Importance of environmental factors in pediatric surgery

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Pain management after pediatric surgery

Knowledge does exist!

→ **Guidelines**

Good practice in postoperative and procedural pain management. Pediatr Anesth 2012

Practice guidelines for acute pain management in the perioperative setting: an updated report by the American Society of Anesthesiologists Task Force on Acute Pain Management. Anesthesiology 2012

Acute pain management; Scientific evidence, (3rd ed.) Melbourne: Australian and New Zealand College of Anaesthetists 2010

Pain management after pediatric surgery

Pain scales

- auto-report: VAS, FPS-R
- observational: FLACC, EVENDOL, COMFORT B
- at home: PPPM
- oncology, burns: DEGR - HEDEN
- neonates: EDIN, LNPS, COMFORT-neo
- disabled children: FLACC, GED-DI, DESS
- neuropathic pain: DN4

Pain management after pediatric surgery

'despite the development of standards, guidelines and educational programs…'

effective pain management in children

↓

continues to fall short of the ideal

Chorney JM, et al. Canadian Med. Ass. J., 2010
Birnie, K. A, et al. Pain Res Manag, 2014
Twycross A, et al. J. Clin. Nurs, 2013
Kozolowski L, et al. Pain Manag. Nurs, 2014
Twycross A, et al. Pain Manag Nurs, 2013

Pain management after pediatric surgery

adverse event

harmful patient outcome

pain as the neglected patient safety concern

Twycross A. Child Health Care, 2016
Chorney JM, et al. Canadian Med. Ass. J., 2010
World Health Organization, 2009

Pain management after pediatric surgery

- negative outcomes of inadequately managed pain
- pain and patient safety links
- quality improvement strategies to improve pain globally

Twycross A, et al. Child Health Care, 2016
Fortier MA, et al. Journal of Pediatric Surgery, 2011

Pain after surgery, the importance of environmental factors

- in-hospital
- at home

- health care professionals (nurses – anesthesiologists surgeons)
- child & parents
- organization

International Association for the Study of Pain (IASP), 2010

in – hospital

Nurses

How do nurses assess children's in-hospital pain?

90% reported having enough knowledge to assess children's pain in the hospital
86% were relying on child's self-report
90% was familiar with commonly used validated pain scales
75% reported not using pain scales recently
58% reported using an alternative method involving the child
86% reported relying on their own overall impression of the child's pain
34% reported involving the parents in their pain assessments

Zisk-Rony R, et al. Pain Manag Nurs, 2015

Nurses

- **What nurses' work-arounds tell us about pain assessment**

Workarounds are observed or described behaviours that may differ from organisationally prescribed or intended procedures. They circumvent or temporarily 'fix' an evident or perceived workflow hindrance in order to meet a goal or to achieve it more readily.

Von Baeyer C, et al. Int. J. Nurs. Stud, 2017
Frank LS, et al. Pain. Res. Manage, 2009
Debono D, et al. BMC Health Serv Res. 2013

Nurses

- CHIPPS (97%) scores on day 1 postoperative: 0 (87%) or 4 (10%)

- Verbal Numerical Rating Scale
  1. no established anchors: 0 = no pain but for 10/10
  2. generally left to care providers
  3. ‘the most hurt’ or ‘the most pain you can image’ or ‘a whole lot of pain’

- nurses change the anchor!

Avian A, et al. Int. J. Nurs. Stud, 2016
Castarlenas E, et al. Clin. J, Pain, 2016

Nurses

- when nurses are to follow an illogical protocol – particularly when following the protocol patient safety might be impacted

- prescribing a specific opioid based solely on pain intensity

- nurses frequently report working around – changing patients' self-reported rating – allows to administer a lower, hopefully safer, dose

Nadhrah, N. & Michell, V. Healthcare Administration: Concepts, Methodologies, Tools, and Applications. IGI Global, Hershey. PA, 2015
Pasero A.L, et al. Pain Manage. Nurs., 2016

Perception of pediatric pain

A comparison of postoperative pain assessments between child, parent, nurse, and independent observer.

Children's pain self-reports should be used wherever possible to guide management, but in their absence, parental pain scores can be reliably used as a surrogate measure. ***Nurses and independent observers produce lower pain scores than parents or children, which may result in inadequate treatment of pain.***

Khin, et al. Pediatr Anesth, 2014

Factors that Stop Nurses from Assessing Managing Pain as Well as They Would Like

Factors Relating to Staff	Factors Relating to Child and Parents	Organizational Factors
• Nurses' personal judgments, preconceived views, and assumptions • Nurses' lack of knowledge–particularly regarding pain management generally, pain medications, and patient-controlled analgesia • Fear of overdosing the child on pain medications • Nurses having to chase down doctors to ensure that analgesic drugs prescribed • Insufficient analgesia prescribed by medical staff • Need for education of medical staff	• Child's age • Child's culture • Noncompliance with nurses' suggestions for pain care by child and parents • Children exaggerating their pain scores • Children complaining of pain when their behaviors do not indicate that they are in pain • Parent/child not informing the nursing staff when the child is in pain • Parents interfering and answering for their child • Parents encouraging their child to have pain medication when they had not asked for it • Child/parent refusing pain medication	• Lack of time and a heavy workload • Staff shortages • Insufficient supply of some medication • Lack of age-appropriate pain assessment tools* • Not having a flowchart of pain medications* • Lack of equipment to distract children • Play therapists not always available

*Note that the hospital's guidelines for managing pain in children included recommended pain assessment tools for all ages of children and an analgesic algorithm.

Twycross A. Pain Manag. Nurs, 2013

What can be done?

