

THE JOHNS HOPKINS HOSPITAL

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# Introduction

In the Weinberg PACU, patients who were having laparoscopic radical prostatectomies experience severe pain which caused them to have an increase length of stay and excessive amounts of opioids. Additionally, these patients had high levels of anxiety due to potential urinary incontinence and sexual dysfunction from the surgery. Perianesthesia nurses questioned what complementary evidence could support a non-pharmacologic approach to reducing anxiety and post-operative pain.

The aim of the study was to determine the best music listening intervention for patients recovering in the PACU.

### Practice Question

What is the best music listening intervention comparing preferred patient – selection music versus relaxation breathing instructional narrative over minimalistic hypnotic music for patients recovering in the PACU?

- **P** = Surgical patients
- I = Music listening
- **C** = Comparing preferred music vs relaxation/breathing music
- **O** = Music listening outcomes: Decrease anxiety and improve pain management



### **Did you know?**

Listening to music has been demonstrated to:

Decrease anxiety Decrease need for opioids

Improve perceptions of post operative pain management

## Search Strategy

The literature search yield 1006 articles and only 20 were appropriate articles that met our PICO criteria. The evidence search strategy range from 2012-2020. The data base searches were PUBMED, CINAHL, Jonna Briggs Institute, and Cochrane Review data bases were searched. The key mesh terms used were: music, music listening, music therapy, intervention, surgery, PACU, post-operative, randomized controlled trials, anxiety, pain and pain management.

### An EBP Project: What is the Best Music Listening Intervention for Patients Recovering In the Post Anesthesia Care Unit (PACU)?

Patricia Anne Bulacan BSN RN CCRN;

