

Weight-based Risk for Prolonged Post-tonsillectomy Pain in Children: A Retrospective Study

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INTRODUCTION

Risk for Pain in Obese and Overweight (OB/OW) Children Undergoing Adenotonsillectomy (T&A) or Tonsillectomy in the United States

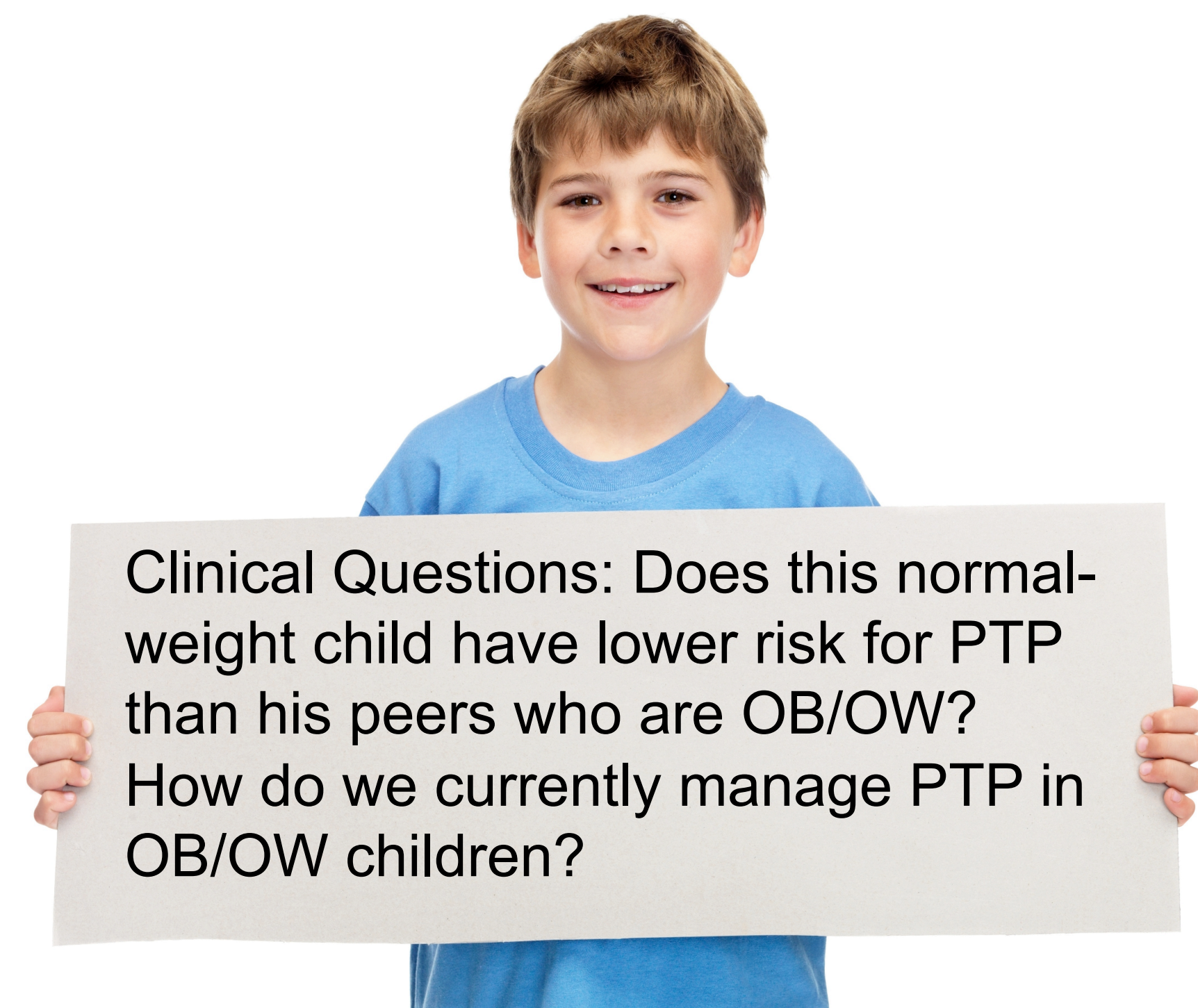
BACKGROUND

Adenotonsillectomy (T&A) is a common painful surgery in children (> .5 million/year U.S.)

