Knowledge of nursing staff at a pediatric referral hospital regarding the assessment and management of pain in children

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Abstract

Background: Pain is a frequent reason for consultation. Poor vocational training is referred to as a critical component for proper treatment. The objective of this study was to describe the knowledge and practices of the nursing staff of the Pediatric Hospital, Pereira Rossell Hospital Center, regarding the assessment and approach of pain in children. **Methods:** Descriptive, cross-sectional study, anonymous survey on 1/12/2016. All the nurses present that day were included. Variables: age, gender, years of work, educational level. For the association of variables, Chi square test was used; a value of $p < 0.05$ was considered significant. **Results:** The survey was answered by 89.3% of the personnel present; median age 39 years (20-63), women 81%; median of years as pediatric nurse 10 years (1 month-38 years); maximum degree of training: auxiliary (73%). Acceptable level of global knowledge (61%); no significant association was found between knowledge and age, gender, years of work and educational level. Infant pain assessment scales less reported: neonates, children 1 to 3 years and children with cognitive disorder. Other deficits of knowledge detected: interval morphine interdosis, interpreting distraction of the child as absence of pain and considering the perception of the experienced health personnel as the most appropriate tool to measure pain. **Conclusions:** The surveys demonstrated acceptable knowledge about pain assessment and management. However, aspects to improve in the knowledge of scales of evaluation in special populations, lack of familiarity with the use of opioids and conceptions of subjective evaluation of pain were objectified.

Key words: Child. Pain management. Nursing.

Conocimientos del personal de enfermería de un hospital pediátrico de referencia respecto a la evaluación y abordaje del dolor en niños

Resumen

Introducción: El dolor es un motivo de consulta frecuente, por lo que la escasa formación profesional es referida como un componente crítico para su tratamiento adecuado. El objetivo de este estudio fue describir los conocimientos y prácticas del personal de enfermería del Hospital Pediátrico del Centro Hospitalario Pereira Rossell, con respecto a evaluación y abordaje del dolor en niños. **Métodos:** Se llevó a cabo un estudio descriptivo, transversal. Se aplicó una encuesta anónima el 1 de diciembre de 2016 en la que se incluyó a todos los enfermeros presentes ese día. Las variables que se consideraron fueron edad, sexo, años de trabajo, nivel formativo. Para la asociación de variables se utilizó la prueba de χ^2 . Se consideró un valor significativo $p < 0.05$. **Resultados:** La encuesta fue contestada por el 89.3% del personal presente: mediana

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Date of reception: 06-07-2018

Date of acceptance: 08-10-2018

DOI: 10.24875/BMHIME.M19000048

Available online: 30-10-2019

Bol Med Hosp Infant Mex. 2019;76:24-30

www.bmhim.com

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de edad = 39 años (20-63), mujeres 81%; mediana de tiempo como enfermero pediátrico = 10 años (1 mes-38 años); grado máximo de formación: auxiliar (73%); nivel de conocimiento global: aceptable (61%). No se encontró asociación significativa entre conocimiento y edad, sexo, años de trabajo y nivel formativo. Las escalas de evaluación de dolor infantil menos reportadas: neonatos, niños de 1 a 3 años y niños con trastorno cognitivo; otros déficits de conocimientos detectados: intervalo interdosis de morfina, interpretar distracción del niño como ausencia de dolor, considerar la percepción del personal de salud experimentado como la herramienta más adecuada para medir el dolor. **Conclusiones:** Los enfermeros encuestados demostraron conocimientos aceptables sobre evaluación y abordaje del dolor. No obstante, se objetivaron aspectos a mejorar en el conocimiento de escalas de evaluación en poblaciones especiales, falta de familiaridad con el uso de opioides y concepciones de evaluación subjetiva del dolor.

Palabras clave: Niño. Manejo del dolor. Enfermería.