Things that Nurses Felt Would Help Them to Assess and Manage Pain Better

Factors Relating to Staff	Factors Relating to Child and Parents	Organizational Factors
Nurses: • Using pain assessment tools • Reassessment of pain after administration of pain medications • Taking a patient history • Having more time • Teaching for nurses Doctors: • Doctors writing the correct prescriptions for pain medications	• Children and parents verbalizing their concerns about pain • Parents informing the nurses when their child is in pain • Parental involvement in pain care	• Better assessment tools • An improved scoring system • Improved staffing levels • Preprinted prescription charts • Having a preoperative questionnaire for parents • Availability of equipment for distraction, e.g., dolls, teddies • Increased availability of a play therapist (child life worker)

Twycross A. Pain Manag. Nurs., 2013

Parents

psychological aspects

physical health (chronic pain & somatic symptoms)

SES – parental eduction

cultural beliefs

- reluctant for their children to receive pain medication
- lack of cooperation
- parents' report of pain – does not always match their child's behavior
- child's diagnosis suggesting pain – facilitates optimal pain management

Birnie, K. A., et al. Pain, 2014
Evans S, et al. J. of pain mang, 2008

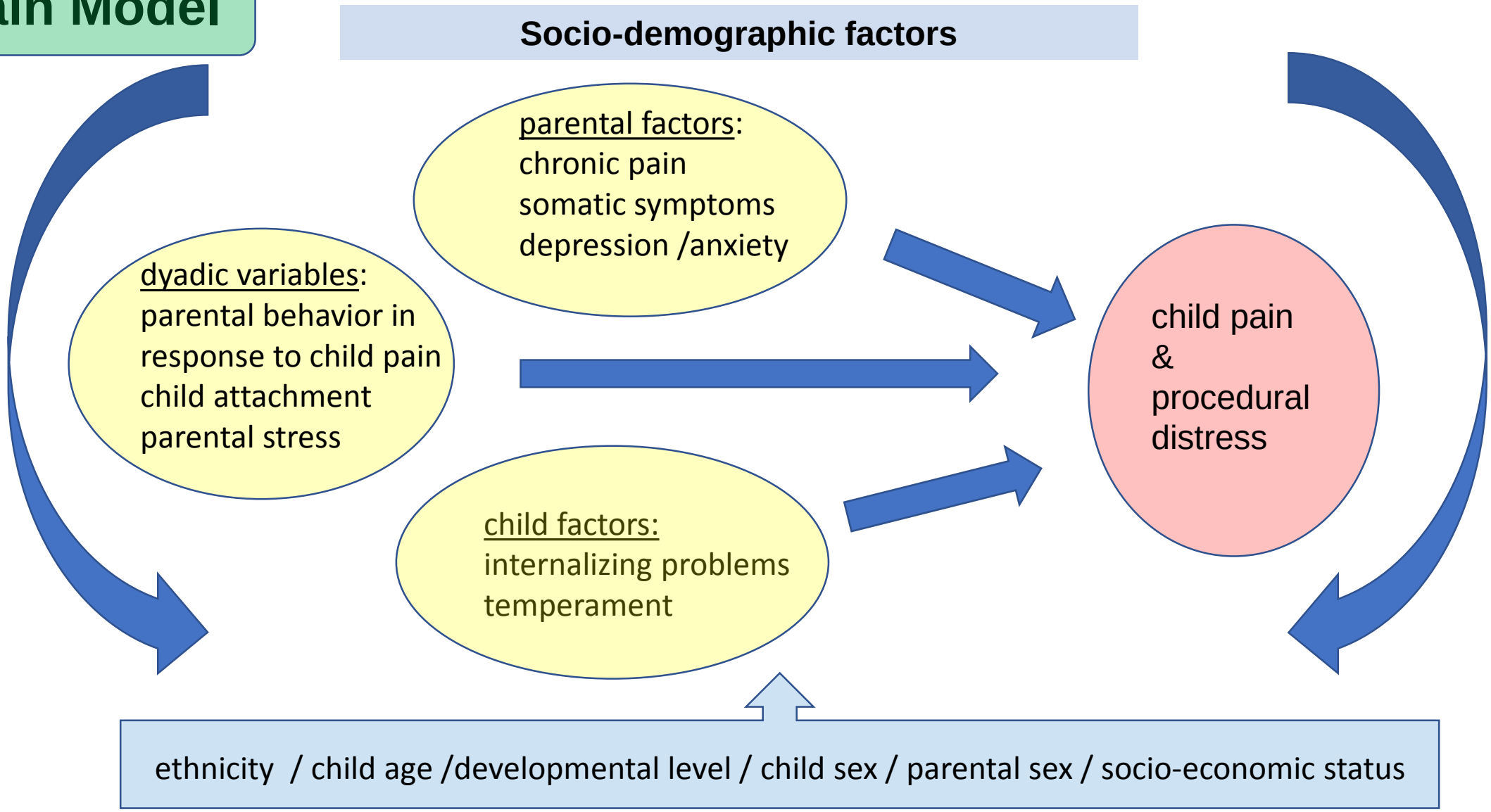
Child

- quality of previous medical encounters
- children's behavior is seen as a barrier to managing pain
- child's diagnosis suggesting pain – facilitates optimal pain management
- age – particularly for children unable to communicate verbally
- children described as being reluctant to report their pain and as unwilling to take pain medications

