

## Effectiveness of Regular Breathing Technique (Hey-Hu) on Reduction of Intrathecal Injection Pain in Leukemic Children: A Randomized Clinical Trial

Zahra Pourmovahed\*<sup>1</sup>, MSc; Khadije Dehghani<sup>1</sup>, MSc; Asghar Sherafat<sup>2</sup>, MSc

1. Department of Pediatrics, Shahid Sadoughi University of Medical Sciences, Yazd, Iran
2. Afshar Hospital, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

Received: Dec 24, 2012; Accepted: Jul 24, 2013; First Online Available: Aug 14, 2013

### Abstract

**Objective:** Children with chronic diseases such as leukemia are subjected to pain during various procedures. Injection pain in children is so important that it is considered as the most stressful aspect of their disease. Distraction is one of the easiest and least costly methods of non-pharmacological pain relief that has not been paid attention to by nurses. In the present study, the effectiveness of regular breathing method (Hey-Hu) in reduction of pain of intrathecal injection in leukemic children was evaluated.

**Methods:** This study was conducted as a single blind randomized clinical trial among 100 patients coming to a referral hospital related to Shahid Sadoughi University of Medical Sciences, Yazd, Iran. The patients were 6-15 years old children coming to oncology ward suffering from leukemia. They were selected and randomly allocated to either regular breathing group or control group in equal numbers. The pain of children was assessed by Wong pain face scale and also general behaviors of the samples were evaluated by the researcher. In Pain Rating Scale, face 0 is considered happy because there is no hurt and face 5 denotes maximum pain.

**Findings:** Mean pain score in the regular breathing group was significantly lesser than the control group ( $2.98 \pm 1.68$  and  $3.80 \pm 1.30$ , respectively;  $P=0.01$ ). There was no significant difference between the two sexes but in the regular breathing group, mean pain score was significantly lower in children aged above 10 years.

**Conclusion:** This study showed that regular breathing can significantly reduce the pain of intrathecal injection in leukemic children, especially in those aged above 10 years. Considering the key role of nurses in a health care team, the researchers hope that the results of this study can help them learn this method and implement it in hospitalized children who undergo painful procedures.

*Iranian Journal of Pediatrics, Volume 23 (Number 5), October 2013, Pages: 564-568*

**Key Words:** Regular Breathing; Intrathecal Injection; Pain; Leukemia; Children

### Introduction

Various treatment procedures in leukemic children result in different degrees of pain and fear of such procedures prevents appropriate treatment in children<sup>[1]</sup>. One of the common invasive procedures in these children is lumbar puncture for chemotherapy that is painful and absence of painkilling actions results in significant

negative effects. Reminder of this painful procedure results in severe psychological responses like crying and severe movements in order to prevent injection, physiological responses like increased heart rate and vascular spasm in these children<sup>[2]</sup>. The health team personnel, especially nurses play an important role in performing effective and correct painful procedures<sup>[3]</sup>. Non pharmacological methods of

\* Corresponding Author;

Address: School of Nursing and Midwifery, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

E-mail: z\_pourmovahed@ssu.ac.ir

© 2013 by Pediatrics Center of Excellence, Children's Medical Center, Tehran University of Medical Sciences, All rights reserved.

pain control in invasive procedures significantly reduce pain and stress. A variety of different distractors have been used for pain management for children. 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, regular deep breathing is one such method. Diversion of attention is one practical, simple and cheap method resulting in increased threshold of pain<sup>[4,5]</sup>. In Hey-Hu regular breathing the patient initially selects a slow and deep inhalation and then utters 'Hey' during exhalation. The patient then repeats the deep inhalation followed by uttering 'Hu' during exhalation. The nurse remains by the bedside and helps the patient<sup>[6]</sup>. Considering the fact that leukemia is the most common carcinoma in children<sup>[1]</sup> in whom lumbar puncture is one of the common treatment actions wherein regular breathing technique is not used for decreasing pain, this study was performed to evaluate the effects of regular breathing on reduction of pain of intrathecal injection in leukemic children.

## Subjects and Methods

This study was conducted as a single blind and cross sectional randomized clinical trial among 100 patients coming to referral hospital related to Shahid Sadoughi University of Medical Sciences, Yazd, Iran. The patients were 6-15 years old children coming to oncology ward suffering from leukemia and hospitalized in the pediatric ward. Sampling method was random (using random allocation software) and the patients were divided into two groups: study and control. A total of 100 leukemic children age 6–15 years were included in the study in the year 2011. The population was divided into two groups of 50 each as the control and study with confidence of 95%, power test of 80% and based on the results of previous studies, *P* values of 0.6 and 0.3 were considered for the control and study groups with a *d*=0.3.