- Estimated 200,000/year T&A obese/overweight

Post-tonsillectomy pain (PTP) management is complicated in OB/OW child:

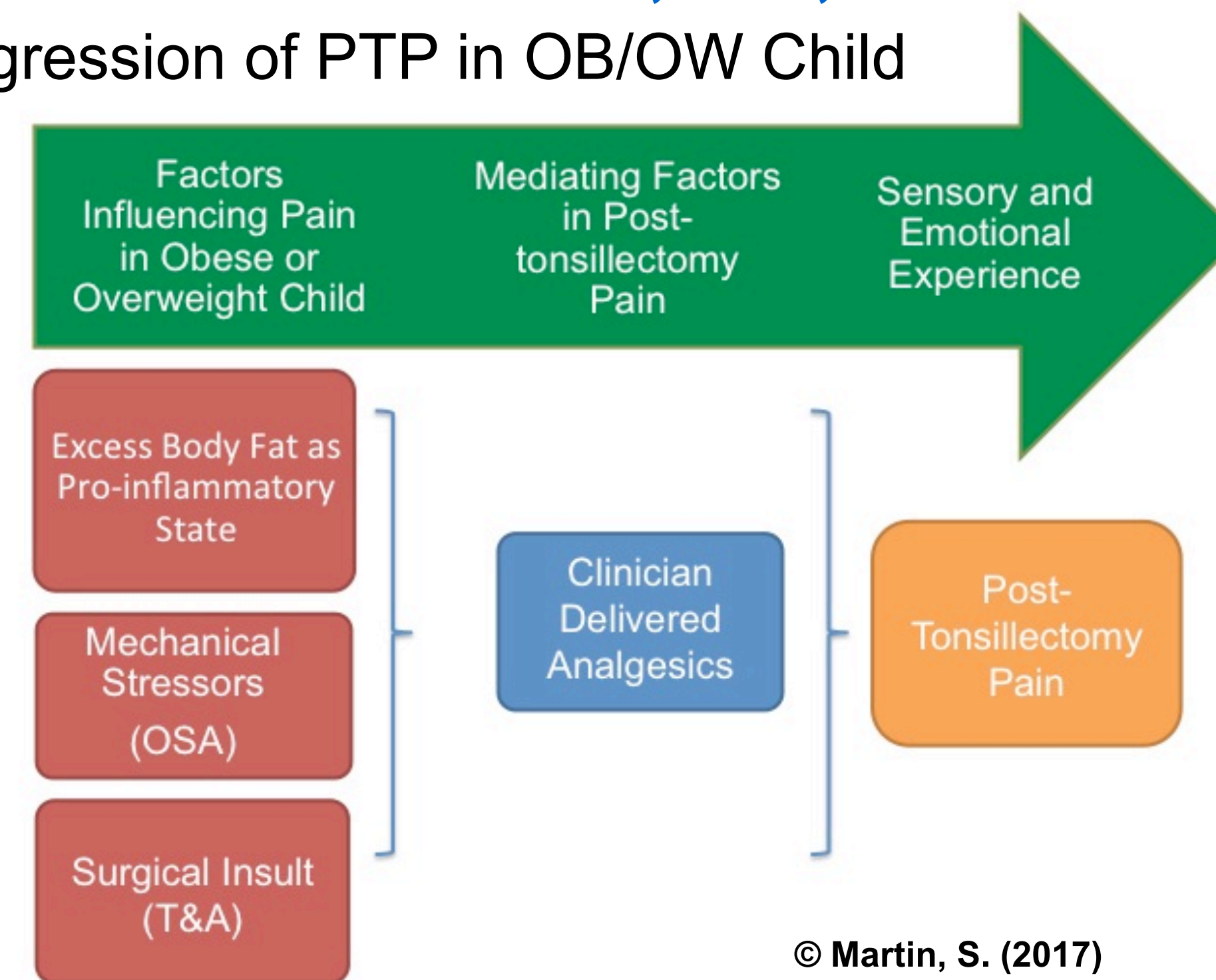
- Obstructive sleep apnea (OSA) common
- Altered drug metabolism due to excess adipose tissue and epigenetic changes
- Inadequate analgesics delivered because of anticipated breathing difficulties
- No clear guidelines for PACU nurses



