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Pain prevalence, severity, assessment and management in hospitalized adult patients: a result of a multicenter cross sectional study

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Abstract

Introduction. The measurement of pain prevalence among the patients admitted to hospital, estimated that pain remains a common problem for patients.

Methods. This is a multi-center cross sectional study carried out in Italian Hospitals, where data was collected in only one day. All patients aged at least 18 years, hospitalized able or unable to communicate, were eligible to be included in the study. Patients with curarization or quadriplegia (any cause) were excluded.

Results. Some hospitals and residential structures took part in our research, 26 centers in total. Pain prevalence has been observed in 268 patients (38%) (95% CI = 34%-41%) (range within wards 31-47%). Women are at higher risk than men (RR = 1.59, 95% CI = 1.29-1.95). Pain prevalence was more observed at 10.9 (+ 1.46) days after surgery. Severe pain has been observed in 148 (21.2%) cases. Pain was managed in 223 (83.2%) cases, and it was predominantly treated with the administration of paracetamol (n = 55; 24.7%) within 30 minutes after having ascertained the presence of pain.

Conclusions. Pain is reported by about 4 out of 10 adults, with a higher prevalence of cases in women, and its appearance does not depend on the care setting. In order to assess the prevalence of pain carefully, an Italian study that involves all regions and a large number of the centers may be necessary.

Key words

- pain
- prevalence
- assessment
- management

INTRODUCTION

Pain is a common symptom across all hospital wards. It is often reported as highly prevalent among patients admitted to hospital, especially within surgical and oncological departments. Acute pain is a major concern for patients admitted to hospital, it is a significant symptom related to ill health and can be significant in indicating disease processes [1]. The importance of effective pain control is obvious, as pain affects all dimensions of quality life [2].

A recent systematic review, based on the analysis of studies conducted between 1992-2011 about the measurement of pain prevalence among the patients admitted to hospital, estimated that pain remains a common problem for patients, in fact the prevalence of severe acute pain ranged up to 36% of the total [3]. The review has confirmed that surgical patients do have a high burden of pain, but, when medical specialists have been surveyed, it has been underlined that approximately half of those patients did experience pain. Hospital-wide pain prevalence obtained range from 37.7 to 84% [3]. It is difficult to determine a definite prevalence of pain for adults in hospital due to the variability of the studies examined. Approximately 50% of medical patients reported pain and in Nursing Home Residents nearly 43% (95% CI = 36%-50%) [4]. The prevalence of self-reported pain is significantly higher in residents with vascular dementia (VaD) (54%) compared with those with Alzheimer disease (18%) and other dementia subtypes (14%) [4].

Although training interventions have been promoted to improve pain management, the hospital-wide prevalence of severe pain was found to range from 9 to 36% [3, 5-7].

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Strohbueker *et al.* (2005), found 36% of patients with severe pain using the score of 65 mm or above on VAS [8].

Pain and inadequate pain management were a significant problem.

Forty-eight units were enrolled in a descriptive, cross-sectional study to identify strengths and weaknesses of pain management in a German university teaching hospital [8]. 50% of 561 patients experienced pain during the interview. 58% had moderate pain (VAS > or = 45 mm) and 36% reported severe pain (VAS > or = 75 mm). Intensive care, psychiatric, obstetric and pediatric units were excluded from this research.

Studies to identify the prevalence and demographic characteristics of pain, as well as the models of pain management practice in hospitalized children in a tertiary care university hospital, have already been carried out [9]. However, there are no studies that observe the prevalence of pain in adult patients (inpatients who are able to talk and not able to talk). The present study was carried out keeping the hypothesis that the pain prevalence is not influenced by the care setting; first: to determine the prevalence of pain for hospitalized adult patients; second: to compare pain prevalence with care settings and with patients' demographic and clinical characteristics.

