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Article in press

This article was accepted for publication in V68N1 of Revista de la Facultad de Medicina (Journal of the Faculty of Medicine), considering the concepts of the peer reviewers and the changes made by the authors based on said concepts. Therefore, the preliminary version of this article is published for consultation and provisional citation purposes. However, it should be noted that this version may differ from the final document since it has not completed the final stages of the editorial process (proof-editing, translation, and layout). Only the titles, authorship, keywords and abstracts will remain unchanged in the final version of the article.

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How to cite:
Type of article: Original research

DOI: http://dx.doi.org/10.15446/revfacmed.v68n1.71744

Differences in pain measurement between nurses and physicians in a teaching hospital

Diferencias en la medición del dolor entre enfermeros y médicos en un hospital universitario

Short title: Assessment of pain in a university hospital

Received: 16/04/2018 Accepted: 05/06/2018

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Abstract

Introduction: In clinical practice, the administration of opioid analgesics depends on pain severity records from nurses because they are responsible for determining the severity of the patient's complaints; however, discrepancies regarding pain measurement are often observed between physicians and graduated nurses, which can lead to an inadequate use of analgesics.
Objective: To carry out a comparison of pain severity measurements made by staff physicians and nurses in a teaching hospital during the first 24 hours of hospital stay of patients with movement-related pain.

Methods: Retrospective, cross-sectional study. Data were obtained from the pharmacy database and medical records (opioids prescribed for 1 month, pain intensity, and medication management). The medical records of 634 in patients who were prescribed at least 1 dose of an opioid analgesic were reviewed.

Results: The average pain score provided by physicians (5.4/10; SEM=0.17) was significantly higher than the average pain score reported by nurses (3.5/10; SEM=0.15) (p<0.05). The intra-class correlation coefficient was 0.371 (95%CI: 0.138-0.563), indicating poor agreement between measurements.

Conclusion: A poor agreement between pain measurements made by physicians and nurses during the first 24 hours of hospital stay was found. Bearing in mind that pain measurement is essential for achieving an appropriate treatment, the jointly provision of pain management education programs to doctors and nurses should be considered, so that they assess pain severity similarly, thus improving the management of inpatients and their quality of life.

Keywords: Analgesics, Opioid; Prescriptions; Pain Management (MeSH).

Resumen

Introducción. En la práctica clínica, la administración de analgésicos opioides depende de los registros de intensidad de dolor realizados por los enfermeros, ya que estos son los responsables de determinar la intensidad de las quejas de los pacientes. Sin embargo, a menudo se observa que existen discrepancias entre médicos y enfermeros profesionales respecto a la medición del dolor, lo que puede llevar a un uso inadecuado de analgésicos.

Objetivo. Comparar las intensidades de dolor de pacientes con dolor asociado al movimiento y registradas por médicos y enfermeros de un hospital universitario durante las primeras 24 horas de hospitalización.

Materiales y métodos. Estudio retrospectivo de corte trasversal. La información se obtuvo de las historias clínicas y de la base de datos de la farmacia del hospital (opioides prescritos por 1 mes, intensidades de dolor y uso de medicamentos). Se revisaron las historias clínicas de 634 pacientes a los que se les recetó al menos 1 dosis de opioide durante su estancia hospitalaria.

Resultados. El puntaje promedio de dolor registrado en el grupo de médicos fue significativamente mayor (5.4/10, SEM=0.17) que el registrado en el grupo de enfermeros (3.5/10; SEM=0.15) (p<0.05). El coeficiente de correlación intra-clase fue 0.371 (IC95%: 0.138-0.563), lo que indica una pobre concordancia entre las mediciones de médicos y enfermeros.

Conclusiones. Se observó una pobre concordancia entre la medición del dolor realizada por los enfermeros y los médicos del hospital. Teniendo en cuenta que la medición del dolor es fundamental para lograr un trata-
miento adecuado, debe considerarse ofrecer programas de educación en manejado del dolor a médicos y enfermeros de manera conjunta para que su medición sea uniforme, lo que mejorará el manejo de los pacientes hospitalizados y, por tanto, su calidad de vida.

**Palabras clave:** Analgésicos opioides; Prescripciones de medicamentos; Manejo del Dolor (DeCS).


**Introduction [T1]**

There are many barriers that prevent proper pain management, including poor pain measurement from health care professional;\(^1\) however, most data show that assessing pain is imperative for good outcomes\(^2,3\) and is necessary in the clinical setting to choose a treatment but also to evaluate treatment efficacy. In other words, an efficient treatment depends on proper evaluation.

In routine clinical practice, inpatients are questioned about the intensity of their pain, their pain upon admission and during their stay at least once a day, and upon discharge from their stay in the hospital. The nurse in charge carries out this process. Using analgesics is determined when the doctor makes a pain measurement. A multidisciplinary practice of patient care requires agreement between the measurements provided by both professionals. However, said measurements may be misleading if the professionals involved have different perceptions about the intensity of the
pain of the patient.