Introduction

Pain in childhood is a common reason for consultation in all healthcare settings;¹⁻³ it is a complex and multidimensional phenomenon with sensory, physiological, cognitive, affective, behavioral, and spiritual components, whose evaluation and approach represent a public health problem¹⁻⁵. Pediatric pain is often underestimated and, therefore, insufficiently treated⁶, which reflects the urgent need for all health professionals who attend children to have the necessary skills to diagnose and treat pain systematically and appropriately²⁻⁵.

The child, the parents or caregivers, and health professionals, mainly nurses, and physicians, participate in the pain assessment process. The nursing staff works closely with the patient and their family; nurses are the personnel who dedicates more time to childcare and perform daily procedures that can be painful, so they constitute a fundamental pillar in the care process, particularly in the quality of care of children with pain^{7,8}. International literature refers that the lack of training in this topic is an important barrier for an adequate approach to pain by the nursing staff⁸⁻¹⁰.

The present study was carried out in the *Hospital Pediátrico del Centro Hospitalario Pereira Rossell* (HP-CHPR) (Pediatric Hospital of the Pereira Rossell Hospital Center). The HP-CHPR is a third level public hospital which represents a national reference center for the health care of children and adolescents in Montevideo, Uruguay. The Pediatric Hospital is separated from the Neonatology Service, located in the *Hospital de la Mujer* (Women's Hospital). Both hospitals integrate the Pereira Rossell Hospital Center.

The Pediatric Hospital is equipped with 140 beds in hospitalization rooms and 20 beds in intensive care units, under the care of 184 nursing professionals. No institutional policy to address pain in children has been established in this center, neither a protocol for pain care, so care differences between services have been

observed (Medicine, Surgery, Orthopedics, Intensive Care). Moreover, no consensus on the use of validated scales to assess the pain intensity or the registration of this symptom in clinical history exist. Also, there are no specific training activities offered by the institution.

Concerning the realization of studies about pain prevalence in children hospitalized in this center^{4,5,11}, a space for reflection was initiated recently to promote the integration of an interdisciplinary team responsible for generating action protocols for the subject.

In Uruguay, studies have evaluated the knowledge of physicians about the approach and treatment of pain in adults and children^{12,13}. However, no national publications regarding the knowledge of nursing personnel were found; consequently, the research and knowledge in this subject could contribute to improving the health care quality.

The present study aims to describe the knowledge and practices enunciated by the nursing staff of the HP-CHPR, about the assessment and approach of pain in children.

Methods

An observational, descriptive, cross-sectional study was conducted using an anonymous self-administered survey applied on December 1st, 2016. The sample was selected for convenience. All the nursing staff of the HP-CHPR who was in the hospital performing their tasks on the day of the survey was included. The professionals who attended to work more than one shift were consulted only once. Those who did not give their consent and those who were absent that day for personal reasons were excluded.

The following variables were described among the surveyed nursing personnel: age, gender, years of working as a pediatric nurse, educational level (student, assistant, graduate, postgraduate), sector where they perform their duties, attendance to courses and reading of articles on pain in the last three years.

Source of information

A questionnaire was conducted using an anonymous, paper-based survey, based on the model of Pediatric Nurses Knowledge and Attitudes Survey Regarding Pain (PNKAS)⁸ and in the study "Pain assessment and implementation of nursing therapeutic interventions in neonatal and pediatric patients, in welfare hospital contexts" performed at the *Hospital Universitario La Paz*, in Madrid⁷. The questionnaire used (Annex 1) was adapted for the objectives of this study without having been previously validated. It consisted of 25 questions, 12 of true or false statements, four questions of selecting the correct option, five with a Likert type scale, and four "yes" or "no" questions. The instrument was analyzed and approved by two graduated nurses with training in palliative care and comprehensive approach to pain in children. A pilot test was performed on pediatric nurses who were performing tasks in polyclinics of the same center to analyze if the questionnaire was understandable: it was not necessary to make modifications to the instrument.

