



ORIGINAL ARTICLE

What do pediatricians know about pain assessment and treatment in newborn infants?

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Abstract

Objectives: to analyze the knowledge of pediatricians who work with neonatal patients regarding the evaluation and treatment of pain in newborn infants.

Methods: cross-sectional study of 104 pediatricians (out of 110) who were working during 1999 to 2001 in seven intensive care units and 14 nurseries in the city of Belém (Pará). The pediatricians answered a questionnaire about their demographic profile and their knowledge of pain evaluation and pain relief methods during the neonatal period.

Results: 100% of the pediatricians believed that newborns feel pain, but only one-third of them declared to know any scale for the evaluation of pain for this age group. The majority of the interviewees perceived the presence of pain in newborns by means of behavioral parameters. Crying was the preferential parameter to evaluate pain in full-term newborns; facial activity was the parameter chosen for premature infants; and heart rate for mechanically ventilated neonates. Less than 10% of the pediatricians reported using analgesia for venous and capillary puncture, while 30 to 40% said that they used analgesia for lumbar puncture, venous dissection, chest tube placement and mechanical ventilation. Less than half of those interviewed reported applying postoperative pain relief measures following abdominal surgery. Opioid was the most frequent medication for analgesia (60%), followed by midazolam (30%).

Conclusion: these results demonstrate that it is necessary to refresh and update pediatricians' knowledge about pain assessment and relief.

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Introduction

Although the medical community nowadays accepts that newborns are capable of feeling pain and of responding to nociceptive stimuli with organic, physiological and behavioral alterations,¹⁻³ in general a low level of analgesic usage is to be observed in neonatal intensive care units.⁴ This disparity between knowledge and clinical practice is due to a failure to incorporate such knowledge with respect

to the presence, diagnosis and treatment of pain into the daily practice of health professionals.⁵

Schechter,⁶ in a study of American doctors performed in 1989 reported that 25% of surgeons interviewed believed that neonates feel less pain than adults under similar clinical conditions, in contrast with 6% of pediatricians. Despite this difference both groups used little or no pain relief for the performance of potentially painful procedures. Tohill and McMorro,⁷ evaluating 17 neonatal intensive care units in 1990, found that 100% of health professionals believed that newborns feel pain. Nevertheless, in only two units written procedures existed for the treatment of pain and 30 to 90% of newborns received no analgesic whatsoever during the execution of procedures known to be painful.

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Porter et al.⁴ analyzed 374 health professionals in 1997. Of these, 90% believed that neonates feel equal or greater pain than adults and described 12 procedures which they considered to be highly painful. However, during procedures so considered, such as circumcision or thoracic drainage, these professionals did not administer any analgesic. Further studies also indicate the same discrepancy between theory and practice in the relief of pain for sick children.^{5,8,9}

Against such a background this study was performed with the objective of analyzing the knowledge of pediatricians working with neonatal patients in the Municipality of Belém (PA) about the treatment of pain in newborns and to discover whether there are differences between doctors who work exclusively with healthy babies and those who treat critically ill neonates in terms of this knowledge.

Patients and methods

This is a cross-sectional study, performed between November 1999 and July 2001 at the seven intensive care units which exist in Belém (PA) and at the 14 nurseries of the municipality's maternity units. The study was begun after being approved by the Committee for Ethics in Research of the Universidade Federal de São Paulo - Escola Paulista de Medicina.

The criteria for inclusion of pediatricians were their free and informed consent and their working routinely with sick or healthy newborns in low and/or medium risk nurseries and/or in intensive care units (daytime and/or on-call doctors). Pediatricians who occasionally resuscitate babies in delivery rooms or who sporadically care for patients within this age group in emergency units or clinics were not included.

