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Critical Review

A Systematic Review of Cross-Cultural Comparison Studies of Child, Parent, and Health Professional Outcomes Associated With Pediatric Medical Procedures

Ólöf Kristjánsdóttir,*,† Anita M. Unruh,* Linda McAlpine,† and Patrick J. McGrath*,†

**Dalhousie University, Halifax, NS, Canada.*
†IWK Health Centre, Halifax, NS, Canada.

Abstract: **The purpose of this review was to evaluate systematically all published and unpublished research concerning culture and medical procedural pain in children. Databases, reference lists, and electronic list servers were searched as data sources. Fifteen studies met the inclusion criteria. Most studies (80%) were conducted solely in the United States comparing Caucasian American groups to other local subculture(s) (ie, African American, Hispanic, or Japanese). The studies compared, cross culturally, pediatric pain-related outcomes in children, parents and/or health professionals. The medical procedural experiences included surgery, immunization, spinal tap, bone marrow aspiration, needle procedures, orthopedic, and wound-related injuries. The evidence published to date suggests that cultural factors may be associated with children's pain experiences when elicited by medical procedural pain, specifically children's pain behavior. Nevertheless, research using more sophisticated research methods is needed to develop culturally sensitive behavioral pain measures. Measures that include physiological pain parameters in addition to other behavioral outcomes may be helpful. Culturally comparative research would benefit from the use of theoretical frameworks to advance our understanding of the cultural underpinnings of child pain development and guide future research.**

Perspective: ***The current evidence supports that children and parents belonging to cultural minority groups, and in need of health care, are a vulnerable population. Together, researchers and clinicians are encouraged to explore this understudied area, and take advantage of sophisticated methods developed by disciplines like cross-cultural psychology.***

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Key words: *Cross-cultural comparison, child, caregiver, pain, medical procedures.*

Culture is an important part of children's painful experience[58] and thus included in many theoretical pain frameworks (eg, the sociocommunication model of child pain).[18,57] Culture contributes to the construction of a framework for learning about pain behavior and pain communication, thus shaping a child's overall perspective of health and illness.[17] Culture might be associated with all aspects of a painful episode, such as threshold, perceptions, and coping, as well as shaping the conditions by which some pain responses are reinforced and others discouraged.[5,18,49]

Culture is a complex concept[22,43] with no generally accepted definition.[73] Similar to previous definitions of culture in the pediatric pain literature, in this review culture: "…entails the accumulated beliefs, practices, attitudes, and values shared by a social collective. It can be construed as a lens through which one registers experience and that shapes and colors perceptions, interpretations, and responses to events."[20] Culture is socialized within families and communicated across generations,[3,18]

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Address reprint requests to Ólöf Kristjánsdóttir, Centre for Pediatric Pain Research (South), IWK Health Centre, 5850/5980 University Avenue (Room # K8306), B3K-6R8 Halifax, Nova Scotia, Ca. E-mail: OL939557@DAL.CA

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with parents playing a significant role in transmitting culture by teaching their children to become competent members of their society.[31]

Culture, ethnicity, and race are often used interchangeably with little agreement about their meaning.[16,22,64] Ethnicity and race are typically used as markers for membership of specific groups living within a culture. Race is often defined on some biological construct (eg, skin color, hair texture), whereas ethnicity tends to be defined by qualities such as language, religion, nationality, or heritage. Ethnicity and race are also social variables often related to cultural dimensions like beliefs, values, and practices.[12,22,67,81] In this paper, race and ethnicity are understood as embedded in culture.

In their original work nearly 60 years ago, Zborowski[84] and Zola[85] reported cultural differences in adults' pain perception and responses. Since then, similar[19,24] and contradictory[15,79] findings have been reported in adult pain research. In contrast to the adult pain literature, there have been fewer studies of culture and children's pain. Most pediatric pain cross-cultural studies explore pain associated with medical procedures, rather than experimental, recurrent, or chronic pain. For this reason, we focused on medical procedures in this systematic review.

Beginning at birth and continuing through adolescence, most children experience medical procedures as part of childhood health care.[74] For healthy children these procedures may include heel sticks and immunizations and others. For sick and hospitalized children, a wider variety of medical procedures may be encountered, such as burn dressing changes, lumbar punctures, and suturing of lacerations. For children, these medical procedures are often painful and can have negative physiologic, emotional, and psychological consequences. Parents often find these medical procedures highly anxiety provoking.[32,59,72,80] Theoretical models, like the socio-communication model of child pain,[18] as well as empirical evidence,[54,59] report a complex interplay between the child, the parents, and/or the health professionals during a pain event. There are rich and varied stereotypes of pain in different cultures.[27,62] Thus, culture may also relate to the practices of health professionals and their attempts to ameliorate pain. The interplay between the child, parents, and health professionals can have a bearing on the child's experience of pain during painful medical procedures. Without further inquiry, it is not possible to know whether management of procedural pain in children is at its best for children of all cultures. For all of these reasons, we included variables related to children, parents, and health professionals in this systematic review. To our knowledge, there have not yet been any systematic reviews of research conducted about culture and child pain experiences.