The questionnaire was delivered by the authors to each of the nurses and answered by them in no more than 30 minutes, without consulting other people, protocols, or materials. Once completed, the informed consent was separated from the rest of the questionnaire and placed in a mailbox to maintain anonymity.

Operational definitions

For this study, an acceptable level of knowledge regarding the assessment of pain management in children was considered arbitrarily if the surveyed nursing staff answered correctly at least 60% of the questions.

The qualitative variables were expressed in absolute and relative frequency (%), and the quantitative variables, in measures of central tendency and ranks. The χ^2 test was used for the association study between variables; when necessary Fisher's exact test was done. In all cases, a value of $p \leq 0.05$ was established as statistically significant. The statistical program SPSS12.0 was used to process data.

Ethical considerations

This study was authorized by the HP-CHPR management and approved by the research ethics committee of the same center. Informed consent was requested from all participants, and anonymity was protected.

Table 1. Characteristics of the nursing population surveyed in HP-CHPR (n = 151)

Variable	RF (AF)
Gender	
Female	81% (122)
Male	19% (29)
Age (years)	
20-29	31.2% (47)
30-39	39.1% (59)
40-49	17.8% (27)
More than 50	11.9% (18)
Working time as a pediatric nurse (years)	
0-5	27% (41)
6-10	46% (69)
11-20	21% (32)
More than 21	6% (9)
Maximum degree of training	
Auxiliary	73% (110)
Graduate	22% (33)
Postgraduate	4% (6)
Student	1% (2)

AF, absolute frequency (n); HP-CHPR, Hospital Pediátrico of the Centro Hospitalario Pereira Rossell; RF, relative frequency (%).

Results

On the day of the survey, 91.8% (169/184) of the nurses went to work to the HP-CHPR. The survey was answered by 89.3% (151) of the nursing staff that met the inclusion criteria. Fourteen administrators refused to participate; four nurses attended two consecutive shifts, so they were surveyed only once.

The nurses' median age was 39 years (20-63), 81% (122) were females, and had a median of 10 years of working history as pediatric nurses (1 month-38 years). The characteristics of the surveyed population are expressed in Table 1.

The average questionnaire correct answers were 61%, with a median of 61.6%, and a 95% confidence interval from 58 to 65.2. No statistically significant association was found between the assessed knowledge on pain and age ($p = 0.179$), gender ($p = 0.123$), years of working history as a pediatric nurse ($p = 0.305$) or academic background ($p = 0.278$).

Table 2 shows the frequencies of correct answers of the true-false type questions.

Regarding the knowledge about the selection of the adequate pain assessment scale according to age and clinical condition of the pediatric patient, 66 % (n = 100) of the respondents correctly indicated the numerical scale in schoolchildren and adolescents; 45% (n = 68)

Table 2. Knowledge of the surveyed nursing staff of the HP-CHPR (n = 151)

Statement	Correct answers	
	RF (%)	AF (n)
Young children have decreased sensitivity to pain	69.5	105
Using exclusively NSAIDs is not sufficient for treating severe pain	61	93
The WHO analgesic ladder consists of two steps: NSAIDs and NSAIDs plus opioids	65	98
Morphine and other opioids can cause addiction and dependence	60	90
Analgesics, once indicated, should be administered at regular intervals, not on demand	67	101
In a child with pain who receives opioids with schedule, it is appropriate to advance the next dose	36	54
Non-pharmacological interventions are not sufficient for pain management	80.1	121
Parents should not witness painful procedures	76.1	115
Children under eight cannot determine the pain intensity	79	119
Administering placebos is not a useful test to assess pain	48.3	73
The opinion of health personnel is the most appropriate tool for assessing pain	36.4	55
If it is possible to distract the patient, it means that he is not experiencing severe pain	50	75

AF, absolute frequency (n); HP-CHPR, Hospital Pediátrico of the Centro Hospitalario Pereira Rossell; NSAIDs, nonsteroidal anti-inflammatory drugs; RF, relative frequency; WHO, World Health Organization.

identified the Face, Legs, Activity, Cry, Consolability (FLACC) scale for children from 1 to 3 years old; 17% (n = 26) correctly answered the Neonatal Infant Pain Scale (NIPS) for neonates and 15% (n = 23) identified the revised-Face, Legs, Activity, Cry, Consolability scale (r-FLACC) for children with a cognitive disorder.