Thus 110 pediatricians from the municipality to be studied fulfilled the inclusion criteria. Six of them refused to be interviewed and 104 (95%) made up the sample for this research. 95% of the entire target population of the study was included and there was no need to calculate the statistical power of the sample. The 104 interviewees were divided into three groups depending on the area of their professional activity:

- Pediatricians who work only with critically ill babies: all those who only work in neonatal and/or pediatric and neonatal intensive care (*ICU Group*).
- Pediatricians who do not work with critically ill newborns: all those who work exclusively in the nurseries of the selected maternity units, these being nurseries without the infrastructure necessary to the care of critically ill newborns (*Nursery Group*).
- Pediatricians who work with healthy and sick patients: all those who work in intensive care and also in medium and low risk nurseries at Belém maternity units (*Nursery + ICU Group*).

Once the pediatricians to be interviewed had been selected and given consent to their participation in the research, the times and places of interview were set. The questionnaire was then given to the interviewee, who had 60 minutes to complete it, always in the presence of the researcher or another previously trained individual. The six pediatricians who did not agree to take part in the research blamed lack of time for this.

The questionnaire was made up of 36 questions requesting personal data (age, sex, marital status, religion, number of children, the existence of living parents and number of hospital internments); professional data (graduation in medicine, specialization in pediatrics, neonatology qualification, location and type of work); socio-economic data (*per capita* earnings and socio-economic classification) and data related to pain. In this section the interviewee was asked whether they thought that newborns felt pain. How would they assess pain in the full term, premature and mechanically ventilated neonate one? Why did the interviewee think it is important to treat pain in newborns? How would they treat the pain related to medical procedures such as venous, arterial and capillary punctures, chest tube insertion, venous cutdown, mechanical ventilation and/or during post-operative period of laparotomy (these questions had five possible answers from which the doctors chose one). And, finally, whether the interviewee had any specific fears with relation to the use of opioids during the neonatal period.

The statistical analysis was descriptive. The comparison of the categorical variables between groups of professionals was made using the chi-square test. Numerical variables were compared between groups using analysis of variance or the Kruskal-Wallis non-parametric statistical test. Results were analyzed using EPI-Info 2000®. For all tests the level for rejection of null hypothesis was set at 5% or $p \leq 0.05$.

Results

The mean age of the 104 pediatricians was 35 years. The minimum age was 23 and the maximum 54 years. Of the total number of interviewees, 98 (94%) were female, 81 (78%) were Catholic and, of these 80 (77%) practiced their religion. With respect to their marital status, 62 (60%) were married and the mean number of children was 1.3 per individual, varying from zero to four children. In relation to the individuals' experience of suffering and pain, it was observed that the mean number of previous hospitalizations of the doctors being interviewed was 1.8, the total varying from zero to ten events. Of those interviewees who had children, on average 0.8 children had undergone hospital internment, with a variation from one to two internments. In relation to the parents of the doctors interviewed, around 80% had a father and/or mother who were still alive. Of the 104 interviewees, 103 doctors had trained in the state of Pará and the average period of qualification by the time of interview was 12 years, varying from two to 27 years. Of the

total, 96 (92%) had specialization in pediatrics, defined as having undertaken an accredited program of medical residence for at least two years. Only 45 (43%) individuals were board certified in Pediatrics (TEP) by the Brazilian Pediatric Society. With respect of specialization in neonatology, 22 said that they had undergone training for at least a year in a university neonatal unit with a formal teaching program and only nine were board certified in Neonatology (TEN) by the Brazilian Pediatric Society. Of the individuals analyzed, 28 (27%) worked exclusively in low and medium risk nursery, 16 (15%) only in neonatal and/or pediatric and neonatal intensive care units and 60 (58%) in both.

When the 104 interviewees were classified according to their place of work, there were no statistically significant differences in relation to age, sex, religion, active/inactive in their religion, marital status, number of children, number of previous hospitalizations, live parents, *per capita* monthly income, socio-economic class, length of time qualified in years, specialization in pediatrics and TEP or specialization in neonatology and TEN (Table 1).

All of the doctors interviewed, irrespective of where they work, said that newborns are capable of feeling pain (Table 2). Also, the pediatricians' replies about the importance of reducing pain in newborns were similar, when those who work in nursery were compared with those who work in intensive care (Table 2).