essential to understand non-verbal expressions and actions of the child

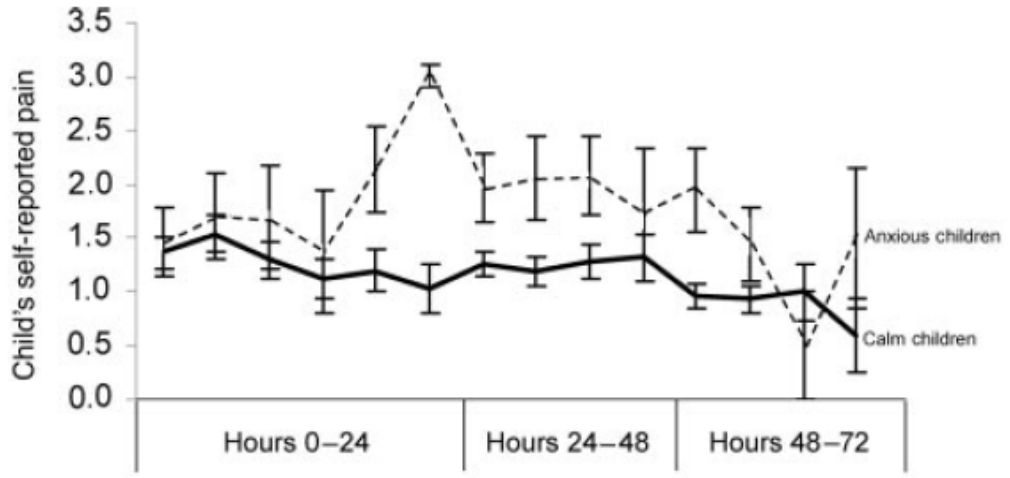
Twycross A, et al. Pain Manag Nurs, 2013
Evans, S, et al. J Pain Manag, 2008
Birnie, K, et al. Pain, 2014.

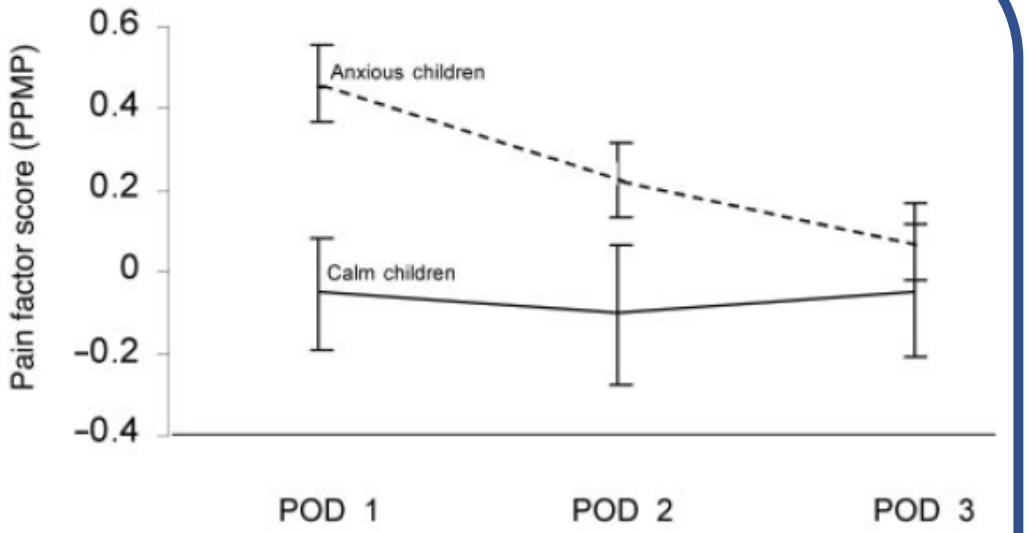
Pain Model



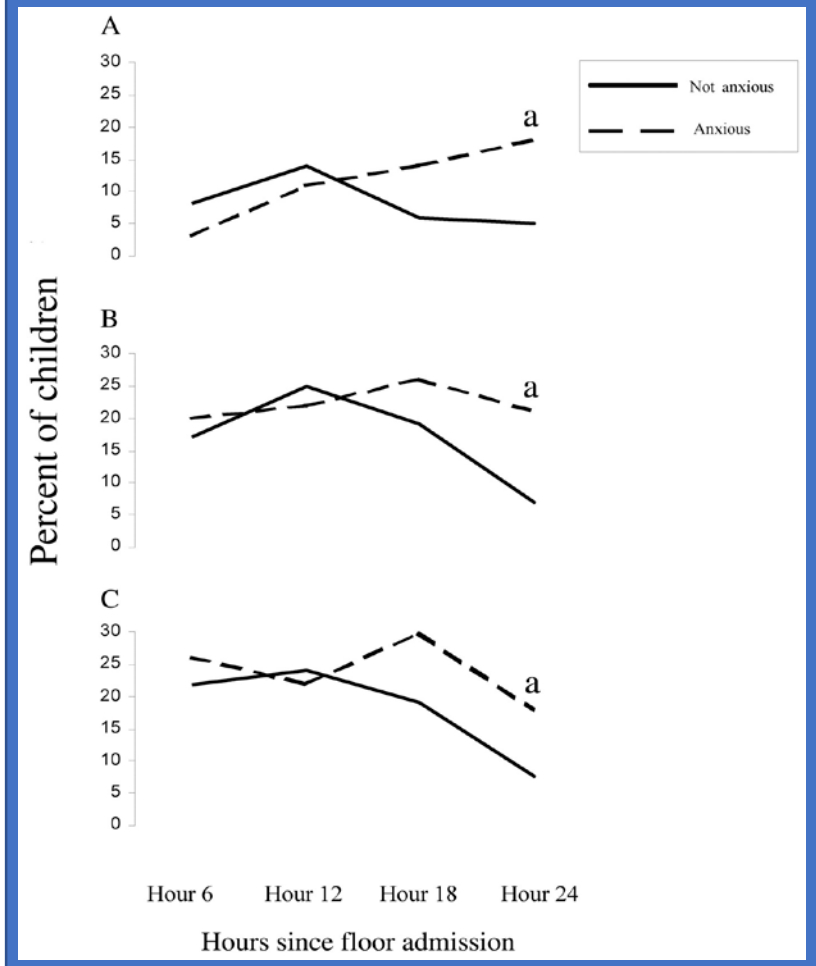
Evans S, et al. J Pain Manag, 2008
Wolff, N. Psychological risk factors for pain in young children – the Generation R Study