METHODS

Design and setting

This is a multicenter cross sectional study carried out in Italian Hospitals, where data was collected in only one day (T_0). The study protocol was in line with the Declaration of Helsinki, as revised in 2013, and was approved by the institutional ethics committee of the Coordinator Center. Consent was requested and obtained by the nursing staff during hospitalization. Where patients were unable to give consent, due to being not oriented (particularly in nursing home residents), sedated or intubated (particularly in intensive care units), the staff passed the request on to the relatives (wives, husbands, sons or daughters). In addition, data was collected anonymously and the authorization to access the data was given by the director and the manager of each center involved in the study.

Sample

A convenience sample for this research was chosen. A network was used to reach more centers. The AISD (Italian Association for the study of pain) and the GiViTi society (Italian Group to assess the intervention in Intensive care unit) helped us to spread the project to more Italian Hospitals and departments. In particular for the GiViTi society, the list of centers belonging to the group has been showed on the website: http://www.giviti.marionegri.it/Download/ListaTI.htm. All patients aged at least 18 years, hospitalized from September 1st 2017 to September 25th 2017 able or unable to communicate, were eligible to be included in the study. Patients with curarization or quadriplegia (any cause) were excluded. The average size of beds at the hospital was 142 (28-1170). The average size of beds at the wards was 24 (8-60). Based on the difference of bed size of each specialty, in order to compare, we tried to include the same number of patients for each surgery, medicine, orthopedics, intensive care and nursing home settings.

Measurement of the outcomes

The main measurement of the outcomes was the prevalence of pain. Prevalence is defined as the proportion of a specific population with a health problem (pain) in a defined point of time or during a period of time [10]. Pain is defined as an unpleasant sensation induced by harmful stimuli recorded by the nerve endings of nociceptive neurons [11].

The secondary measurement of the outcomes was the pain management, (this includes the presence of a pain management protocol, therapeutic treatment, assessment tools used) and the presence of severe pain.

We considered pain: Numerical Rating Scale (NRS) score 4-7 or Visual Analogue Scale (VAS) score 45-74 mm [12], Verbal Rating Scale (VRS) item moderate pain [13], Pain Assessment in Advanced Dementia (PAINAD) score 4-6 [14], Abbey pain scale score 8-13 [15], Behavioral Pain Scale (BPS) score 5-7 and Critical Care Pain Observation Tool (C-CPOT) score 4-5 [16].

We considered severe pain: Numerical Rating Scale (NRS) score 8-10 or Visual Analogue Scale (VAS) score 75-100 mm [12], Verbal Rating Scale (VRS) item sever pain [13], Pain Assessment in Advanced Dementia (PAINAD) score 7-10 [14], Abbey pain scale score > 14 [15], Behavioral Pain Scale (BPS) score 8-12 and Critical Care Pain Observation Tool (C-CPOT) score 6-7-8 [16]. Moreover, the pain prevalence and its severity will be observed, making a comparison between patients who received a pain management and patients who did not receive pain management, according to the department protocol.

Data collection

Data collection took place in only one day. Pain detection was performed ad hoc by a nurse department. After the detection, the missing data (e.g. clinical and demographic data) was collected thanks to the consultation of the patients' medical records. Data was collected by the nurse department, involved in the study, and was reported in a case record form attached to the research protocol. Due to the organization of the wards and the multicenter's structure, obtaining a pain assessment the same day in all wards was difficult.

Data analysis

Data analysis was performed as a blind test by a colleague not involved in the study and not informed about its aim or about the patients' group the data belonged to, using SPSS. software v.17.0 (SPSS. Inc., Chicago, IL). A descriptive statistic was performed in order to calculate the mean, median, standard deviations and absolute and percentage frequencies.

Between-group comparisons were performed with the chi-square test (nominal variables) or Student's t-test (ratio level variables). ANOVA test was used to assess potential differences in a scale-level dependent variable by a nominal-level variable, having 2 or more categories. For example, anova examines the difference of prevalence in the different wards involved.

The level of significance was set at $p < 0.05$.

RESULTS

Study population

Some hospitals and residential structures took part in our research, 26 centers in total. Data was received from surgery, medicine, orthopedics, intensive care unit and nursing homes.