With respect to the assessment of pain, less than 50% of the professionals in the three groups said they knew any pain scale (Table 2). Such knowledge of pain scales was greater in doctors active in intensive care: of the 76 pediatricians with some activity in an ICU, 32 (42%) knew of some sort of pain scale, *versus* 5/28 (18%) of those who work exclusively in nursery (χ^2 ; $p=0.02$). In relation to parameters for pain evaluation, cited in a spontaneous manner by the interviewees (Table 2), facial activity was referred most by those who have some contact with intensive care, in a manner analogous to that observed in relation to the knowledge of pain scales. Crying was mentioned most by those professionals who work outside of intensive care units: of the 88 pediatricians working in nursery, 74 (84%) said that they used crying to evaluate newborns' pain, *versus* 9/16 (56%) professionals working exclusively in

Table 1 - Demographic characteristics of the 104 interviewees, classified according to their place of work

| | Nursery n = 28 | NICU n = 16 | NICU +Nursery n = 60 | p |
|--|-------------------|-------------------|-------------------------|------|
| Age in years (x \pm SD) | 37 \pm 10 | 36 \pm 6 | 34 \pm 6 | 0.22 |
| n (%) female | 26 (93%) | 15 (94%) | 57 (95%) | 0.92 |
| n (%) catholic | 22 (79%) | 12 (75%) | 47 (78%) | 0.95 |
| n (%) active regarding religion | 24 (86%) | 12 (75%) | 44 (73%) | 0.43 |
| n children (x \pm SD) | 1.7 \pm 1.2 | 1.3 \pm 1.3 | 1.1 \pm 1.0 | 0.25 |
| n (%) married | 19 (68%) | 10 (63%) | 33 (55%) | 0.50 |
| n (%) live father | 19 (68%) | 13 (81%) | 48 (80%) | 0.40 |
| n (%) live mother | 25 (89%) | 15 (94%) | 54 (90%) | 0.87 |
| Years after graduation (x \pm SD) | 13 9 | 12 6 | 11 5 | 0.29 |
| n (%) specialization in pediatrics | 25 (89%) | 15 (94%) | 56 (93%) | 0.78 |
| n (%) TEP* | 10 (36%) | 8 (50%) | 27 (45%) | 0.60 |
| n (%) specialization in neonatology | 4 (14%) | 6 (38%) | 12 (20%) | 0.18 |
| n (%) TEN† | 1 (4%) | 2 (13%) | 6 (10%) | 0.50 |
| Income in reais (x \pm SD) | 3,683 \pm 2,637 | 4,350 \pm 2,663 | 4,254 \pm 2,583 | 0.60 |
| Social class | | | | 0.25 |
| n (%) class A1+A2 | 16 (57%) | 13 (81%) | 37 (62%) | |
| n (%) class B1+B2+C | 12 (43%) | 3 (19%) | 23 (38%) | |
| n of previous hospital admissions (x \pm SD) | 1.9 \pm 2.1 | 2.5 \pm 2.7 | 1.6 \pm 1.5 | 0.65 |

* Board certified in Pediatrics; † Board certified in Neonatology.

Table 2 - Assessment and treatment of newborns according to the 104 interviewees, classified according to the place of work

