointestinal	23	10.40	
Respiratory	6	2.60	
Genito-urinary	20	8.70	
Muscoloskeletal	70	30.6	
Other	4	1.70	
Missing	1	0.40	
Knowledge of the Law 38/2010			
No	155	67.6	
Yes	73	32.0	
Missing	1	0.40	
	Median	**Q1, Q3**	**Missing (%)**
Days from admission	5	3, 8	2 (0.9)

[1]Education was categorised as lower (none, primary, or middle school) and higher (high school or university); Q1: first quartile; Q3: third quartile.

Table 2
Pain severity (NRS) at the interview by demographic and clinical characteristics (N=229)

Patients' characteristics	NRS Median (Q1, Q3)	p-value[1]
Age		
≤76 years	5 (2, 6)	
>76 years	5 (3, 7)	0.01
Gender		
Men	4 (1, 6)	
Women	5 (2, 7)	0.11
Ethnicity		
Non-Caucasian	2 (0, 5)	
Caucasian	5 (2, 6)	0.06
Marital status[2]		
Unmarried	4 (0, 5)[a,b]	
Married	5 (2, 6)[c]	
Divorced/widowed	6 (3, 7)	0.01
Education		
Higher	4 (1, 6)	
Lower	5 (3, 7)	0.03
Residence		
Rural	5 (2, 7)	
Urban	5 (2, 6)	0.60
Wards[3]		
Surgery	5 (3, 7)[a,b]	
Medicine	4 (1, 6)[c]	
Rehabilitation	5 (2, 6)	0.01
Pain in the past 24 hours		
No	4 (0, 6)	
Yes	5 (3, 7)	<0.01
Knowledge of the Law 38/2010		
No	5 (2, 7)	
Yes	3 (1, 6)	0.01

NRS: numerical rating scale; Q1: first quartile; Q3: third quartile; [1] Wilcoxon test or Kruskal-Wallis Rank Test. [2]Post-hoc pairwise comparisons; p-values were adjusted using the Benjamini-Hochberg method: [a]group unmarried *vs* married p=0.08; [b]group unmarried *vs* divorced/widowed p=0.01; [c]group married *vs* divorced/widowed p=0.12. [3]Post-hoc pairwise comparisons; p-values were adjusted using the Benjamini-Hochberg method: [a]group surgery *vs* medicine p=0.01; [b]group surgery *vs* rehabilitation p=0.05; [c]group medicine *vs* rehabilitation p=0.64.

Factors associated with moderate-to-severe pain are presented in *Table 3*. No significant associations were found with age, gender, ethnicity, marital status, educational attainment, area of residence, and hospital ward. Male patients were less likely to report moderate-to-severe pain than females, although the association was not significant (adjusted OR 0.62, 95% CI: 0.34-1.12, p=0.12). Similarly, older patients (aged >76 years) had higher odds of reporting moderate-to-severe pain compared with those aged ≤76 years, but this association was also not significant (adjusted OR 1.22, 95% CI: 0.62-2.42, p=0.60). In contrast, experiencing pain in the past 24 hours was significantly associated with moderate-to-severe pain (adjusted OR 2.17, 95% CI: 1.21-3.94, p=0.01). A hospital stay of 4-6 days was also associated with greater odds of moderate-to-severe pain (adjusted OR 2.87, 95% CI: 1.29-6.70, p=0.01), whereas stays of ≥7 days were not (adjusted OR: 0.93, 95% CI: 0.48-1.77, p=0.80). Overall, the association between length of hospital stay and pain severity was significant (p=0.03).

Knowledge of the Law 38/2010

A total of 68% of respondents (155/229) reported being unaware of the law. Patients who were aware of Law 38/2010 had lower odds of experiencing moderate-to-severe pain at the time of the interview (adjusted OR 0.47, 95% CI: 0.25-0.88; p=0.02).