All hospitalized patients were included in the study, those who could communicate (n = 477; 68.3%) and those who could not (n = 221; 31.7%). Patients unable to communicate were observed in Nursing Home residents 81 (36.7%), Intensive care unit 57 (25.8%), Medicine 47 (21.3%) Surgery 24 (10.8%), Orthopedics 12 (5.4%).

Data collection was cross-sectional (one day for each department). The study population consisted of 698 patients in total, divided into 5 settings *(Table 1)*, of them, 311 were males (44.5%). The average age of our samples was 59.8 (sd +15.1).

Surgical patients were 249 (35.7%), at the time of data collection no surgery in the last month was performed for 59% of the patients, 412 people in total.

Pain prevalence and severity

Pain prevalence has been observed in 268 patients (38%) (95% CI = 34%-41%) (range within wards 31-47%). Despite the dissimilarities in numbers and characteristics among the five settings, the statistics do not show great differences of pain among hospitalized patients from one ward to another ($f_{(4)} = 2.088$, $p = 0.0806$) *(Table 1)*. Women are at higher risk than men (RR = 1.59, 95% CI = 1.29-1.95). Pain prevalence was more observed at 10.9 (+ 1.46) days after surgery (range 10-15) ($f_{(4)} = 13.088$, $p < 0.001$) *(Table 2)*.

Among the patients found to be painful, the relationship between the two variables, that are diagnosis of the admission and days of assessment during the hospitalization, establishes a similar and constant trend, with an increase at 7.4 days (range 4-9 days) for each patient *(Figure 1)*. In particular, despite the numerical differences of the samples, for traumas and surgical patients, at 4-9 days, the observed average pain increased (trauma = 49%, surgical= 42%).

Severe pain has been observed in 148 (21.2%) cases. Women are at higher risk than men for severe pain (RR = 1.73, 95% CI = 1.26-2.36). In the trauma (n = 75; 10.7%), severe pain was most prominent compared with other diagnosis of admission ($f_{(3)} = 3.369$, $p = 0.018$).

Among the patients who felt pain, the prevalence of severity was 55.2%, and it has been commonly observed among patients who had self-reported their pain level, compared to those who were unable to self-report (n = 103; 21.6% *vs* n = 45; 20.3%) ($x^2_{(1)} = 0.137$, $p = 0.7112$).

Moreover, pain has been commonly observed among patients who had independently reported their pain level compared to the patients who were unable to communicate (n = 174; 36.5% *vs* n = 94; 42.5%) ($x^2_{(1)} = 2.342$, $p = 0.126$).

Pain management and assessment

Pain was managed in 223 (83.2%) cases, and it was predominantly treated with the administration of paracetamol (n = 55; 24.7%) within 30 minutes after having ascertained the presence of pain *(Table 3)*. The presence of a pain management protocol was observed in 18 (31.6%) of the 57 wards. 212 (30.4%) patients were treated with a protocol. Despite pain prevalence was equal among patients treated with or without a protocol ($x^2_{(1)} = 2.53$, $p = .111$), severe pain was most prominent among patients not treated with a pain management protocol ($x^2_{(1)} = 4.863$, $p = .027$).

Given the increased presence of patients able to communicate with nursing staff, the most used pain assessment tool was the Numerical Rating Scale (n = 411; 58.9%) *(Table 4)*.

DISCUSSION

This is the first investigation on pain prevalence of a selected patient population, in which some patients can talk and others cannot, in 26 Italian centers, including hospitals and residential structures. Despite differences in age and clinical characteristics, the prevalence of pain was underlined without no substantial statistical differences from the 5 departments we received the data from. The patient's pain experience was assessed using eight tools. Although the Numerical Rating Scale is the most common tool, it seems to lack an accepted and validated pain prevalence survey tool, that is the reason why each ward used different survey instruments to obtain the data.

Among the patients hospitalized to the 26 centers, pain prevalence was high. This study reveals that about 40% of the Italian inpatients have experienced pain (half of them of severe intensity) during the hospitalization.

