Original Article

The Effect of Entonox, Play Therapy and a Combination on Pain Relief in Children: A Randomized Controlled Trial

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Abstract:

Pediatric pain is often undertreated/neglected due to time constraints, difficulties in timing of oral analgesics, fear of side effects of opioids and anxiolytics, and apprehension of additional pain in the use of local anesthetic injections. In this study, the researcher was prompted to choose rapidly acting interventions that were low dose and allowed the child to stay alert, suitable for a quick discharge. The purpose of this study was to evaluate the effects of Entonox, play therapy, and a combination to relieve procedural pain in children aged 4-15 years. The study was designed as a randomized controlled trial; the subjects were divided into four groups using a sequential allocation plan from 123 total subjects. Group A received Entonox, Group B received play therapy, Group C received both Entonox and play therapy, and Group D received existing standard interventions. The study was vetted by the departmental study review committee. The pain level was assessed using FLACC scale for children aged 4-9 years and the Wong Bakers Faces Pain Scale for children aged 10-15 years; scores ranged from 0 to 10. All the data were analyzed using SPSS 16.0 with descriptive statistics and, inferential statistics. The mean pain scores were as follows: Entonox group, 2.87; Play therapy group, 4; combination group, 3; and control group, 5.87. When statistical testing was applied, a significant reduction in the pain score in all the three experimental groups when compared to the control group was found ($p = .002$), but not in the pain score among the three experimental groups ($p = .350$). The findings of this study indicated that all three interventions were effective in lowering pain scores when compared to the control group. Play therapy is as potent as Entonox in relieving procedural pain, though there was no additive effect on pain relief when play therapy and Entonox were combined. A protocol for age-related choice between play therapy and Entonox administration was introduced as a

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standing order in the Pediatric Surgery department for acute procedural pain relief.
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INTRODUCTION

Pain is an intolerable sensation that makes the patient vulnerable (Rao, 2006) and it has been recognized as the fifth vital sign by the Joint Commission on Accreditation of Health Care Organization (JCAHO). Healthcare professionals regard immunizations, injections, dressings, and suturing as routine procedures; for children, however, all these arouse fear and are perceived as stressful. Inadequate relief of pain and distress during childhood procedures may have long-term negative effects on future pain tolerance and pain responses. Infants and children respond to pain with behavioral reactions that depend upon their age and cognitive process: "The inability to communicate in no way negates the possibility that an individual is experiencing pain and is in need of appropriate pain-relieving treatment" (Goddard, 2002, page no. 839).

Pain is defined by the International Association for the Study of Pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage" (Fields, 1999). The effects of pain are deleterious. Pain evokes negative physiologic, metabolic, and behavioral responses in children, including increased heart rate; respiratory rate; blood pressure; and secretion of catecholamine, glucagon, and corticosteroids. The catabolic state induced by acute pain is more damaging to infants and young children, who have higher metabolic rates and fewer nutritional reserves than adults (Franck, Greenberg, & Stevens, 2000). The American Society for Pain Management Nursing (ASPMN) believes that individuals who undergo potentially painful procedures have a right to optimal pain management before, during, and after the procedure and a plan should be in place to address potential pain and anxiety before the initiation of any procedure (Czarnecki et al., 2011).

The present study was prompted by the need to address pain in children in the pediatric surgery outpatient clinic, where it was often undertreated/neglected. Acute, short-term painful procedures, such as dressing and suture removal, were common and the limited pharmacological agents available in the outpatient clinic were not being used on a regular basis. Thus, it was necessary to choose rapidly acting interventions that could be applied for procedures done at short notice and not requiring postprocedural observation. The researcher, having observed the use of Entonox (nitrous oxide 50%:oxygen 50%) for burn dressing, felt that the method might be appropriate for pain relief among children for short, planned procedures. When a nonpharmacological intervention is used in association with a medical procedure, either before, during, or after the procedure, the child gets a chance to have a sense of control and experience mastery over procedure, thus reducing anxiety, improving coping and pain relief.

OBJECTIVES

The study was undertaken to assess and compare the pain levels in children undergoing short-term procedures treated with either Entonox, play therapy, both Entonox and play therapy, or standard pain interventions (control group). In addition, the researchers sought to determine the relationship between an observer's pain assessment and the self-reported pain in children aged 10 to 15 years.

Hypothesis

H1: There is a significant difference in the pain level of children in the Entonox group as compared to the control group.
H2: There is a significant difference in the pain level of children in the play therapy group as compared to the control group.
H3: There is a significant difference in the pain level of children in the combination group as compared to the control group.
H4: There is a significant difference in the pain level of children in the combination group as compared to those for whom either Entonox or play therapy alone is used.

METHODS

The aim of the study was to assess the effect of Entonox, play therapy, and a combination of both on pain relief in children in the pediatric surgery outpatient setting of Christian Medical College, Vellore. Children aged 4-15 years who underwent a painful procedure were selected and were divided into four different groups.

Children undergoing painful procedures and those who met the inclusion criteria were identified by the staff nurse in charge of the treatment room and were directed to the researcher. Consent was obtained and the parents were told by the researcher that the child could be in any one of the four groups. The staff in charge randomly allocated the children to one of the experimental groups or the control group

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