PURPOSE

The **purpose** of this study was to examine risk for uncontrolled PTP episodes in OB/OW children compared to non-OB/OW children in the PACU

Theoretical Links: OB/OW, T&A, PTP
Progression of PTP in OB/OW Child



METHODS (continued)

Human Subject Protection: expedited IRB review, password protected online storage of data

Definitions:

- Moderate-to-severe PTP:** PTP ≥ 4 on one of the 0 – 10 scales
- Prolonged PTP:** Time from a pain score ≥ 4 until the pain was reduced and sustained <4 for at least 30 minutes
- OB/OW** = BMI-z score $\geq 85^{\text{th}}$ percentile according to CDC guidelines

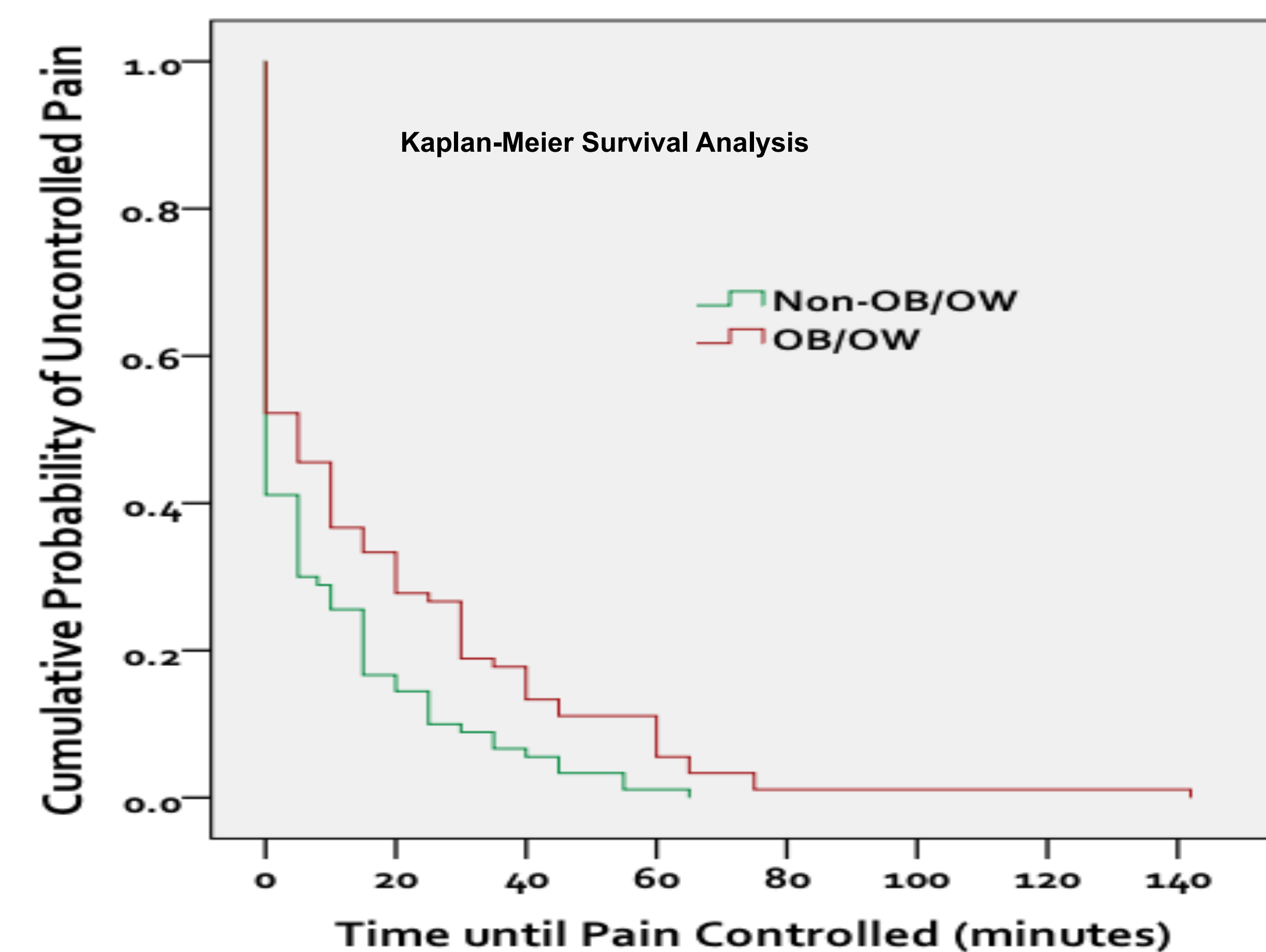
RESULTS

Sample Demographics:

Average uncontrolled pain = 12.5 minutes

Variable	Mean	SD	p
Age (years)	7.87	2.23	.12
Weight (kilograms)	33.08	14.28	.0001
OR opioids (milligrams)	5.30	1.84	.03
PACU opioids (milligrams)	1.05	1.13	.03
Weight controlled opioid dose OR	.17	.05	.0001
Weight controlled opioid dose PACU	.03	.03	.994
Uncontrolled pain (minutes)	12.50	20.73	.21

Variable	n (%)
Girls	98 (54)
History of OSA	40 (22.2)
History of asthma	33 (18.3)
History of gastro-esophageal reflux	5 (2.8)
ASA I	52 (28.9)
ASA II	124 (68.9)
Caucasian/White	147 (81.7)
Opioids in the OR	180 (100)
Non-opioids in the OR	53 (29.4)
Non-opioids in the PACU	14 (7.8)
Early PTP	61 (33.9)



RESULTS

Average Uncontrolled Pain by Group

Group	Mean	Median
Non-OB/OW children	8.367	.00
OB/OW children	16.633	5.00
All children	12.500	.00

OB/OW children were **significantly** more likely to have longer episodes of PTP in the PACU ($\chi^2 (1) = 8.353, p = .004$).

Average Equianalgesic Opioid Doses by Group

Variable	Mean	SD	p
Equianalgesic opioid doses in OR			