| | Nursery n = 28 | NICU n = 16 | NICU +Nursery n = 60 | p |
|--|-------------------|----------------|-------------------------|-----------------------|
| Does the NB feel pain? | | | | |
| Yes | 28 (100%) | 16 (100%) | 60 (100%) | 1.00 |
| How do you assess the pain? | | | | |
| Do you know any pain scale? | 5 (18%) | 5 (31%) | 27 (45%) | 0.04 ^a |
| Facial activity | 14 (50%) | 14 (88%) | 48 (80%) | 0.005 ^b |
| Cry | 22 (79%) | 9 (56%) | 52 (86%) | 0.03 ^c |
| Movement | 4 (14%) | 1 (6%) | 9 (15%) | 0.65 |
| Physiological parameters | 6 (21%) | 1 (6%) | 9 (15%) | 0.41 |
| Others | 3 (11%) | Zero | 1 (17%) | 0.08 |
| Why do you treat pain? | | | | |
| It improves the prognosis | 3 (11%) | 2 (13%) | 15 (25%) | 0.22 |
| It reduces suffering | 9 (32%) | 2 (13%) | 14 (23%) | 0.33 |
| Both alternatives above | Zero | 1 (6%) | 2 (3%) | 0.47 |
| It reduces stress | 13 (46%) | 9 (6%) | 22 (37%) | 0.50 |
| Other reasons | 3 (11%) | 2 (13%) | 7 (12%) | 0.98 |
| Drug used in analgesia | | | | |
| Opioids | 14 (50%) | 10 (63%) | 40 (67%) | 0.33 |
| Diazepines | 13 (46%) | 3 (19%) | 15 (25%) | 0.07 |
| Opioids + diazepines | Zero | 2 (13%) | 3 (5%) | 0.17 |
| Others | 1 (4%) | 1 (6%) | 2 (3%) | 0.17 |
| Fears with relation to the use of opioids | | | | |
| Respiratory depression | 12 (43%) | 16 (100%) | 52 (87%) | < 0.0001 ^d |
| Hemodynamic effect | 2 (7%) | 1 (6%) | 3 (5%) | 0.92 |
| Tolerance | Zero | Zero | 1 (2%) | 0.69 |
| Addiction | 2 (8%) | 1 (6%) | 4 (7%) | 0.99 |

a: nursery = NICU; nursery < NICU + nursery (χ^2 , p = 0.01); NICU = NICU + nurseryb: nursery < NICU (χ^2 , p = 0.01); nursery < NICU + nursery (χ^2 , p = 0.004); NICU = NICU + nursery

c: nursery = NICU; nursery = NICU + Nursery; NICU < NICU + nursery (Fisher, p = 0.01)

d: nursery < NICU (χ^2 , p = 0.0002); nursery < NICU + nursery (χ^2 , p = 0.00002); NICU = NICU +nursery.

intensive care (Fisher; p = 0.02). Physiological parameters for the evaluation of pain were equally cited by the three groups in the study. Having directed the question relating to methods of assessing pain in different neonatal patients by means of a choice of answers between pre-chosen alternatives, the results obtained do not reveal any statistical differences between the three groups of pediatricians (Table 3). It is worth pointing out that crying was the criteria most often cited for evaluation of pain in full term neonates by professionals working outside of intensive care units, whereas facial activity was most often referred to by the group of doctors working exclusively in intensive care (Table 3). For premature infants, the three groups in the study preferred facial activity as the best parameter for evaluating pain, although 20 to 30% of the professionals in each group cited heart rate (Table 3). For patients on mechanical ventilation, 50 to 60% of pediatricians working in nursery pointed the heart rate, while 56% of those

exclusively active in ICU preferred facial activity (Table 3).

Investigation of preferences in terms of analgesic medication revealed no significant differences between the groups based on the location in which doctors worked (Table 2). The results relating to the use of pain relief for potentially painful procedures performed in intensive care units or nurseries by the 104 interviewees, classified by work location, are found in Table 4. For venous and capillary punctures, the minority of professionals in all groups referred to using analgesics. For lumbar puncture, 70% to 80% of those interviewed did not apply any analgesic technique. The use of pain relief for venous cutdown in newborns was reported with greater frequency by those professionals with some intensive care activity [of the 76 pediatricians who worked at least part of the time in ICU, 30 (39%) reported employing analgesics for venous cutdown, *versus* 3/28 (11%) of those who work exclusively in nursery (χ^2 ; p = 0.005)], although such usage was cited by less than half of

Table 3 - Best parameter to assess pain in full-term newborns, pre-term newborns and newborns on mechanic ventilation, according to the 104 interviewees, classified according to their place of work