Methods

Selection of Studies

One reviewer (OK), in association with 2 health librarians, conducted the literature search for papers on culture in the context of medical procedural pain in children. Relevant studies were retrieved through a search of Pubmed—MEDLINE (1950s–May 2011), CINAHL (1982–May 2011), PsycINFO (1887–May 2011), the Web of Science Citation Database (1980–May 2011), and EMBASE (1974–May 2011). The searches were conducted in 2009 and repeated in 2011. Search terms included subject headings and thesaurus terms (MeSH, CINAHL, Emtree, etc.), as well as text words using truncation/wild cards with boolean operators (and/or/not) relevant to the following terms: culture, cross-cultural comparison, ethnic groups, ethnicity, emigration and immigration, minority groups, pain and pain measurement, infant, child, adolescent and pediatrics. Reference lists from previous narrative reviews[5,6,18] and from all identified appropriate papers were examined for other relevant studies. The reviewers also contacted researchers via 2 electronic list servers (Pain in Child Health and Pediatric Pain) to obtain additional studies that did not emerge from searches of the data bases. Authors of abstracts were contacted through e-mail to locate original data. The abstract was excluded if sufficient original data was not available.

A study was included if: 1) the study population consisted of children from 0 to 18 years of age belonging to any cultural group within any setting who were defined as being healthy or sick; 2) the study design compared (quantitatively or qualitatively) subjects from at least 2 different cultural backgrounds; 3) the study concerned acute procedural pain (eg, needles, surgery, and hypothetical treatments); 4) the outcome variables related to painful procedures (eg, pain severity, distress, anxiety, stress, attitudes, and coping); 5) the study included parents of children within the specified age group and/or health care professionals working with the children; and 6) the study was a published or unpublished paper, in any language, providing empirical data analysis about pediatric pain and culture.

A study was excluded if: 1) the age range of the study population included youth older than 18 years of age; 2) children (0–18 years old) and adult data was not analyzed separately; 3) the design was a single case study or a single subject study; 4) the study was about experimental pain, recurrent or chronic pain, or everyday pain (bumps and falls); or 5) the study did not provide data on cultural comparisons for pain variables. The methodological quality of the study was not a determinant for exclusion or inclusion of a study.

Review Procedure

One reviewer (OK) screened all identified titles and abstracts for relevance in the review. Two reviewers (OK and LM) using full articles and abstracts, independently assessed potentially relevant studies for inclusion. Disagreements were resolved by discussion with AU and PM.

A systematic approach to data extraction was developed by the reviewers based on the American Dietetic Association (ADA) evidence analysis manual.[2] This extraction form was used by 1 reviewer (OK) to extract and code the following data from the included studies:

1) background and theory; 2) study design; 3) participants (child, parent, and/or health professionals); 4) the painful procedure; 5) ethnic/race/culture assessment; 6) data collection and measurement of primary outcomes; 7) results and significance of primary outcomes; and 8) a methodological quality rating total score. Unlike other data extraction strategies, this approach accommodates data from studies of different research designs, and does not focus solely on randomized controlled trials. Instructions for using the data extraction form were developed for this systematic review. Using the same extraction form independently, another reviewer (LM) randomly extracted and coded data from 50% of the included studies for coding reliability. Inter-rater reliability[70] for data extraction, using the total number of variables in the extraction form, was .94 (Kappa coefficient).

The studies were independently evaluated for methodological quality by 2 reviewers (OK and LM) using the ADA quality criteria checklist located in the ADA manual.[2] The ADA quality criteria checklist assesses 10 main components: 1) research question; 2) selection of participants; 3) group comparability; 4) handling of withdrawals; 5) blinding; 6) description of intervention/procedures; 7) validity/reliability of measures/outcome defined; 8) type of statistical analyses; 9) representation of conclusion; and 10) bias due to funding or sponsorship. The final ratings categorized the study as minus (−, weak methodological rigor), neutral (Ø), or plus (+, strong methodological rigor). The ADA quality criteria checklist was used to assess the methodological quality of included studies, and not as a determinant for the exclusion or inclusion of studies. Inter-rater reliability[70] for methodological quality was .90 (Kappa coefficient). Coding discrepancies were resolved through discussion with the second author (AU).

Results

Ninety-four studies about culture and children's pain were identified and of these studies, 79 were excluded from this systematic review. The reasons for exclusion of these studies are given in Table 1. The remaining 15 studies,[4,13,36,39,41,42,45,52,55,63,65,66,75,77,83] all in English, met our inclusion criteria (see Table 2).

The age of the children in the studies ranged from 2 months to 18 years. The painful medical procedures included surgery, immunization, spinal tap, bone marrow aspiration, hypothetical needle procedures, and orthopaedic and wound-related injuries. Thirteen (87%) studies were conducted solely in North America (of those, 92% in U.S.) comparing Caucasian American groups to other local subculture(s) (ie, African American, Hispanic, Chinese, or Japanese). Two studies were conducted in 2 different countries (U.S. and the Netherlands; U.S. and Thailand).

The outcome variables in these studies were situated in 3 domains. The first domain was cultural similarities or differences related to children's outcomes in pain intensity, pain language, pain behavior, pain coping, and/or physiological responses to pain. The second domain was cultural similarities or differences in parental anxiety and/or preference regarding their presence during the child's medical procedure. The third domain concerned the potential impact of culture on health professionals' administration of pain medication for pediatric medical procedures.

Table 1. Reasons for Exclusion of Studies (N = 79)

Reason	No
Children and adult data in study were analyzed together.	5
The study was a single case design.	30
The study lacked cultural group comparisons.	4
The study concerned validation studies without specific cultural group comparisons.	7
Only an abstract or commentary was provided.	4
The study focused only on non-pain-related outcomes.	6
The focus was on cultural comparison in the context of everyday pain.	2
The focus was on cultural comparison in the context of recurrent pain.	5
The focus was on cultural comparison in the context of chronic pain.	8
The focus was on cultural comparison in the context of experimental pain.	5
The study presented data already presented in another paper (duplicated data).	3

Child Outcomes

Pain intensity, pain language, pain behavior, coping strategies, and/or physiological response to painful procedures in children's pain experience were examined in 9 studies. They are summarized in Table 3.