Regarding the knowledge and perception of the nursing staff about the pain caused by common procedures or maneuvers in their clinical practice, the respondents considered that the following procedures always or almost always generate pain: blood extraction and cannulation of peripheral venous routes (93 %, n = 141), bladder catheter placement (80%, n = 121), and aspiration of respiratory secretions (62%, n = 94).

The surveyed nurses reported that their role in pain relief is essential or vital (94%, n = 143), and considered that the patient's pain record is necessary for the clinical history (97%, n = 146). Concerning the listed practices, 93% (n = 141) referred to register the patient's pain frequently or very frequently, 52.3% (n = 79) reported reading at least one article on pain in the last three years, and 38% (n = 57) stated attendance to courses or lectures about pain. Finally, 97% (n = 146) of the respondents expressed interest in receiving training courses on pain in children.

Discussion

In the present study, the knowledge and practices of a population of nurses regarding the evaluation and management of pain in children were evaluated for the first time in Uruguay. The reported knowledge by the surveyed population was overall of an acceptable level. Although previous international studies which examined the knowledge and practices of nursing personnel on this subject have been published, the results are not comparable with the findings of the present investigation, given that previous studies included heterogeneous populations, used different questionnaires and analyzed the results with different knowledge scales^{7,8,10,14}. Regardless of this clarification, most studies report a knowledge deficit of the personnel dedicated to the evaluation and management of pain in children^{7,8,14}.

No statistically significant association was found between nurses' knowledge and their age, gender, years of working as pediatric nurses, or educational level in this study. Moreover, the literature consulted was not conclusive. Most studies report that the identified knowledge deficit is generalized, without focusing on groups of professionals with specific characteristics^{8,14}. The usual training of nursing staff includes aspects aimed at the promotion, recovery, and rehabilitation of

health, with a compassionate and humanitarian attitude. The relief of pain and suffering is considered one of the primary patients' rights and one of the fundamental responsibilities of the nursing practice, enshrined in the International Code of Ethics for Nurses of the International Council of Nurses^{9,14-16}.

The overall level of knowledge of the surveyed nurses was acceptable, although confusion on the selection of appropriate scales to assess pain in children was detected, especially for those patients who cannot express themselves verbally. The assessment of pain intensity in children, especially in children under five years of age or in those suffering from a cognitive disorder, is a challenge for both families and the care team. The application of standardized scales constitutes a tool that contributes to objective evaluation. A study conducted at the University of Dalhousie, Canada, in 2003, indicates that pain in children with severe cognitive disorders has a higher incidence, duration, and intensity compared to pain in children without cognitive disorders¹⁷. The difficulty to express themselves verbally makes these patients' pain more difficult to be identified by the caregivers and the care team, and therefore, to not be treated¹. The separation between the neonatal service located in the Women's Hospital and the Pediatric Hospital where the survey was conducted can explain the lack of training of the nursing staff in the use of scales for newborns. However, this could also be related to the lack of regular application of scales or lack of consensus about what scale to use systematically for specific populations^{5,6,10}.

Another deficit detected was the lack of knowledge about the time interval between morphine doses. Some practices constitute common errors regarding the approach to pain and may reveal a lack of knowledge about morphine kinetics, such as advancing the morphine doses or not to administer rescue doses when necessary, as well as not to administer the drug dose if the child is sleeping. The World Health Organization established as one of the principles for the prescription of opioids that they should be administered with schedule and not on-demand only if the patient suffers or requires them¹. The exclusive on-demand administration of morphine has an unfavorable impact on the child's pain control since the patient or his caregivers should recognize and express the pain to trigger the mechanisms directed for its control⁴. Lack of knowledge of the time interval between morphine doses was also previously reported in pediatric residents¹³. In both populations, this finding could be related to the lack of experience with the drug given its low prescription rate in hospitalized pediatric patients with pain—a fact

already demonstrated in previous national publications^{4,5,11}.

