The effects of acupressure on venipuncture pain among 6–12 year-old hospitalized children

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Abstract

Background and Aim: Venipuncture is among the commonest painful invasive procedures performed by nurses. Preventing and alleviating children's pain is of paramount importance. This study was undertaken to evaluate the impacts of acupressure on venipuncture pain among 6–12 year-old hospitalized children.

Methods: In this clinical trial, eighty 6–12 year-old children hospitalized in Ali Ibn Abitalib and Moradi Hospitals, Rafsanjan, Iran, were recruited and allocated to the acupressure and the control groups by using the block randomization technique. Pain intensity was assessed in both groups after performing venipuncture by using a self-report numerical analog scale. Study data were entered into SPSS v. 18.0 and analyzed by performing the Chi-square, the Fisher's exact, and the Mann-Whitney tests as well as median regression analysis.

Results: The intensity of venipuncture pain in the acupressure and the control groups was 3.35.±1.8 and 8.65±1.5, respectively. The difference between the study groups regarding the intensity of venipuncture pain was statistically significant (P<0.0001).

Conclusion: Study findings suggest that as a non-pharmacological therapy, acupressure is effective in reducing pain. Consequently, it can be used as an effective strategy for managing venipuncture pain.

Key Words: Phlebotomy; Pain; Child; Acupressure

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Introduction

Diseases and hospitalization are usually the first crises experienced by children (1). Hospitalized children find venipuncture pain extremely frightening and hence, venipuncture procedures can be a significant cause for pain and anxiety among them (2). The negative effects of pain experiences can last throughout life and cause children to avoid medical treatments and procedures later in their lives (3).

Besides pain, invasive procedures are also associated with anxiety for children. Givenits significant relationship with pain, anxiety lowers pain threshold and hence, an anxious individual experiences greater pain compared with an ordinary individual (4). While confidence is a prerequisite for strong relationship and close adherence to medical treatments, pain impairs nurse-patient relationship and undermines patients' confidence in nurses (5).

Pain management is among the responsibilities of nurses (6). One of the pain management strategies is non-pharmacological therapies. These therapies are not expensive and need no physician's order and hence, can be administered by nurses (7). There are different types of non-pharmacological complementary and alternative pain management therapies such as acupressure which entails massaging acupuncture points (8). Acupressure is a treatment modality which has been used in China since thousands of years ago and it is currently one of the branches of medical sciences (9). In this technique, fingers are used for compressing key points on the skin in order to stimulate the natural therapeutic activities of the body. Acupuncture assumes that there are points in the skin which are related to certain internal organs. Moreover, it holds that life energy is cycling throughout the body through twelve channels or meridians. It is believed in acupressure that problems and diseases happen due to energy imbalance; therefore, stimulating acupressure points on the skin can balance energies and eliminate problems. Acupressure is a non-expensive and safe technique which can be employed even on one's own body. Besides, its application does not need any equipment (10).

One of the acupressure points is located between the two eyebrows on the root of the nose and is originally called Yintang. In some cultures, the Yintang point is referred to as the third eye. Applying acupressure on this point is known to be effective in alleviating anxiety (8). Another acupressure point is Laogong (labored palace) which is located in the middle of the palm. Applying acupressure on the Laogong point exerts therapeutic effects and balances life energies (11). These points are known in the Chinese traditional medicine as the anxiety points. Given the significant relationship between anxiety and pain, a question which rises here is whether massaging these points is associated with pain relief or not.

Sadat Hoseini et al. (2011) investigated the effects of acupressure before invasive procedures on anxiety among 7–11 year-old hospitalized children and found that massaging the Yintang and the Laogong points significantly alleviated anxiety (7). Another study examined the effects of acupressure at the Yintang point on subjective and autonomic responses to needle insertion and showed that pain intensity and heart rate were significantly lower in the experimental group than the control group probably due to reduced sympathetic activity following acupressure (13).

Numerous studies have been conducted so far for reducing venipuncture pain among children by using strategies such as distraction and massage. The findings of these studies have shown that non-pharmacological techniques are effective in alleviating venipuncture pain in children (14, 15). Venipuncture is an intensely painful procedure and thus alleviating children's pain is ethically essential and rational. Given their minimal side effects, non-pharmacological techniques are preferred. Implementing such techniques does not need physician's order and hence, it can enhance nurses' job satisfaction. Studies have reported that sociocultural factors such as race, culture, and ethnicity are the determining factors behind individuals' responses to

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pain and they can affect all sensory responses even the pain-related ones (16). Our literature search in Iranian and international scientific databases showed that the effectiveness of acupressure in alleviating 6–12 year-old children's pain during venipuncture has not been examined yet. Therefore, this study was undertaken in 2013 to evaluate the impacts of acupressure on venipuncture pain among 6–12 year-old children hospitalized in teaching hospitals of Rafsanjan University of Medical Sciences, Rafsanjan, Iran.

