

Factors associated with pain intensity in Mexican patients hospitalized in postoperative period

M. G. Moreno-Monsiváis, E. E. Fonseca-Niño¹ and M. G. Interrial-Guzmán²

Doctora en Filosofía con Especialidad en Administración. Maestra en Ciencias de Enfermería. Universidad Autónoma de Nuevo León. Facultad de Enfermería. ¹Maestra en Ciencias de Enfermería. Secretaría de Salud. ²Maestra en Ciencias de Enfermería. Universidad Autónoma de Nuevo León. Facultad de Enfermería. Monterrey NL. México

Moreno-Monsiváis MG, Fonseca-Niño EE and Interrial-Guzmán MG. Factors associated with pain intensity in Mexican patients hospitalized in postoperative period. *Rev Soc Esp Dolor* 2017;24(1):4-10.

ABSTRACT

Objective: To determine the association between pain intensity (assessment) reported by hospitalized post-operative Mexican patients with some features of patients and nursing staff.

Material and methods: The study design was descriptive and correlational. The sample consisted of 231 patients selected through systematic sampling of one in two with a random start. 31 nurses were included, representing the total number of nurses working in the departments of general surgery, orthopedics and gynecology. Data collection used patients' data cards, nurse identification cards, pain intensity (assessment) questionnaires for post-operative patients and pain awareness surveys for nursing staff.

Results: A high proportion of patients had moderate to severe pain during the first 24 post-operative hours, and 69.6 % of participants had severe pain. No association was found between pain intensity (assessment) and patients' age and education, or nurses' knowledge of pain management. Significant differences were found in pain intensity regarding sex, maximum pain experienced ($U = 3997.50$, $p = 0.001$)

and average pain over 24 hours ($U = 4852$, $p = 0.03$). Greater pain intensity (assessment) was found among females. Average nursing staff knowledge of pain management stood at 54.40 (SD = 13.12). Average pain intensity (assessment) experienced by patients in the first 24 hours was associated with the number of patients assigned to nurses ($r_s = 0.167$, $p = 0.01$).

Conclusions: Pain management in the post-operative period is inadequate and remains a challenge in view of the national and international trend towards pain-free hospitals. As a measure to contribute to pain relief, it is recommended to consider pharmacological management appropriate to patients' requirements, the use of non-pharmacological measures, regular assessment of pain intensity and its effects and the education provided to patients.

Key words: Postoperative pain, pain management, pain assessment, hospitalization, nursing staff.

RESUMEN

Objetivo: Determinar la asociación entre la intensidad del dolor reportado por pacientes mexicanos hospitalizados en periodo postoperatorio con algunas características del paciente, así como del personal de enfermería.

Material y métodos: El diseño del estudio fue de tipo descriptivo correlacional. La muestra fue de 231 pacientes seleccionados a través de un muestreo sistemático de uno en dos con inicio aleatorio. Se incluyeron 31 enfermeras que representan el total del personal de enfermería que

trabaja en los departamentos de cirugía general, traumatología y ginecología. Para la recolección de la información se utilizó la cédula de datos del paciente, cédula de identificación de la enfermera, cuestionario de intensidad del dolor en el paciente postoperatorio y la encuesta de conocimiento del dolor por enfermería.

Resultados: Una alta proporción de pacientes presentó dolor moderado a severo durante las primeras 24 horas postoperatorias. El 69,6 % de los participantes presentó dolor severo. No se encontró asociación entre la intensidad del dolor con la edad y escolaridad del paciente, ni con el conocimiento del personal de enfermería sobre el manejo del dolor. Se encontró diferencia significativa en la intensidad del dolor respecto al sexo, en el máximo dolor experimentado ($U = 3997,50$, $p = 0,001$) y en el dolor promedio en 24 horas ($U=4852$, $p=0,03$). La mayor intensidad del dolor se ubicó en el sexo femenino. La media de conocimiento del personal de enfermería en relación con el manejo del dolor se ubicó en 54,40 ($DE=13,12$). La intensidad del dolor promedio que ha experimentado el paciente en las primeras 24 horas se asoció con el número de pacientes asignados al personal de enfermería ($rs=0,167$, $p=0,01$).