Our findings are in line with previous studies that

Table 1
Prevalence of pain in hospitalized adult patients in relation to the hospitalization department

Settings	Participating center N (%)	Patients included N (%)	Pain	Prevalence	CI 95%	df	*f*	p.
Orthopedic	9 (15.6)	135 (14)	63	47 %	[0.46;0.48]			
Surgery	15 (26.3)	146 (25)	59	40 %	[0.39;0.41]			
Medicine	10 (17.5)	147 (29)	58	39 %	[0.38;0.40]	4	2.088	.0806
Intensive care unit	18 (31.6)	138 (15)	43	31 %	[0.30;0.32]			
Nursing Home	5 (9)	132 (17)	45	34 %	[0.33;0.35]			
Total	**57**	**698**	**268**	**38 %**	**[0.34;0.41]**			

Table 2
Pain at interview by demographic and clinical characteristics of the patients

Variable	Patients n = 698	No pain n = 430	Pain n = 268	Severe pain n = 148
Range age; no. (%)				
18-29	76 (10.9)	55 (72.4)	21 (27.6)	10 (13.2)
30-39	164 (23.5)	106 (64.6)	58 (35.4)	35 (21.3)
40-59	162 (23.2)	97 (59.9)	65 (40.1)	36 (22.2)
60-79	154 (22.1)	86 (55.8)	68 (44.2)	29 (18.8)
over 80	142 (20.3)	86 (60.6)	56 (39.4)	38 (26.8)
			(*p* = .205)	(*p* = .185)
Gender; no. (%)				
Male	311 (44.6)	221 (71.1)	90 (28.9)	47 (15.1)
Female	387 (55.4)	209 (54)	178 (46)	101 (26.1)
			(*p* < .001)	(*p* <. 001)
Clinical conditions; no. (%)				
Comunicative	477 (68.3)	303(63.5%)	174(36.5%)	103 (21.6)
Not comunicative	221 (31.7)	127(57.5%)	94 (42.5%)	45 (20.3)
			(*p* = .126)	(*p* = .711)
Diagnosis; no. (%)				
Medical	242 (34.7)	149 (61.6)	93 (38.4)	41 (16.9)
Surgical	249 (35.7)	164 (65.9)	85 (34.1)	48 (19.3)
Trauma	75 (10.7)	40 (53.3)	35 (46.7)	20 (26.7)
Others	132 (18.9)	77 (58.3)	55 (41.7)	39 (29.5)
			(*p* = .197)	(*p* = .018)
Days from admission; no. (%)				
0-3	64 (9.2)	41 (64.1)	23 (35.9)	9 (14.1)
4-9	215 (30.8)	117 (54.4)	98 (45.6)	41 (19.1)
10-15	111 (15.9)	67 (60.4)	44 (39.6)	26 (23.4)
16-29	166 (23.8)	109 (65.7)	57 (34.3)	39 (23.5)
over 30	142 (20.3)	96 (67.6)	46 (32.4)	33 (23.2)
			(*p* = .082)	(*p* = .443)
Days from surgery; no. (%)				
0-3	41 (5.9)	30 (73.2)	11 (26.8)	8 (19.5)
4-9	82 (11.8)	46 (56.1)	36 (43.9)	21 (25.6)
10-15	107 (15.3)	35 (32.7)	72 (67.3)	33 (30.8)
16-30	56 (8)	38 (67.9)	18 (32.1)	11 (19.6)
No surgery in the last month	412 (59)	281 (68.2)	131 (31.8)	75 (18.2)
			(*p* < 001)	(*p* = .054)

All *P*-values derive from anova test, except for gender and clinical conditions (chi square test).