| | Nursery n = 28 | NICU n = 16 | NICU +Nursery n = 60 | p |
|-------------------------------------|-------------------|----------------|-------------------------|------|
| Full-term NB | | | | |
| Heart rate | 2 (6%) | 1 (6%) | 1 (2%) | 0.39 |
| Respiratory rate | 1 (4%) | 0 | 0 | 0.25 |
| Arterial pressure | 1 (4%) | 0 | 0 | 0.25 |
| Cry | 17 (61%) | 7 (44%) | 39 (65%) | 0.30 |
| Facial activity | 7 (25%) | 8 (50%) | 20 (33%) | 0.24 |
| Pre-term NB | | | | |
| Heart rate | 6 (21%) | 5 (31%) | 17 (28%) | 0.72 |
| Respiratory rate | | 0 | 1 (2%) | 0.08 |
| Arterial pressure | 1 (4%) | 0 | 1 (2%) | 0.69 |
| Cry | 8 (29%) | 2 (13%) | 7 (12%) | 0.12 |
| Facial activity | 10 (36%) | 9 (56%) | 34 (57%) | 0.17 |
| NB on mechanical ventilation | | | | |
| Heart rate | 14 (50%) | 6 (38%) | 34 (57%) | 0.38 |
| Respiratory rate | 2 (7%) | 1 (6%) | 0 | 0.12 |
| Arterial pressure | 1 (4%) | 0 | 0 | 0.25 |
| Cry | 0 | 0 | 0 | NA |
| Facial activity | 11 (39%) | 9 (56%) | 26 (43%) | 0.54 |

NA: Not applied test.

the professionals in each group. The result for chest tube insertion was similar: of the 76 pediatricians who spent some part of their routine in ICU, 35 (46%) said that they would use analgesics, *versus* 5/28 (18%) of those who work exclusively in nursery (χ^2 ; $p = 0.009$). In newborns undergoing mechanical ventilation, it was observed that 54% (41 out of 76) of the pediatricians who work in ICU employ analgesics, compared with 18% (5 out of 28) of those who work exclusively in nursery (χ^2 ; $p = 0.001$). Thus for lumbar puncture, venous cutdown, chest tube insertion and mechanical ventilation, pediatricians who work exclusively or not in intensive care units said that they employed analgesics more often. Despite this, around half of these same professionals said they did not use any pain relief for the four procedures listed. Finally, 50-75% of the professionals in both groups said that they did not use medication for the relief of pain in newborns soon after an abdominal surgery.

In relation to the fears of doctors about the prescription of opioids, pediatricians who work at least part of the time in intensive care had greater fears related to respiratory depression when compared to those who do not work in intensive care: 43% of the doctors in the nursery group said that they feared respiratory depression related to the use of

opioids, compared with 87% of the pediatricians in the ICU + Nursery Group and with 100% of those in the ICU Group (Table 2).

Discussion

In an attempt to obtain answers to the objectives proposed by this study a questionnaire was completed by 95% of the pediatric doctors who work in the maternity units and neonatal intensive care units in the municipality of Belém in the state of Pará. When we compare the demographic characteristics of the pediatricians studied here with data obtained in the research work “*Profile of the Brazilian Pediatrician*”,¹⁰ differences are sparse. This means that although our sample is restricted from a geographical point of view, there are similarities with the characteristics of Brazilian pediatricians in general.

In terms of the doctors’ general impressions with respect to the capacity of newborns to feel pain, they were unanimous in believing that patients in this age group feel pain. This result indicates a change in paradigm. Until the seventies, the prevalent belief among pediatricians and neonatologists was that newborns do not feel pain.^{1,2} The probable explication of this change has been attributed to the

Table 4 - Use of analgesia in the newborn in seven different procedures, according to the 104 interviewees, classified according to their place of work

| | Nursery n = 28 | NICU n = 16 | NICU +Nursery n = 60 | p |
|------------------------|-------------------|----------------|-------------------------|--------------------|
| Capillary puncture | 1 (4%) | 0 | 4 (7%) | 0.51 |
| Venous puncture | 0 | 0 | 9 (15%) | 0.03 ^a |
| Lumbar puncture | 5 (18%) | 4 (25%) | 20 (33%) | 0.31 |
| Venous cutdown | 3 (11%) | 5 (31%) | 25 (41%) | 0.01 ^b |
| Chest tube insertion | 5 (18%) | 7 (44%) | 28 (47%) | 0.03 ^c |
| Mechanical ventilation | 5 (18%) | 7 (44%) | 34 (57%) | 0.003 ^d |
| Abdominal surgery PO | 14 (50%) | 4 (25%) | 18 (30%) | 0.13 |

a: nursery < NICU + nursery (χ^2 , p = 0.05); NICU = NICU + nurseryb: nursery = NICU; nursery < NICU + nursery (χ^2 , p = 0.003); NICU = NICU + nurseryc: nursery = NICU; nursery < NICU + nursery (χ^2 , p = 0.01); NICU = NICU + nurseryd: nursery = NICU; nursery < NICU + nursery (χ^2 , p = 0.0006); NICU = NICU + nursery.