Self-reported pain intensity in response to procedures was examined in 5 studies[13,39,42,63,65] in comparisons between Caucasian Americans and other local cultural groups (Hispanic/Latino and/or African American). The age range of the children was 3 to 12 years and the medical procedures included surgery, needles, spinal tap, or bone marrow aspiration. The type of self-reported measurement tools used varied in each study. No significant difference was found between the cultural groups in children's self-reported procedural pain intensity.

Pain language was examined in 1 study.[63] There were significant differences in the words used by European American and African American children (3–11 years) having surgery in this study. African American children provided fewer verbal pain responses, compared to European American children. The authors suggested that African American children may be socialized to display tougher ways of coping, given that they are living in a predominantly white culture. This toughness might have been reflected in their responses to a European American interviewer. The author also suggested there was a need for more culturally reflective questions and language when interviewing children from different cultural groups.[63]

Behavioral measures of pain were compared in 5 studies of children of ages 2 months to 18 years.[13,52,65,66,75] These comparisons were of Caucasians with Hispanic,

Table 2. Sample Description of Included Studies in Alphabetical Order

Author(s)	Participants	Pain Context
Bauchner[4]	Parents (m = 29, f = 22), n = 250 Black 135, Hispanic 46, white 45, other 24	Hypothetical venipuncture or intravenous placement
Bohannon[13]	Children age 3–7 years, n = 55 African American 25 (m = 20, f = 5), Anglo-American 30 (male = 20, f = 10)	Surgery
Hostetler[36]	Children age <18 yrs, n = 43,725 records (retrospective data from HAMCS 1992–1997) African American, Caucasian	Orthopedic (any type of fracture) or wound-related (lacerations) injury
Jimenez[39]	Children age 5–12 years, n = 94 (retrospective data from files in a single pediatric U.S. hospital 2003–2005) Spanish-speaking Latino 47, English-speaking non-Latino Caucasian 47	Surgery
Jordan-Marsh[42]	Children age 3–12 yrs, n = 79 Black 18, Hispanic 46, white 11, other 4	Surgery
Jones[41]	Parents n = 300 (m = 40, f = 254, grandparents = 6) Black 72, White 73, English-speaking Hispanic 76, Spanish-speaking Hispanic 79	Five hypothetical painful procedures
Karpman[45]	Children age 2–15 years, n = 63 (m = 43, f = 20) (retrospective medical charts review Jan 1, 1992 to April 30, 1993) Hispanic 37, white 26	Orthopedic injury (closed forearm fracture reduction)
Lewis[52]	Children age 2–6 months, n = 62 Japanese-American 31, Caucasian-American 31	Immunization (DPT)
McCarty[55]	Children age 6–14 yrs, n = 141 Thai 68, American 73 (m = 58, f = 83)	Hypothetical injection
Neuman[63]	Children age 3–11 yrs, n = 130 African-American 54, European-American 74, Hispanic 2	Surgery, needles
Pfefferbaum[65]	Children age 3–15 yrs, n = 78 Hispanic 43 (m = 23, f = 20), Anglo 35 (m = 14, f = 21) Parents n ≈ 78 Hispanic, Anglo	Spinal tap or bone marrow aspiration
Rosmus[66]	Children age 2 months, n = 52 Chinese Canadian 26, non-Chinese-Canadian 26	Immunization
Yen[83]	N = 1,030 records (3.9 million children), age <19 yrs, Non Hispanic white 792, black 111, Hispanic white 127 Retrospective data from NHAMCS 1992–1998	Orthopedic injury (long bone fracture)
van Aken[75]	Children age 8 months-18.7 years, n = 175 Dutch 60, American 115	Bone marrow aspiration
VanderBeek[77]	Children age ≤18 yrs, n = 503 (retrospective chart review June 1, 2000- May 31, 2002) African American 85, Caucasian 418	Orthopedic injury (closed forearm fracture reduction)

African American, Chinese or Japanese children living in America (4 studies). One study compared Caucasian children in America with Caucasian children in the Netherlands.[75] Four studies found that Caucasian American children displayed significantly more pain behavior as measured on these behavioral measures of pain intensity.[13,52,65,75] The authors, in these studies, suggested various explanations for their findings. Caucasian American children could be more expressive and less stoic than the comparison group(s),[13,75] or they might have received inadequate pain medication which would have contributed to perceived cultural differences.[13] Lack of cultural relevancy or sensitivity in pain measures might have biased cultural comparisons.[65] Investigators could have their own cultural biases and these biases might influence research design, analyses and results.[52,65] The milieu or culture of the clinics themselves (eg, size, parents' presence/absence during procedures) could have facilitated some interactions and inhibited others (eg, mother-infant interactions and mother-mother interaction).[66,75] In addition, parent-infant attachment might be promoted differently in some cultures through differences in feeding, holding, and sleeping and may influence parents' response to the infant's pain and the infant's responsiveness to the parent.[52,66]

In 1 study,[66] Asian (Chinese Canadian) infants displayed more pain behavior in an infant facial and vocal expression scale during immunization, when compared to Caucasian (Canadian) infants. These findings differed from the results of a similar study[52] comparing Asian (Japanese American) and Caucasian (American) infants during immunization. The reason for dissimilar findings in this case may lie in different measures, different age ranges, as well as the acculturation level of the immigrant parents.

