Original Article

Analgesic Effect of Regular Breathing Exercises with the Aim of Distraction during Venipuncture in School-aged Thalassemic Children

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Abstract

Background

Pain is described as the fifth vital sign, and inadequate pain management is linked to numerous immediate and long-term negative outcomes. Venipuncture is one of the most painful medical procedures in children. Distraction is one of the main effective ways to relieve pain. Reducing patients' pain sensation maybe feeling is important for all nurses for many reasons. Unnecessary pain can damage the nurse-patient relationship, whereas the knowledge of alternative techniques can improve patient care and satisfaction.

Materials and Methods

Forty patients (6–12 years) suffering from thalassemia and requiring venipuncture were randomized into distraction group (n=20, regular breathing exercise) and control group (n=20, without any intervention). The pediatric pain behavioral symptoms and Numeric Pain Rating Scale were used to assess pain caused by venipuncture.

Results

The mean of pain score based on the numerical scale was 5.60 ± 3.13 in the control group and 1.85±1.42 in breathing exercises and the mean score of behavioral pain symptoms was 3.80±2.80 in the control group and 0.96±0.75 in breathing exercise group. Results showed a significant difference between the mean of pain scores (based on numeric scale and pain behavior scale). ($p \leq 0.001$)

Conclusion

Distraction demonstrated to be effective in reducing pain. This intervention requires minimum effort and time and may be a cost-effective and convenient nursing intervention that could be used easily in clinical settings.

Keywords

Pain, Thalassemia, Breathing Exercises, Child

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Introduction

Thalassemia is known as the most common genetic disorder. The disease is caused by impaired synthesis of one or more of the globin polypeptide chains (1). Thalassemia major is likely to be one of the great health problems for at least the next few decades, particularly in developing countries (2). It is estimated that 1.5% of the world's population are carriers of beta thalassemia (3). Currently, about 18800 patients have been identified with thalassemia major (4). Diseases such as thalassemia and other chronic debilitating diseases require long and sustained treatment (5). Nowadays, the advancement of technology has led to better diagnosis and control of many chronic diseases as well as thalassemia. The children who suffer from thalassemia should be hospitalized frequently and undergo diagnosis and treatment procedures (6). Venipuncture is commonly seen as one of the most frequently performed invasive procedures in hospital (7). In the pediatrics population, it can be one of the most distressing events associated with medical encounters (8). Unnecessary pain can damage the nurse-patient relationship, whereas the knowledge of alternative techniques can improve patient care and satisfaction. As advocates for children, nurses are obligated to minimize the emotional and physical effects of painful procedures (9). There are many different approaches in the treatment of acute pain during medical procedures in children, including pharmacological and non-pharmacological measures. One of the non- pharmacological methods to reduce pain is distraction (10). The goal of distraction is to "refocus attention from threatening, anxiety-provoking aspects of medical treatments to non-threatening and ideally pleasant, and engaging, objects or situations"(11). Esmaeili et al. (2008) and Valizadeh et al. (2004) showed that breathing exercise and music during venipuncture can reduce the pain (12, 13). Huth et al. (2004) suggested that imagery reduce children's post-operative pain (14). Caprilli et al. (2007) found that interactive music as a treatment for pain and stress in children during venipuncture (15). Almost all studies have confirmed the effect of distraction on reducing pain in patients, most studies have dealt with acute painful procedures, such as immunizations (16, 17), or lumbar puncture/ bone marrow aspiration in patients with cancer (18). First of all, pain relief in children at the time of injection is paid less attention to nurses and strategies to reduce pain are rarely used. Second, this intervention requires minimum effort and time and may be a cost-effective and convenient nursing intervention that could be used easily in clinical settings. The other reason for using this toy was being suitable for both boys and girls. Therefore, the purpose of this study was to determine the effectiveness of distraction during venipuncture in children suffering from thalassemia who referred to the Thalassemia Center in Kerman, Iran.