### Perioperative Services, The Johns Hopkins Hospital, Baltimore, MD Level and Quality of Appraised Evidence after anesthesia threatening hiswell C, Akram Y guidelines with the two author elevant review: studies identified and 15 clinical outcome Levels of smokir Oxygen desaturation, laryng ensen R, Voepel-Lewis T, Lewis I, Anesthesia-related pediatric CPR arre handran SK Malviya S rests multicenter CPA registry - 27 case pediatric PACU patients' morbidity and mortality Children <5 years Infants < 1 year 78% Underlying co-morbidities 44% Respiratory most frequer - Secondary purpose to describe pediatric surviva following PACU CPAs te V, Ruiz AG, Perkins J, Sillau S, Friedman NR 2015 Retrospective chart review 038 patients under two years of age Identify predictors of risk factors for upp undergoing tonsillectomy under general obstruction complication postoperativel anesthesia for obstructive sleep disordered leich SJ, Olson MD, Sprung J, Weingarter T N 100 severely obese children who were matched to 100 Severely obese childre normal weigh children undergoing tonsillectomies weigh children in Mayo Clinic having der DR, Warner DO, Flick RP, rom January 1996 to December 31, 2005 Reactive airway disorders. UR SDB, Hypotonia; PACU respiratory complication raaff J C, Sarfo M, Wolfawinkel LV, Werff, incidents voluntary reported occurred over a <1 year. ASA III and IV status, emerge affected safety of children under the care of the 6-year period of time with 1214 critical mpson-Evans D, Morgan P, Farrar M lorwood L, Nguyen H P, Brown K, Paci P, Retrospective cohort stuc 4 Children aged 0 to 18 Canadian tertiary care cente neuro-muscular disease, pulmonary dise T&A at our institution from 2002 to 2006 airway & craniofacial abnormalities Hui JW, Ong J, Herdegen JJ, Kim H, Codispoti CD, 916 patients with CRS were evaluated for factors diagnosed with polysomnogram (PSG) and Obstructive sleep apnea (OSA) versus African American patients who ha chronic rhinoisinusitis (CRS) endoscopic surge ones DT, Bhattacharyya N procedures mask anesthesia: American Thoracic underwent children not exposed to second hand sm smoke. Children exposed to one cigaret o adverse airway events intraoperatively and per day or exposed to smoking within the PACU for patients with and without passive smok months before exposure Search terms: obesity overweight, sev ekkas P. Stephanopoulos N. Bakalis N criteria: January 1990- Sample: patients aged 1-19 yea April 2014; Of 169 titles, 16 selected and 9 total BMI > 85- 95 percentile abdominal obesity, perioperative adverse studies included and appraise respiratory events, hypoxemia, pediatric tz MP. McNamara ER. Schaeffer AJ. In 2012, queried the NSQIP data base for Pediatric ages 2-18: investigated 2871 Pediatric patients 2-18 yea ndex was above the 95<sup>th</sup> percentile and without bowel involvement, surgeries. Urologic procedures; post-operative ev overweight > 85<sup>th</sup> percentile. (CDC definitio Secondary descriptive sta Multivariate and odds ration ee LK, Bernardo MK, Grogan TR, Elashoff DA Prospective study to validate C pediatric patients; multi variate regression to having sedation and/or general anesthe create an optimized sc 4-6 yr n=174) male, ASA II. URI (n=139). lung disease, ewanda AF. Matisoff A. Revenis M. Harahs Expert clinical review article Downs syndrome childre Cervical spine instability, cardiovascu erman C, Nino G, Greenberg J, Myserg abnormalities, pulmonary hypertens airway obstructio um KN. Summar M C, Xie Z, Wang Z, Li J, Huang C, Zhang J, Lu K, Retrospective study to analyze pediatric 263,607 pediatric surgical patients from 1-14 1812 pediatric preoperative risk factors to predict postoper Zhu B, Ma D, Li J, Lian Q, Shang GW CU admissions and perioperative deat status, prematurity, SPO2 and unfasted : lviya S, Voepel-Lewis T, Chiravuri SD, Gibbo Risk Assessment Tool Descriptive statist 40 consecutive surgical cases were selected Adverse events (AE), hospit imbira WT, Nafiu OO rom a cohort of birth to 18 yr undergoing length of stay, admission status N = Neurological general anesthesia with risk factors identify A= Airway respiratory adverse event R= Respiratory C= Cardiovascula O= Other ofuvong M, Geater AF, Chongsuvivatwong V, 12 month prospective matched cohort pediatric same day surgery study at a tertiary hospital in 430 children enrolled (215 matched pairs) anesthesia; ASA physical status yanon T, Sriyanaluk B, Saefung B, Nuanj hildren less than 15 years of age undergoing Outpatient surgery Length of stay(LOS); Hospital costs and 1.Compared excess hospital length of stay direct anesthesia costs: who had complications: were admitted Random selection outpatient sur Compared indirect costs of parents loss o income due to missing work, transportation, hote N= 430 subjects with 215 matched pairs errer D, Mallory, MM, Cravero JP, Lowrie L, Retrospective chart review on pediatric patients 28,792 patient records were eligible of which Procedural nursing interventions on obes og JH, Berkenbosch JW who had sedation for procedures; Descriptive 5153 patients were obese (17.9%), children who more frequently required a predominately male interventions: repositioning, suctioning, j thrust, airway adjuncts and bag-valve- m 1. nanyam R, Yeramaneni S, Hossain MM, Perioperative respiratory adverse events in en AM, Varughese / and validation of a risk prediction tool. xvgen requirement. Development and validation of the risk p tool for PRAE ongyam A, Marcus CL, Lockman JL, Cornaglia Relationship between 369 children PSG and The authors present different professio studies evaluating the relationship between <3 years obesity, severe obstructive sleep OSA guidelines: ASA, AAP and American ardoff A, Gallagher PR, Shults J, Traylor children who had polysomnograms (PSG) with apnea (SOSA). of Otolaryngology Head and Neck Surge post- operative complication Jngern-Sternberg, BS, Ramgolam A, Hall GL, 2015 s improve prediction of 119 Children aged 1 month - 16 years with PRAE. Children 1 month to 16 years with URI, URI, wheezing previous history of asthma, hay URIs, wheezing previous history of asthm PD, Habre W wheezing, asthma, hay fever, exposure to second fever, exposure to second hand smoke. hand smoke. Venous blood samples taken at time Exclusion cardiac disease

of IV insertion

dysplasia patients

/hite KK, Bompadre V, Goldberg MJ, Bober MB,

Γ, Hoover-Fong JE, Irving M et al.

