

# Knowledge and attitude of pain management among Italian nurses in intensive care unit: a multicentric descriptive study

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**Parole chiave:** *Aggiornamento professionale continuo, conoscenza e attitudine, assistenza infermieristica, educazione al dolore*

## Abstract

**Aim.** The main objective of the study was to document the current knowledge and attitudes towards pain management among Italian nurses working in intensive care unit (ICU).

**Methods.** A multicenter cross-sectional study design was carried out. In order to assess the knowledge and attitudes of pain management, the KASRP questionnaire was used. The questionnaire was submitted online through Google Forms platform.

**Results.** A total of 864 nurses completed and returned the study questionnaire (58% were males). The mean of the total correct answers was 31.21 (SD 2.92) out of 40 (total score if all items answered correctly) with range of 22–38. No significant differences were observed with regard to gender ( $t = 1.875$ ,  $P = .061$ ). Spearman's correlation test showed a positive significant relationship between knowledge and attitude of pain management and years of ICU experience ( $r = .424$ ,  $P <.001$ ) and between knowledge and attitude of pain management and the attendance of a pain update course in the last 3 years ( $r = -0.83$ ,  $P = .014$ ). We haven't found any correlation neither between age and knowledge nor between age and attitude score ( $r = -0.32$ ,  $P = .351$ ).

**Conclusions.** This study has shown that Italian ICU nurses have good level of pain management knowledge and attitudes of pain medication. It is recommended to consider pain management in the context of continuing professional development.

## Introduction

Pain is one of the main stress factors in intensive care unit (ICU) (1). There is a growing awareness on the etiology of pain, together with the advancement of pharmacological management of pain. Despite this awareness and pharmacological

advancement, patients still experience intolerable pain which hampers the physical, emotional, and spiritual dimension of the health (2, 3).

The concept of pain cannot be easily understood, evaluated and managed, especially in ICU patients and during the postoperative period (4).

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A recent prevalence study estimated that 31% of ICU patients experience moderate or intense pain, regardless patient characteristics or patients' disease status (5). After surgery, the prevalence of postoperative pain intensity increases to 40% (5).

The level of pain experienced by a hospitalized patient can be affected significantly by the nurse's attitude and level of knowledge, to the point that unrelieved pain is one of the most common patient complaints (6, 7).

It is well known that pain assessment and management is the responsibility of health professional nurses, in particular nurses whose duty is to protect the wellbeing of those patients who are entrusted to their care (8). In Italy, the last code of ethics of nurses was published in 2019. In article 18 it is mentioned that the nurse prevents, detects and documents the pain during the treatment path. The nurse works applying good practices for the pain management and related symptoms, in accordance with the patient's wishes (Ethic Code of Italian Nurses, 2019) (8).

Limited knowledge and negative attitude of nurses toward pain management were reported as major obstacles in the implementation of an effective pain management (9, 10). Some, like the political and cultural issues, are difficult to modulate and modify, while others are easier to influence and overcome, such as the shortage of appropriate training programs for healthcare professionals (11).

Knowledge deficit about pain management is not uncommon among health-care professionals. It is estimated that around 50% of health-care providers reported lack of knowledge in relation to pain assessment and management (12, 13).

The existing medical literature is abundant with reports referring to patients' dissatisfaction with

pain assessment and management and many focus on nurses employed in the

oncological setting or in palliative care (14, 15). In addition, there are recent studies that have also compared the knowledge and attitudes of nurses about pain in multiple hospital settings (16). However, little is known on how Italian registered nurses (RNs) approach pain management in ICU settings.

The main objective of the study was to document the current knowledge and attitudes towards pain management among Italian nurses working in ICUs.

## Methods

### *Study design and setting*

A multicenter cross-sectional study design was carried out.

Convenience sample of nurses who work in the ICU, Neurosurgical ICU and Pediatric ICU in each hospital member of the GiViTi (*Italian Group to assess the intervention in Intensive care unit*) group, were invited to participate in this study. All nurses were informed of our intention to perform the study and were encouraged to take part in the survey.