Coping strategies were compared in 2 studies with children aged 3 to 14 years.[55,63] The first study[55] used

Table 3. Child Outcomes: Description of Included Studies in Alphabetical Order

Author(s), Pain Context, and Sample	*Main Outcomes (Measures)*	*Main Results*
Bohannon[13] Surgery n = 55, age 3–7 yrs, African-American 25 (m = 20, f = 5), Anglo-American 30 (male = 20, f = 10)	(1) Child self-reported pain intensity (Faces Scale[82]) (2) Child behavior measure of pain (CHEOPS[56]) (3) Child vital signs (heart rate, respiratory rate, blood pressure, temperature)	(1) No significant differences. (2) Significant difference in behavior between the African American (7.48 ± 2.04, range 5–12) and Anglo-American (8.58 ± 2.19, range 4–12) (P = .043), African American showing lower scores. (3) Significant difference between pre-and post-operative respiratory rate in African American children (P = .032), but not Anglo-American children. Anglo-American showed significant differences between pre- and post-op heart rate (P = .016), respiratory rate (P = .003), systolic blood pressure (P = .031), and temperature (P = .044), but not African American children.(Statistical comparisons made within, but not between groups.)
Jimenez[39] Surgery n = 94, age 5–12 yrs Spanish-speaking Latino 47, English-speaking non-Latino Caucasian 47 Retrospective data from files in a single pediatric U.S. hospital 2003–2005	Child median peak pain score in early or late recovery (Wong-Baker faces scale, Numeric Rating Scale – English/Spanish versions; Face Leg Activity Cry Consolability. Data from nursing records)	No significant differences. (Children matched on age, gender, type of surgery; child median peak pain scores only analyzed on subgroups.)
Jordan-Marsh[42] Surgery n = 79, age 3–12 yrs, black 18, Hispanic 46, white 11, other 4	Child self-reported pain intensity (Oucher scale Caucasian version,[8] PCT[33])	No significant differences
Lewis[52] Immunization (DPT) n = 62, age 2–6 months, Japanese-American 31, Caucasian-American 31	(1) Child behavior measure of pain (infants' facial and vocal expression scale (0–6), measured 5 seconds before, 90 seconds after) (2) Child saliva cortisol (measured pre-, post-immunization).	(1) Significant differences. Japanese infants dampen crying sooner (P = .03), stopped crying sooner (P < .01). Caucasian-American infants had more intense initial reaction (P = .004), shorter latency to reach max intensity score (P = .009), greater peak affective reaction (P = .05), shorter latency to peak reaction (P = .06). (Infants matched on gender and age.) (2) Significant differences. Japanese infants had higher post-immunization cortisol response (P < .05), more likely to fall into the low behavior–high cortisol reaction group Caucasian-American infants more likely to fall into the high behavior-low cortisol reaction group (P < .02). (Infants matched on gender and age. Significant increase in cortisol levels postimmunization in all infants.)
McCarty[55] Hypothetical injection n = 141, age 6–14 yrs, Thai 68, American 73 (m = 58, f = 83)	Child pain coping (interview with children)	Significant differences. Thai children used more covert coping methods (P < .001) especially in youngest and oldest age groups. Thai boys used significantly (P < .05) more covert methods than Thai girls. (Most American children were Caucasian.)
Neuman[63] Surgery, needles n = 130, age 3–11 yrs, African American 54, European-American 74, Hispanic 2	(1) Child pain language (interview with children). (2) Child self-reported pain intensity (Oucher scale Caucasian version,[9] Oucher scale African American and Hispanic versions[10]) (3) Child pain coping (interview with children)	(1) Significant differences. European-American children used the phrase "it hurt real bad" more compared to African American children (P < .012). African American children provided fewer verbal responses (P < .021) (2) No significant differences (3) No significant differences

Table 3. Continued

Author(s), Pain Context, and Sample	Main Outcomes (Measures)	Main Results
Pfefferbaum[65] Spinal tap or bone marrow aspiration Children: n = 78, age 3–15 yrs, Hispanic 43 (m = 23, f = 20), Anglo 35 (m = 14, f = 21) Parents: n ≈ 78 Hispanic, Anglo	(1) Child behavior measure of pain (PBCL[50]) (2) Child self-reported pain intensity (Faces scales,[48,50] CAPS,[48] CPI,[48,50]) (3) Child self-reported pain anxiety intensity (CAPS,[47] CPI) (4) Child self-reported anxiety intensity (STAI-C[69])	(1) PBCL mean score for Anglo children (M = 7.5) and Hispanic children (M = 6.9). High score indicating more pain behavior, (*P*-value not provided). Both groups showed inverse relationship between age and PBCL for Hispanic ($P < .001$) and Anglo children ($P < .05$). (Time period for observation not reported.) (2) Pain intensity similar between groups (range 2.5–3.4), (*P*-value not provided) (3) No significant differences (4) No significant differences
Rosmus[66] Immunization n = 52, age 2 months, Chinese Canadian 26, non-Chinese Canadian 26	Child behavior measure of pain (NFCS,[30] FFT [60] measured for 30 seconds following needle)	Significant differences. Chinese Canadian babies had more behavioral reactivity (brow bulge, cry duration, cry burst) than non-Chinese Canadian babies ($P < .003$). (Significant difference in feeding time before immunization. Chinese Canadian infants fed closer to injection. Non- Chinese Canadian parents scored significantly higher in education.)
van Aken[75] Bone marrow aspiration n = 175, age 8 months–18.7 yrs, Dutch 60, American 115	Child behavior measure of pain (PBRS[46]; measured in preparatory, puncture, and recovery phases)	Significant differences in carrying and restraining behavior, fear expression, and muscular rigidity (less evident in Dutch group) and clinging to parents or nurses (more evident in Dutch children) Significant interaction between culture and phase ($P < .001$), between culture, age and phase ($P < .05$), between culture, gender and phase ($P < .05$) No main cultural effects

vignettes of injections given to children in a doctor's office and found significant cultural differences in the coping strategies of children (6–14 years) living in Thailand and those in the U.S. Thai children relied significantly more on covert coping methods (eg, "I tried to remember my favorite things"), whereas American children reported using more explicit coping methods (eg, screaming). Thai boys used significantly more covert coping methods than Thai girls. The authors attributed this cultural difference to differences in children's expectations about interactions with adult authority figures (eg, doctors).[55] In the second study,[63] no significant differences were found in the coping of African American and European American children (3–11 years) postoperatively. The authors suggested that acculturation of the African American children to American culture, and the interviewers' cultural background, may have confounded the results.