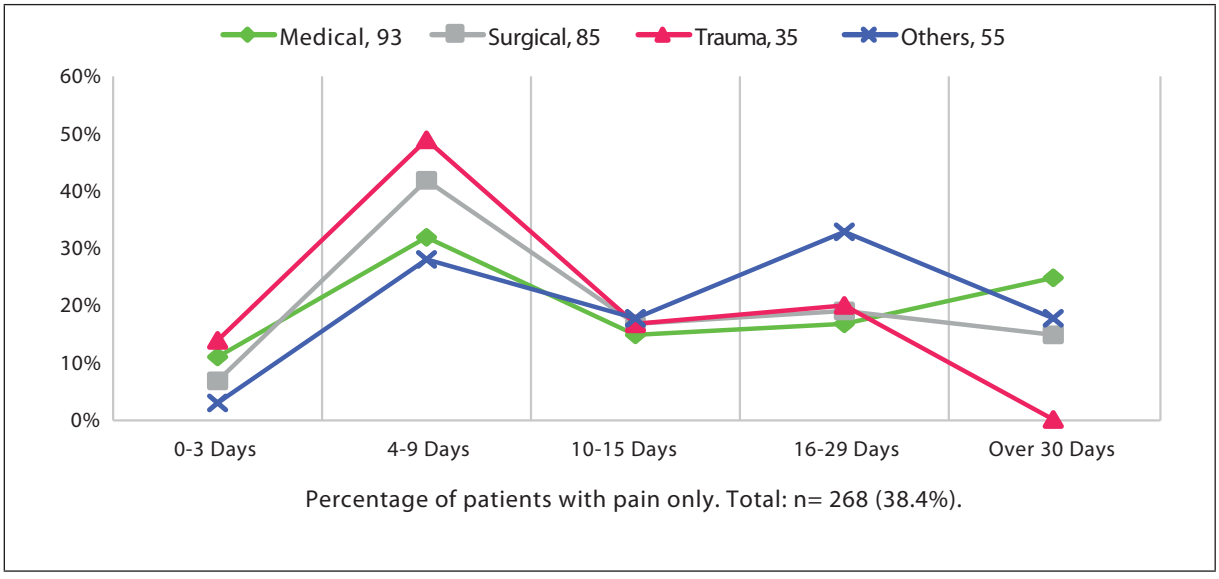

Figure 1
Relationship between admission diagnosis and assessment day.

Table 3
Distribution of drugs or treatment to relieve pain within 30 minutes after having ascertained the presence of pain

Treatment or drugs	N (%)
Paracetamol	55 (24.7)
Ketoprofene	39 (17.5)
Tramadol	24 (10.8)
Paracetamol and ice	22 (9.9)
Ice	19 (8.4)
Paracetamol and codeine	18 (8.1)
Ketorolac	16 (7.2)
Fentanyl	7 (3.1)
Morphine	6 (2.7)
Ibuprofen	6 (2.7)
Postural change	6 (2.7)
Ketamine	5 (2.2)
Total treatments	**223**

Table 4
Pain assessment tools used

Instrument	N (%)
Numerical Rating Scale	411 (58.9)
PAINAD	116 (16.6)
Visual Analogue Scale	62 (8.9)
Behavioral Pain Scale	46 (6.6)
Abbey pain Scale	36 (5.1)
Critical Care Pain Observational Tool	21 (3)
Verbal Rating Scale	4 (0.6)
NOPPAIN	2 (0.3)
Total assessments	**698**

showed that the women are at a slightly higher risk than men (AOR = 1.4, 95% CI = 1.2-1.7) [17].

In disagreement with previous studies [3], no significant differences emerged between surgical and medical patients regarding the presence of pain or its severity.

The high number of treatments (n = 223) observed suggests that a good pain management is equally distributed in the different wards. However, the increase at 12.6 (+ 1.7) days from surgery in the prevalence of pain, may mean a reduction in attention that reveals itself after the acute phase.

Pain management could be easily improved by giving adequate analgesics [18,19].

Studies revealed that those who received more than three dosages per day of opioids have had these effects: a shorter length of stay, a more intense pain, they were younger and more resilient compared to those who received less than three dosages per day [20].