Inclusion criteria in the study included alertness, verbal, subjective, visual and hearing ability, absence of pain and physiological needs (thirst, need for excretion) before injection. The

patients were admitted for the first time to the hospital and underwent the first intrathecal injection (Fig. 1).

Those patients who received a second injection were excluded from the study. We also excluded patients who had any respiratory difficulties.

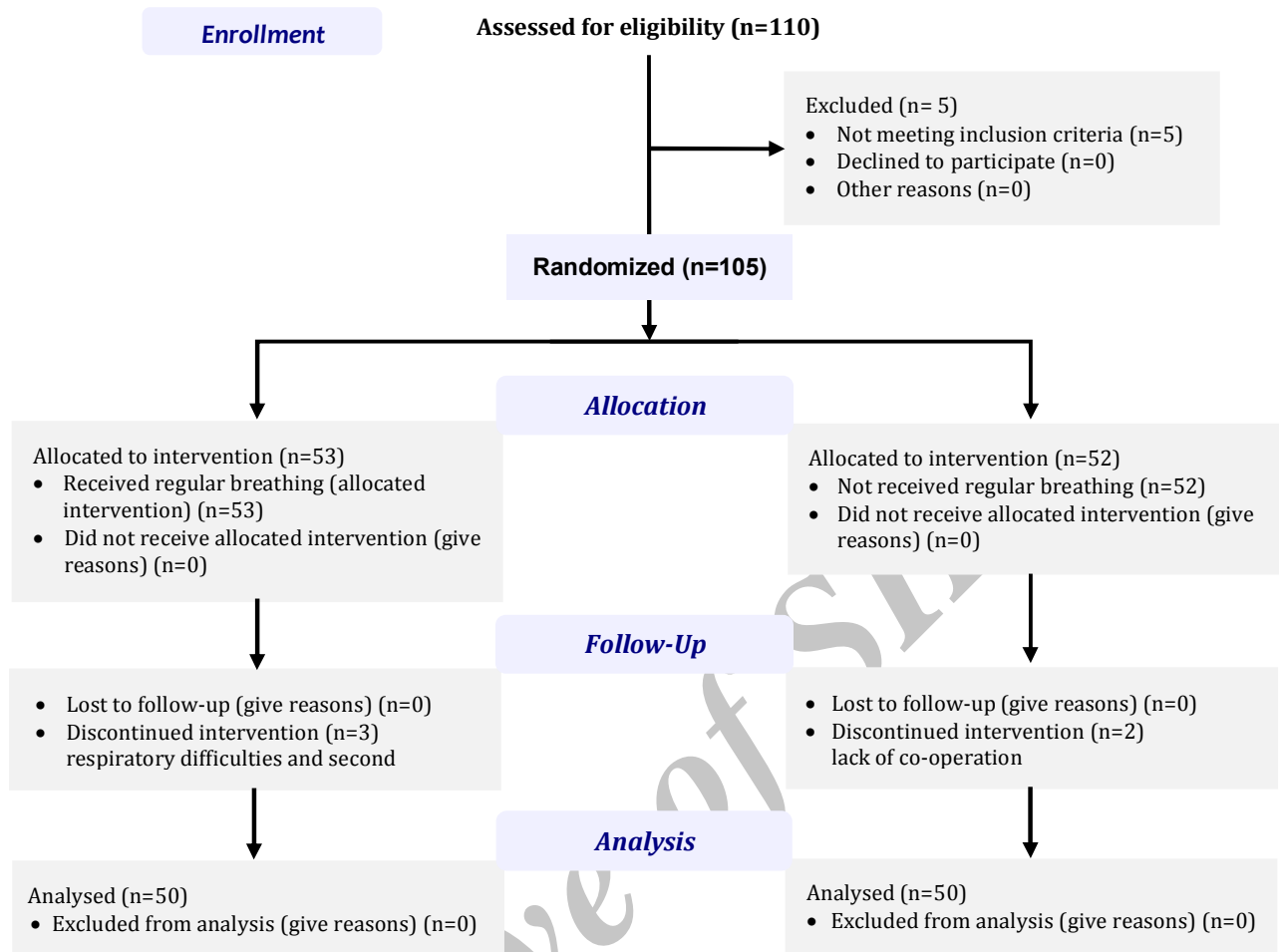
Demographic characteristics were recorded by a questionnaire and pain intensity was measured by Wong facial pain criteria scored between 0-5. The Hey-Hu technique was demonstrated to the patients before injection. In this method, at first the child takes a deep breath, exhales while whispering hey, then inhales deeply again and exhales whispering hu. This was practiced with the child in order to implement it accurately and was performed one minute before till to the end of the procedure. We asked the patients to do regular breathing for a short time, so it could not have been the cause of any problems for patients. A respiratory rate of 20-30 per minute was considered normal for the children. It is worth mentioning that the performer of the procedure was aware of the aim of the study, so this was a single blind trial.