Patient satisfaction and preferences for relief

Most patients reported a high level of satisfaction with pain management: 32% (73/229) stated being satisfied, 45% (104/229) very satisfied, and 14% (32/229) extremely satisfied. A smaller proportion reported being slightly satisfied (7%, 16/229) or not satisfied at all (2%, 4/229). As shown in *Table 4*, patients who were aware of Law 38/2010 had significantly higher odds of reporting high satisfaction with pain control compared to those who were unaware (adjusted OR 2.33, 95% CI: 1.26-4.43; p=0.01). Conversely, experiencing pain in the past 24 hours was associated with lower odds of reporting high satisfaction (adjusted OR 0.52, 95% CI: 0.30-0.90; p=0.02). Older age (>76 years) was associated with reduced odds of high satisfaction (adjusted OR 0.49, 95% CI: 0.26-0.91; p=0.03).

Gender, ethnicity, educational attainment, area of residence, and length of hospitalisation were not associated with patient satisfaction. Patients admitted to rehabilitation had higher odds of reporting high satisfaction compared to those in surgical wards (crude OR 1.59, 95% CI: 0.80-3.24, p=0.20), although this association was not significant.

Figure 1 shows the overall preferences expressed by patients who reported pain, as well as preferences stratified by pain severity. Since patients were allowed to select multiple options, the reported percentages reflect the proportion of respondents endorsing each need. The most commonly reported need was the desire to feel less pain (84.2%), followed by the presence of loved ones (72%) and the need for a comfortable care environment (65.1%). Additionally, 62.6% of patients expressed a need for psychological and emotional support, while 44.4% reported a desire for clear and complete information on pain management. Only 15.9% expressed a desire to receive an opioid. When stratified by pain severity, patients experiencing moderate-to-severe pain expressed a need for pain relief (90% *vs* 67%) and for psychological and emotional support (68% *vs* 48%) compared to those with mild pain. The presence of loved ones was considered important by both groups (70% *vs* 79%). Differences in preferences regarding a comfortable care environment, autonomy in treatment decisions, access to clear information on pain management, and the option to receive an opioid were less marked between the two groups.

DISCUSSION

Pain remains a common challenge among hospitalised patients [34], with prevalence rates in the literature ranging from 38% [35] to 84% [36]. In our study, 84% of patients reported pain at the time of the interview, a figure consistent with findings from a multicentre hospital survey conducted in the Emilia-Romagna region [30]. When compared with that survey, our data

Table 3
Factors associated with pain severity at the interview in hospital. Results from logistic models comparing moderate-to-severe pain (N=142) *versus* mild/no pain (N=87)

	OR_c	95% CI	p-value	OR_a	95% CI	p-value
Age						
≤76 years	Ref.			Ref.		
>76 years	1.61	0.88-3.00	0.13	1.22	0.62-2.42	0.60
Gender						
Women	Ref.			Ref.		
Men	0.67	0.39-1.15	0.20	0.62	0.34-1.12	0.12
Ethnicity						
Non-Caucasian	Ref.			Ref.		
Caucasian	2.56	0.71-10.2	0.20	3.26	0.75-17.1	0.13
Marital status						
Unmarried	Ref.					
Married	1.36	0.69-2.66	0.40			
Divorced/widowed	2.35	1.04-5.44	0.04			
Education[1]						
Higher	Ref.			Ref.		
Lower	1.62	0.95-2.78	0.08	1.46	0.80-2.67	0.20
Residence						
Rural	Ref.					
Urban	0.88	0.49-1.58	0.70			
Wards						
Surgery	Ref.					
Medicine	0.61	0.32-1.16	0.13			
Rehabilitation	0.66	0.34-1.31	0.20			
Days from admission						
1-3 days	Ref.			Ref.		
4-6 days	2.52	1.20-5.53	0.02	2.87	1.29-6.70	0.01
≥7 days	1.04	0.57-1.91	0.90	0.93	0.48-1.77	0.80
Pain in the past 24 hours						
No	Ref.			Ref.		
Yes	2.15	1.25-3.73	0.01	2.17	1.21-3.94	0.01
Knowledge of the Law 38/2010						
No	Ref.			Ref.		
Yes	0.45	0.25-0.79	0.01	0.47	0.25-0.88	0.02

