LETTER TO EDITOR

Use of non-pharmacological therapies for sedation in children with cancer

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Dear editor,

Although cancer is rare in childhood, children with cancer often face several venipuncture events, intravenous cannulations, intramuscular injections, lumbar punctures, bone marrow aspiration and biopsies during the diagnosis, treatment, and follow up of their disease [1-3]. Sedation for painful medical procedures is frequently used to help immobilize the patient, reduce anxiety, and induce a state that allows the patient to tolerate the unpleasant procedures in pediatric patients [4]. Pharmacological and non-pharmacological therapies are used for sedation in children. Herein, the use of non-pharmacological therapies for sedation in children with cancer is discussed to attract attention to its importance, overlooked by many health professionals.

Non-pharmacological therapies used for sedation in infants, children and adolescents can be categorized as cognitive behavioral, physical, mind-body, and nutritional therapies [3-6] (Table 1). Cognitive behavioral therapy helps infants, children and adolescents change their behavior by changing the way they think and feel about sedation. Physical therapy involves hands-on techniques, exercises, and movements in management of sedation. Mind-body therapy, used in sedation, is based on the principle that the mind and body are interconnected and that emotional, mental, spiritual, and physical states can affect one another. Nutrition therapy is a form of treatment that uses appropriate diet, nutrition education, and behavioral counseling to manage sedation.

Non-pharmacological interventions can reduce delays in treatment, total requirement and associated side effects of sedation and analgesia medications, risk for infection, and associated healthcare expenditures and have been recommended by international sedation guidelines [4, 7].

Although, non-pharmacological therapies are frequently used for sedation in children, limited studies have been reported about their use in childhood cancer. Iannalfi et al. [8] reported that moderate sedation with the combined use of nitrous oxide, midazolam, and non-pharmacological techniques (distraction, parental presence with songs or music, breathing, relaxation techniques, and imagery) was effective for lumbar puncture and bone marrow aspiration in children with cancer. Beneficial results were obtained through social interaction with robots and its use as a distraction, symptom registration through applications, and the use of video games and distractions through virtual reality to improve pain, anxiety, and depression in children with cancer [9].

Table 1: Non-pharmacological therapies for sedation in infants, children and adolescents

Cognitive behavioral therapies	**Physical therapies**
Taking time with family, parental involvement or presence, mother's voice, simulated mother's voice. Quietly singing or talking, comforting songs or sounds	Positioning/positioning aids, holding/ containment holding, postural support, embracing, rocking with or without simulated
Adequate communication with children and parents. Child-friendly format. Modeling behavior.	Touch, therapeutic touch, stroking, soothing
Skin-to-skin contact, kangaroo-mother care, sensorial saturation	Sucking, non-nutritive sucking, pacifier use
Parental education	Swaddling, tucking, facilitated tucking
Sleep	Massage, rubbing
Bribes and promises of prizes	**Mind-body therapies**
Tell-show-do technique	Acupuncture
Desensitization technique	Aromatherapy
Bibliotherapy	Homeopathy
Play therapy (or therapeutic play)	Hypnotherapy or hypnosis
Animal-assisted therapy such as dog interaction	Mindfulness, biofeedback, magic, reiki, yoga, relaxation
Distraction techniques such as clown/clown doctors, toy (e.g., using bubbles), game, counting, cartoon, computer, television, video (e.g., fairytale, animation), electronic device, and virtual reality distraction	Meditations such as imagery with or without guided, breathing exercises, music therapy, prayer, religious-spiritual interventions, and Quranotherapy
Repeated reorientation, early mobilization	**Nutritional therapies**
Psychological preparation through both a photo-booklet and written advice to parents. Watching a movie showing the procedures. Using of mock devices such as a mock magnetic resonance imaging.	Breastfeeding, feeding, "feed and sleep," "feed and wrap," and "feed and bundle"
Environmental modifications such as age-appropriate environment, a quiet environment, day-night rhythm, avoiding overstimulation by light (e.g., dimming lights, mask introduction/exposure, and eye mask), decrease noise (e.g., limiting visitors, mute setting of heart rate monitoring sounds, decreasing music, wearing noise-canceling headphones, and use of ear plugs)	Glucose, sucrose, sweet solution. Pacifier dipped in Sweet Ease (24% sucrose solution)

Non-pharmacological treatments such as talk, stories, music, videos, plays or guided imagery have proven effective, especially before induction of sedation-analgesia, to reduce anxiety and fear and to improve children's and their parents' experiences of painful procedures in pediatric hematology-oncology [10]. A meta-analysis showed that music can be adopted as a nonpharmacological therapy in the multimodal approach or as monotherapy in pediatric integrative medicine, since it presented consistent data for improving the condition of physical and mental well-being of children undergoing cancer treatment [5]. An intervention using biofeedback and relaxation was also found effective for preprocedural distress in children with cancer [3]. A procedure management program should include appropriate analgesia and sedation procedure preparation for parent and child and effective parent education and teaching. Although new and effective pharmacologic agents are now available, management of painful procedures in children with cancer should be designed to the individual patient through effective communication between the child, parents, and medical staff [6].

In conclusion, limited studies have shown that non-pharmacological therapies, alone or in combination with pharmacological agents, are effective in sedation in children with cancer. We strongly recommend that randomized controlled studies including large series should be conducted about use of cognitive behavioral, physical, mind-body, and nutritional therapies for sedation in pediatric hematology-oncology. These studies will guide healthcare professionals, benefit cancer patients and their families in clinical practice, and fill the gap in the literature.

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