Sometimes the obstacles to optimal pain management are: difficulty in identifying and assessing of pain, the patients' resistance to reporting pain and/or taking medicines, the knowledge of pain management among nurses [21], and the communication barriers between the nursing and physicians staff [22, 23]. These include a more consistent approach to document pain in patients' progress notes and an improvement in nurse-physician communications to ensure that a new pain or a pain that is becoming more and more intense can be easily identified in order to make changes in the treatment of the pain patients' management.

Paracetamol turned out to be the first choice for pain treatment in line with precedent studies [4].

A national case-population study of non-overdose paracetamol exposure resulted in twice the rate of acute liver failure leading to registration for transplantation than NSAIDs [24].

Poisoning with paracetamol (acetaminophen) is a common cause of hepatotoxicity and serious skin problems [25]. A systematic review of observational studies shows that paracetamol is associated with an increase in mortality, cardiovascular adverse events (fatal or non-fatal myocardial infarction, stroke, or fatal coronary heart disease), gastrointestinal adverse events (ulcers and complications such as upper gastrointestinal hemorrhage), and renal impairment [26].

A Cochrane review on interventions for paracetamol (acetaminophen) overdose concludes that activated charcoal seems to be the best choice to reduce absorption [27]. Our findings showed in 45 (16.8%) cases a pain not treated.

If a pain is underestimated or undertreated, this becomes chronic quickly. Approximately 19.0% of adults in the United States reported chronic or persistent pain in 2010 [17]. In 2015, it is estimated that 126.1 million adults have felt pain for at least 3 months, with 25.3 million adults suffering from daily (chronic) pain and 23.4 million report a lot of pain [28].

Older adults are much more likely to report persistent pain than younger adults, with adults aged 60 to 69 at highest risk (AOR = 4.0, 95% CI = 2.7-5.8) [28].

Prevention and control of pain are essential especially in surgical and trauma patients. However, optimal assessment and management of pain requires an understanding of the pathophysiology of pain, of the existing methods available to reduce pain, of the invasiveness of the procedure, and patient factors associated with increased pain, such as anxiety, depression, catastrophizing, and neuroticism [29]. Use of a procedure-specific [30], multimodal for pain management provides a rational basis for enhanced postoperative pain control, optimization of analgesia, decrease in adverse effects, and improved patient satisfaction [29].

Study limitations

The major limitations of this study are the convenience sample and the arbitrary choice of the departments where the data collection was carried out.

Conclusively, the quantification of the phenomenon (pain) was made with the use of different assessment tools. However, this is due to the close proximity of our results with clinical practice.

Implications for nursing education, practice, and research

Nurses should be more aware of recent researches regarding pain treatment. Furthermore, it is essential, in

case of the need of an effective nursing care, that nurses know that all individuals express and cope with pain in different settings and in many ways, so they may have different behaviours when they feel pain. Nurses play a key role in implementing programmes aimed at improving pain management, since pain symptom detection is a specific task of their job. There is a great need for interdisciplinary education on pain assessment in the hospitals. Finally, with all the interacting variables and methods of intervention available, painkillers should never be the only intervention used for a correct and better management of pain.

CONCLUSION

The data show that, despite a concentrated focus on improving pain assessment and management over the past decades, such as the establishment in Italy of the Hospital Committees without Pain (Cosd), pain remains a common problem among hospitalized adult patients. Pain is reported by about 4 out of 10 adults, with a higher prevalence of cases in women, and its appearance does not depend on the care setting. Identification of patients' populations and characteristics that lead to an increase in pain, provide a focus for the development of targeted interventions and further research to improve care. In future, assessing the impact of training to improve the knowledge, attitude and practice for nurses on issues related to pain assessment and pain management, will be very useful. In order to assess the prevalence of pain carefully, an Italian study that involves all regions and a large number of the centers may be necessary.

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Conflict of interest statement

Authors declare no conflict of interest.