The literature reports that the training received by physicians and nurses in pain management is deficient.\textsuperscript{4,5} Previous studies have shown that there are important differences between pain intensities assessed by doctors and nurses and that these differences may generate inadequate treatments because the interventions, for example, may lead to increase or decrease dosages of analgesics, often based on the pain reports obtained from the nursing records. It should be noted that pain measurement is often missing and that this lack of reports leads to inadequate treatment as well.\textsuperscript{6}

Contemporary analgesia takes into account many aspects that can generate pain, but the most important analgesic goals are those associated with painful movement,\textsuperscript{7} given that its inadequate management can result in late recovery of mobility or previous functional status.

The main objective of this study was to compare the records of nurses on patient worst pain to records coming from physicians, evaluated within the first 24 hours and associated with movement.

The presence of different types of pain remains problematic for many people around the world. For example, studies report that 75\% of the patients interviewed feel moderate/extreme pain during the immediate post-surgical period.\textsuperscript{8,9} In low and middle-income countries, the prevalence of unspecified chronic pain ranged from 13\% to 49.4\%.\textsuperscript{10} In Colombia, according to the national pain survey of 2014, the intensity of chronic pain was severe in 41\% of the respondents and 30\% of all those suffering from chronic pain do not receive treatment.\textsuperscript{11} Chronic pain full conditions are seen even in young people.\textsuperscript{12}
Material and Methods [T1]

Retrospective and cross-sectional study of pain measurement in hospitalized patients during one-month period in a university hospital that serves most medical and surgical specialties. An institutional policy enforced the measurement of pain during hospital stay (admission and follow up). The hospital drug formulary includes the following opioid analgesics: hydromorphone, morphine, and tramadol; parenteral pethidine; transdermal and parenteral fentanyl; and oral codeine, hydrocodone, methadone, and oxycodone.

Regarding institutional routine in pain patients, treatment includes multimodal analgesia based on non-steroidal anti-inflammatory drugs, paracetamol and short-acting opioids through route of administration and therapeutic guidelines considered most appropriate for each patient. At the end of the first 24 hours of hospitalization, each patient is asked about his/her level of pain during physical activity or movement (sitting or walking after surgery for the first time or upon admission to the floor in the case of non-surgical patients), using a scale from 0 to 10, being zero absence of pain and 10 the worst imaginable pain. The staff doctor and the graduated nurse independently record the report. The researchers retrieved data from the electronic database of the hospital pharmacy and patient medical records, including socio-demographic, clinical diagnosis, prescriptions, prescriber, opioid analgesic, and pain (type, duration, and intensity as recorded by the staff physician or graduated nurse).

The quality of the information collected was assured by training the team responsible for this task by conducting a pilot study and by double-checking the information. When discrepancies arose regarding the data collect-
ed, the researchers who reviewed the databases resolved them. The Ethics committee of the Institution where the study was carried out approved this research.

This retrospective study was conducted at 190 beds teaching hospital. Patients hospitalized for surgical and non-surgical treatment were included; patients were included if they were hospitalized and were prescribed at least 1 dose of opioid analgesic (codeine, hydrocodone, hydromorphone, fentanyl, methadone, morphine, oxycodone, pethidine or tramadol). In patients who were not prescribed any of these opioids, and pediatric (younger than 18 years old) and obstetric patients were excluded. Finally, 634 patients were included for study.

This study did not involve the performance of experiments on human or animal subjects. This study was approved by institutional ethics committee with the number CCEI-1647-2011 (24/10/2011). This study followed the indications of the Declaration of Helsinki and the regulations of Resolution 8430 of 1993.

**Statistical Analysis**

A descriptive analysis was conducted using measures of central location and dispersion for continuous variables, and the Student’s t test was used to compare continuous variables. Mean, standard deviation (σ), and maximum and minimum values were calculated for quantitative variables. If variables were not distributed symmetrically, the median and interquartile ranges were calculated. Qualitative variables were expressed as absolute percentages and relative frequencies. The chi-square test was used to compare proportions and the intra-class correlation coefficient was estimated. Analyses were performed for a 2-sided type I error level of 0.05,
and were performed using the statistical package R.

**Results [T1]**

This study included 634 hospitalized patients, of which 387 (61.9%) were female. 354 (55.8%) patients were in the ≤50 years of age range, 169 (26.7%) in the 51-70 years and 111 (17.5%) in the ≥70 years. The most frequent diagnoses were diseases of the musculoskeletal system in 100 (15.8%) patients, trauma in different body regions in 94 (14.8%) patients, non-specific systemic symptoms in 86 (13.6%), digestive system in 70 (11%) patients, genitourinary system in 57 (9.0%) patients, and neoplasms in 51 (8.0%) patients.

**Distribution of pain intensities [T2]**

Physicians recorded their pain intensity measurement on admission in 349 patients (55.1%). Meanwhile, nurses recorded pain intensity measurement on admission in 275 patients (43.4%). It was found that, on average, physicians rated pain intensity significantly higher than nurses; physicians mean intensity was 5.45/10 (σ: 0.17) (95%CI: 5.13-5.78) vs. nurses mean pain intensity 3.55/10 (σ: 0.15) (95%CI: 3.25-3.86). The intra-class correlation coefficient was 0.371 (95%CI: 0.138-0.563), indicating poor agreement between pain measurements by physicians and nurses. Most opioids were prescribed for the treatment of acute pain in 578 (91.1%), chronic pain in 35 (5.5%), cancer in 17 (2.7%), and undefined in 4 (0.6%).