innumerable research papers published on the subject, making possible better understanding and knowledge of the subject on the part of health professionals with respect to the existence of pain during the neonatal period, the development of the nociceptive system, the short, medium and long term consequences of pain to the newborn and also to formal recommendations on pain relief strategies for this age group.^{3,11} The result found by our study is supported by other studies in the literature, such as those by Purcell-Jones¹² and DeLima.¹³ The first, published in 1988, reports that, at that time, 80% of British anesthetists believed that newborns feel pain while only 18% prescribed pharmaceutical medications for its relief during the post-operative period. The second work evaluated the same category of doctors ten years later and found that 100% said that all newborns are capable of feeling pain and that, this time, the use of analgesic medication for newborns during the post-operative period was performed by 92% of the professionals in question. Other studies, such as those by Porter⁴ and Larsson,⁹ evaluated the attitude of health professionals in the face of pain and pointed out that around 90% of doctors and nurses believed that newborns felt as much or more pain than adults. Thus, the pediatricians analyzed in the current research present a general vision similar to that of health professionals in developed countries and to "the state of the art" when they say that newborns are capable of feeling pain. It is also observed that the general vision of the pediatricians in Belém with respect to the presence of pain in newborns is the same irrespective of the location at which they work. It may be that factors specific to the place of work and the type of patient cared for appear in the questions relative to practical attitudes and not in general considerations of the presence or absence of pain in the age group in question.

In relation to the assessment of pain, when the interviewees were asked, in an undirected manner, without pre-determined replies, how they evaluated their patients' pain, their replies indicated that only a third of the pediatricians had knowledge of some type of scale for the assessment of pain. This finding is worth noting, since scales for evaluating pain in newborns have been available since the end of the eighties and are widely referred to and recommended in the general literature,¹⁴⁻¹⁶ including in journals and books in Portuguese.^{17,18} Nevertheless, a minority of the interviewees referred to knowledge of such scales. This finding is worrying, since, according to Halfens,¹⁹ theoretical knowledge and day-to-day practice go hand-in-hand, and, are certainly decisive factors in the health professional's capacity to decode and deal with the phenomenon of nociception. If a pediatrician, as interviewed here, does not have specific theoretical knowledge of the evaluation of pain in newborns, their practice of pain relief may be compromised.

Since a minority of pediatricians know about pain scales, what are the parameters that they employ for assessment of pain in newborns?

Crying: was cited by a large proportion of those interviewed for the evaluation of pain in newborns in general, and specifically in full term newborns. In fact crying is widely cited as an index of pain by health professionals, parents and lay populations in general.²⁰ However, in practice its use is highly questionable.²¹

Facial activity: two thirds of the pediatricians studied cited, in a spontaneous manner, facial activity for the assessment of pain in newborns, preferring it to other parameters for premature newborns specifically. In fact facial expression is a frequently used parameter in measuring

the pain of newborns and its efficacy, universality and reliability as an instrument for evaluating pre-verbal patients' pain has been demonstrated by many different researchers.²¹⁻²⁵

Heart rate: in a spontaneous manner, a minority of the interviewees opted for physiological parameters for the evaluation of pain in newborns. This finding, on the one hand, agrees with studies which indicate that physiological parameters should be used as coadjutants to evaluate pain during the neonatal period.^{15,26} On the other hand, this result goes against data in literature which demonstrates that doctors, in contrast with nurses, prefer physiological parameters for the evaluation of pain.²⁷ Nevertheless, when we asked what pediatricians preferred to use for evaluating pain in intubated babies, from the pre-established options, the preference for physiological parameters, especially for heart rate, resurfaced. Which is to say, with the most ill patients, that more often receive painful procedures and require criteria-based evaluation of pain, the doctors interviewed chose a parameter which is not very specific and difficult to interpret (heart rate), which confirms data obtained by Franck.²⁷ This author reports that medical teams tend to use heart rate, respiratory rate, oxygen saturation and arterial pressure to evaluate neonatal pain, and delegate behavioral assessment to nurses.