Conclusiones: El manejo del dolor en periodo postoperatorio es inadecuado y sigue siendo un reto a la tendencia nacional e internacional de contar con hospitales libres de dolor. Se recomienda, como medida para contribuir al alivio del dolor, considerar el manejo farmacológico adecuado a las demandas del paciente, el uso de medidas no farmacológicas, la valoración de la intensidad del dolor y sus efectos de manera regular y la educación que se proporciona al paciente.

Palabras clave: Dolor postoperatorio, manejo del dolor, intensidad del dolor, hospitalización, personal de enfermería.

INTRODUCTION

Pain is one of the world's main causes of suffering and disability. It represents a public health problem with major social and economic repercussions, affecting people's quality of life (1,2).

The International Association for the Study of Pain defines it as an unpleasant sensory and emotional experience associated with tissue damage (3). Approximately 60% of patients report that pain interferes with their daily activities, work and mood, as well as with sleep and rest periods (1,2).

There exist different types of pain. Post-operative pain stands out as the result of surgical procedures; 90% of patients report post-operative pain (4), and approximately 60% undergo moderate to intense pain in their first 24 post-operative hours (2,5,6). This generates multiple repercussions, particularly patients' discomfort, dissatisfaction with their medical attention (7), more protracted hospital stays (2,8) and unfavorable clinical results, such as alteration in vital signs, emotional

tension, anxiety, fear, depression (9,10), interference with night-time rest, limitation of mobility, increased perioperative morbidity and even the development of chronic pain with an impact on quality of life (11-15).

Post-operative pain is an expected result that can be avoided with appropriate management. However, there exist factors such as healthcare personnel's lack of knowledge and experience (9,16,17), staff's poor attitude to pain (5,18) or environmental barriers of an organizational type (lack of resources, insufficient staff numbers and, consequently, excessive burden of patients assigned) which are related with inadequate management (2,4,12,17,19,20). Other factors are attributed to prescribing analgesic treatment intermittently and without schedules (10,20), and apprehension among medical personnel in prescribing or administering opioids for fear of causing addiction and for possible side-effects, such as respiratory depression, nausea and vomiting (5,16,19,21).

The available literature regarding the subject includes studies that have focused on establishing the relationship of pain intensity and patients' personal characteristics. They report that sex is an aspect that leads to pain intensity being perceived differently. Women report greater pain intensity compared to men (6,7,10,20,22-24). Pain is perceived differently between men and women due to certain anatomical, physiological, neural, hormonal, psychological and sociocultural factors (6,24,25). As regards patients' age and education, some studies found no association (6,20,22-25).

As may be seen from the information presented above, the existence and intensity of pain are multifactorial; this requires pertinent steps to be taken by healthcare professionals, able to measure and treat it as quickly as possible according to the terms of national and international quality standards relating to pain assessment, management and relief (26), thus contributing to the national and international trend towards pain-free hospitals (27,28).

Although at present appropriate pain management is considered an indicator of good practice and quality care, and of the existence of national and international standards for appropriately managing pain (29,30), they do not guarantee pain control when assessment and management do not respond to patients' specific needs. According to Lohman et al. (16) and Moreno et al. (26), intense pain is avoidable and affects patients' rights. Additionally, no patient should suffer intense pain and its existence shows inadequate management.

As a theoretical reference, this study used Good and Moore's middle range nursing theory (31), which is specific to managing acute post-operative pain. It is based on guidelines for clinical practice focused on

alleviating pain. It explains that pain relief is determined by pharmacological and non-pharmacological management, regularly assessing pain and its effects, providing education to patients so they can contribute to managing the pain and establishing goals for relieving and managing it.

In view of the fact that pain intensity is associated with personal characteristics and with organizational environment, the purpose of this study was to determine the association between pain intensity reported by hospitalized post-operative Mexican patients in a public institution with certain characteristic aspects of the patient (age, education, sex), as well as of nursing staff (number of patients assigned, knowledge and ongoing education as regards pain management) involved in managing the pain.

MATERIAL AND METHODS

This is a descriptive correlation study. The population was made up of patients during the post-operative period, over 18 years old, hospitalized in the general surgery, traumatology and gynecology departments of a public health institution in the metropolitan area of Monterrey, Nuevo León, Mexico. Sampling was random, stratified by assignment proportional to the size of each stratum. The sampling technique was systematic, of one in two within each stratum. Strata corresponded to the three departments mentioned above.