[1]Education was categorised as lower (none, primary, or middle school) and higher (high school or university); OR_c: crude odds ratio; OR_a: adjusted odds ratio; N: number of patients in each pain category; Ref.: reference category; CI: confidence interval.

showed a higher proportion of patients reporting moderate pain (52.4% *vs* 37.1%), and a lower proportion reporting severe pain (9.6% *vs* 15.9%). While not directly measured, this reduction in severe pain may be indicative of improved pain assessment and management in recent years, in line with ministerial and institutional guidelines.

A total of 52% of patients reported experiencing pain in the 24 hours preceding the interview, a proportion lower than found in other studies, including Strohbuecker [37] (63%), Abbot [38] (67%), Quattrin [39] (69%) Costantini [40] (57%) and Das [41] (71%). This difference may reflect contextual variability across healthcare settings or improvements in pain management practices following the introduction of Law 38/2010, although these aspects were not directly assessed. Importantly, our findings showed that experiencing pain in the past 24 hours was significantly associated with a twofold increase in the odds of moderate-to-severe pain (adjusted OR 2.17; 95% CI: 1.21-3.94, p=0.01), suggesting the importance of timely and effective pain control.

This study is one of the few surveys conducted in Italy on the prevalence of pain among hospitalised patients since the introduction of Law 38/2010 [28]. Approved

Table 4
Factors associated with patient satisfaction with pain management. Results from logistic models comparing high/very high satisfaction (N=136) low/no satisfaction (N=93)

	OR_c	95% CI	p-value	OR_a	95% CI	p-value
Age						
≤76 years	Ref.			Ref.		
>76 years	0.53	0.30-0.95	0.03	0.49	0.26-0.91	0.03
Gender						
Women	Ref.			Ref.		
Men	1.00	0.59-1.69	>0.90	1.01	0.57-1.76	>0.90
Ethnicity						
Non-Caucasian	Ref.			Ref.		
Caucasian	1.50	0.40-5.50	0.50	1.93	0.48-7.86	0.30
Marital status						
Unmarried	Ref.					
Married	1.00	0.49-1.99	>0.90			
Divorced/widowed	0.47	0.21-1.04	0.07			
Education[1]						
Higher	Ref.			Ref.		
Lower	1.12	0.66-1.89	0.70	1.54	0.86-2.77	0.20
Residence						
Rural	Ref.					
Urban	0.95	0.53-1.69	0.90			
Wards						
Surgery	Ref.					
Medicine	0.78	0.42-1.46	0.40			
Rehabilitation	1.59	0.80-3.24	0.20			
Days from admission						
1-3 days	Ref.					
4-6 days	0.99	0.49-1.98	>0.90			
≥7 days	1.03	0.56-1.90	>0.90			
Pain in the past 24 hours						
No	Ref.			Ref.		
Yes	0.49	0.28-0.84	0.01	0.52	0.30-0.90	0.02
Knowledge of the Law 38/2010						
No	Ref.			Ref.		
Yes	2.15	1.20-3.96	0.01	2.33	1.26-4.43	0.01

[1]Education was categorised as lower (none, primary, or middle school) and higher (high school or university); OR_c: crude odds ratio; CI: confidence interval; OR_a: adjusted odds ratio; N: number of patients in each pain category; Ref.: reference category; CI: confidence interval.

in March 2010, this law is unique in Europe for guaranteeing citizens the right to adequate pain management, involving not only specialist and general physicians but also nurses and psychologists, and for recognising pain not merely as a symptom, but as a condition in its own right. To date, most European countries have issued guidelines or national strategies on pain, but none has introduced legislation as comprehensive and binding as Italy's Law 38/2010. Notably, no prevalence studies on pain in hospitalised patients have been conducted during the COVID-19 pandemic, as healthcare and research priorities shifted toward emergency response and infection control. These aspects underscore the relevance of our findings both within the Italian context and in the broader European debate on pain management.