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REFERENCES

1. Wadensten B, Frojd C, Swenne C, Gordh T, Gunningburg L. Why is pain still not being assessed adequately? Results of a pain prevalence study in a university hospital in Sweden. Journal of Clinical Nursing. 2011;20:624-34.
2. Black B, Herr K, Fine P, Sanders S, Tang X, Bergen-Jackson K, Titler M, Forcucci C. The relationships among pain, nonpain symptoms, and quality of life measures in older adults with cancer receiving hospice care. Pain Medicine. 2011;12(6):880-9. DOI: 10.1111/j.1526-4637.2011.01113
3. Gregory J, McGowan L. An examination of the prevalence of acute pain for hospitalised adult patients: a systematic review. Journal of Clininical Nursing. 2016;25(5-6):583-98. DOI: 10.1111/jocn.13094
4. van Kooten J, Smalbrugge M, van der Wouden JC, Stek ML, Hertogh CMPM. Prevalence of pain in nursing home residents: The role of dementia stage and dementia subtypes. Journal of the American Medical Directors Association. 2017;18(6):522-7. DOI: 10.1016/j.jamda.2016.12.078
5. Constantini M, Viterbori P, Flego G. Prevalence of pain in Italian hospitals: results of a regional cross-sectional survey. Journal of pain and Symptom Management. 2002;23:221-30.
6. Melotti RM, Samolsky-Dekel BG, Ricchi E, Chiari P, Di Giacinto I, Carosi F, Di Nino GF. Pain prevalence and predictors among inpatients in a major Italian hospital. A baseline survey towards a pain free hospital. European Journal of Pain. 2005;9:485-95.
7. Vallano A, Malouf J, Payrulet P, Banos JE. Prevalence of pain in adults admitted to Catalonian hospitals: a cross-sectional study. European Journal of Pain. 2006;10:721-31.
8. Strohbueker B, Mayer,H, Evers GCM, Sabatowski R. Pain prevalence in hospitalised patients in a German teaching hospital. Journal of Pain and Symptom Management. 2005;28:498-506.
9. Kozlowski LJ, Kost-Byerly S, Colantuoni E, Thompson CB, Vasquenza KJ, Rothman SK, Billett C, White ED, Yaster M, Monitto CL. Pain prevalence, intensity, assessment and management in a hospitalized pediatric population. Pain Management Nursing. 2014;15(1):22-35.
10. Loney PL, Chambers LW, Bennett KJ, Roberts JG, Stratford PW. Critical appraisal of the health research literature: prevalence or incidence of a health problem. Chronic Diseases in Canada. 1998;19(4):170-6.
11. Mannion RJ, Wolf CJ. Pain Mechanisms and Management: a central perspective. Clinical Journal of Pain. 2000;16(3):144-56.
12. Hawker GA, Mian S, Kendzerska T, French M. Measures of adult pain: Visual Analog Scale for Pain (VAS Pain), Numeric Rating Scale for Pain (NRS Pain), McGill Pain Questionnaire (MPQ), Short-Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Grade Scale (CPGS), Short Form-36 Bodily Pain Scale (SF-36 BPS), and Measure of Intermittent and Constant Osteoarthritis Pain (ICOAP). Arthritis Care & Research. 2011;63(11):240-52. DOI:10.1002/acr.20543
13. Bech RD, Lauritsen J, Ovesen O, Overgaard S. The verbal rating scale is reliable for assessment of postoperative pain in hip fracture patients. Pain Research and Treatment .2015;676212. DOI:10.1155/2015/676212
14. Warden V, Hurley AC, Volicer L. Development and psychometric evaluation of the Pain Assessment in Advanced Dementia (PAINAD) scale. Journal of the Ameri-