Physiological responses to medical procedural pain were compared in 2 studies.[13,54] African American children (aged 3–7 years) demonstrated significant differences between their pre- and post-operative respiratory rate, whereas, Anglo American children had significant differences in their pre- and post-operative heart rate, respiratory rate, systolic blood pressure, and temperature.[13] Statistical comparison between cultural groups was not made. The authors suggested that differences in physiological responses might be due to higher pain behavioral scores postoperatively (significantly different), or higher pain ratings postoperatively (not significantly different). They also noted that the Anglo American children were given less pain medication than the African American children but the difference was not statistically significant.[13] In the second study, pre- and post-immunization cortisol levels were compared in Japanese and Caucasian infants (2–6 months, both groups living in the U.S.).[52] Cortisol levels increased significantly postimmunization in both groups, but the postimmunization cortisol level was significantly higher for the Japanese infants. Moreover, when infants' cortisol levels were analyzed with pain behavior, the Japanese babies were significantly more likely to demonstrate a low behavioral, but high cortisol response to immunization. On the other hand, Caucasian American infants were more likely to display high behavioral but low cortisol response postimmunization. The authors concluded that while both groups were affected by the stressful immunization, they had different responses. They speculated that the cortisol differences may have been due to genetic temperamental factors and the behavioral cortisol differences may have been the result of complex interaction between socialization and the physiological systems of these groups.[52]

Parent Outcomes

Three studies[4,41,65] focused on cultural comparisons of parents in response to children's medical procedures

Table 4. Parent Outcomes: Description of Included Studies in Alphabetic Order

Author(s), Pain Context, and Sample	Main Outcomes (Measures)	Main Results
Bauchner[4] Hypothetical venipuncture or intravenous placement Parents n = 250 (m = 29, f = 22), black 135, Hispanic 46, white 45, other 24	Parental preference regarding their presence during a painful procedure (questionnaire)	Significant difference. Black parents more likely to choose to be present than Hispanic or white ($p<0.05$). Parents with more education ($P < .01$) or children with previous procedures ($P < .01$) more likely to choose to be present
Jones[41] 5 hypothetical painful procedures Parents n = 300 (m = 40, f = 254, grandparents = 6) black 72, white 73, English-speaking Hispanic 76, Spanish-speaking Hispanic 7	(1) Parental preference regarding their presence during a painful procedure (questionnaire) (2) Parental anxiety (4 level Likert scale)	(1) Significant difference. Spanish-speaking Hispanic parents less likely to prefer being present for laceration repair ($P < .01$). English-speaking Hispanic parents less likely to prefer being present for critical resuscitation ($P < .01$). Black parents were least likely, English-speaking Hispanic parents most likely to want physician to decide regarding parental presence during venipuncture ($P < .04$), fracture reduction ($P < .04$) and critical resuscitation ($P < .004$). (2) No significant differences in parental anxiety (Significant sociodemographic differences between parental groups in age and education.)
Pfefferbaum[65] Spinal tap or bone marrow aspiration Children: n = 78, age 3–15 yrs, Hispanic 43 (m = 23, f = 20), Anglo 35 (m = 14, f = 21) Parents: n ≈ 78 Hispanic, Anglo.	Parental anxiety (STAI Spanish/English version[68])	Significant differences. Hispanic parents significantly more anxious (*P*-level not reported). Hispanic parents' anxiety did not correlate with their children's pain behavior or pain intensity. (No information on parental age or socioeconomic status given)

(Table 4). All but 1[65] of these studies concerned hypothetical pain. Parents were asked to imagine a painful situation according to the instruction given by the researcher's script and asked about their perceptions or responses. Table 3 provides an overview of parent results.

Parent willingness to be present during painful pediatric procedures was examined in 2 studies[4,41] of black, white and Hispanic parents living in the U.S. In 1 study,[4] black parents were significantly more likely to agree to be present for their child's hypothetical medical procedure compared to white or Hispanic parents. In addition, parents with more education, and parents of children who had previously undergone painful procedures were more likely to agree that they would want to be present. In the second study,[41] independent of cultural background, parents in general wanted to be present during their child's hypothetical procedure. Nevertheless, English-speaking Hispanic parents, compared to Spanish-speaking Hispanic parents, black parents and white parents were significantly less likely to choose to remain present during highly invasive procedures (ie, critical resuscitation). Compared to the other cultural groups, black parents were significantly less likely, and English-speaking Hispanic parents were more likely to want the physician to decide if they should stay during some of the medical procedures. The authors suggested that there may be larger differences within minority groups (black and Hispanic parents) than between minority groups and white parents.[41] The 2 studies used different measures, which may also have impacted their findings.

Parental anxiety about their children's painful procedures was explored in 2 studies of white/Anglo parents and black and/or Hispanic parents living in the U.S.[41,65] Different pain context and measurement tools were used in these studies. In 1 study,[65] Hispanic parents experienced significantly higher anxiety compared to Anglo parents in a comparison of parental anxiety about their children's cancer procedures (bone marrow aspiration or spinal tap). The authors suggested that Hispanic parents may be more anxious. Further, they may have different anxieties about the disease and the possible death of their child that are exacerbated by cultural conflicts for Hispanic parents living in a minority culture. It was also proposed that Anglo parents may value more emotional control and may have wanted to represent themselves as less anxious than Hispanic parents.[65] In the other study,[41] there were no statistical differences in parental anxiety towards a hypothetical, painful pediatric medical procedure among white, black, English-speaking Hispanic, and Spanish-speaking Hispanic parents.