This study was conducted in all ICUs registered with the GiViTi (*Italian Group to assess the intervention in Intensive care unit*) group.

GiViTi is an Italian Intensive Care network. GiViTi, *Italian Group to assess the intervention in Intensive care unit* is promoted by the Mario Negri IRCCS Institute for Pharmacological Research. For many years, the society has been collecting epidemiological data on patients admitted to Italian intensive care, including many ICUs of Central-Northern Italy and for some years also in Southern Italy. The GiViTi group is made up of 3 fundamental units: the ICUs, the Technical Scientific Committee (CTS) and the Coordination Center. To date, 477 ICUs are enrolled in the GiViTi group. Membership in the group is free and no

form of grant is foreseen for the participating Centers or their representatives. The CTS is made up of 13 members, 12 clinicians and one member of the Coordination Center. On the basis of funding, available forces and interests of the group, it has the task of identifying, on an annual basis, the research projects to which to dedicate interest and report to the whole group. The Coordination Center is responsible for: managing contacts with centers belonging to the group and / or participating in the various research projects, Collecting and managing data from the various research projects, Analyzing and disseminating the results obtained.

#### *Inclusion criteria*

The study was conducted in the ICUs located in different geographical areas in Italy.

The sample consisted of the staff nurses who were active in nursing practice during the study period from December 2019 to February 2020, including Nurses with temporary contracts and staff nurses not participating in direct patient care (e.g., team leaders). Nursing students in the ICU were excluded.

#### *Data collection*

An email has been sent to all the centers registered with GiViTi. A short letter attached to the email, explaining the project and a link to click to access the compilation of the questionnaire was sent. The email was sent by the GiViTi secretary.

The questionnaire was submitted online through Google Forms platform. Google Forms is a tool that allows collecting information from users via a personalized survey or quiz. The information is then collected and automatically connected to a spreadsheet. The spreadsheet is populated with the survey and quiz responses.

The questionnaires collection took place between 1st December 2019 and 20th February 2020.

#### *Instrument*

The questionnaire sent to the participants, was divided into two sections.

The first section concerned the collection of the demographic sample data (eg. age, gender, level of education, training, ICU work experience, department, pain update course in the last 3 years).

The second section concerned the Knowledge and Attitudes Survey Regarding Pain (KASRP) questionnaire.

Ferrell and McCaffery's Italian Version of the Knowledge and Attitudes Survey Regarding Pain (17) was used to collect the data from the Italian ICUs and to gather additional information on the nurses' approach to pain assessment and management (18).

The content of the tool derived from current standards of pain management such as the American Pain Society, the World Health Organization, and the National Comprehensive Cancer Network Pain Guidelines.

The KASRP consists of 22 true/false questions; 13 multiple choice questions; and 2 case vignettes, with 2 questions each. The KASRP has a score from 0 to 39 (if all items answered correctly). We evaluated the percentages of the total scores, distinguishing items as either "knowledge" or "attitudes." Mean total survey scores were calculated for each participant, the questions were analyzed in terms of frequency of correct/incorrect answers, and the 18 items with the least number of correct answers were explored further, as suggested by Ferrell and McCaffrey (18).

#### *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 group of subjects the data belonged to, using the Statistical Package for Social Sciences (SPSS) version 22 (SPSS Inc., Chicago, Illinois, USA).

Results are reported as numbers and percentages for categorical variables and as means and standard deviation (SD) for continuous variables.

Mean total survey scores were calculated for each participant, the questions were analyzed in terms of frequency of correct/incorrect answers.

Independent t-test was used to compare the mean total scores between gender and previous exposure to pain education. Analysis of variation (ANOVA) was used to determine the significant difference in the mean total knowledge score and educational level. Spearman correlation was used to determine the correlation between variables.  $P < 0.05$  was considered statistically significant.

### *Ethical considerations*

The recruitment of participants started with the researchers obtaining the approval of the study from technical-scientific committee (CTS) and the president of the GiViTi Association. Nurses who showed interest for the study were recruited and asked to sign the consent form attached to the questionnaire. The study questionnaire was introduced to each participant, and each participant was asked to answer the questions.