The sample was estimated using the n-Query Advisor version 4.0 statistical package for a confidence interval analysis for mean difference. A population of 579 hospitalized post-operative patients was considered over a period of three months, a significance level of 0.05, a bilateral confidence interval, a standard deviation of 0.50, an estimation error limit of 0.05, resulting in a sample of 231 patients, distributed as follows: 145 from General Surgery, 37 from Traumatology and 49 from Gynecology. Criteria for inclusion considered: patients subjected to traditional non-laparoscopic surgery and with 24 post-operative hours as from the end of the surgical procedure.

Nursing staff included 31 nurses corresponding to all personnel working permanently in the departments mentioned above with the category of General Nurse and Graduates in Nursing. Nursing assistants with a training level of General Nursing or Graduates in Nursing were considered when they provided nursing care to post-operative patients.

To collect patient information, a data identification sheet was used, showing age (in number of years), sex, education (in number of years' formal education) and

pharmacological treatment prescribed in the first 24 post-operative hours (analgesic name, dose, administration route and schedule).

The McCaffery and Pasero (32) Patient Pain Intensity Questionnaire was used to measure pain intensity. This tool is used as a reliable measure for estimating pain intensity in post-operative patients. It consists of 11 options that measure the presence and intensity of pain at the time of the interview, maximum pain and average pain in the last 24 hours. A visual, numerical scale is used, with scores from 0 to 10, where 0 represents absence of pain and 10 is maximum possible pain. Pain intensity was rated as follows: 0 absence of pain, 1-3 slight pain, 4-6 moderate pain, 7-10 severe pain.

It includes a question that measures pain's interference with activity, mood and sleep, with scores from 0 at 10, where 0 represents absence of interference and 10 maximum interference. To measure orientation provided to patients for managing pain, a dichotomous question was asked, with the options "did receive orientation" or "did not receive orientation". Satisfaction with post-operative pain management was measured using three questions that identified patients' perception of pain relief as a result of the care offered by medical and nursing staff, with a scale of values from 0 to 10, where 0 means total lack of satisfaction and 10 maximum satisfaction. The tool includes two questions relating to time waiting for administration of the analgesic requested, and the use of another non-drug alternative for pain management.

As for nursing staff, an identification sheet was used, including information relating to the service where they work, academic training level, category, training in pain management (number of hours' ongoing education that staff attended in the last year), as well as shift and number of patients assigned. McCaffery and Pasero's (32) Nurses' Knowledge of Pain Survey (NKASRP) was applied, including 15 options relating to pain intensity assessment, pharmacological treatment and beliefs regarding pain management. The maximum number of successful points is 15, transformed into indexes with values from 0 to 100, so as to assign a score in this range, assuming that the greater the score, the greater the knowledge.

The study was carried out according to the Regulations of the General Health Act as regards Health Research (33). It was approved by the Committees on Research and on Ethics in Research at the School of Nursing of Universidad Autónoma de Nuevo León. Patients authorized their participation by signing the document of informed consent and their dignity, privacy, well-being and rights were respected at all times. Also, care was taken not to interfere with procedures or care prescribed to patients. If patients described pain when answering the

questionnaire, their nurse was notified and it was left until later. As for nursing staff, an appropriate moment was found during shift changeovers.

Data analysis was carried out using the SPSS (Statistical Package for the Social Sciences) version 17. Data analysis used descriptive and inferential statistics such as Spearman's correlation and Mann-Whitney's U-test, because the data did not report normality using the Kolmogorov-Smirnov test.

RESULTS

Characteristics of participating patients

There was a prevalence of females, with 67.5%. Average age was 45 (SD = 19.45) and average education 5.69 years (SD = 4.46).

83.5% of patients stated they did not receive pre-operative orientation for pain management. As for who provided this orientation, 13% reported it was the medical surgeon, 1.3% the nurse and 2.2% the anesthesiologist.

As regards analgesic therapy prescribed during the first 24 post-operative hours, there was a prevalence of ketorolac, as the only analgesic option, with 94.8%. Upon questioning participants on the use of any non-drug alternative for managing pain, their main options were prayer (32%) and a change of position (13%).

Pain intensity

Table I shows that 71.8% of patients had moderate to severe pain during the first 24 hours. Maximum pain was rated as severe, with 69.6%, while predominant average pain was moderate, with 54.5%.

Table II shows pain intensity that patients reported according to the visual numerical pain scale, with ranges from 0 to 10. An average of 7.82 (SD = 2.4) for maximum pain in the first 24 hours, which corresponds to severe pain. Average pain in the first 24 hours showed a mean value corresponding to moderate pain.