Materials and Methods

This is a clinical trial on 40 children ranging from 6 to 12 years old, who were suffering from major thalassemia and referred to the Center for Thalassemia in the city of Kerman in 2010. The sampling was convenient method and participants were randomly divided into two groups (experiment and control). Entry criteria included age range of 6 to 12 years old, having medical file in the Thalassemia Center and were willing to participate in the study. Those children who had physical problems (verbal, mental, visual and hearing) and psychological problems or were using pain relief or anxiety medicine were excluded from the study. The sample size has been determined based on previous studies. Following permission from the Thalassemic center, sampling was started to perform. Following consensus of patients' parent; they were randomly divided in two groups.

The random selection was based on throwing dice. In one group, injection was done in the usual way of as of the ward routinely performs (without any activity for pain relief) and in the control group, regular breathing exercises were practiced. In the breathing exercise group, children were taught how to do regular breathing exercise and were asked them to do one minute before and during catheter insertion until the fixation of angiocath. (Breathing method of Hey-hu: in this method first child takes a deep breath, exhale while whispering Hey, then inhale deeply again and exhale whispering Hu)(12). Data were collected using a demographic questionnaire, a scale for pediatric pain behavioral symptoms and Numeric Pain Rating Scale. Demographic data questionnaire was completed by interviewing the children or parents. At the next stage, the behavioral pain scale during procedure in children of all two groups were observed and recorded. Behavioral pain scale was used to determine the severity of the pain of catheter insertion through children's reactions during injection. The randomized, double-blind, controlled trial is the ‘‘gold standard’’ for experimental studies, because the design reduces bias, controls for confounding variables, provides for manipulation of the dependent variable, and therefore, allows for cause and effect correlation factor to be determined (8). In this study, it was impossible to accomplish a true double-blinded study with regular breathing exercises as it was obvious to the children who intervention they were received. The behavioral pain scale was developed in an attempt to provide a simple consistent method of pain assessment in non-verbal or preverbal children. This tool incorporates 5 categories of behavior that have been used in other behavioral scales. The acronym FLACC (Face, Legs, Activity, Cry and Consolability) facilitates the recall of the categories, each of which is scored from 0-2 with total scores ranging from 0-10 similar to other clinical assessment tools. The reliability and validity of this tool have been established in diverse settings and in different patient populations (19, 20 and 21). After injection, children's pain was assessed by numerical pain scale. The numerical pain scale, also called by some as numeric rating scale (NRS) that is a scale which asks the patient to grade pain from 0 (no pain) to 10 (worst pain)(22). Numerical pain scale has been shown to have a high degree of inter-rater reliability; validity and versatility (23). The nurse responsible for cathetering, size, type and manufacturer of catheter, side of injection and environmental conditions were the same in all cases.

Statistical Analysis

Data were analyzed using descriptive (frequency, mean and standard deviation) and inferential statistics (Mann Whitney U, T-test and Spearman correlation and Chi Squre test). Standardized mean differences with 95% confidence intervals were computed for all analyses using spss 16 software.

Results

The mean of age breathing exercise was 10.25±1.33 and in the control group 9.90±2.38. There was no significant difference between these two groups regarding various variables such as age and gender. (Table 1) Comparing the mean score of numerical pain scale between the two groups of breathing exercise and control by Mann Whitney U test showed a significant difference ($p \geq 0.001$). In addition, comparing the mean score of behavioral pain scale between the two groups of breathing exercise and control by Mann Whitney U test showed a significant difference ($p \geq 0.001$) (table 2). There was a direct and significant correlation between the numerical pain scale and behavioral using Spearman correlation ($rho=0.674$, $p<0.001$). There was a reverse and significant correlation between the increase of age and numerical pain scale score using Spearman

correlation test, so that with the increase of age, the reported score of pain was lower (rho=-0.278, P<0.05). There was also a reverse and significant correlation between the increase of age and behavioral pain scale score using Spearman correlation test (rho=-0.359, P<0.01). Although the mean score of pain based on numerical pain scale in girls (3.02±2.65) was a little higher than boys (3±3.17), Mann Whitney U showed no significant difference between the two groups (p=0.678). However, the pain score based on behavioral pain scale in girls (2.30±2.66) was higher than boys (1.58±1.78), even though Man Whitney U showed no significant difference (p=0.324).