Health Professional Outcomes

The results of outcomes for health professionals are summarized in Table 5. Six studies[13,36,39,45,77,83] compared health professionals' administration of pain medication for procedural pain depending on the children's cultural backgrounds. In 2 studies,[13,39] the cause of pain was associated with surgery. The other studies concerned pain due to management of fractures in an emergency setting. The type of fracture, the type of pain medication given, and the administration route (oral and/or parenteral) varied between the studies. No study evaluated children's pain intensity with respect to the pain medication used.[39]

Table 5. Health Professional Outcomes: Description of Included Studies in Alphabetical Order

Author(s), Pain Context, and Sample	*Main Outcomes (Measures)*	*Main Results*
Hostetler[36] Orthopedic (any type of fracture) or wound related (lacerations) injury n = 43,725 records, age < 18 yrs, African-American, Caucasian Retrospective data from HAMCS 1992–1997.	Child pain medication administration in ER (Parenteral analgesic and sedative, ie, fentanyl, ketamine, meperidine, methohexitalm idazolam, morphine, nitrous oxide, propofol)	Significant difference. African American children with orthopedic injuries (not wound-related injuries) covered by Medicaid insurance least likely to receive parental analgesics or sedatives when compared to the entire population with orthopedic injuries covered by Medicaid or private insurance (P = .002) 5.6% of all children received analgesics or sedatives
Jimenez[39] Surgery n = 94, age 5–12 yrs Spanish-speaking Latino 47, English-speaking non-Latino Caucasian 47 Retrospective data from files in a single pediatric U.S. hospital 2003–2005	Child pain medication administration post-op early/late recovery (opioids, fentanyl, alfentanil)	Significant difference. Latino children received 30% less opioid analgesics (mg/kg) than Caucasian (P = .02)
Karpman[45] Orthopedic injury (closed forearm fracture reduction) n = 63 (m = 43, f = 20), age 2–15 years, Hispanic 37, white 26 Retrospective medical charts review Jan 1, 1992 to April 30, 1993	Child pain medication administration in ER (Analgesia medication by national drug code 1700–1799–drugs used for pain relief)	No significant difference
Yen[83] Orthopedic injury (long bone fracture) n = 1,030 records (3.9 million children), age <19 yrs, Non-Hispanic white 792, Black 111, Hispanic white 127 Retrospective data from NHAMCS 1992–1998	Child pain medication administrated in ER (morphine (parenteral), meperidine (parenteral), ketorolac tromethamine (parenteral), oxycodone hydrochloride (oral), codeine (oral), ibuprofen (oral)	No significant difference. 57% of non-Hispanic white children, 64% of black, and 57% of Hispanic white children received some pain medication during the ER visit. 37% of non-Hispanic white, 25% of black and 32% of Hispanic white children received opioid pain medication
VanderBeek[77] Orthopedic injury (closed forearm fracture reduction) n = 503, age ≤18 years, African-American 85, Caucasian 418 Retrospective chart review June 1, 2000–May 31, 2002	Child pain medication administration in ER (conscious sedation for pain control; medazolam, fentanyl, ketamine)	No significant difference

'In 2 studies,[36,39] significant differences were found in health professionals' administration of pain medication depending on children's cultural backgrounds. In a retrospective study of hospital files (2003–2005), Jimenez et al[41] reported significant differences in opioid administration between Spanish-speaking Latino and English-speaking non-Latino Caucasian children (5–12 years). During the early postoperative period, the Latino children received 30% less opioid analgesics (mg/kg) than Caucasian children (P = .02). Although the authors reported on children's mean pain score, the pain score was not connected to the medication administrated.[39] Using data from the National Hospital Ambulatory Medical Care Survey (NHAMCS 1992–1997), Hostetler et al[36] found that being a child (<18 years), African American, or covered by Medicaid insurance were factors that significantly increased the risk of receiving less parenteral analgesic and fewer sedatives (eg, fentanyl, ketamine, morphine) when compared to adults, Caucasians, or those covered by private insurance. Thus, African American children who were covered by Medicaid insurance were also at greatest risk for undertreatment of pain.[36] A different study,[83] also using the NHAMCS 1992–1998 data, found no significant difference. Contradictory findings between these 2 studies may be due to differences in the type of pain medication and/or the type of orthopedic injuries explored in each study.

No study discussed issues concerning cultural sensitivity or cultural competence possibly influencing health professionals' pain treatments. Only 1 study[45] reported the cultural background of health professionals in the sample groups. In this study, 80% of the Hispanic and white children were treated by a white male orthopedic physician.

The authors' explanations for the nonsignificant differences found in their studies (where they occurred), included: the type and severity of injury,[77] the hospital location and type,[77,83] the pain medication studied,[77] and, the limited cultural diversity between comparison groups.[45]

Methodology

The design of the studies was cross-sectional, [4,13,41,42,52,55,65,66,75] descriptive,[63] retrospective cohort,[39,45,77,83] or nonconcurrent cohort.[36] Using the ADA quality criteria checklist,[2] the overall methodological quality of most of these studies (11 of 15) was neutral. Two studies[4,42] had weak methodological rigor. Two studies were rated as having strong methodological rigor.[45,52] The studies varied considerably in their use of theoretical frameworks to support their methods, the way in which the culture of their participants was identified, and their attention to issues about the adequacy of the research materials (eg, language) for participants of diverse cultures.