Other questions with a high percentage of incorrect answers were linked to common myths regarding the evaluation of pain, such as the use of placebos and the distractibility of the patient. The placebo effect is the modification, sometimes physiologically verifiable, that occurs in the body as a result of a psychological stimulus induced by the administration of an inert substance, a drug, or a treatment¹⁷⁻¹⁹. In clinical practice and from an ethical point of view, it is controversial to hide the use of placebos from patients and their families, for which they should not be used¹⁹⁻²¹.

Another myth is that "if it is possible to distract the patient, it means that he is not experiencing severe pain." It has been demonstrated that distraction is a mechanism of unconscious coping with pain, which in no way means that the patient is not experiencing it, so it is not correct to use this technique to assess the pain intensity^{4,22-24}.

Another question that presented a relevant number of incorrect answers was the one referring to "the opinion of experienced health personnel as the most appropriate tool for assessing pain in children." The collaboration between parents, caregivers, and professionals in the understanding of pain signals is fundamental in the process of evaluation of pain in children, and has been the substrate for the validation of objective scales for this purpose. However, when pain is assessed in children who can communicate, the most relevant information is their opinion, followed by that of their parents or caregivers and, lastly, that of the health personnel who assist them²³.

Concerning the practices stated by the respondents, the vast majority reported that they frequently recorded the pain assessment in the patient's medical history. The optimal treatment of pain begins with a thorough evaluation, which should be repeated at regular intervals of time since the disease and other factors that influence it can change over time. Periodic evaluations allow determining the efficacy of different therapeutic strategies¹. The report of the presence or absence of pain is made in the medical record on paper in the section of nursing records since there is no specific attached form for this purpose. During their training, nursing professionals acquire skills to deal with pain scenarios; also, they use various tools for adequate pain assessment and the implementation of both pharmacological and non-pharmacological therapeutic interventions. The North American Nursing Diagnosis Association (NANDA) states two diagnostic labels regarding pain (acute pain and chronic pain)²⁵. The HP-CHPR is

in the process of computerization of the clinical history of patients attended at the ambulatory level and in hospitalization. Moreover, in the section of nursing records, it incorporates articles on the periodic evaluation of pain, the use of validated scales, and pharmacological and non-pharmacological interventions for its treatment. These strategies could contribute to protocolize the performance of professionals within the framework of an institutional policy to address the pain in children and adolescents.

As limitations of this study, the fact that a sample calculation was not performed may have incurred in a selection bias. Although most of the nurses present on the day of the survey participated, it is not possible to generalize these results to all the pediatric nurses in the center. Another limitation was the use of an invalidated questionnaire based on two previously validated instruments. These modifications could alter the ability of the instrument to detect the level of knowledge of nurses in this area. As a strength, this is the first study in Uruguay that explores the knowledge and practices enunciated by pediatric nurses on the assessment and approach of pain in children. The meaningful participation of nursing professionals was vital to achieving accurate results for the surveyed population. It would be appropriate to replicate this research using a validated questionnaire and after carrying out a sample calculation and the establishment of institutional action protocols on the approach and evaluation of pain in children.

The surveyed nursing staff demonstrated adequate knowledge about the evaluation and management of pain in children. However, deficiencies in the knowledge of pain assessment scales in specific populations and lack of familiarity with the use of opioids were found. Also, difficulties in the pain evaluation and the presence of some myths were observed, which support the need, recognized by the staff surveyed, for continuous training in the subject. The selection of a sample for convenience and the use of an unvalidated questionnaire could influence the results found.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors declare that no patient data appear in this article.