Pain & anxiety





Kain Z, et al. Pediatrics, 2006

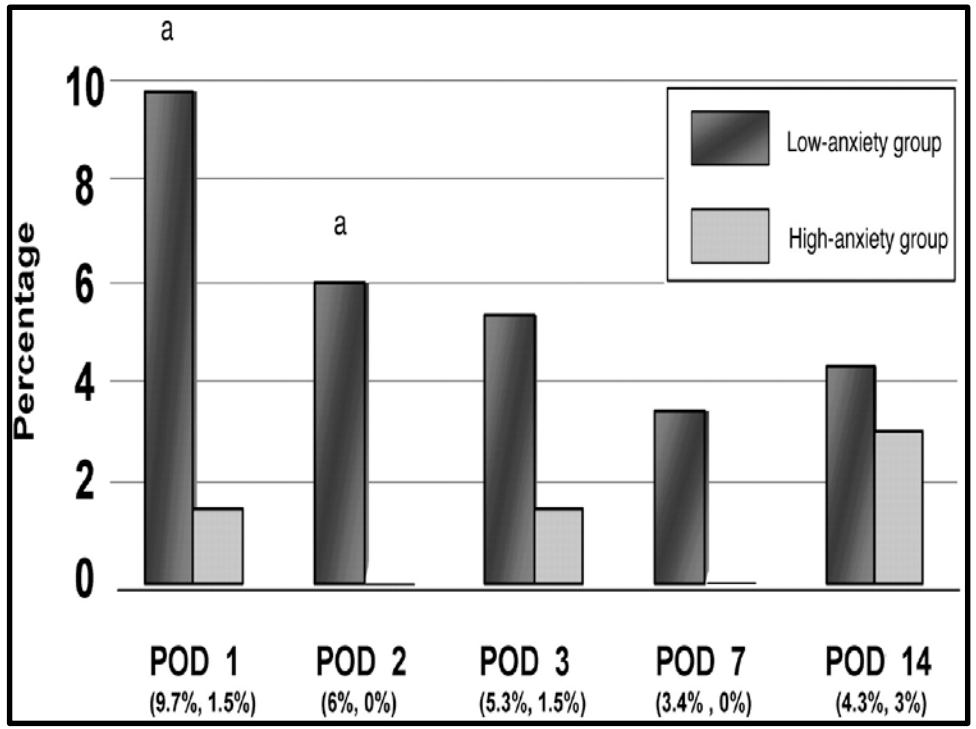


Nurse assessment of the children's postoperative sleep difficulties.