Theoretical frameworks were used to present 3 studies.[13,55,63] These frameworks include Orem's theory of self-care,[63] Piaget's theory of cognitive development,[63] Neuman's systems model,[13] and the primary-secondary control model.[55] The choice of independent and dependent variables was not clearly associated with elements in these theoretical frameworks.

Study groups were defined by individuals' background characteristics, such as their nationality (eg, Chinese, Japanese, Dutch, African American), ancestry (Asian), ethnicity (eg, Hispanic/non-Hispanic), ethnicity and first language (eg, Spanish-speaking Hispanic), race (eg, black/white), by exclusion (ie, non-Chinese Canadian, others), or by combination (non-Hispanic white). Consequently, different terms were used to describe similar cultural groups; for example, individuals with European ancestral origins were described in various ways as white, American, Anglo American, Dutch, European American, Anglo, Caucasian, Caucasian American and non-Hispanic white.

The methods used to identify and assign individuals to cultural backgrounds in these studies varied. In no studies did children assign themselves into relevant cultural groups. In most cases, group assignment was done by either the parents,[13,63,65] the researchers,[52,65,66] or the registration personnel in the hospital.[77] Researchers used the child's or parents' surname,[65] language spoken,[65] parents' birthplaces,[52,65] or the mother's generational history[66] to assign participants into a cultural group. In 8 of the 15 studies,[4,36,41,42,45,55,75,83] no information was provided about the criteria used to identify or assign participants into cultural groups.

The homogeneity or heterogeneity of groups received limited attention; for example, the group name "American" used by McCarty et al[55] may or may not have included individuals who identify themselves as African American, European American, Japanese American, Chinese American, or former citizens of some other countries. Two studies[65,66] measured the acculturation of their comparative groups using the Brief Language-Based Acculturation Scale[21] or the SL-ASIA scale.[71] Apart from acculturation, other covariates controlled for in some studies were parental education,[4,41,66] parental occupation,[66] parental social class,[52] insurance,[36,45,77,83] child age,[39,55,65,75] child gender,[39,55,65,75] primary language,[41,77] health professional background,[45,75] urban/rural location,[36,77,83] behavioral patterns (sleeping and eating),[52,66] opioid side effect,[39] and type of surgery.[39]

Equivalence is the comparability of the construct and test scores from 1 population to another.[76] Cultural equivalence issues in study procedures or measures were addressed in few studies. Two studies[42,65] evaluated the validity and reliability of pain assessment tools between different cultural groups of children. One study[63] used pain measurement tools (ie, the photographic Oucher scales) that were previously developed and tested for validity and reliability for each of the cultural groups studied. Translation equivalence issues associated with questionnaires[39,65,66] and interview protocols (interview guides and/or translators)[41,55,63,66] received more attention in the studies. Language barriers were reported in 4 studies.[41,45,65,66] Another equivalency issue addressed by researchers was possible bias when researchers and participants were of different cultural backgrounds; for example, when interviewing children[63] or coding pain behaviors.[52,65] Some researchers believed that this factor had an impact on their outcomes,[63] whereas others did not.[52]

Discussion

This study is the first systematic review to examine culture and painful pediatric medical procedures. Fifteen cross-cultural comparison studies of child, parent, and/or health professional outcomes associated with painful pediatric medical procedures were found. Most studies (80%) were conducted solely in the United States.

Children's pain was examined using verbal (self-report) and nonverbal (behavioral and physiological) measures. Contradictory to the adult pain literature,[19,24] our review discovered no cultural differences in children's self-reported pain intensity associated with medical procedures. None of the reviewed studies used the same self-report measure and only 1 study[63] applied a culture-sensitive tool. The pediatric pain literature disagrees on the importance of developing culture specific self-report pain intensity measures for children. Some view culturally sensitive tools as clinically important as they portray the sensitivity of health professionals to the culture of children and families and thus may enhance the accuracy of the self-report.[11] Others, however, regard a "universal faces pain scale" as a viable and practical option that facilitates comparison across studies.[25] Considering the limitations of the studies, researchers are encouraged to address the cultural sensitivity of the self-report pain intensity measures used, and their feasibility, in clinical and research settings.

Cultural differences around infant's and children's nonverbal pain expression (behavioral and physiological) were found. In all but 1 study,[66] Caucasian American infants and children displayed significantly more pain behaviors when compared with other cultural groups such as African Americans,[13] Japanese Americans,[52] Hispanic Americans[65] and Dutch (living in the Netherlands).[75] Caucasian American infants and children may

have exhibited more pain behavior because of differences in socialization processes (eg, encouragement of expression), genetic differences in expressivity, similarity in culture of the health professional, child and family, and/or differences in the medical procedure. Differences in infant and child pain behavior, when they occur, have been attributed to socialization rather than other causes.[25] Another possible explanation may be due to pain measurement. Tools that have been developed for Caucasian American infants and children may lack sensitivity to assess pain in culturally diverse groups of infants and children. For example, a study of South African infants suffering from HIV and AIDS found that standardized measures of infant pain behavior used during painful procedures were not sensitive to the infant's facial pain expression. Other factors such as exhaustion or malnutrition may have played a part as well.[1] When measures are used across cultures, issues such as social norms, values, and beliefs can affect the reliability and validity of the measurement results.[78] Specific concepts occurring in 1 culture may not be present or may have different meaning in another culture.[34,38] More work is needed to validate the sensitivity of behavioral pain measures in culturally diverse groups of infants and children.