**Prevalence of pain [T2]**

On a scale of 0 to 10, patients responded to the first pain intensity measurement performed by the doctors in the following way: 73 patients
(20.9%) presented pain 0 to 2; 93 patients (26.7%) indicated pain from 3 to 5; pain was severe to unbearable (≥6/10) in 182 patients (47.0%) (Figure 1).

![Pie chart]

**Figure 1.** Distribution of first pain intensity (%) scored by physicians.

Source: own elaboration

The responses of patients to the first pain intensity performed measurement by nurses were: 120 patients (43.6%) reported a scale of 0 to 2; 84 patients (30.5%) indicated their pain from 3 to 5; pain severe to unbearable (≥6/10) in 71 patients (25.7%) (Figure 2).
Figure 2. Distribution of first pain intensity (%) scored by nurses

Source: own elaboration.

Opioids used for severe pain (visual analog scale score, >6/10) were tramadol (43.0%), morphine (35.8%), hydromorphone (12.6%), fentanyl (5.3%) and pethidine (3.3%).

The classification on pain according to duration of symptoms was acute pain 91.1% (n=578), chronic pain 5.5% (n=35), cancer pain 2.6% (n=17), undefined 0.6% (n=4). Pain in the limbs was the most affective part of the body (Figure 3).
**Figure 3.** Pain location during the worst pain intensity according to physicians

Source: own elaboration

**Discussion [T2]**

Several findings are relevant for this study. One of them is the discrepancy in pain intensities reported by each professional group, which reaches a significant difference of 1.5/10 ($\sigma$: 0.2). This finding is particularly observed during the worst moment of pain, and is potentially linked to analgesics prescription, as some patients may have not received them because the nursing group did not consider them necessary, or may have received analgesics because doctors considered their pain to be from severe to unbearable. These discrepancies in the measurement of pain intensity have been previously documented and the result is poor pain management. Pain affected most patients admitted to the hospital, but pain relief in this setting was inadequate. In fact, in this sample, between 25 % and 47% of patients presented severe to unbearable pain during their hospital stay, that is, after having undergoing triage. The most influential factor to this
situation may be the lack of systematic pain measurement, which may require a personal or institutional improvement process, as previously reported in other conditions.\textsuperscript{16} In this research pain intensity was reported in only 55\% of the patients seen by doctors and in 43\% of the patients seen by nurses. Background and personal conditions, in addition to pain education, make a difference in pain measurement and treatment.\textsuperscript{17}

Another relevant finding was the need to improve pain control through a better evaluation of the intensity by physicians and nurses and better prescribing of opioid analgesic treatment after assessing the reports of patient pain. Only just over half of patients had their pain intensity assessed by their physician and even less by nurses. It is significant that, in the patients with severe pain, tramadol, an analgesic comparatively less potent than other opioids tested, was the most frequently prescribed, indicating that the intensity of pain was not a variable that defined the selection of the opioid.

In daily practice, nurses play an essential role in the measurement of pain because they tend to have more contact with the patient than physicians. However, this study detected lack of measurements by nurses. Both physicians and nurses should assess pain in their patients. The lack of correlation between the rating of pain intensity by the nurses and physicians may reflect the lack of a systematic approach to pain measurement and suggests the need for unified education for both professional groups, which may lead to better accessibility to timely pain measurement and efficient analgesic administration. Effective physician-nurse communication may help to build strong professional relationships, keep things working well and make people feel included.
In the hospital setting, measurement of pain intensity could give way to more effective treatments.\textsuperscript{18} As mentioned repeatedly, pain documentation needs to be improved through institutional educational programs for nurses and doctors, accompanied by pain monitoring and treatment. Therefore, postoperative pain measurement and treatment remains a priority challenge for physicians and nurses.

In addition to pain measurement, this research focused on opioid analgesics because they are essential in the pharmacologic management of severe pain. In fact, their use can be increased or reduced according to the intensity of pain. Although it may seem redundant, it is worth stressing the essential role of these drugs in pain management, although opipophobia has been identified as a barrier to proper pain management.

Face-to-face education, as well as other educational initiatives,\textsuperscript{19} can change professional behavior\textsuperscript{20} and improve the prescription of medications for patients with severe pain and their adherence to management guidelines, while preventing abuse and drug addiction.\textsuperscript{21} The results of this study showed the patterns of prescription and with this knowledge; hospitals can provide prescribers with friendly face-to-face education as a first step to solve the problem.

**Conclusion [T2**

Bearing in mind that pain measurement is essential for achieving an appropriate treatment, the jointly provision of pain management education programs to doctors and nurses should be considered, so that they assess pain severity similarly, thus improving the management of inpatients and their quality of life.
Conflict of interests

None stated by the authors.

Funding

None stated by the authors.

Acknowledgments

None stated by the authors.

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