

Caregivers' knowledge and acceptance of complementary and alternative medicine in a tertiary care pediatric hospital

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Background: The use of complementary and alternative medicine (CAM) therapies has increased in children, especially in those with chronic health conditions. However, this increase may not translate into acceptance of CAM in the perioperative setting. We surveyed caregivers of patients undergoing surgery to determine their knowledge and acceptance of hypnotherapy, acupuncture, and music therapy as alternatives to standard medication in the perioperative period.

Materials and methods: An anonymous, 12-question survey was administered to caregivers of children undergoing procedures under general anesthesia. Caregivers reported their knowledge about hypnotherapy, music therapy, and acupuncture and interest in one of these methods during the perioperative period. CAM acceptance was defined as interest in one or more CAM methods.

Results: Data from 164 caregivers were analyzed. The majority of caregivers were 20–40 years of age (68%) and mothers of the patient (82%). Caregivers were most familiar with acupuncture (70%), followed by music therapy (60%) and hypnotherapy (38%). Overall CAM acceptance was 51%. The acceptance of specific CAM modalities was highest for music therapy (50%), followed by hypnotherapy (17%) and acupuncture (13%). In multivariable logistic regression, familiarity with music therapy was associated with greater odds of CAM acceptance (odds ratio=3.36; 95% CI: 1.46, 7.74; $P=0.004$).

Conclusion: Overall CAM acceptance among caregivers of children undergoing surgery was 51%, with music therapy being the most accepted CAM method. Familiarity with music therapy was the only factor that was independently associated with accepting CAM in the perioperative period. The low acceptance for acupuncture and hypnosis in the perioperative situation may be related to insufficient parental knowledge and information.

Keywords: complementary and alternative medicine, perioperative, children, caregiver, hypnotherapy, acupuncture, music therapy

Plain language summary

Why was this study done? Complementary and alternative medicine (CAM), described more recently as integrative therapies, encompasses a diverse range of products and practices used to treat medical conditions, but not considered a part of conventional medicine. The use of CAM therapies has recently increased in children, especially in those with chronic health conditions. However, this increase may not translate into acceptance of these therapies in the perioperative setting (before and after the surgical procedure) and there is little information on their perioperative use in children.

What did the researchers do and find? An anonymous 12-question survey was administered to caregivers of patients aged <18 years undergoing procedures with general anesthesia during a 1-week period in our institution. Caregivers reported their knowledge about hypnotherapy, music therapy, and acupuncture and if they would be interested in one of these methods instead

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of standard premedication before general anesthesia. In our survey, overall CAM acceptance among caregivers was 51%. Music therapy was the most accepted CAM method. Familiarity with this CAM therapy was the only factor that was independently associated with accepting CAM in the perioperative period.

What do these results mean? The low acceptance for acupuncture and hypnosis in the perioperative situation may be related to inadequate parental knowledge and information. Additional preoperative education would be needed before introducing these techniques.

Introduction

Complementary and alternative medicine (CAM), described more recently as “integrative therapies”, encompasses a diverse range of products and practices used to treat medical conditions, but not considered a part of conventional medicine.¹ Among children in the USA, CAM use is common, with 12% of all children, aged 4–17 years, identified as using CAM in 2012, according to a cross-sectional, nationally representative survey.^{2,3} The prevalence of CAM use is significantly higher among children with chronic health conditions, older children, children of parents with higher socioeconomic status, and children whose parents use CAM or worry about the risks of conventional medicines.^{1,4} Recognizing the common use of CAM, many hospitals now offer these services. In a recent study of freestanding children’s hospitals in the USA, 92% offered CAM services, while 38% had a CAM center on-site as these modalities have seen increased use among children with chronic health conditions.^{5–7} In the perioperative setting, although CAM may reduce preoperative anxiety or control postoperative pain, nausea, and vomiting, it may not be accepted due to the primary caregivers’ lack of exposure to these treatment options or reluctance to consent to CAM in this setting.^{8,9}