The study protocol was in line with the Declaration of Helsinki, as revised in 2013, and the Oviedo Convention for the protection of human rights and dignity of the human being with regard to the application of biology and medicine (1996). The nurses belonging to the three different ICU settings completed the survey and were offered the possibility to remain anonymous. Data were collected in completely anonymous form. Therefore, the approval of an Ethics Committee was not necessary and the GDPR EU 2016/678 in force in Italy since 2018 does not apply for our study design.

## Results

### *Socio-demographic presentation of the analyzed sample*

A total of 864 nurses completed and returned the study questionnaire.

As shown in Table 1, 58 % of participants were males. Participants had a mean age of 36.5 (SD 5.0) and range from 27 to 55 years. Most of the nurses had a bachelor in nursing (n= 641; 74.2%), and worked in general intensive care units (n= 627; 72.6%). Further, 638 (73.8%) of nurses reported no previous pain education in the last 3 years.

Table 1 - Demographic and Educational Characteristics of Italian Critical Care Nurses.

Characteristic	Total sample
Age (years), n (%)	
24-30	11 (1.3)
31-40	700 (81)
41-50	137 (15.9)
51-60	16 (1.8)
Gender, n (%)	
Male	501 (58)
Female	363 (42)
Level of Education, n (%)	
Bachelor's degree	641 (74.2)
Diploma	223 (25.8)
Nursing experience in ICU (years), M (sd)	9.13 (6.01)
Masters, n (%)	
Yes	92 (10.6)
No	772 (89.4)
Pain update course (last 3 years), n (%)	
Yes	226 (26.1)
No	638 (73.8)
Department, n (%)	
Intensive Care Unit	627 (72.6)
Pediatric Intensive Care	105 (12.2)
Units	
Neurosurgical Intensive Care	132 (15.2)
Units	

n = number; (%) = percentage; M = mean; (sd) = standard deviation

## Nurses' knowledge and attitudes regarding pain management.

The number of correct answers has been 26,902 out of 33,696 (79.8% percentage of correct answer). The percentages of the correctly answered items in the questionnaire for each item are shown in Table 2. The mean of the total correct

answers was 31.2 (SD 2.9) out of 39 (total score if all items answered correctly) with range of 22–38.

No significant differences in the mean were observed with regard to gender ( $t = 1.875$ ,  $P = .061$ ). However, males had a higher mean score (mean= 31.4, SD 4.0) than females (mean= 30.9, SD 3.7).

Table 2 - correctly answered items in the questionnaire.

Item number	Item content	Correct responses, n (%)
<b>True or false questions</b>		
1	Changes in vital signs must be relied on to verify the patient's statement of pain (false)	372 (43.1)
2	Children <2 years old have decreased pain sensitivity and limited memory of painful experiences (false)	549 (63.5)
3	If the patient can be distracted, this means that he is not suffering from acute pain (false)	763 (88.3)
4	Patient may sleep in spite of severe pain (true)	642 (74.3)
5	Stimuli in different people produce the same intensity of pain (false)	853 (98.7)
6	Aspirin and non-steroidal anti-inflammatory agents are not effective for bone pain because of metastases (false)	577 (66.8)
7	Non-drug interventions are effective for mild–moderate pain control but not for severe pain (false)	645 (74.7)
8	Respiratory depression rarely occurs in patients who have been administered opioids for several months (true)	832 (96.3)
9	650 mg of aspirin per oral have an analgesic effect approximately equivalent to 50 mg of Pethidine per os (true)	613 (70.9)
10	The WHO pain ladder suggests using single analgesics rather than combination drugs (false)	776 (89.8)
11	The average duration of action of pethidine intramuscularly administered is 4–5 hours (false)	768 (88.9)
12	Some research has shown that the promethazine (Farganesse) certainly enhances the analgesic opioid (false)	613 (70.9)
13	Patients with substance abuse should not be given opioids because of high risk of addiction (false)	577 (66.8)
14	Beyond a certain dosage of morphine increases in dosage will not increase pain relief (false)	832 (96.3)
15	Older patients cannot tolerate opioids to relief pain (false)	800 (92.6)
16	Patient should be encouraged to endure pain before resorting to a pain-relief measure (false)	716 (82.9)
17	The nurse should rely on the parents' assessment for children <11 years old (false)	804 (93.1)
18	Patients with religious beliefs may think that pain and suffering are necessary (true)	744 (86.1)
19	Dosages are adjusted in accordance with the patient's response (true)	809 (93.6)
20	The patient should be advised to use non-drug techniques alone rather than use medications (false)	804 (93.1)
21	Giving an injection of sterile water (placebo) is often a useful test to determine if the pain is real (false)	792 (91.7)
22	Heat or cold should only be applied to the painful area (false)	682 (78.9)