Delphi Method used to author this consensus Expert opinion of a panel of 13

in the perioperative management of skeletal two round Delphi study

practice guideline to improve the clinical outcomes multidisciplinary international experts for the

# **Recommendations for Translation into Practice**

laryngotracheal malacia

abnormalities of the bronchial tree

Respiratory – obstructive lung disease; snoring, OSA;

with skeletal dysplasias. Am J Med Genet

The evidence recommends to conduct a randomized comparative clinical trial comparing two methods of music listening: patient preferred music listening via Spotify versus relaxation breathing narrative over minimalistic music. The study should identify the best cost- effective music listening intervention to decrease patient's anxiety and post anesthesia pain management.

Preoperative assessment of patients' ris

s	Measurements & Data Analysis	Results/Findings	Evidence
у	Pediatric surgical patients' morbidity and mortality: infants 1 month-1 year have 4 times higher risk of anesthesia cardiac arrest than 1-18 years	AAP guiding principles: Facility/Medical staff policies Clinical privileges: Pain management Competency of anesthesia and nursing staff	Critical elements for the pediatric perioperative anesthesia environment. Pediatrics Level IV-A
way	Evidence-based interpretive statements	Perianesthesia nurses will be knowledge in the assessment and care of the pediatric patient and their family	2019-2020 Perianesthesia Nursing Standards, Practice Recommendations and Interpretive Statements, 114-116 Level IV-A.
Ig	Decision algorithm: child with URI presents to surgery perioperative respiratory adverse events (PRAE)	Expert opinion: literature review: research studies, case studies, quality improvement studies, systematic reviews, clinical practice guidelines	Anesthesia in children with a cold. Pediatric Anesthesia Level IV-A
g	Data extraction 17 articles: 13 not possible; 5 only asthma; 1 SBD; 3 same cohort studies	Children with asthma risk factor more likely to have habitual snoring and SDB	Influence of asthma on sleep disordered breathing in children: A systematic review. Sleep Medicine Level III-A
ly like-	Occurs most often on emergence; 10-fold increase in second hand smoke exposure	Risk factors include: Age – infants and young children, higher ASA, upper respiratory infection (URI)	Laryngospasm in paediatric anaesthesia: A review. Int J Anes Res Level V-A
nd	Significant for 2.5 times likely for children to experience laryngospasms with exposure to second hand smoke	Environmental tobacco smoke exposure increases the risk of PRAE in the PACU and negative surgical outcomes	Impact of Environmental tobacco smoke exposure on anesthesia/ surgical outcomes in children: A systemic review and meta-analysis. Arch Dis Child Level III-A
ACU:	Descriptive statistics; Odds ratios with confidence intervals calculated survivors & Non-survivors Chi-Square, t-test, Mann-Whitney U-test; p value of <0.05 statistically significant	27 CPA events: 67% in patients <5 years & 30% <1 years; Nonsurvival older age p<0.02 Weekend occurrence p<0.01 Nonpediatric setting p=0.02 Occurrence at night p=0.04	Pediatric cardiopulmonary arrest in the postanesthesia care unit: Analysis of data from the AHA get with the guidelines –Resuscitation registry. Pediatric Anesthesia Level III-A
rway the	The odds of patients with syndromes or craniofacial anomalies were 11 times greater (p <0.0001) in this sample	Risk factors include: under 2 years of age, OSA severity, African-American, prematurity, daycare, Downs Syndrome	Characteristics of children under 2 years of age undergoing tonsillectomy for upper airway obstruction. Int J Ped Otorhinolaryngology Level III-A
	Frequencies with central tendency Two-tailed t test, p value< 0.05 Multivariable logistic regression	PACU respiratory complications: airway obstruction, bronchospasm, aspiration, hypoxemia (<90% on room air) tracheal intubation	Perioperative outcomes of severely obese children undergoing tonsillectomy. Pediatric Anesthesia Level III-A