Available medications used to reduce anxiety, pain, and postoperative nausea and vomiting in the perioperative setting may have adverse reactions, ranging from unpleasant (itching) to life-threatening effects, including electrocardiographic abnormalities, sedation, and apnea. Several institutions have explored the utility of hypnotherapy, acupuncture, and music therapy in the perioperative period.^{10–12} However, there is little information on the perioperative use of CAM in children and only one survey has assessed the current attitudes among caregivers toward CAM in the perioperative period.^{8,9,13,14} Therefore, we surveyed the caregivers of children undergoing surgery in a tertiary care pediatric hospital to determine their knowledge and acceptance of hypnotherapy, acupuncture, and music therapy, if they were available as alternative options to standard medication in the perioperative

period. Our secondary aim was to explore factors associated with acceptance of CAM in the perioperative setting.

Materials and methods

Institutional Review Board approval is not required for quality improvement surveys at our hospital, and therefore, this project was considered exempt. An anonymous 12-question survey (Figure S1) was administered to consenting caregivers of pediatric patients, <18 years of age, undergoing surgery or procedures under general anesthesia during a 1-week period in December 2016. Participation was voluntary and the participants were not paid for their involvement. Caregivers were asked to complete the survey upon arrival at the surgery unit by a nurse, before any premedication was administered and before the start of anesthesia. Only one caregiver per patient completed the survey.

The survey had two parts. One part collected demographic information including age, sex, and relationship of the caregiver to the patient; and the patient’s age. Caregivers were also asked if their child had received any premedication or had a previous exposure to anesthetic care. The second part of the survey asked caregivers to report their knowledge about hypnotherapy, music therapy, and acupuncture and if they would be interested in one of these methods instead of standard premedication before general anesthesia. The CAM modalities included in the survey were selected due to availability at our institution and are not representative of all potential CAM therapies.

For descriptive analysis, the primary outcomes were caregivers’ familiarity with each of the following CAM modalities: hypnotherapy, acupuncture, and music therapy (familiar vs. unfamiliar); and caregivers’ acceptance of each modality as an alternative treatment option in the perioperative setting (accepting, not accepting, or unsure). Outcomes were summarized as absolute values with percentages. A composite measure of CAM acceptance was coded as 1, if caregivers accepted one or more CAM modalities and as 0 otherwise. Categorical caregiver and patient characteristics (caregiver’s age, caregiver’s relation to patient, caregiver’s sex, patient’s age, patient’s prior exposure to anesthesia, and whether the patient received medication to relax before the procedure) were compared according to the composite measure of CAM acceptance using chi-square tests and were entered in multivariable logistic regression of this composite outcome. The premedication covariate was excluded from multivariable analysis due to significant missing data. Caregiver’s sex was excluded from multivariable analysis due to collinearity with caregiver’s relationship to the patient.

Analysis was performed in Stata/IC 13.1 (StataCorp LP, College Station, TX, USA), and $P < 0.05$ was considered statistically significant.

Results

One hundred and sixty-six patients underwent general anesthesia during the study period and their caregivers were invited to participate in the survey. Two caregivers refused to complete the survey, and therefore, data from 164 caregivers who completed the survey were analyzed. The majority of caregivers ranged in age from 20 to 40 years (68%) and were the mothers of children undergoing surgery (82% vs. 13% fathers and 5% other caregivers). Caregivers were most familiar with acupuncture (114/164, 70%), followed by music therapy (99/164, 60%) and hypnotherapy (62/164, 38%). Most caregivers were familiar with at least one of these modalities (128/164, 78%). Acceptance of specific CAM modalities in the perioperative setting was highest for music therapy (82/164, 50%), followed by hypnotherapy (28/164, 17%) and acupuncture (21/164, 13%). Overall acceptance of any CAM modality as an alternative treatment in the perioperative setting was 51% (83/164 caregivers). There were no differences in caregiver or patient characteristics according to the composite measure of CAM acceptance (Table 1). However, familiarity with music therapy and acupuncture was higher among caregivers who were willing to accept at least one CAM measure. In multivariable analysis, familiarity with music therapy remained associated with greater odds of accepting CAM in the perioperative setting (odds ratio=3.36; 95% CI: 1.46, 7.74; $P=0.004$; Table 2).