A The child had trouble falling asleep

B The child had trouble staying asleep

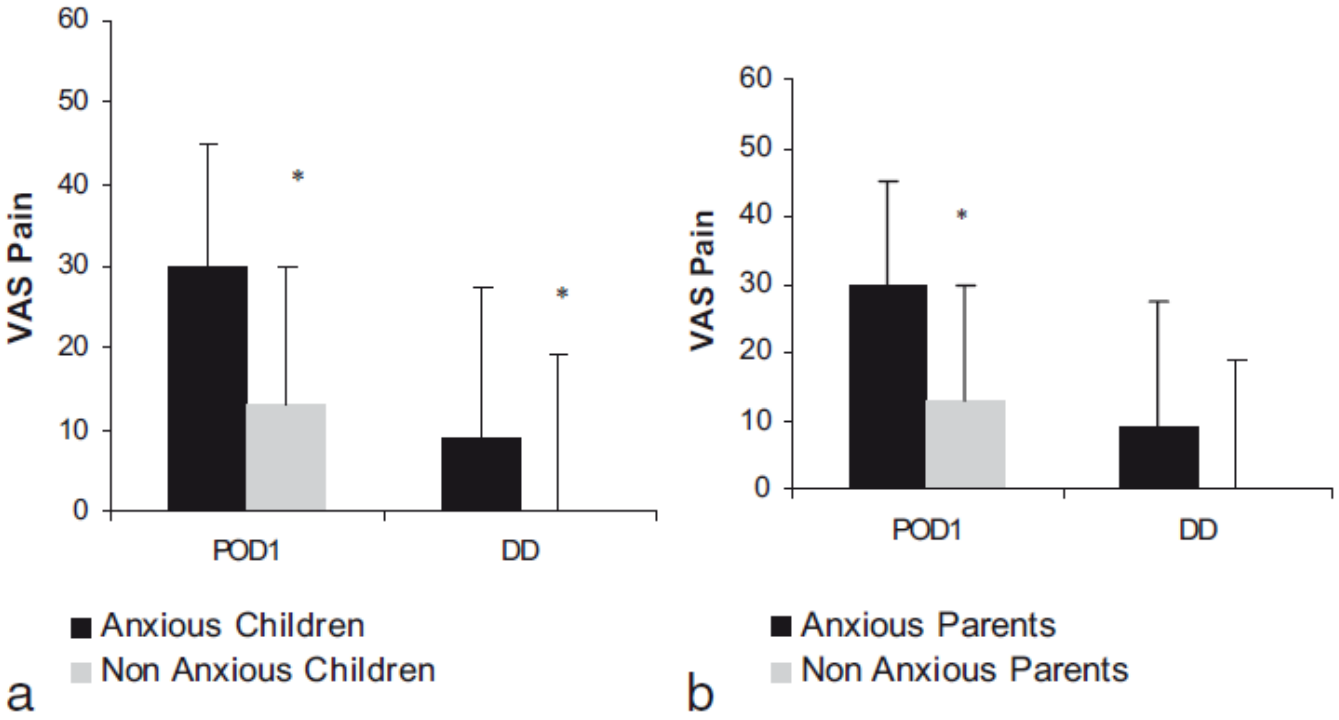
C The child woke up crying



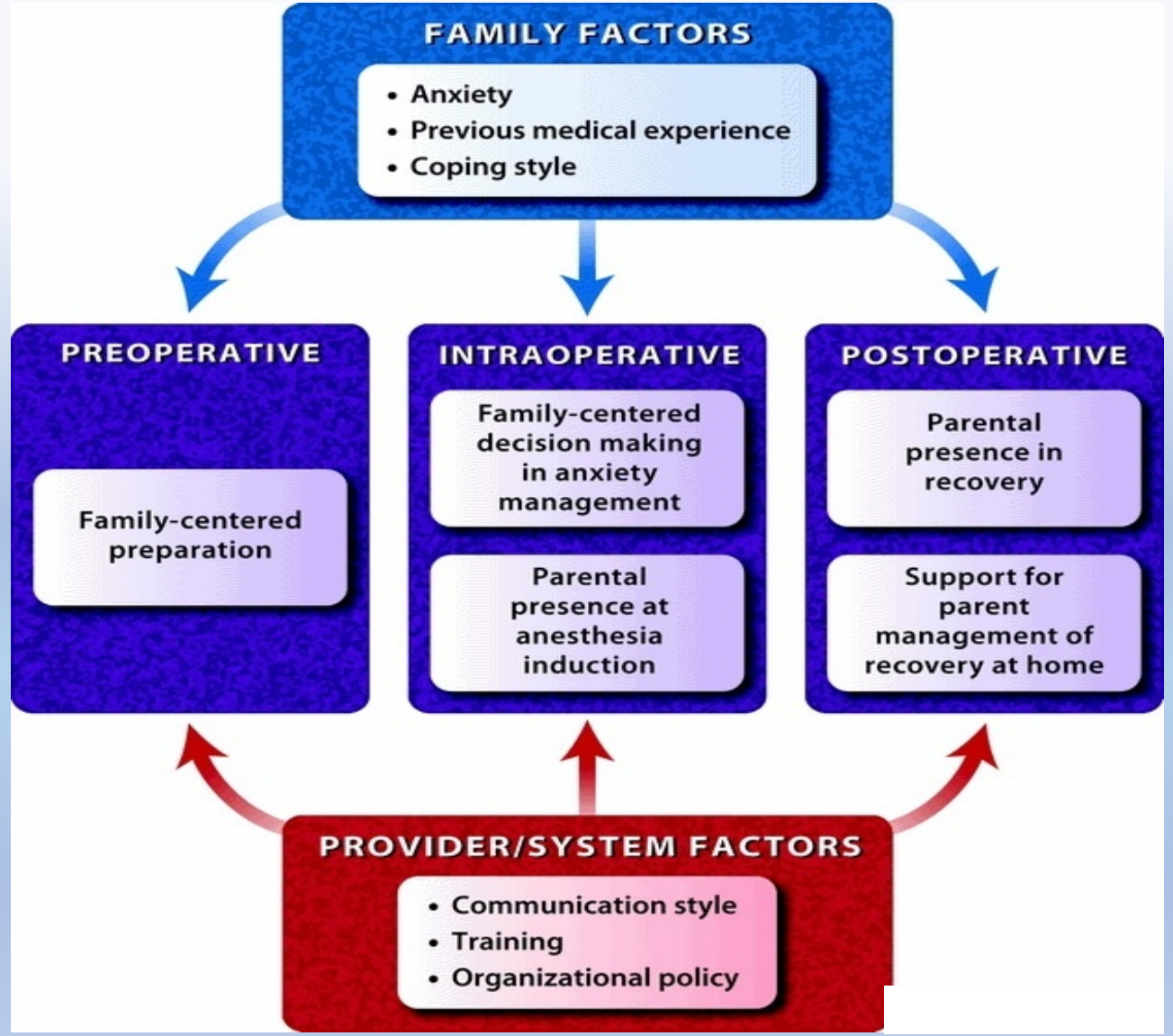
Kain Z, et al. Pediatrics, 2006

Bringuier S. et al. Anesth Analg, 2009

Figure 7. a, Impact of children state anxiety on postoperative pain: median values and 75th percentiles of visual analog scale (VAS)-pain of children: anxious children versus nonanxious children, $^*P < 0.05$ on postoperative day 1 (POD1) and the day of discharge (DD). b, Impact of parents state anxiety on postoperative pain: median values and 75th percentiles of VAS-pain of children: anxious parents versus nonanxious parents, $^*P < 0.05$ on POD1 and DD.



FAMILY-CENTERED PEDIATRIC PERIOPERATIVE CARE



Chorney, et al. Anesthesiology 2010

at home?

how are we coping?