can Medical Directors Association. 2003;4(1):9-15.
15. Abbey J, Piller N, De Bellis A, Esterman A, Parker D, Giles L, Lowcay B. The Abbey pain scale: a 1-minute numerical indicator for people with end-stage dementia. International Journal of Palliative Nursing. 2004;10(1):6-13.
16. Severgnini P, Pelosi P, Contino E, Serafinelli E, Novario R, Chiaranda M. Accuracy of critical care pain observation tool and behavioral pain scale to assess pain in critically ill conscious and unconscious patients: prospective, observational study. Journal of Intensive Care. 2016;7:4:68.
17. Kennedy J, Roll JM, Schraudner T, Murphy S, McPherson S. Prevalence of persistent pain in the US adult population: new data from the 2010 national health interview survey. Journal of Pain. 2014;5(10):979-84. DOI: 10.1016/j.jpain.2014.05.009
18. Allen CA, Ivester JR. Ketamine for pain management-side effects and potential adverse events. Pain Management Nursing. 2017;18(6):372-7. DOI:10.1016/j.pmn.2017.05.006
19. Tsai IP, Jeong SY, Hunter S. Pain assessment and management for older patients with dementia in hospitals: an integrative literature review. Pain Management Nursing. 2017;S1524-9042(17):30022-X. DOI: 10.1016/j.pmn.2017.10.001
20. Resnick B, Galik E, Wells CL, Boltz M, Renn CL, Dorsey SG. The impact of pain management with opioids among older adults post orthopedic trauma. Pain Management Nursing. 2016;1-9. DOI: 10.1016/j.pmn.2016.05.005
21. Latina R, Mauro L, Mitello L, D'Angelo D, Caputo L, De Marinis MG, Sansoni J, Fabriani L, Baglio G. Attitude and Knowledge of Pain Management Among Italian Nurses in Hospital Settings. Pain Management Nursing. 2015;16(6):959-67. DOI: 10.1016/j.pmn.2015.10.002
22. Veal F, Williams M, Bereznicki L, Cummings E, Thompson A, Peterson G, Winzenberg T. Barriers to optimal pain management in aged care facilities: An Australian qualitative study. Pain Management Nursing. 2017;S1524-9042(16):30243-0.
23. Prandi C, Garrino L, Mastromarino P, Torino F, Vellone E, Peruselli C, Alvaro R. Barriers in the management of cancer-related pain and strategies to overcome them: findings of a qualitative research involving physicians and nurses in Italy. Annali Istituto Superiore di Sanita. 2015;51(1):71-8. DOI: 10.4415/ANN_15_01_13
24. Gulmez SE, Larrey D, Pageaux GP, Bernuau J, Bissoli F, Horsmans Y, Thorburn D, McCormick PA, Stricker B, Toussi M, Lignot-Maleyran S, Micon S, Hamoud F, Lassalle R, Jové J, Blin P, Moore N. Liver transplant associated with paracetamol overdose: results from the seven-country SALT study. British Journal of Clinical Pharmacology. 2015;80(3):599-606. DOI: 10.1111/bcp.12635
25. Bridget M, Kuehn FDA. Acetaminophen may trigger serious skin problems. JAMA. 2013;310(8):785. DOI:10.1001/jama.2013.276938
26. Roberts E, Delgado Nunes V, Buckner S, Latchem S, Constanti M, Miller P, Doherty M, Zhang W, Birrell F, Porcheret M, Dziedzic K, Bernstein I, Wise E, Conaghan PG. Paracetamol: not as safe as we thought? A systematic literature review of observational studies. Annals of the Rheumatic Diseases 2016;75(3):552-9. DOI: 10.1136/annrheumdis-2014-206914
27. Brok J, Buckley N, Gluud C. Interventions for paracetamol (acetaminophen) overdose. Cochrane database of systematic review. 2006;19(2):CD003328.
28. Nahin RL. Estimates of pain prevalence and severity in adults: United States. Journal of Pain. 2015;16(8):769-80.
29. Lovich-Sapola J, Smith CE, Brandt CP. Postoperative pain control. Surgical Clinics of North America. 2015;95(2):301-18. DOI: 10.1016/j.suc.2014.10.002
30. Damico V, Cazzaniga F, Murano L, Ciceri R, Nattino G, Dal Molin A. Impact of a Clinical Therapeutic Intervention on Pain Assessment, Management, and Nursing Practices in an Intensive Care Unit: A before-and-after Study. Pain Management Nursing. 2018;19(3):256-266. DOI: 10.1016/j.pmn.2018.01.007