The data was coded, entered in SPSS version 15 software program and descriptive, inferential statistical tests included Chi square and t-test, while comparison of groups was done by Mann Whitney test. We considered *P* values less than 0.05 to be statistically significant. Pain intensity was reported as mean and standard deviation. T-test and Mann-Whitney test were performed to compare the results in two groups.

## Findings

The mean age of the population under study was  $9.45 \pm 2.80$  years of which 42% were girls and 58% boys. The mean pain intensity in the study group was  $2.98 \pm 1.68$  that was significantly more than the control group according to the results of Mann-Whitney test ( $P=0.01$ ) (Table 1). The mean pain intensity in children aged above 10 years in the study group was less than that in the control group (Table 2). Mann-Whitney test results showed that the difference was significant. ( $P=0.004$ ) The mean pain intensity in boys and girls of the study group was less than that of the

Archive of SID



**Fig. 1:** Flow diagram of randomization, allocation, follow-up and analysis

control group but not significant. The pain intensity according to gender was not significantly different (study group  $P=0.8$ , control group  $P=0.6$ ) (Table 3).

## Discussion

According to the results of the study, the mean pain intensity score in the controlled breathing

study group was 2.98 that was less than that in the control group (3.80). It is in line with the results of the study by Valizadeh et al<sup>[7]</sup>. They reported that pain intensity in routine venous puncture is moderate while it is low in controlled He-Hu controlled breathing method. Thought deviation methods including breathing exercises result in decreased pain intensity due to insertion of catheter. Bagherian et al<sup>[8]</sup> reported that the mean pain intensity in regulated Hey-Hu breathing group was 0.96 ( $\pm 0.75$ ) while that in the controlled group was 3.80 ( $\pm 2.80$ ) which depicts

**Table 1:** Pain intensity of lumbar puncture in the study and control groups

Group	n	Mean (SD)
Regular breathing*	50	2.98 (1.68)
Control	50	3.80 (1.30)
Total	100	3.39 (1.55)

\* $P$ . value=0.01; SD: Standard Deviation

**Table 2:** Mean pain intensity according to age group in in the study and control groups

Age group Comparison Group	Below 10 years Mean (SD)	Above 10 years Mean (SD)	Total Mean (SD)
Regular breathing	3.92 (1.17)	1.86 (1.51)	2.98 (1.68)
Control	3.86 (1.25)	3.61 (1.50)	3.80 (1.30)
Total	3.89 (1.20)	2.50 (1.71)	3.39 (1.55)
P. value	0.9	0.004	0.01

SD: Standard Deviation

the effectiveness of Hey-Hu breathing technique in reduction of pain intensity. Thus thought deviation is effective in reduction of stress in order to reduce pain intensity in children<sup>[9,10,11]</sup>.

The results showed that in the children aged above 10 years, the mean pain intensity in regular breathing technique was significantly less than control group during intrathecal injection. It can be said that with an increase in age and thought maturity, fear of children from lumbar puncture decreases and makes them more compliant. Arts et al<sup>[12]</sup> stated that younger aged children report more pain intensity than older children irrespective of the interventional method. It can therefore be stated that regulated Hey-Hu breathing method is effective in reducing pain intensity of lumbar puncture in children aged above 10 years. Hasanpour et al<sup>[13]</sup> also reported similar results indicating that there is weak but significant inverse relationship between age and injection pain intensity. In another study studying the effectiveness of music and desensitization EMLA cream on venous puncture in children, it was observed that the mean pain intensity in the 10-12 year age group in all of the 3 study groups (EMLA cream, music and control) was less than that in the other age groups and this was more remarkable in the group using EMLA cream<sup>[14]</sup>.