When doctors who work in intensive care were compared with those who work in nursery with respect of pain assessment, the pattern described above predominated, although those from an intensive care background demonstrated greater knowledge of pain scales. Even so, pediatricians who work with critically ill newborns did not say they used them in their daily routines. This group cited with the greatest frequency the use of facial expression for the evaluation of premature babies' pain and had greater knowledge of the difficulties of using crying for the assessment of pain in the newborn infant.

In relation to treatment, we attempted to find out, in the first place, why the professionals interviewed felt it is important to deal with newborns' pain and whether there was any difference between those who primarily worked with normal babies and those who worked in intensive care. In this sense, the replies to the question "why is it important to treat the pain of newborns?" were similar for the three groups of interviewees. The reasons for which the doctors, irrespective of their place of work, considered it important to treat newborns' pain appear to be involved with subjective and intuitive reasons.

The lack of knowledge of the consequences of pain for newborns may affect the results observed from the question related to pain relief during painful procedures frequently performed in nurseries and/or in intensive care units. Less than 15% of professionals applied some sort of analgesia for capillary and venous punctures. In relation to lumbar puncture, around 20 to 30% of all pediatricians said they used some sort of analgesia. This fact reflects the medical

resistance to use analgesics for lumbar puncture believing that the needle used for infiltration hurts as much as that for the puncture.²⁸ In relation to more invasive treatments, such as venous cutdown, chest tube insertion and mechanical ventilation, a greater percentage of doctors from intensive care backgrounds reported the use of analgesics for such procedures. Nevertheless when the percentage of these doctors who report using analgesics for these procedures is observed, this figure is around 50%. Which is to say that around half of the professionals did not believe pain relief to be necessary for procedures known to be invasive and painful. Such considerations become even more striking when we arrive at the replies related to the use of pain relief in a situation known to be painful: the period post-operative to laparotomy. Only 25 to 30% of the doctors who work in intensive care reported employing techniques for the treatment of pain and 50% of the pediatricians who work with healthy neonates (and who, therefore shouldn't deal with post-operative newborns) said they would bother with pain relief in this situation. It is difficult to understand why doctors who believe that newborns feel pain (100% in our study) and believe that it is important to treat pain for humanitarian reasons (100% in our study) do not report using analgesics for a post-operative situation in which any adult would receive at least one dose of analgesic.

Finally, when the doctors assessed, based on their place of work, were questioned about their preference in analgesic medication, 50 to 70% of the pediatricians from the three groups preferred opioids for pain relief. The doctors who work with critically ill newborns reported more concern about the depressive effects on respiration of the medication. Those who work in nurseries had less specific fears in relation to the use of opioid. This calls attention to the low level of reference to fears of addiction or physical dependence, which is very different to other studies in published literature.^{11,29,30} With respect to benzodiazepines, it was observed that around 30% of those working in intensive care and 46% of the pediatricians who are not active in intensive care said they would use benzodiazepines in isolation or in conjunction with opioids for the treatment of pain. These numbers indicate a lack of knowledge on the part of the doctors interviewed of the pharmacology and indications of sedatives, and also of their long-term effects.

Thus, it is perceived that the pediatricians studied here know that newborns feel pain and that it is necessary to treat this pain. However, there is still an enormous knowledge gap to the practical application of these concepts. The doctors did not apply methods for the assessment of pain in this age group in their clinical practice, nor the most effective treatment alternatives for the relief of this pain. In order to bridge this gap, formal training for health professionals at all levels of qualification and the adoption of written procedures for the assessment of pain and pain relief during the neonatal period at units which care for neonates are necessary.

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