<b>Multiple choice questions</b>		
23	The recommended route of administering opioids to patients with prolonged cancer pain (oral)	524 (60.6)
24	Recommended route of administration of opioids to patients with sudden onset of severe pain (IV)	520 (60.2)
25	What analgesic treatment that goes from moderate to strong is considered the drug of choice in treating pain (morphine)	779 (90.2)
26	Intravenous doses of morphine administered every 4 hours should be equivalent to 30 mg of oral morphine administered every 4 hours (morphine 10 mg iv)	752 (87)
27	Analgesic therapy in post-operative pain should be administered (around the clock on fixed schedule)	472 (55.1)
28	Scenario 1: developing respiratory depression (< 1%)	683 (79.1)
29	Analgesic therapy in chronic pain should be administered (around the clock on fixed schedule)	471 (54.5)
30	The most likely explanation of why pain patients require an increase in the dose of pain medication (the patients is experiencing increased pain)	817 (94.6)
31	Drugs useful in the treatment of pain (all the above)	810 (93.8)
32	Accurate assessment of the intensity of the patient's pain (the patient)	824 (95.4)
33	The approach to the patient with pain considering cultural diversity (patient should be individually assessed to determine cultural influence)	577 (66.8)
34	Percentage of patients who overestimate their pain (0)	524 (60.6)
35	What is the likelihood of addiction to opioids in patients with pain treated with opioids (1-5%)	810 (93.8)
<b>Case studies</b>		
36 A	Case study A: assessment of pain on surgical patients (8)	838 (97)
36 B	Case Study A: clinical decision after assessment of pain (administer morphine 3 mg iv now)	629 (72.8)
37 A	Case Study B: assessment of pain on surgical patients (8)	832 (96.3)
37 B	Case study B: clinical decision after assessment of pain (administer morphine 3 mg iv now)	477 (55.2)

KASRP= nurses' knowledge and attitudes survey regarding pain; n (%) = number and percentage of correct answers. Total correct score for each questionnaire 0-39 (mean 31.2). 26902 correct answer on 33696. Percentage of correct answer (79.8%).

The results of the KASRP test confirmed that nurses from general ICUs have better knowledge about pain than nurses from other ICU settings ( $F = 11.185$ ,  $P < .001$ ) (Table 3).

One-way ANOVA showed no significant difference in the mean total KASRP score with regard to educational levels. Spearman's correlation test showed a significant relationship between knowledge and attitude of pain management and years of ICU experience ( $r = -.424$ ,  $P < .001$ ).

Nurses who participated a pain update over the past 3 years scored higher on the

test (mean= 31.9, SD 3.5 vs mean= 30.9, SD 4.0) ( $t= 2.993$ ,  $P = .003$ ).

We found no correlation with the age ( $P = .351$ ).

The comparison of some questions revealed discrepancy between the nurses' beliefs and practices: 95.4% of the nurses agreed that the patient is the most reliable source for reporting pain, but 148 nurses (17.1%) would encourage their patient to tolerate the pain before giving them any pain medications.

In addition, nurses have been found to have a negative attitude towards pain and its

Table 3 - Knowledge and Attitude regarding pain among nurses in relation to ICU settings.