As for pain intensity according to sex, Table III shows that maximum pain was reported as severe by both sexes, but with greater intensity among women (mean = 8.17, SD = 2.40). In general, maximum pain and average pain was reported as being of greater intensity among females. A significant difference in pain intensity was found as regards sex in maximum pain experienced ($U = 3997.50$, $p = 0.001$) and in average pain in 24 hours ($U = 4852.50$, $p = 0.03$). Greater pain intensity was reported among female. No association between pain intensity and

patients' age and education was found.

As regards pain's interference with general activity, mood and sleep, greater interference was found in general activity, with a mean value of 5.55 (SD = 2.76), followed by interference with sleep, with 3.83 (SD = 3.27) and mood, with 3.39 (SD = 3.27). All measurements were on a scale from 0 to 10.

In relation to waiting time to receive an analgesic and the patient's satisfaction with pain management by medical and nursing staff, it was observed that a larger proportion of patients (26.8%) received the analgesic in a time less than 10 minutes; we should mention that 9.5% had to wait more than 20 minutes. Most patients reported being satisfied or very satisfied with pain management. Only 11.7% said they were unsatisfied with management by nurses and 7.8% with management by doctors.

Characteristics of participating nursing staff

There was a prevalence of nursing staff with a general nursing training level, with 54.8%. As regards the position assigned in the institution, the largest proportion

TABLE I
CLASSIFICATION OF PAIN INTENSITY

Pain intensity	Maximum pain in the first 24 hours		Pain in the first 24 hours	
	<i>f</i>	%	<i>f</i>	%
Absence of pain	2	0.90	5	2.20
Slight pain	10	4.30	60	26.0
Moderate pain	58	25.2	126	54.5
Severe pain	161	69.6	40	17.3
				n = 231

Source: Patient pain intensity questionnaire

TABLE II
PAIN INTENSITY ASSESSMENT

Intensity	Mean	<i>Mdn</i>	<i>SD</i>
Maximum pain in the first 24 hours	7.82	8.00	2.40
Pain in the first 24 hours	4.69	4.00	2.16
			n = 231

Source: Patient pain intensity questionnaire

TABLE III
PAIN INTENSITY ACCORDING TO SEX

Intensity	Sex	Mean	Mdn	SD	95 % Confidence interval	
					Lower limit	Upper limit
Maximum pain in the first 24 hours	Female	8.17	10.0	2.40	7.79	8.85
	Male	7.09	8.00	2.22	6.58	7.61
Pain in the first 24 hours	Female	4.90	4.00	2.20	4.56	5.25
	Male	4.24	4.00	1.99	3.78	4.70
						n = 231

Source: Patient pain intensity questionnaire.

corresponded to general nurse, with 71%. We should mention that 9.7% of nurses assigned the category of assistant nurse have a general nursing training level (Table IV).

Table V shows that the average education of nursing staff was 14.74 (SD = 2.25).

Mean number of patients assigned by shift was 10.42 (SD = 1.45). Level of knowledge stood at 54.40 (SD = 13.12), on a scale of 0 to 100. Nursing staff said they had not attended ongoing training courses in relation to pain management.

TABLE IV
CHARACTERISTICS OF NURSES: TRAINING LEVEL AND ASSIGNED CATEGORY

Characteristics	f	%
<i>Training level</i>		
Nursing graduate	11	35.5
General Nursing	17	54.8
Specialist nursing	2	6.50
Nursing assistant	1	3.20
<i>Assigned category</i>		
Nursing graduate	5	16.1
General Nursing	22	71.0
Nursing assistant	4	12.9
		n = 31

Source: Nursing staff's personal identification sheet.

TABLE V
CHARACTERISTICS OF NURSES: YEARS OF EDUCATION, NUMBER OF PATIENTS ASSIGNED AND LEVEL OF KNOWLEDGE OF PAIN MANAGEMENT

Characteristics	Mean	Mdn	SD	Minimum value	Maximum value
Years of education	14.74	15.00	2.25	11.0	20.00
Number of patients assigned per shift	10.42	10.00	1.45	6.00	15.00
Level of knowledge of pain management	54.40	53.30	13.12	33.33	80.00
					n = 31

Source: Nursing staff's personal identification sheet and NKASRP.