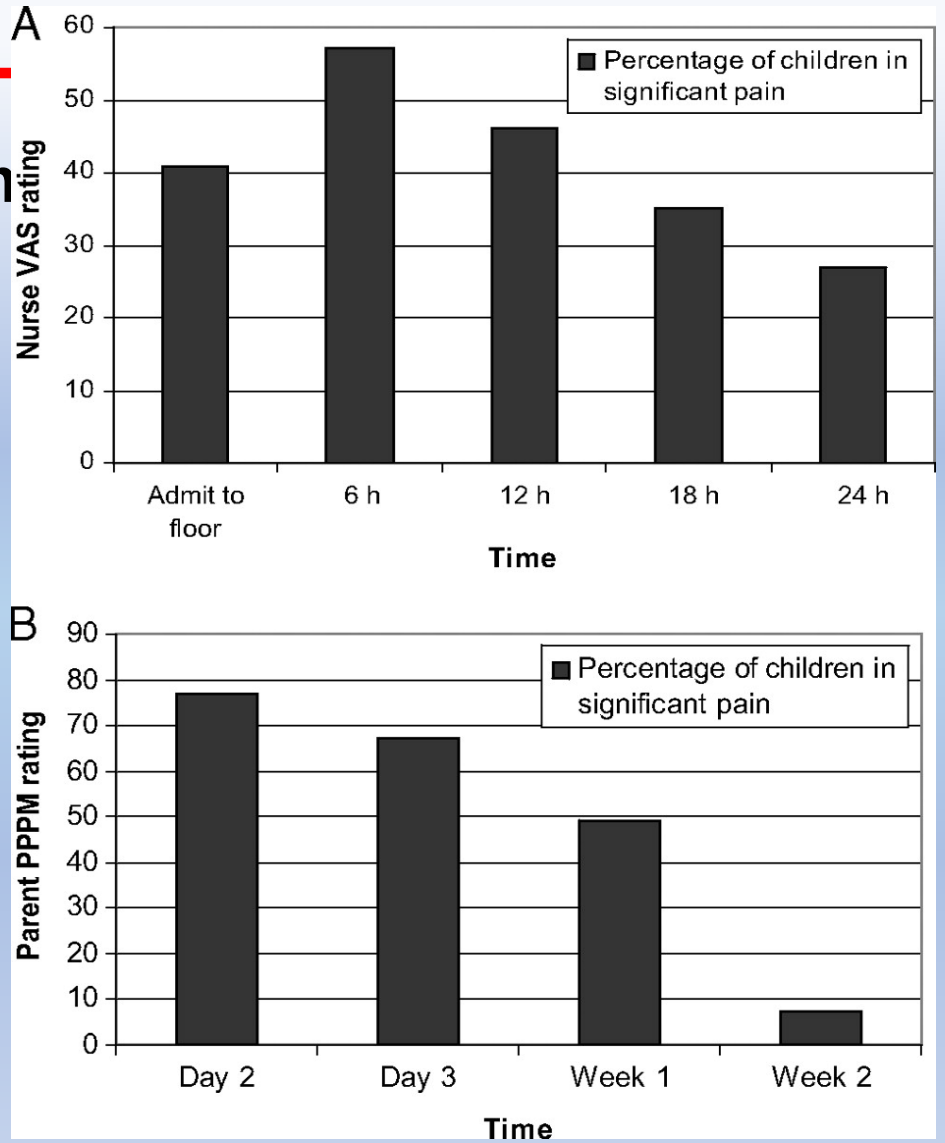
At home – How are we coping?

**Following day-care – tonsillectomy, circum
strabismus**

≥ 50% had significant pain
On day 3 > 25%

Parents pain rating of their children

Day 1	**86%**	**(significant pain)**
Day 3	**67%**	
1st week	**49%**	
2nd week	**7.5%**	



At home – How are we coping?

Pain scores hig

at discharge	**3.6%**
day 1	**48.3%**
day 2	**28.5%**

Tonsillectomy – hig

Does day-care tons postoperative pain

	Day case median (range)		Overnight stay median (range)		
	Parent	Child	Parent	Child	*P*-value
Usual level of pain at 24 h	2 (0–4)[a]	2 (0–5)[b]	1 (0–3)[a]	1 (0–4)[b]	[a]0.01 [b]0.06
Worst level of pain 24 h	3 (0–5)[a]	3 (0–5)[b]	4 (1–5)[a]	4 (0–5)[b]	[a]0.70 [b]0.88
Usual level of pain at 7 days	1 (0–4)[a]	1 (0–4)[b]	0 (0–3)[a]	0 (0–3)[b]	[a]0.53 [b]0.36
Worst level of pain at 7 days	3 (0–5)[a]	3 (0–5)[b]	2 (0–5)[a]	2 (0–5)[b]	[a]0.64 [b]0.79

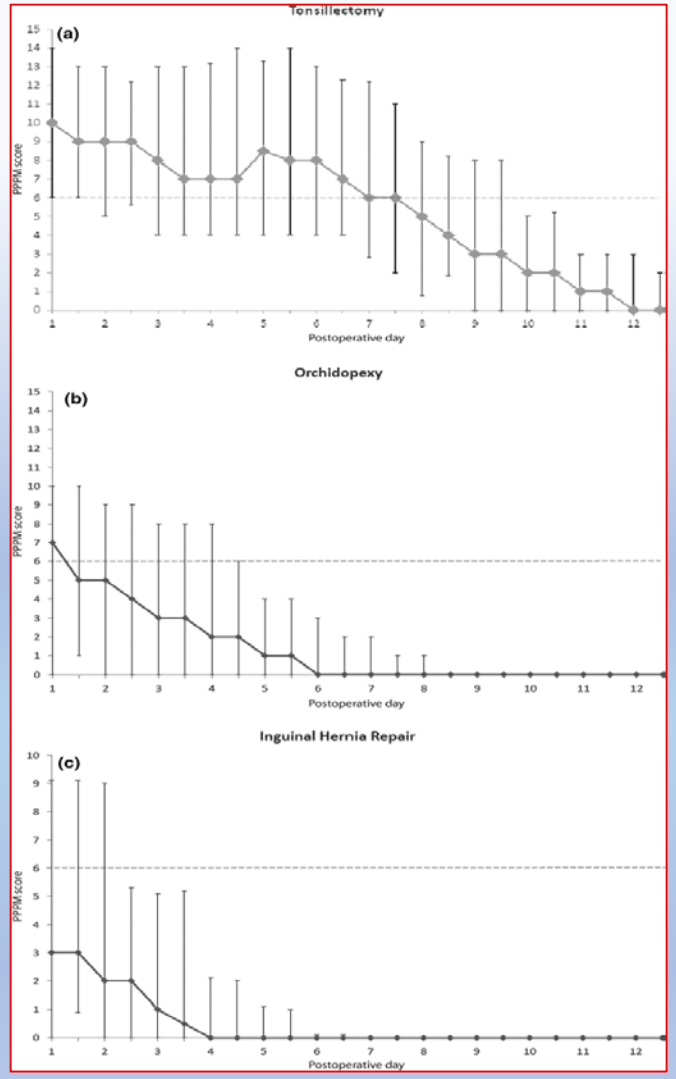
[a]Comparison of pain scores reported by parents.
[b]Comparison of pain scores reported by children.