Non-OB/OW	5.0	1.75	.03
OB/OW	5.6	1.9	
Weight-controlled opioid doses in OR			
Non-OB/OW	.2	.05	.0001
OB/OW	.15	.04	
Equianalgesic opioid doses in PACU			
Non-OB/OW	.87	1.08	.03
OB/OW	1.2	1.15	
Weight-controlled opioid doses in PACU			
Non-OB/OW	.03	.04	.994
OB/OW	.03	.03	

Equianalgesic doses = morphine equivalencies of opioid doses
Weight-controlled opioid doses = equianalgesic dose/weight of child in kg.

RESEARCH GAPS

- How do clinicians decide to dose opioid analgesics in OB/OW children?
- How can we better manage PTP in OB/OW children to lower risk for prolonged pain?

DISCUSSION

OB/OW have higher risk of uncontrolled PTP. Possible factors: nurse anticipation of airway obstruction, lack of knowledge about weight-based differences in drug metabolism.

IMPLICATIONS FOR PACU NURSES

PACU nurses have an opportunity to drive improvements in clinical practice, education, and research to lower risk for PTP in OB/OW children. Further research is needed to develop clinical practice guidelines for PTP management in OB/OW children.

METHODS

RESEARCH QUESTION:

- Is OB/OW a risk factor for prolonged PTP in the PACU?

Retrospective study. Examination of 180 Electronic Health Records of children who had T&A or tonsillectomy

- Surgeries occurred between April 2016 – July 2016
- No other surgeries except for bilateral myringotomy tubes

Sample: 90 OB/OW, 90 non-OB/OW children

Setting: Cook Children's Medical Center & Dodson Surgery Center, Fort Worth, Texas

Sample size determined by power analysis with power set at .80, α set at .05, a moderate effect size of 2.5, and a two-tailed test

Data collected:

- Demographics
- Pain scores (FLACC, Wong-Baker FACES, Verbal Numeric Scale)
- Analgesic doses