Methods

Eighty 6–12 year-old children hospitalized in Ali Ibn Abitalib and Moradi Hospitals, Rafsanjan, Iran, were recruited to this randomized controlled clinical trial. The sample size calculation formula for comparing two means (Formula 1) revealed that 80 children were necessary for the study. Children were assigned to two 40-person groups by using the block randomization technique. The size of each block was equal to four. Two children from each four-child block were assigned to the control group and two were assigned to the acupressure group. Blocks for female children were independent from those for male children. The benefit of this technique was that participants were allocated to the groups equally.

Formula 1. The sample size calculation formula

$$n = \frac{2\left(z_{1-\frac{\alpha}{2}} + z_{1-\beta}\right)^2 \delta^2}{d^2}$$

$\delta = 2 \quad \alpha = 0/05 \quad 1-\beta = 0/90$

The inclusion criteria were being conscious, having no need for emergency venipuncture, and giving informed consent. Children were excluded if they had received analgesics or hypnotics before undergoing venipuncture or had speech, visual, hearing, mental, or psychological problems. The study groups were matched with regard to the size, type, and manufacturer of intravenous catheter, the nurse who performed venipuncture, and the site of venipuncture. Venipuncture was supposed to be successful at first attempt.

The study data collection tool consisted of a demographic questionnaire (including items such as age, gender, birth order, attending parent, parents' education and employment, venipuncture site, diagnosis, length of hospital stay, and the hospital ward in which the child was hospitalized) and a Numerical Analog Scale (NAS). The numerical range of the NAS is 0–10 in which 0, 5, and 10 respectively shows 'No pain', 'Moderate pain', and 'Severest possible pain'.

Five minutes after undergoing a venipuncture, we provided the NAS to children, explained to them how to use it, and asked them to score their pain. Although the NAS is among the valid scales for pain assessment, we reevaluated its validity through performing content validity assessment. Accordingly, we provided the questionnaire and the scale to five pediatricians and five nursing faculty members and used their comments. The validity and the reliability of this scale had been confirmed in Aghdami studies (17).

Children in the acupressure group received the study intervention in two sessions with a 30-minute interval in between. The intervention was implemented by a therapist (the first author) who had been trained by an acupressure specialist regarding the exact location of acupressure points and the manner of massaging them. For implementing the study intervention on each participant, the therapist approached her thumb from the lateral side of child's index finger toward the palm and placed it firmly on the middle of the palm. The point was then pressed by the thumb. While it was placed on the point, the thumb was rotated clockwise and counterclockwise by rotating the wrist and the hand. Finally, the pressure of the thumb on child's palm was reduced and the aforementioned massaging technique was repeated with firmer pressure. This technique was repeated on each hand for seven 20-minute rounds. Immediately after applying acupressure on the palms, the Yintang point was massaged by using the thumb. Accordingly, the therapist placed her thumb on the point and rotated the thumb clockwise for five minutes. Thereafter, venipuncture was performed.

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Children in the control group only received routine care of the study setting. Pain intensity was also evaluated in the control group five minutes after venipuncture.

Study data were entered into SPSS v. 18.0. The measures of central tendency and dispersion were used for data presentation. The Chi-square and the Fisher's exact tests were performed for comparing the study groups regarding participants' demographic characteristics and the Mann-Whitney test was done for between-groups comparison of pain intensity. Moreover, median regression analysis was used for comparing pain intensity between the study groups while eliminating the effects of demographic variables on pain intensity. The level of significance was set at 0.05.

This study was registered by the Iranian Registry of Clinical Trials with the registration code of IRCTT2014041817324N1. Moreover, the Research Council of Kerman University of Medical Sciences, Kerman, Iran, approved the study. The ethical approval code was K/93/45.

Results

Eighty children—40 individuals in each group—were studied. Fifty percent of participants in each group were male (P=1.00). The mean of participants' age in the two study groups was 7.9±1.79. The Mann-Whitney test revealed no significant difference between the groups regarding participants' age (P=0.9). Moreover, the Chi-square, the Fisher's exact, and the Mann-Whitney tests showed that there were no significant differences between the study groups in terms of participants' birth order, their attending parent, parents' education and employment, venipuncture site, diagnosis, and the affiliated hospital ward.