Cultural variance in infants' and childrens' physiological responses to medical procedures was also found in this review. In their first study, Lewis et al[51] concluded that when compared to Caucasian American infants (3–5 months), Japanese infants were less distressed and showed higher thresholds for pain during immunization based on behavioral (ie, grimace, raised eyebrows, cry), but not physiological measures. In their second study, Lewis et al[52] added a pre- and post-immunization saliva cortisol measure. Again, Japanese infants (2–6 months), compared to Caucasian American infants, showed significantly less behavioral response to the immunization; however, they displayed significantly greater physiological response thus indicating distress response. Underlying theories and assumptions around culture and child pain have centered on sociocultural rather than biocultural elements. Based on these findings, physiological responses may help disentangle some sociocultural from biocultural responses. Future studies should include physiological pain parameters in addition to other behavioral outcomes to determine potential causal mechanisms.

Adult pain research demonstrates that cultural disconcordance between a patient and medical personnel, as well as in the milieu, can significantly decrease expression of pain by the minority cultural group.[37] In the pediatric literature there is a concern that health care providers may be more open to the communications of pain by children of the same cultural background compared to children from different culture.[27,35] In the studies reviewed, cultural dissimilarity between the child and observer (medical staff and/or investigators) was raised as a possible explanation for why children belonging to minority groups expressed less pain related to medical procedures compared to the majority groups.[45,52,63,65]A recent adult experimental pain study in Canada found that Chinese participants in a Chinese milieu displayed more nonverbal behavior of pain than did Chinese participants in a Euro Canadian milieu,[37] suggesting that a familiar milieu may encourage pain expression. Similarly, the milieu of the health clinics performing the medical procedures was suggested to have had an impact on children's pain expression in some of the included studies.[55,66,75] One study[55] noted that a power imbalance between the Thai children and the Thai physician, implementing the medical procedure, may explain the differences found in Thai (living in Thailand) and American (living in the U.S.) children's pain coping. Cultural concordance of the milieu, the observer and the child in pain may have a bearing on research and clinical outcomes.

Limited and contradictory findings occurred in cultural variance in parental and health professional reactions related to children's medical procedures. Disparity of pain medication administration for medical procedures in immigrant minority groups of children living in the U.S. was explored. The results were mixed for children, but studies have repeatedly reported disparities in pain treatment for adult immigrant minority groups.[23,29] Compared to nonimmigrant parents, immigrant parents may differ in how they cope with stress,[65] and in their use of nonpharmacological methods for the child's pain.[39] Moreover, differences in pharmacodynamics and pharmacokinetics of pain medications between cultural groups were suggested to explain why Latino children (5–12 years old) received 30% less opioid analgesics postoperatively compared to Caucasian children.[39] The empirical literature supports that children and parents belonging to cultural minority groups are a vulnerable health population and need more attention to quality and adequacy of pain assessment and management by health professionals.[26] However, without more information, it is not possible to know whether management of procedural pain in children is at its best for children of all cultures.

Research based on theoretical frameworks enriches and strengthens the research design.[7,40] In general the included studies lacked theoretical underpinning. Applying a theoretical framework, like the sociocommunication model of child pain,[18] may help future researchers bring forward the complexity of studying pain in children of all cultures. Instead of comparisons based on proxies such as nationality or race, researchers are encouraged to study culture-specific elements such as parenting. This may help us better understand the underlying cultural aspects of children's pain development, yielding more meaningful outcomes. Further, a more comprehensive knowledge of the relationship of culture and children's pain development is created by theory development.

A variety of factors such as gender, age, acculturation, and socioeconomic status affect how closely an individual identifies with a cultural group.[28,61] Self-designation of cultural background is considered the best method of identifying cultural groups, though there is no consensus on the best method of self-designation.[14,44] Parents' and children's culture may not be identical, especially if the child does not live in a traditional family structure.[53] Also, both the parent and the child may identify with

multiple cultures especially if the family has immigrated to a country with a different dominant culture. In cases of mixed parentage (eg, having 1 African American parent and 1 Caucasian American parent), a child may identify equally with the cultural backgrounds of both parents or to 1 background over the other. Allowing for the selection of multiple cultural identities or the culture with which the parent or child is most closely identified may provide more accurate information. In the included studies, parents were rarely asked to self-assign themselves or the child to a cultural group. Children were never asked, even though children from 6 to 8 years of age are able to identify their cultural background.[28] This omission may have caused selection bias and inaccurate findings. Having children and parents identify their culture should be standard in future studies.

Overall, most cross-cultural comparisons were between individuals belonging to cultures within a single country. Most comparisons were of Caucasian American majority groups to Hispanic American and/or African American groups. Other comparisons included groups identified as Japanese, Chinese, Thai, and others from other Asian countries. Any of these groups may have significant heterogeneity within the group. Further, white (non-Hispanic) immigrant groups were not evaluated in any study, even though, as immigrants, these groups face many of the same cultural and linguistic barriers as other immigrant groups.[53] Level of acculturation of the minority groups was evaluated in only 2 studies.[65,66] Immigrant groups may vary in their cultural affiliation from those who remain in their homeland. Moreover, at different times, immigrants may be of higher or lower social class than average in the recipient countries and intersect with cultural values. Any of these issues may contribute more to within than between cultural group differences.

In conclusion, culture may be associated with children's pain behavior during painful medical procedures. Self-report is more likely to be culturally neutral in assessing pain and should be used in clinical pediatric settings. Behavioral tools have been developed primarily with Caucasian children and may have cultural biases. Given the limited evidence and methodological challenges of the research in pediatric medical procedural pain it is unreasonable to act as if there are clinically important differences to minimize or dismiss a child's report of pain because of the child's or family's cultural background. Sensitivity to possible cultural differences between the health care environment, the child and the family may exist, and may shape the pain experience of the child.

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