Discussion

High rates of CAM use have been reported among children with chronic health conditions and children treated in outpatient settings, with some pediatric hospitals making CAM services available.^{5-7,15} Most of the published surveys investigating the use of CAM in children have been performed in patients suffering from cancer, chronic gastrointestinal conditions, rheumatologic conditions, and neuropsychologic diseases.¹⁶⁻²⁰ Among children requiring surgery, the use of CAM in the perioperative period is less well understood.²¹ Eighty-six percent of hospitals with Accreditation Council for Graduate Medical Education (ACGME)-approved pediatric anesthesia fellowship programs provided CAM therapies for pediatric pain management, while music therapy, acupuncture, and hypnotherapy were offered in 81%, 46%, and 38% of the freestanding US children's hospitals, respectively.^{5,22} With caregivers' consent being integral to the perioperative use of

Table 1 Characteristics of caregivers and children presenting for surgery, according to caregiver acceptance of CAM in the perioperative setting (N=164)

Variables	Caregiver does not accept CAM ^a (n=81) n (%)	Caregiver accepts CAM ^a (n=83) n (%)	P-value
Caregiver age (years)			0.661
<20	5 (6)	2 (2)	
20-30	23 (28)	21 (25)	
30-40	32 (40)	35 (42)	
40-50	12 (15)	17 (20)	
>50	9 (11)	8 (10)	
Caregiver relation to patient			0.319
Father	13 (16)	8 (10)	
Mother	65 (80)	69 (83)	
Other	3 (4)	6 (7)	
Caregiver sex ^b			0.343
Male	13 (16)	9 (11)	
Female	68 (84)	73 (89)	
Patient age (years)			0.157
<1	4 (5)	8 (10)	
1-2	13 (16)	10 (12)	
3-5	14 (17)	21 (25)	
6-12	34 (42)	22 (27)	
13-18	16 (20)	22 (27)	
Prior exposure to anesthesia	53 (65)	59 (71)	0.437
Received premedication ^c			0.761
Yes	21 (32)	19 (27)	
No	28 (43)	32 (45)	
Unsure	16 (25)	20 (28)	
Caregiver familiar with hypnotherapy	25 (31)	37 (45)	0.070
Caregiver familiar with acupuncture	49 (60)	65 (78)	0.013
Caregiver familiar with music therapy	37 (46)	62 (75)	<0.001

Notes: ^aCAM includes acupuncture, hypnotherapy, and music therapy. ^bOne case with undisclosed sex excluded. ^cTwenty-eight cases with no response excluded.

Abbreviation: CAM, complementary and alternative medicine.

CAM, we investigated knowledge and acceptance of CAM modalities as alternatives to anxiolytic premedication among caregivers of children presenting for surgery at a large tertiary care pediatric hospital.⁴ Music therapy was the most accepted CAM method, and familiarity with this CAM modality was the only factor independently associated with the caregivers' acceptance of CAM in the perioperative period. Understanding caregivers' views on the risks and benefits of CAM in the perioperative setting may facilitate the offering of select CAM modalities during the perioperative period.