s less ries	Sex: male 0.95 ASA III/IV p <0.001 Age: Infant p <0.001 Urgency Surgery	Respiratory events were the highest critical incidents reported; Higher incidence laryngospasms Infants <1 year of age, ASA III & IV, emergency surgeries greatest risk for critical incidents	Anesthesia-related critical incidents in the perioperative period in children; a proposal for anesthesia-related reporting system for critical incidents in children. Pediatric Anesthesia
v/17	P <0.001 Exposure to URIs 96/1000 anesthetics; greater incidence with exposure to passive tobacco smoke	Risk factors include: young age, recent URI, exposure to cigarette smoke. obstructive lung or pulmonary disease,	Level III-A Pediatric laryngospasm. Pediatric Anesthesia Level V-A
a,	Evaluated: ethnicity and major PACU T&A respiratory complications for 23% of African American children preoperative sickle cell test (TestSC). Sensitivity 96%; Specificity 93%; PPV 77%	74 of 594 (12.5%)children experience major respiratory events; African American ethnicity is risk factor; Risk factors also reported in this cohort study: Age <2 years Male sex Obese Moderate to severe OSA	African American ethnicity as a risk factor for respiratory complications following adenotonsillectomy. JAMA Otolaryngology Level III-A
s R	Adjusted odds ratio of 1.98 (95% Cl), 1.19-3.29). Patients with CSR without nasal polyps were at higher risk for OSA – odds ratio 1.63 (95% Cl, 1.02- 2.61)	African American patients with CSR were at a significantly higher risk for OSA compared to white patients	Risk of obstructive sleep apnea in African American patients with chronic rhinoisinusitis. Ann Allergy Asthma Immunol Level III-A
and	Airway complications in PACU higher for all outcome measures for PSE children (all P < 0.005) PACU, breath holding (P < 0.086). Intraoperative laryngospasm and airway obstruction were 4.9 & 2.8 times more likely with PSE than non-exposure to PSE	Pediatric patients with passive smoke exposure have significantly increased rates of perioperative airway complications as compared with children without passive smoke exposure.	Passive smoke exposure as a risk factor for airway complications during outpatient pediatric procedures Otolaryngology–Head and Neck Surgery Level III-A
esity, Idren	Significant univariate and multivariate associations between obesity and overall perioperative adverse respiratory events (PARE)	Obesity was independently associated with PAREs and asthma, sleep-disordered breathing, and OSA	Perioperative adverse respiratory events in overweight/obese children: Systematic review. JoPAN, 31(1), 11-22 Level III-A
	BMI significant risk factor BMI <u>&gt;</u> 85% percentile (Odds Ratio 1.36, Cl 1.03-1.8, p=0.035; wound complications Odds ratio 2.36, Cl 95%, 1.28-4.35, p=0.006	<u>Results:</u> Overweight/obese factors increased the odds of overall complications by 36% and of wound complications by 136% Conclusion: "BMI in the pediatric NSQIP urologic population found	Funded by National Institute of Diabetes, Digestive, and Kidney Diseases Assoc: Peds postoperative events: NSQIP. J Pediatric Urology Level II-A
	PRAE = 17.8% (93 of 522 patients COLDS score predicted bronchospasm, oxygen desaturation, and beta-agonistic therapy; performed best in children under 2 years	COLDS score had potential to be valuable risk assessment tool for prediction of perioperative respiratory adverse events; Good predictive value potential for risk assessment perioperative respiratory adverse events.	Perioperative respiratory adverse event risk assessment in Children with upper respiratory tract infection: Validation of the COLDS score, Pediatric Anesthesia Level III-A
er	Downs syndrome children have multiple anatomical and physiologic abnormalities predisposes them to respiratory complications	Downs syndrome risk factor places these children at greater risk for upper airway problem in the PACU	Preoperative evaluation and comprehensive assessment for children with Down syndrome. Pediatric Anesthesia Level V-A
sical s	6626 admitted to ICU or died; Using multiple logistic regression analysis revealed age, ASA physical status, prematurity, SPO2 and unfasted status were independent risk factors	Study revealed that age, ASA physical status, SpO2 prematurity, and unfasted status are risk factors to predict postoperative ICU admission and death in pediatric patients.	Pediatric preoperative risk factors to predict postoperative ICU admission and death from multicenter retrospective study. Paediatric Anaesthesia, 26, 637-643