A significant association was found between the length of hospital stay and pain intensity in our cohort. This finding is consistent with the results reported by Li-Ying *et al.* [25], who observed that longer hospital stays were associated with higher pain levels at discharge. Persistent, intensive pain can activate complex peripheral and central mechanisms, potentially leading to the transition from acute to chronic pain [42-44]. Ensuring

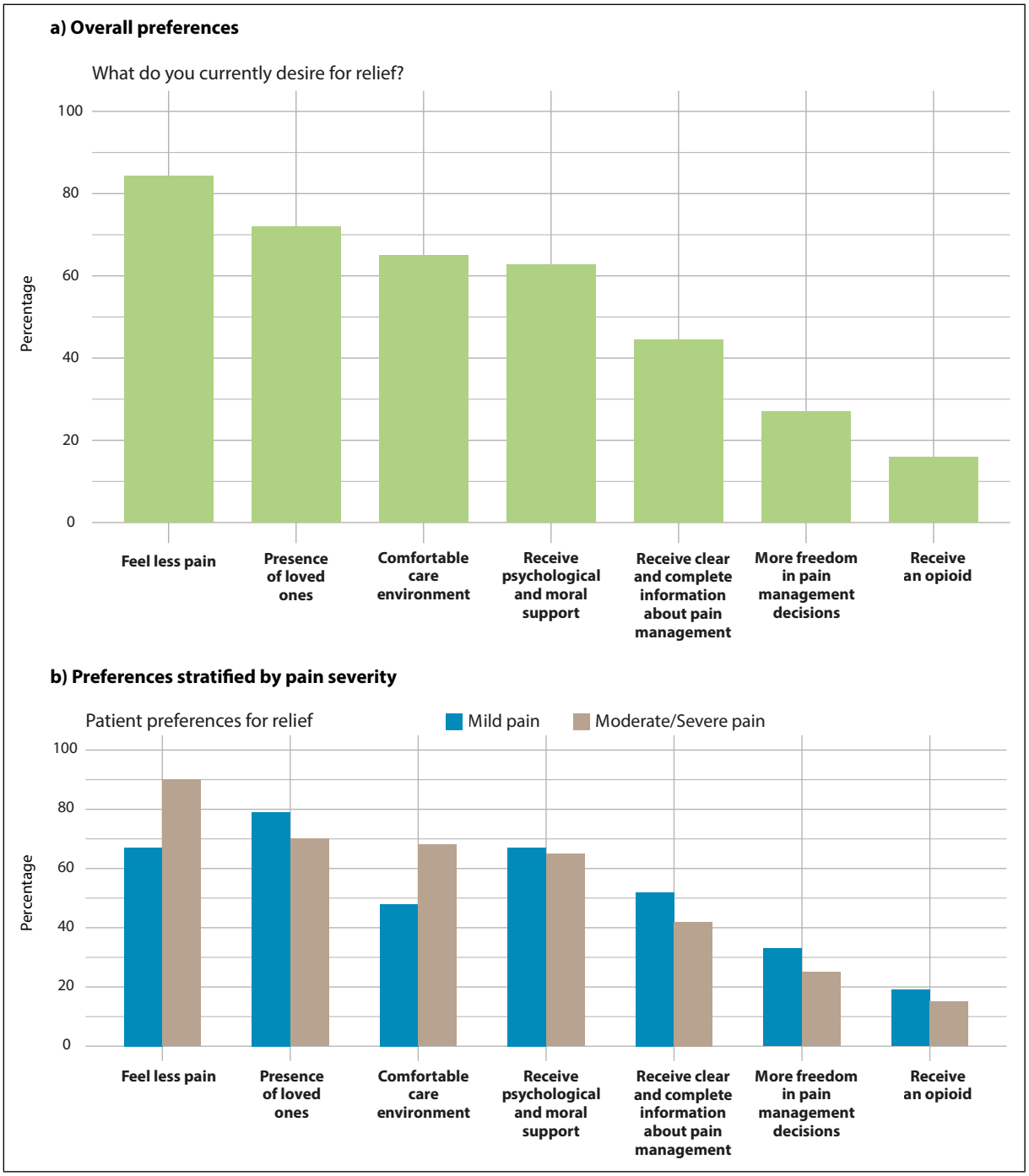

Figure 1
Patient preferences for relief among those reporting pain (N=192)[1].
[1]There are between two to three missing responses for each variable. N: number of patients reporting pain at the time of the interview.

effective pain control during hospitalisation is therefore essential to prevent the development of chronic pain.