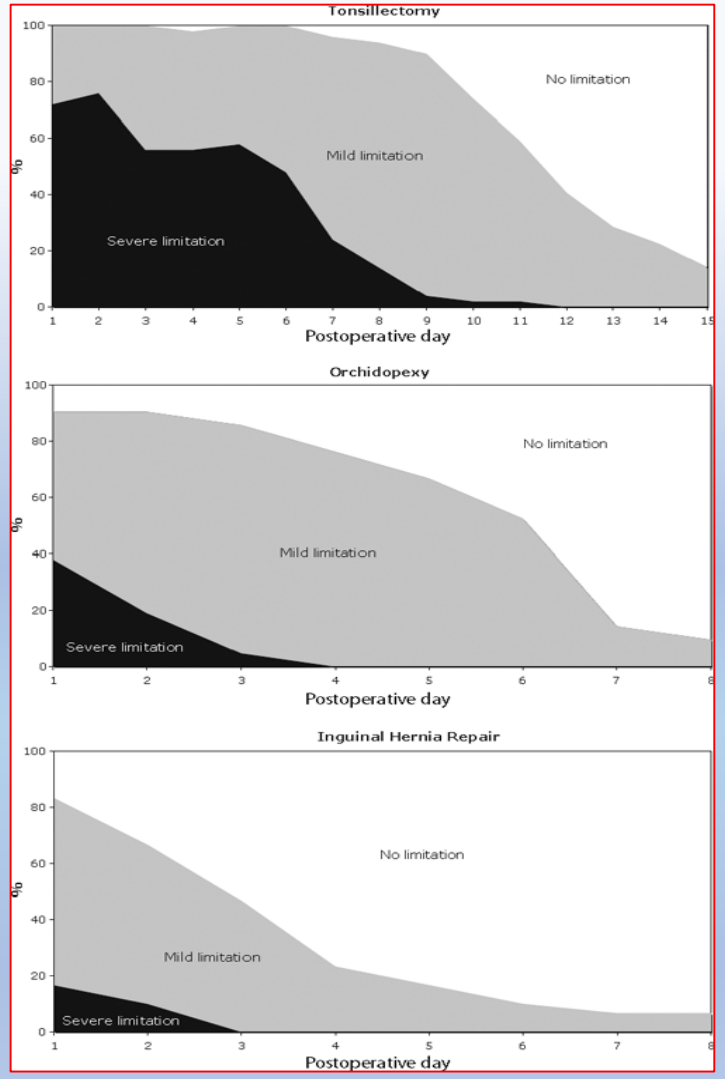
Norrington AC, et al. Pediatr Anesth 2013

Tonsillectomy

Orchidopexy

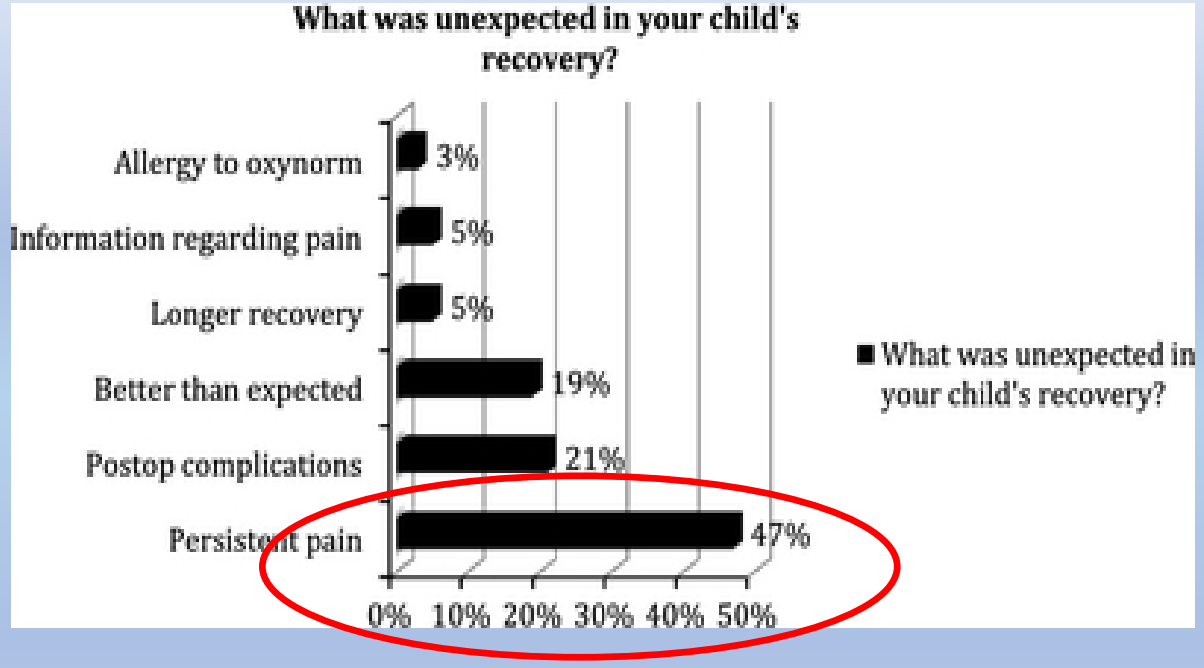
Inguinal hernia





Stewart DW, et al. Pediatr Anesth 2012

Postoperative pain, nausea and vomiting following adenotonsillectomy – a long-term follow-up



52% rated their child's pain as VAS ≥ 5 on day 3 dropping to 30% by day 7

Stanko D, et al. Paediatr Anaesth 2013

Pain: why is it poorly managed at home?