	NARCO correlated with ASA-PS (r¼0.664; P<0.01) supporting its criterion validity. coefficients 0.71–0.96; k 0.43–0.87	Measures of exact agreement were slightly better for NARCO compared with ASA-PS. Scores; correlated significantly with perioperative escalation of care, adverse events (AE), LOS	Preliminary psychometric evaluation of newly developed and specific measures of perioperative risk for children using the NARCO. BJA Level III-A
ct	Multivariate analysis; Odds ratio 2.56, 96% confidence interval for hospital stay after surgery; indirect costs 1.58, p=0.003	Results 1.Thirty percent higher excess hospital costs; 58% higher indirect costs over the discharged ambulatory surgery 2.Young age less than one year old 3.Induction with propofol higher excess costs	Applicable to US. First study that looks at direct and indirect costs related to length of stay and respiratory events LOS excess costs; attributable to respiratory events in children. Anesthesia-Analgesia Level III-A
У	Multivariate regression analysis	Results: Multivariate regression analysis demonstrated that obesity to be independently associated with minor and moderate respiratory adverse events. Obesity is an independent risk factor for adverse respiratory events	The impact of obesity on pediatric procedural sedation- related outcomes: Results from the pediatric sedation research consortium. Paediatric Anesthesia Level III-A
f ged ction	Model C-statistic and corresponding SE for validation cohort was $0.64 \pm 0.01$ and $0.63 \pm 0.02$ , respectively. Sensitivity and SE of risk prediction tool to identify children at risk for PRAE 77.6 $\pm$ 0.02 in the derivation cohort and 76.2 $\pm$ 0.03 in validation cohort.	Predictor variables were: age <3 yr, sex, severe obesity, ASA II & III physical status, pre-existing pulmonary disorder, preexisting neurologic/ neuromuscular disorders	Perioperative respiratory adverse events in pediatric ambulatory anesthesia: Development and validation of a risk prediction tool. Anesthesia and Analgesia Level III-A
nedical demy	Measurement reported in percentages; Odds ratios. Respiratory events: laryngospasm bronchospasm, hypoxemia, hypercapnia with critical interventions.	Results: Respiratory most frequent cause of CPAs; Recommend RRT's in PACU; African American children higher risk respiratory complications "craniofacial structure", ventilatory drive, exposure to environmental allergens	Predictors of Perioperative resp complications in adenotonsillectomy for obstructive sleep apnea: A prospective study. Otolaryngology Head Neck Surgery Level III-A
ay	Screen by asking parents about H&P risk factors compared to Biomarkers (IgE blood levels) Correlated adverse respiratory events Analyzed binary logistic regression and Receiver operating characteristic (ROC) curve analysis. SPSS version 22	Results reported that identification of risk factors (exposure second hand smoke exposure, asthma, hay fever, URIs) were superior to using IGE serum markers. Also the more risk factors children had the greater the prediction of respiratory adverse events	Peri-operative adverse respiratory events in children. Anesthesia Level III-A
ctors:	Second round of the Delphi study identified	PACU providers should be prepared to manage airway	Best practices in peri-operative management of patients

Music listening has been shown to attenuate SNS and activate PSNS activities, resulting in a reduction of anxiety and improved relaxation in patients (Kavak et al., 2020). Pain and anxiety are most effectively controlled with music-listening during the preoperative phase (Hole, Hirsch, Ball & Meads, 2015); preoperative anxiety can alter, inform, and intensify postoperative pain and medication requirements (Stamenkovic, Rancic, Latas, Neskovic, Rondovic & Wu, 2018). Additionally, music has consistently shown improved pain and anxiety management in post-operative settings (Poulsen & Coto, 2018). The synthesis of evidence revealed two evidence based music listening interventions: 1. Preferred music listening method and 2. relaxation breathing over minimalistic hypnotic music for therapeutic interventions to reduce anxiety and pain.

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# Synthesis

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