Consistent with a previous study of pediatric inpatients, caregivers identified music therapy as the most accepted method.¹⁴ Music therapy uses trained musical therapists to

Table 2 Multivariable logistic regression of caregiver acceptance of CAM in the perioperative setting (N=164)

Variables	OR	95% CI	P-value
Caregiver age (years)			
<20	0.24	(0.04, 1.53)	0.131
20–30	0.72	(0.29, 1.78)	0.473
30–40	Ref.		
40–50	0.94	(0.34, 2.65)	0.912
>50	0.60	(0.15, 2.38)	0.465
Caregiver relation to patient			
Father	0.60	(0.21, 1.75)	0.350
Mother	Ref.		
Other	2.03	(0.36, 11.29)	0.420
Patient age (years)			
<1	4.30	(0.98, 18.80)	0.053
1–2	1.18	(0.37, 3.71)	0.779
3–5	2.55	(0.98, 6.63)	0.055
6–12	Ref.		
13–18	2.00	(0.75, 5.34)	0.165
Prior exposure to anesthesia	0.85	(0.38, 1.87)	0.681
Caregiver familiar with hypnotherapy	0.94	(0.41, 2.13)	0.877
Caregiver familiar with acupuncture	1.30	(0.53, 3.17)	0.560
Caregiver familiar with music therapy	3.36	(1.46, 7.74)	0.004

Abbreviations: CAM, complementary and alternative medicine, OR, odds ratio.

help patients move conscious thought away from the symptoms and focus their attention away from stressful events, thereby reducing anxiety and perceived pain.²³ Kain et al demonstrated that music therapy could be helpful during separation from parents and upon entrance to the operating room, but was not effective in reducing anxiety during the induction of anesthesia.²⁴ Nevertheless, more recent systematic reviews and meta-analyses have suggested the effectiveness of music therapy in children undergoing surgery and anxiety-provoking procedures.^{9,25} Due to high caregiver familiarity and acceptance of music therapy, this CAM modality may be an ideal candidate for a prospective trial comparing its efficacy to standard premedication in children undergoing procedures under general anesthesia.

Although acupuncture was the most familiar CAM therapy among caregivers in this survey (70%), it had the lowest acceptance rate (13%). Acupuncture is intended to stimulate the flow of nutrients, vital substances, and bioenergy, collectively called Qi, throughout the body, providing balance, regulation, and coordination of internal processes.²⁶ Acupuncture has been shown to be effective in reducing postoperative pain and preventing postoperative and chemotherapy-induced nausea and vomiting in children.^{8,10,13,27} Somri et al demonstrated that acupuncture was as effective as intravenous ondansetron in preventing postoperative vomiting in children undergoing dental surgery.²⁸ Despite available evidence regarding

the efficacy of acupuncture, the low acceptance rate of this modality may be explained by its more invasive nature as well as the potential for the caregivers' and children's fear of needles. It may also be that there are concerns regarding its invasive nature and the potential for adverse effects. The most common side effects are minor, such as skin and soft tissue reactions at the acupuncture point.²⁹ Serious complications, including infection, spinal cord injury, and pneumothorax, are rare and have been reported only in adults.^{30,31} However, acupuncture is a relatively safe treatment when compared to several medications routinely used during the perioperative period.³² Its low acceptance in the perioperative situation may be related to inadequate parental knowledge and to the perioperative context, which is likely more stressful for caregivers than a general pediatric care setting.

Hypnotherapy induces an altered state of consciousness by focusing the attention of the patient on certain objects or ideas. In the perioperative setting, hypnotherapy helps focus attention away from pain and anxiety toward relaxation.³³ From a neurophysiological standpoint, hypnotherapy may induce an alteration of cortical activity of the brain.³⁴ Calipel et al compared hypnosis to midazolam 0.5 mg kg⁻¹ in 50 children, 2–11 years of age, undergoing ambulatory lower abdominal surgery. Hypnosis was more effective than midazolam in reducing preoperative anxiety during the induction of anesthesia, specifically when applying the face mask. In addition, hypnosis reduced behavioral disorders (aggressiveness toward parents and fear of separation) during postoperative weeks 1–2, when compared with midazolam.³⁵ Despite its safety and evident efficacy, hypnotherapy was associated with a very low acceptance rate among caregivers in our study and in a previous survey of caregivers.¹⁴ This low acceptance could be explained by caregivers' low familiarity with this CAM modality.¹⁴ Further education on the efficacy and safety of hypnotherapy may be considered for caregivers of children undergoing surgery under general anesthesia.