Demographic factors, such as gender and age, are well-documented predictors of pain in the literature [29, 35, 40, 45-47]. However, our study did not identify significant gender differences in pain prevalence or intensity ratings. Although women frequently report higher pain intensity across a wide range of clinical and surgical contexts [48], the literature on gender differences in pain severity remains complex and sometimes contradictory. For example, Damico *et al*. [29] found that women were at a higher risk of experiencing pain than men (RR 1.59; 95% CI: 1.29-1.95), with similar findings by Costantini *et al*. [40] (adjusted OR 1.40; 95% CI: 1.23-1.58) and Vallano *et al*. [45] (adjusted OR 1.37; 95% CI: 1.11-1.70). In contrast, Visentin *et al*. [49] reported a lower risk of intense pain in women (adjusted OR 0.80; 95% CI: 0.71-0.92). Biological, psychological,

and socio-cultural factors are thought to contribute to these discrepancies [50]. Social factors, such as child-rearing practices, media portrayals of gender roles, and social learning can shape pain-related behaviours and perceptions [51]. Stereotypes often depict women as more expressive and men as more stoic in their response to pain, which may influence individuals' willingness to report pain and how it is perceived by others [51-53]. In this regard, Falk *et al*. [54] observed that women need to report more intense levels of pain and other distress symptoms for their complaints to be recognised and documented by healthcare professionals.

Regarding age, our analysis showed that patients over 76 years reported significantly higher NRS pain scores compared to those ≤76 years old, based on non-parametric tests. However, logistic regression did not confirm a significant association with moderate-to-severe pain, possibly due to the limited number of older patients. Evidence from the literature remains inconsistent. Li-Ying *et al*. [25] reported a negative correlation between age and pain intensity at discharge. Conversely, Costantini *et al*. [40], found no association between age and pain at the interview, while Vallano *et al*. [45] observed that younger adults (18-39 years) were more likely to report pain than those over 70 years (adjusted OR 1.65; 95% CI: 1.21-2.26). These discrepancies highlight the complexity of age-related differences in pain perception and emphasise the need for further research in more age-balanced samples.

Another important sociodemographic factor considered in our study was educational attainment [55]. Lower educational attainment has been conceptualised as a marker of maladaptive coping strategies that influences the pain experience, and is associated with pain-related beliefs, catastrophizing, and low perceived control [56]. In our study, lower educational attainment was associated with a non-significant increase in the odds of moderate-to-severe pain (adjusted OR 1.46, 95% CI: 0.80-2.67; p=0.20). This finding may reflect limited sample size, which reduces statistical power, as well as the dichotomous classification of educational attainment, which may have obscured more subtle gradients across educational levels.

However, a more specific dimension of knowledge, awareness of Law 38/2010 was significantly associated with a lower risk of moderate-to-severe pain (adjusted OR 0.47, 95% CI: 0.25-0.88; p=0.02), independently of age, gender and educational attainment.

Regarding ward type, our results showed no significant association between ward type and pain intensity. This contrasts with findings from other surveys. For example, Zoega *et al*. [46] observed a higher prevalence of pain in surgical wards compared to medical wards (90% *vs* 80%, p=0.028), while Vallano *et al*. [45] found that patients in orthopaedic and rehabilitation wards were more likely to report pain than those in internal medicine wards (adjusted OR 1.74; 95% CI: 1.21-2.44). Conversely, Damico *et al*. [29] observed no significant differences in pain prevalence across hospital wards (F-statistic 2.088; p=0.081).