Conflicts of interest

The authors declare that they have no conflicts of interest.

Funding

None for this research.

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APPENDIX 1. Survey form

Complete with a cross, circle, letter, or number as appropriate

Patronymic data:

Gender_____ Age_____

Years working as a pediatric nurse_____

Degree of training achieved:

Student_____

Auxiliary_____

Graduate_____

Postgraduate_____

Regarding the evaluation and management of pain in children, indicate true (T) or false (F):

- 1) Young children have a developing neurological system and, therefore, have decreased sensitivity to pain. (False)
- 2) Using only ibuprofen or other nonsteroidal anti-inflammatory drugs (NSAIDs) is not adequate for the treatment of severe pain. (True)
- 3) The analgesic scale of the World Health Organization (WHO) consists of two steps: one of NSAID and other NSAIDs plus opioids. (True)
- 4) Morphine and other opioids are characterized for generating addiction and dependence, so its use in pediatrics is not advisable. (False)
- 5) Analgesics, once indicated, should be administered at regular intervals and not only when the patient has pain (on demand). (True)
- 6) You are assisting a child in the postoperative period; the patient receives analgesia with morphine every 4 hours intravenously and has indicated up to three rescues if he requires it. When you evaluate the patient, he is in pain. Given that he received the last scheduled dose 3 hours ago, it is appropriate to advance the next dose. (False)
- 7) Non-pharmacological interventions are not useful for pain management. (False)
- 8) Parents should not be present during painful procedures. (False)
- 9) Children under eight years of age are not able to determine the intensity of the pain, and this is the reason why the nurse must rely on the evaluation made by the parents. (False)
- 10) Administering placebos to patients is not a useful test to determine if the pain is real. (True)
- 11) The opinion of experienced health personnel is the most appropriate tool for assessing pain in children. (False)
- 12) If it is possible to distract the patient, it means that he is not experiencing severe pain. (False)

Patients with pain, application of pain intensity scales:

- 13) Indicate the correct scale for pain assessment in newborns:
 - a) Faces Scale
 - b) Numerical (VAS)
 - c) r-FLACC
 - d) NIPS (correct)
 - e) FLACC
- 14) Indicate the correct scale for evaluation of pain in children under three years of age:
 - a) Faces Scale
 - b) Numerical (VAS)
 - c) r-FLACC
 - d) NIPS
 - e) FLACC (correct)
- 15) Indicate the most used scale for pain assessment in schoolchildren and adolescents:
 - a) Faces Scale,
 - b) Numerical (VAS) (correct)
 - c) r-FLACC
 - d) NIPS
 - e) FLACC
- 16) Indicate the correct scale for pain evaluation in patients older than three years with a cognitive disorder:
 - a) Faces Scale
 - b) Numerical (VAS)
 - c) r-FLACC (correct)
 - d) NIPS e) FLACC

Concerning the following maneuvers, indicate how often they can cause pain:

- a) Never
- b) Rarely
- c) Almost always
- d) Always
- 17) Blood extraction and cannulation of peripheral venous routes (always or almost always)
- 18) Bladder catheter placement (always or almost always)
- 19) Aspiration of respiratory secretions (always or almost always)

Regarding the nurse's role in pain evaluation and management:

- 20) The nurse's role in pain relief is (check one option):
 - a) None
 - b) Unimportant
 - c) Very important
 - d) Essential
- 21) Do you consider it necessary for the nurses to record the patient's pain in the clinical record? Yes/No
- 22) How often do you register the patient's pain assessment?
 - a) Never
 - b) Rarely
 - c) Frequently
 - d) Very frequently
- 23) Have you read any article(s) or journal(s) about pain in the last three years? Yes/No
- 24) Have you attended lectures, courses, or updates about pain in the last three years? Yes/No
- 25) Would you be interested in receiving specific training courses or workshops on pain management in children? Yes/No