The results of the Mann-Whitney test reflected that the mean of venipuncture pain intensity in the acupressure group was significantly lower than the control group (3.35±1.8vs. 8.65±1.5)(P<0.001); Moreover, median regression analysis indicated that the median of pain intensity in the experimental group was significantly less than the control group by 6.27 points (P<0.001)(Table 1).

The correlation of pain intensity with the length of hospital stay was statistically significant (P=0.01). Pain intensity reduced by 0.04 point with each one minute passing from hospital admission time. Consequently, longer hospital stay was associated with lower pain intensity (Table 1).

Table 1: Median regression analysis for the effects of the treatments and the length of hospital stay on pain intensity

Variable		Median (95% CI)	P value
	Control	1	-
Treatment	Acupressure (pain intensity)	-6.27(-7.12&-5.43)	<0.0001
	Length of hospital stay	-0.04(-0.06&-0.01)	<0.005

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Discussion

Study findings revealed that acupressure was effective in alleviating pain (P<0.0001).This is in line with the findings of the previous studies. For instance, Arai et al. (2008) evaluated the effects of acupressure on the Yintang point on subjective and autonomic response to needle insertion and reported that pain intensity in the experimental group reduced significantly compared with the control group (P<0.05). Moreover, they found a significant decrease in heart rate at the time of needle insertion which can be attributed to reduced sympathetic activity as a result of acupressure (13). Sadat Hoseini et al. (2011) also investigated the effects of massaging acupuncture points (acupressure) before invasive procedures on anxiety among 7–11 year-old hospitalized children and found a significant difference between the control and the experimental groups regarding the level of anxiety (P<0.001). They also reported that massaging the third eye and the palmar acupressure points before implementing invasive procedures can reduce anxiety (7). Although the length of acupressure in the study conducted by Sadat Hoseini et al. (2011) was different from our study, their findings (7) support our findings. Ackerman et al. (2012) also found that giving Swedish massage and acupressure to children with leukemia was effective in alleviating symptoms, facilitating sleep onset, removing stress, enhancing parents' self-efficacy, and improving child-parent relationship (18).

Many studies have investigated the effects of acupressure and massage therapy on children and adults' pain and reported that both of them are safe and cost-effective interventions for pain relief (19–21). Accordingly, the results of these studies (19–21) support the findings of the current study which showed that acupressure reduced pain.

We also found that except for the length of hospital stay, other demographic characteristics of children were not significantly correlated with their pain intensity. This is in line with the findings reported by SadatHoseini et al. (2011). They also found no significant correlation between pain and demographic characteristics (7).

Our findings contradicted the findings of Aron et al. (2006). They reported that compared with other individuals, pain threshold among children and elderly people is lower and thus, the intensity of their perceived pain is higher (22). Moreover, Urden et al. (2009) noted that females' pain threshold is lower than male. In other words, in response to a similar pain stimulus, females perceive higher levels of pain compared with males (23). This is also not congruent with our findings. However, in line with our findings, the findings of the aforementioned study showed that the correlation of pain to length of hospital stay was statistically significant. This is probably due to the fact that longer hospital stay is associated with stronger nurse-children relationship and lower levels of anxiety among children. Given the known relationship between anxiety and pain, longer hospital stay can alleviate pain intensity among children. Wong and Hockenberry (2003) also mentioned that good relationship with children is effective in alleviating their pain (24). Another reason behind the significant correlation of length of hospital stay and pain is children's greater familiarity with hospital environment during their hospitalization and its effect on anxiety alleviation.

One of the study limitations was our limited access to eligible participants which prolonged the period of the study.

Developing simpler, short-term acupressure techniques and educating parents about the positive effects of acupressure on children's pain are recommended. Further studies on acupressure can validate the findings of the current study.

Conclusion

As a healing art, acupressure is properly integrated into nursing activities. The basic skills of acupressure are easy to learn and they can be used for managing a wide spectrum of diseases. Nurses can involve patients in care delivery—both in hospital and at homes—and

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enhance their self-confidence through educating safe, simple, and cost-effective techniques of acupressure. The findings of the current study show the effectiveness of non-pharmacological pain management strategies. As a safe, cost-effective, and easy-to-learn technique, acupressure is a known pain reliever. Consequently, healthcare professionals, patients, and family members can be taught to use this technique. Acupressure has been recommended by academic centers to be included in the official curriculum of medical sciences.

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