Table1: Comparison of frequency distribution of the subjects divided by sex and age, age mean

Group		Breathing exercise		control		result
Variables		frequency	percent	frequency	percent	p=0.62
sex	Female	11	55	13	65	
	Male	9	45	7	35	
Age group(year)	6-8	9	45	3	15	p=0.03
	9-10	5	25	8	40	
	11-12	6	30	9	45	
age	Mean ± Sd	8.9±2.3		10.25±1.3		
	total	20	50	20	50	100

Table 2: Comparison of the mean of pain severity according to behavioral and numerical pain scale in two groups

Result	Breathing exercise	Control	Group Mean
P ≥ 0.001	1.42 ± 1.85	3.13 ± 5.60	Numerical scale
P ≥0.001	0.96 ± 0.75	2.80 ± 3.80	Behavioral scale

Statistical test= Mann Whitney U

Discussion

The results show that the breathing exercise is effective in decreasing children's pain. Some former studies revealed that pain control for IV (intravenous) insertion, DPT (Diphtheria, Pertussis, Tetanus) vaccination and dressing changes in burned children reported that distraction had no effect on reducing pain (8). But the use of Videogame playing as distraction could reduce response of children during venipuncture (24). Also, one study

suggested that a passive strategy (such as watching TV) might be more effective than an active one (distraction with an interactive toy) for decreasing the pain of venipuncture. This is because children's distress interfered with their ability to interact with the distractor (11). The use of audiovisual distraction techniques was demonstrated to be effective in reducing self-reported pain, improving children's cooperation and increasing success rates in venipuncture procedure as effectively as routine psychological interventions. These differences may be due to different methods of distraction and painful procedure (25, 16). Esmaeili et al. (2008) and Valizadeh et al. (2004) compared two methods of breathing exercise and music on pain of catheter at the time of blood transfusion. They concluded that both methods reduce children's pain significantly, but the effect of music was more than that of breathing exercise (12,13). Simple breathing exercises are effective in significantly reducing injection pain and distress during venipuncture. This fact is important, because children can be easily and quickly taught these exercises with minimal instruction and cost. Another finding of this study was that there was no significant correlation between gender and self-reported pain and behavioral pain. However, a study conducted by Arts et al. (1994) also showed no significant effect on the severity of pain and behavioral reactions in terms of gender; this is in agreement with the current study (26). Tootoonchi also found no significant relationships between the severity of pain and gender (27). Moreover, in the present study, there was a significant reverse relationship between age and the score of numerical scale in two behavioral scales; as the age increased, the score of reported pain decreased. Arden found that younger children, regardless of intervention, had significantly more pain than that of older children (28). The results of other studies also showed reverse relationships between pain and age. In a study by Pourmovahhed et al. (2008), indicated that the mean score of pain severity in the children of 10-12 years old was lower than those of 6 to 9 years old (29). The present study revealed that there is a significant correlation between pain ratings and age, but not gender. While this study did not, as hoped, succeed to recommend a simple method for decreasing pain responses to procedures involving needles in children, but it revealed important boy/girl differences in response to physiological stimuli and in the influence of social setting on reporting of pain. All health team members involved in pediatric injections are advised to avoid deceiving the child before venipuncture. Children should be assured that the health team members would do their best to reduce the pain as much as possible (30). Further studies regardness the effect of other non-pharmacological methods such as relax-ation or other distraction methods on pain relief due to venipuncture in children specially thalassemic children who experience severe pains during procedures including diagnosis, treatment and control of their disease are strongly recommended.

Conclusion

The use of breathing exercise was effective in reducing pain responses in school-aged children during venipuncture. Because a wide range of distraction interventions and conflicting effects on pain reduction have been reported, the selection of a distraction that attracts a child's attention is very important. The breathing exercise interven tion used in this study was found to be an effective intervention for pre-school-aged children. Since in the children's centers for treatment of thalassemia, there isn't any policy for distraction, the results of this study recommend using these methods to reduce pain in children with thalassemia.

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Conflict of Interest

The authors have no conflict of interest.

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