No association was found between pain intensity and nursing staff's knowledge of pain management; however, an association was found between average pain intensity that patients experienced in the first 24 post-operative hours with the number of patients assigned to nursing staff (rs = 0.167, p = 0.01).

It was not possible to find an association between pain intensity and ongoing training in relation to pain management because staff reported they had not attended courses for pain management.

DISCUSSION

The results of this study allowed pain intensity in hospitalized post-operative patients to be determined. A high proportion of patients was identified with the presence of moderate to severe pain in the first 24 post-operative hours. This coincided with findings reported by Lee et al. (2), Sada et al. (5) and Moreno et al. (6). The result may be associated with analgesic management; in almost all participants, ketorolac was used as the only option, apart from the absence of non-pharmacological measures, which may be effective in combination with the appropriate analgesic measures according to pain intensity assessment.

More than half the participants reported severe pain in the first 24 hours. These results led us to determine that there exists inadequate pain management in this patient

group. In accordance with the literature, this is ethically unacceptable, stressing a greater adherence to the guidelines on national and international quality standards for appropriately managing pain (26,29,30).

Despite the fact that findings show inadequate pain management, most patients said they were satisfied, similar to the result reported by Moreno et al. (7), Galindo et al. (17) and Díez-Álvarez et al. (23). This shows that patients do not attribute their pain to inadequate management, but rather, culturally, pain is to a certain extent seen as a normal response to a surgical procedure.

As regards pre-operative orientation for managing pain, it was found that only a quarter of patients received orientation. This figure is lower than reported Moreno et al. (6,7), Bajo et al. (9), Galindo et al. (17) and Usichenko et al. (18). With respect to the person providing orientation, it is relevant to mention that only a minimum proportion reported receiving orientation from nurses. This is important to bear in mind because it is a function of nursing where there exists little participation and represents an area of opportunity.

As regards finding no association of pain intensity and patient age, this coincides with other research carried out by Moreno et al. (6), Magdalena et al. (22) and Díez-Álvarez et al. (23). Furthermore, no association was found with patients' education. This result is similar to the one reported by Moreno et al. (6), Machado et al. (10), Machado et al. (20) and Navarro et al. (25). This discovery reinforces the previously-reported lack of association. It is worth highlighting the fact that this study found little variability in years of education, with a predominance of an education level of incomplete primary schooling.

As regards pain intensity according to sex, some authors such as Moreno et al. (6), Moreno et al. (7), Machado et al. (10,20), Magdalena et al. (22) and Díez-Álvarez et al. (23) found that females reported greater intensity compared to men. A similar finding was made in this study. This difference could be attributed to factors of a sociocultural nature (6). Nevertheless it is acknowledged, in accordance with what is reported in the literature, that a variety of aspects may explain the difference in pain intensity between sexes, such as anatomical, physiological, neural, hormonal and psychological factors (24,25). Nursing staff reported zero participation in ongoing training courses relating to pain management, and a low level of knowledge.

These findings are below those reported by Moreno et al. (6), Bajo et al. (9) and Galindo et al. (17). Additionally, little variability was found in scores for knowledge, which may explain the lack of association

between staff knowledge and pain intensity in patients. This finding is relevant and confirms the notion that adequate pain management does not represent a priority within the organization, despite being considered a care quality indicator.

An association was found between average pain intensity that patients experienced in the first 24 hours and the number of patients assigned to staff.

This differs from the findings reported by Moreno et al. (6) who did not find an association, although they do not rule out the relationship. This finding is important for nursing administrators to take into account because the increase in nurse-patient ratio generates a greater demand for care from staff, as well as work overload, and consequently, less time available to respond to the pain management requirements of post-operative patients, especially in the first 24 hours, where greater pain intensity occurs.

As may be seen, pain management in post-operative patients is inadequate and continues to be a challenge. A high proportion reports moderate to severe pain during the first 24 post-operative hours. This diverges from the national and international trend towards pain-free hospitals (27,28) and requires analysis and administration of the factors associated with inadequate pain management. It is recommended, as a measure to contribute to pain relief, considering pharmacological management adapted to patients' requirements, the use of non-pharmacological methods, regular assessment of pain intensity and its effects and education provided to patients so they can contribute to managing pain. All these aspects have been proven to be effective according to Good and Moore's theory (31) for acute post-operative pain management and reported as areas of opportunity in this study.

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publicada en el Diario Oficial de la Federación el 02 de
abril de 2014. Available in:
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