Our survey found no differences in CAM acceptance according to the caregivers' age, sex, relation to the child, or the child's age. However, we did not include questions on demographic characteristics previously shown to predict CAM use, such as sex of the child, ethnicity, parental CAM use, education, and income.^{1,3} Although not all of these measures were included in our study, the evident homogeneity in CAM acceptance among respondents to our survey suggests that factors specific to the perioperative environment (e.g., concern about risk during surgery and in recovery) might be more relevant in influencing caregivers' acceptance of CAM in this setting.

Despite the common use of CAM therapies in the general pediatric population and among children with chronic conditions, caregivers' familiarity with and acceptance of these techniques in the perioperative period are still low, especially in the case of acupuncture and hypnotherapy. Further educational initiatives to educate caregivers on the safety and efficacy of CAM therapies in the perioperative setting and large trials comparing these methods to standard anxiolytic medication may increase their use in the perioperative setting in children.

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Authors contributions

MT: Writing up of the first draft of the paper. DT: Statistical analysis, revision of the manuscript. HW: Survey management. KL: Survey design, revision of the manuscript. JD: Critical revision of the article for important intellectual content and final approval of the version to be published. TB: Survey design, revision of the manuscript. All authors contributed toward data analysis, drafting and revising the paper and agree to be accountable for all aspects of the work.

Disclosure

The authors declare no conflicts of interest in this work.

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Supplementary material

Dear parent,
We would appreciate your help to complete our two minutes questionnaire regarding Complementary and Alternative Medicine (CAM) for use in the perioperative period. Thank you

The 3 first questions are intended for the guardian of the child:

Q1- What is your age (years)?
 <20 20-30 30-40 40-50 50-60 >60

Q2- What is your relationship with the child?
 Father Mother Other (please specify)

Q3- What is your gender?
 Male Female Other (please specify)

The next questions are about your child:

Q4- What is the age of your child having surgery (years)?
 <1 1-2 3-5 6-12 13-18 >18

Q5- Has your child ever had anesthesia before?
 Yes No

Q6- If yes, do you remember if he/she had a premedication (medication given in the preoperative area to help your child relax before going back to the operating room)?
 Yes No

Q7- Have you ever heard about hypnotherapy?
 Yes No

What is hypnotherapy?
Hypnotherapy is the use of focused attention on purpose to help you gain control over your mind and body for a specific goal (and pay less attention to things you don't want to attend to). Hypnosis is a way to use your imagination, with YOU in charge, and be more open to suggestion.

Q8- Have you ever heard about acupuncture?
 Yes No

What is acupuncture?
Acupuncture is a medical treatment that consists of placing very thin, sterile needles into specific-shallow locations on the body (acupuncture points) to stimulate the flow of what is known as Qi (pronounced "chee"). The general theory of acupuncture is that the proper function and health of the body depend upon the circulation of nutrients, vital substances and bio-energy called Qi through a network of "channels" or "meridians." This network connects every organ and part of the body, providing balance, regulation and coordination of internal processes.

Q9- Have you ever heard about music therapy?
 Yes No

What is music therapy?
Music Therapy is the use of music interventions by an accredited music therapist to accomplish individualized goals within a therapeutic relationship and to provide a deeply humanizing experience to the in-the-moment needs of the patient.

Q10- Would you be interested in hypnotherapy instead of a premedication, if it is an available option for your child?
 Yes No

Q11- Would you be interested in acupuncture instead of a premedication, if it is an available option for your child?
 Yes No

Q12- Would you be interested in music therapy instead of a premedication, if it is an available option for your child?
 Yes No

Figure S1 Survey questionnaire

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