Inadequate administration

parental factors

child factors

Inadequate prescription

medication factors

system factors

Dorkham MC, et al. Pediatr Anesth 2014

Parental factors

Attitudes and misconceptions regarding pain & use of analgesics

Lack of analgesia administration

1. **up to 60% had fewer analgesics than prescribed for 3 days**
2. **although 67% experiencing significant pain on day 3 postoperative 41% received one or no medication**
3. **median number of analgesic dose provided on day 1 was one, and 26% of parents provided no analgesics**
4. **strength of doses: only 10% received a therapeutic dose**

Finley GA, et al. Pain 1996
Fortier MA, et al. Pediatrics 2009
Rony RY, et al. Pediatrics 2010
Wilson ME, et al. Pain Manag Nurs 2006

Parental factors

1. 52% of parents indicated that analgesics are addictive
2. 73% reporte
3. 37% though
   the better th

Ethnicity Matters in the Assessment and Treatment of Children's Pain

1. cultural factors – *Calvinistic values*
2. personality characteristics
3. sociodemographic factors – education

Rony RY, et al. Pediatrics 2010
Kankkunen P, et al. Pediatr Anesth 2003
Page MG, et al. J Pain Res 2013
Zisk RY, et al. Anesth Analg 2007
Fortier MA, et al. Pediatrics 2009

Child factors

refusal to take the medication and up to 60% negative experience

Bad taste, painful swallowing, nausea, waking up at night

pain levels are significantly higher when children are anxious

girls reported higher levels of acute postoperative anxiety and pain unpleasantness compared with boys. In addition, pain anxiety was significantly associated with acute postsurgical pain (APSP) intensity and functional disability 2 weeks after discharge, whereas pain catastrophizing was associated with APSP unpleasantness.

Sutters KA, et al. *J Spec Pediatr Nurs 2007*
Kain ZN, et al. Pediatrics 2006
Bringuier S, et al. Anesth Analg 2009
Page MG, et al. J Pain Res 2012

Additional concerns / findings

Children

1. **also 65% of children experienced more pain than expected!**
2. **majority of children aged 7-17 who undergo surgery want to be given comprehensive perioperative information**

Parents

up to 60% of parents seek additional advice from primary care physicians

Sutters KA, et al. J Spec Pediatr Nurs *2007*
Stewart DW, et al. Paediatr Anaesth 2012
Fortier MA, et al. Anesth Analg 2009

Pain and behavior changes in children following surgery

- 93% had pain and 73% exhibited PB on day 2
- 25% still had pain and 32% PB at week 4

Factors associated →

1. previous pain experience
2. anxiety child and parent
3. parent level of education

Power NM, et al. Arch Dis Child 2012

System factors

1. lack of adequate discharge information
2. poor communication from health professionals
3. access to analgesics

Does take-home analgesia improve postoperative pain after elective day case surgery? A comparison of hospital vs parent-supplied analgesia

Mary Hegarty[1], Alyson Calder[1], Kylie Davies[1], Margaret Shave[2], Elaine Christiansen[1], Tessa Meyer[1] & Britta S. von Ungern-Sternberg[1,3]

Shum S, et al. Pain Res Manag 2012
Kankkunen P, et al. Scand J Caring Sci 2003
Rawal N. Br J Anaesth 2001
Hegarty M, et al. Paediatr Anaesth 2013

Medication factors

1. around-the-clock dosing *versus* prescribed as needed

2. nonsteroidal anti-inflammatory drugs (NSAID's)

3. steroids

4. adjuvant therapy

Lewis SR, et al. Cochrane Database Syst Rev 2013
Riggin L, et al. Clin Otolaryngol 2013
Steward DL, et al. Cochrane Database Syst Rev 2011
Hermans V, et al. Br J Anaesth 2012
Fedorowicz Z, et al. Cochrane Database Syst Rev 2013
Russell P, et al. *Curr Opin Anaesth 2013*

Interventions: addressing the barriers

standardized detailed instructions for postoperative care, including information regarding the trajectory for postoperative pain and rationale for prescribed analgesia, <u>can contribute</u> to effective postoperative pain management at home

Sutters KA, et al. Pain Med 2012

non-pharmacological methods	**Effect**
relaxation, simple distraction and imagery	**negligible**

Huth MM, et al. Pain 2004
Huth MM, et al. J Spec Pediatr Nurs 2007

1. **Pain education booklet (Chambers et al.)** **minor**
   (Chambers CT, *et al.* Child Health Care 1997)
2. **Pediatric PRO-SELF** **minor**
   (Sutters KA, *et al. J* Spec Pediatr Nurs 2011)
3. **Interactive educational program** **negligible**
   (Vincent C, *et al*. J Spec Pediatr Nurs 2012)
4. **Videotaped present**
   (Greenberg RS, *et al*. A
5. **Preoperative pain e**
   (Crandall M, *et al*. Int J
6. **Improved written di**
   (Homer JJ, *et al*. J Lary

1. **Parents' Postoperative Pain Measure** **minor**
   (Kankkunen P, *et al*. Pediatr Nurs 2009)
2. **Pain assesement scale** **negligible**
   (Unsworth V, *et al.* J Child Health Care *2007*)
3. **Pain diary** **minor**
   (Sutters KA, *et al*. J Spec Pediatr Nurs 2011)
4. **Alarm reminder for around-the-clock** **minor**
   (Wiggins SA, *et al.* Issues Compr Pediatr Nurs 2009)
5. **Digital timer** **minor**
   (Sutters KA, *et al.* J Spec Pediatr Nurs 2011)
6. **Algorithm** **negligible**
   (Vallee E, *et al.* J Otolaryngol Head Neck Surg 2008)

Conclusions

- environmental aspects in pediatric pain management are important!
- several barriers – health care providers – parents
- in-hospital & at home – inadequately managed pain = adverse event
- family-centered pediatric perioperative care

The wise man looks into space and does not regard the small as too little, nor the great as too big, for he knows that, there is no limit to dimensions…

Chinese Philosopher Zhuangzi 莊子 (369-286 BC)