Setting	KASRP mean (SD)	IC 95%	F	P-value
ICU	31.9 (3.88)	31.6, 32.2		
PICU	28.9 (3.15)	28.2, 29.6	11.185	< .001
TIN	29.6 (4.23)	29.1, 30.3		

F and P-values derive from anova test

management. Only 55.1% of nurses believe that it is correct to manage postoperative pain with the administration of drugs around the clock on fixed schedule, and 492 of nurses (56.9%) believe that is necessary to rely on changes in vital signs to verify the patient's pain statement.

## Discussion

This study was conducted to identify nurses' knowledge and attitude toward pain management in intensive care unit and assess nurses' strengths and weakness in managing patients' pain.

The outcome of the current study demonstrates that the surveyed nurses had good knowledge of pain management, and this result was associated with appropriate attitude toward pain management.

This is mainly related to the nurses' knowledge and years of work experience in ICU on pharmacological pain therapy such as the use of opioids. The average KASRP score in the present study was 31.2, which was higher if compared to other studies (19, 20).

In line with Latina et al., study (2015), no significant statistical association is related to age, gender, or level of education (16).

About two thirds of the nurses surveyed responded that they rely on changes in vital signs to verify the patient's pain statement. Clinical guidelines suggest that vital signs (or observational pain scales that include vital signs) cannot be used alone for pain assessment in adult ICU patients (1).

However, the vital signs may be used as a cue to begin further assessment of pain in these patients (1). Observational studies with major limitations provide inconsistent evidence of the validity of vital signs for the purpose of pain assessment in medical, postoperative, and trauma ICU patients. Even if there is a trend for vital signs to increase when critically ill patients are exposed to painful procedures, this increase is not a reliable predictor of pain (1).

In one study by Payen and colleagues with 30 surgical and trauma ICU participants, mean arterial pressure (MAP) and heart rate (HR) were found to increase significantly during nociceptive procedures (turning and endotracheal suctioning) compared to non-nociceptive procedures (compression stocking applications and catheter dressing change). However, this study was conducted with unconscious patients only, and the relationship between vital signs' fluctuations and patients' self-report of pain (i.e., the gold standard for pain assessment) could not be examined (21).

In a more recent study with 55 ICU patients with different and various diagnoses (medical, surgical, and trauma), vital signs' fluctuations (i.e., systolic pressure, diastolic pressure, MAP, HR, respiratory rate, capillary saturation ( $SpO_2$ ), and end-tidal  $CO_2$ ) were not associated with patients' self-report of pain during a nociceptive procedure (turning) (22). However, a recent study showed a significant fluctuation in diastolic pressure, Heart Rate,  $SpO_2$  and intra cranial pressure during pain assessment in nociceptive procedures. These fluctuations

were related to the participants' self-report (23).

As highlighted in another article, nurses agreed that the patient is the most reliable source for reporting pain, but at the same time nurses would encourage their patient to tolerate the pain before giving them any pain medications (20).

Just over half of the nurses believe that administration of drugs around the clock on fixed schedule is necessary to properly manage postoperative pain. If pain drugs are administered around the clock on fixed schedule there is a significant reduction in postoperative pain. The outcome of mild or no pain has been suggested as being a target important to adult patients. It has the advantage of being useful as a dichotomous outcome to determine efficacy. Failure to attain the outcome is a marker of poor treatment. Evidence of opioid-sparing effect has been observed for: NSAIDs, paracetamol, ketamine, clonidine, gabapentin and other perioperative analgesics (24-26). These molecules should use analgesic efficacy with known endpoints, and take into account concerns about safety and serious adverse events such as postoperative bleeding (24-26).

Refresher courses on pain in the last three years has improved nursing knowledge. Recent studies have shown that pain management workshops have been very effective in increasing knowledge and promoting nurses' attitude to pain management, and the knowledge scores increased from 2.7% to 67.2% after training (27). Mashayekhi and Kamali in 2019 observed that attitudes to pain management were significantly different before and after participation in the workshop and post-training. The nurses had a more positive attitude towards pain management after training. As nurses' knowledge increases, nurses' attitude to pain management is also subject to change (27).