Pain management is a recognised indicator of quality of care and an essential criterion for hospital accreditation. Despite the high prevalence of moderate-to-severe pain in our sample, more than 90% of patients expressed satisfaction with the pain management they received, consistent with previous findings [57]. Patient satisfaction may be influenced by psychological and social factors, such as expectations and perceived experiences [58-60]. In our study, satisfaction was assessed using structured questionnaires. However, the absence of a qualitative component is a limitation, as open-ended questions [61] could have offered a deeper understanding of patients' experiences and helped identify additional or unaddressed patient needs.

We observed no significant associations between patient satisfaction and socio-demographic or clinical factors [62, 63]. However, older patients (>76 years) were significantly less likely to report high satisfaction, possibly due to different expectations or a more critical attitude shaped by past healthcare experiences.

Notably, awareness of Law 38/2010 was associated with higher satisfaction. This may indicate that awareness of legal rights is linked to a more positive perception of care. Conversely, patients who experienced pain in the previous 24 hours were significantly less likely to report high satisfaction with pain management, suggesting the importance of timely and effective pain control [57, 63].

Our results revealed that patients' preferences for pain relief included the presence of loved ones, psychological and emotional support, a comfortable care environment, and clear communication about pain management. Although these data were collected through a structured multiple-choice question, they provide a useful overview of patients' perceived needs for relief.

These findings suggest the multidimensional nature of pain experiences and emphasise the importance of a person-centred approach to pain management [64-66].

Limitations

In addition to relying on quantitative self-report questionnaires to assess satisfaction, this study has some limitations. First, it was conducted in a single university hospital (IRCCS Policlinico San Donato), which may limit the generalisability of the findings to other healthcare settings in Italy. However, the single-centre design allowed for a more granular analysis of pain trends within a clearly defined organisational context. Second, specific patient populations, such as those admitted to intensive care or emergency departments, patients with cognitive impairment, and those with language barriers, were excluded, thus limiting the applicability of the results to these groups. Third, the presence of healthcare staff during questionnaire administration may have influenced patient responses, particularly regarding satisfaction, potentially reducing the likelihood of reporting dissatisfaction. Fourth, the questionnaire used in this study was developed pragmatically [23] and was not subjected to formal validation, which may affect the reliability and comparability of the results. However, internal consistency measures such as Cronbach's alpha were not applicable to most of the tool, as it consisted mainly of single-item questions (e.g., pain intensity, satisfaction). Nevertheless, its clinically focused and con-

cise format likely contributed to the very high response rate observed (98%) [22]. Finally, we did not assess pre-existing pain prior to admission or pain specifically related to care procedures. Instead, our data reflect the overall prevalence of pain among hospitalised patients and underscore the importance of conducting repeated pain assessments throughout the hospital stay.

CONCLUSIONS

This cross-sectional study confirms that pain remains a frequent and widespread issue among hospitalised adults, affecting patients across all ward types. Pain experienced in the previous 24 hours was associated with greater pain severity and lower satisfaction with care, suggesting the importance of timely and effective pain control throughout hospitalisation. These findings may inform health policy and service planning aimed at enhancing pain assessment and management in hospital settings.

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Data availability statement

The data that support the findings of this study are available on reasonable request from the corresponding Author. The data are not publicly available due to privacy or ethical restrictions.

Declaration on the use of AI

None.

Authors' contributions

The Authors' responsibilities were as follows: MB designed the study, curated the dataset, performed the statistical analysis, and drafted the manuscript. FA and PR checked the code and supervised the analysis. All Authors contributed to data interpretation and revised each draft for important intellectual content. All Authors read and approved the final manuscript.

Ethical approval statement

Ethical approval was obtained from the Ethics Committee of San Raffaele Hospital, Milan, on 15 March 2023 (CE: 34/INT/2023).

Patient consent statement

Participation in the survey was anonymous and voluntary, and informed consent was requested from all patients prior to completing the questionnaire.

Conflict of interest statement

The Authors declare that they have no conflicts of interest.

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