In the present study, the mean pain intensity in girls and boys undergoing lumbar puncture in whom regular Hey-Hu breathing technique was used was less than the control group and there

was no meaningful difference between the two sexes. Arts et al<sup>[12]</sup> and Hasanpour et al<sup>[13]</sup> also reported that gender does not have a significant effect on the intensity of pain. It can therefore be concluded that sex variable does not affect the pain intensity of lumbar puncture.

## Conclusion

Considering the fact that lumbar puncture is one of the most common regular clinical methods used in leukemic children and a bad experience from the viewpoint of most of the children, the nursing staff of the pediatric oncology ward can use the Hey-Hu regular breathing technique which is a simple and easy thought diversion method to decrease stress and fear in children and effectively reduce pain intensity during injection.

## Acknowledgment

We would like to thank the personnel of pediatric ward of referral hospital related to Shahid Sadoughi University of Medical Sciences, Yazd for their valuable help in conducting this research. This study was registered in Iranian Registry of Clinical Trials (Code IRCT2012102311230N1).

**Conflict of Interest:** None

**Table 3:** Mean pain intensity according to gender in the study and control group

Gender Comparison Group	Girls Mean (SD)	Boys Mean (SD)	Total Mean (SD)	P value
Regular breathing	3.05 (1.63)	2.93 (1.74)	2.98 (1.68)	0.8
Control	3.86 (1.45)	3.57 (1.20)	3.80 (1.30)	0.6
Total	3.47 (1.58)	3.32 (1.54)	3.39 (1.55)	
P value	0.08	0.08	0.01	

SD: Standard Deviation

## References

1. Wong LD. Wongs nursing care of infants and children. 9<sup>th</sup> ed. St Louis: Mosby Inc. 2011; Pp: 220-21.
2. Vessy J, Carlson K, Mc Gill J. Use of distraction with children during an acute pain experience. *Nurs Res* 1994; 43(6):369-72.
3. Movahedi AF, Rostami S, Salsali M, et al. Effect of local refrigeration prior to venipuncture on pain related responses in school age children. *Aust J Adv Nurs* 2006; 24(2):51-5.
4. Christensen J, Fatchett D. Promoting parental use of distraction and relaxation in pediatric oncology patients during invasive procedures. *J Pediatr Oncol Nurs* 2002; 19(4):127-32.
5. Hockenbrry MJ, Wilson D, Rentfro AR, et al. Wongs Nursing Care of Infants and Children. 8<sup>th</sup> ed. Philadelphia: Elsevier Science Health Science Div. 2006; P: 220.
6. Phipps WJ, Long BC, Woods NF, et al. Medical – Surgical Nursing. 4<sup>th</sup> ed. St. Louis: Mosby Year Book. 1991; P: 307.
7. Valizadeh F, Shahabi M, Mehrabi Y. Comparing the efficacy distraction breathing exercises and music. *Lorestan Uni Med Sci J* 2004; 22(6):43-50. [In Persian]
8. Bagheriyan S, Borhani F, Abbaszadeh A, et al. The effects of regular breathing exercise and making bubbles on the pain of catheter insertion in school age children. *Iran J Nurs Midwifery Res* 2011; 16(2):174-80.
9. Cohen LL, MacLaren JE, Fortson BL, et al. Randomized clinical trial of distraction for infant immunization pain. *Pain* 2006;125(1-2):165-71.
10. Windich-Biermeier A, Sjoberg I, Dale JC, et al. Effects of distraction on pain, fear and distress during venous port access and venipuncture in children and adolescents with cancer. *J Pediatr Oncol Nurs* 2007;24(1):8-19.
11. Broome ME, Rehwaldt M, Fogg L. Relationships between cognitive behavioral techniques, temperament, observed distress and pain reports in children and adolescents during lumbar puncture. *J Pediatr Nurs* 1998;13(1):48-54.
12. Arts SE, Abu-Saad HH, Champion GD, et al. Age-related response to lidocaine-prilocaine (EMLA) emulsion and effect of music distraction on the pain of intravenous cannulation. *Pediatrics* 1994;93(5): 797-801.
13. Hasanpour M, Tootoonchi M, Aein F, et al. The effects of two non – pharmacologic pain management methods for intramuscular injection pain in children. *Acute Pain* 2006;8(1):7-12.
14. Pourmovahed Z, Salimie T, Dehghani K, et al. Comparative study of the effect of music distraction and Emla cream on pain of the children during intravenous cannulation. *Iran J Nurs Res* 2008; 21 (55):47-53. [In Persian]