### *Limitations*

This study has a number of limitations.

First, a total of 864 nurses completed and returned the study questionnaire. However, we have not calculated a response rate, not knowing how many nurses registered in the GiViTi ICUs.

Second, the convenience sample and the non-knowledge of participation rate could have affected the study results. We adopted non-probabilistic and convenient sampling criteria, including only those nurses who had agreed to participate in the study. Therefore, results may not faithfully reproduce the real level of knowledge and attitude of nurses who did not take part in this survey, which can lead to a generalization of the obtained results. We therefore believe that further research should be performed on a larger scale by including more nurses.

Third, based on the test scores, the KASRP questionnaire we used does not define poor, good or excellent knowledge of pain. However, our data have been compared with literature and other similar studies.

Fourth, the study results could be affected by the outdated version of the instrument used (KASRP questionnaire version 2011) and a new update to the questions may be appropriate, given that research and knowledge on pain are constantly evolving.

### **Implication for nursing clinical practice**

Pain knowledge is influenced by work experience and specific training. The best scores were observed among nurses who have attended an educational program in the last three years, providing further evidence of the validity of a pain update course. Participation in continuing professional development (both in formal and informal contexts) is an important component of clinical practice. In relation to pain assessment and management,

the work of IASP in the development of profession-specific and interdisciplinary curriculum guidelines, combined with the establishment of the pain competencies, has provided a firm foundation for course design (28).

## Conclusions

Pain is a complex and subjective phenomenon. Effective pain management requires a careful assessment and patients are entitled to have their pain addressed by healthcare providers. Use of a specific and multimodal procedure for pain management provides a rational basis for enhanced postoperative pain control, optimization of analgesia, decrease in adverse effects, and improvement in patient satisfaction (29).

Despite the several limitations, this study has shown that Italian ICU nurses have adequate level of pain management knowledge and attitudes particularly in the issues related to myths of pain medication.

Moreover, it may be necessary to revise the educational curricula of critical care nurses, and a course on pain, pain assessment, pain management methods, and pain pharmacology and physiology should be added to their curricula. It is recommended to consider pain management in the context of continuing professional development. Further studies are needed to identify and overcome barriers of pain management among ICU nurses and to evaluate the effectiveness of conducted pain management courses.

Moreover, future research should focus on how improved pain management level translates into better patient outcomes.

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## Riassunto

*Conoscenze e atteggiamenti riguardo la gestione del dolore tra gli infermieri italiani in terapia intensiva: uno studio descrittivo multicentrico.*

**Scopo.** L'obiettivo principale dello studio era di documentare le attuali conoscenze e atteggiamenti nei confronti della gestione del dolore tra gli infermieri italiani che lavorano in terapia intensiva (TI).

**Metodi.** È stato realizzato un disegno di studio trasversale multicentrico. Al fine di valutare le conoscenze e gli atteggiamenti della gestione del dolore, è stato utilizzato il questionario KASRP. Il questionario è stato inviato online tramite la piattaforma Google Forms.

**Risultati.** Un campione di 864 infermieri ha completato e restituito il questionario di studio (il 58% era di sesso maschile). La media delle risposte esatte totali era 31.21 (SD 2.92) su 40 (punteggio totale se tutte le voci erano corrette) con un intervallo di punteggi di 22–38. Non sono state osservate differenze significative riguardo al genere ( $t = 1.875, P = .061$ ). Il test di correlazione di Spearman ha mostrato una relazione significativa positiva tra la media dei punteggi del KASRP e gli anni di esperienza in terapia intensiva ( $r = -.424, P < .001$ ) o con avere frequentato un corso di aggiornamento sul dolore negli ultimi 3 anni ( $r = -.083, P = .014$ ). Nessuna correlazione è stata trovata con l'età ( $r = -.032, P = .351$ ).

**Conclusioni.** Questo studio ha osservato che tra gli infermieri italiani in terapia intensiva esiste un buon livello di conoscenza della gestione del dolore. Si raccomanda di considerare la gestione del dolore nel contesto del continuo sviluppo professionale.

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