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Efficacy of Acupressure and Massage With Ice For Huko Point on Pain Intensity During Venipuncture In Children With Thalassemia

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Abstract

Venipuncture is the commonest painful invasive procedures that usually applied for thalassemic children, this process keep the children stressful and frightening. The **aim** of this study was to determine efficacy of acupressure and massage with ice for huko point on pain intensity during venipuncture in children with thalassemia. True experimental research **design** was utilized in this study. The study **subjects** included 90 school age thalassemic children recruited from blood disease unit and blood transfusion center at Assuit university children hospital. They were selected randomly and divided into three groups: Group I: acupressure, Group II: ice massage and Group III: control group. **Two tools** were used to collect necessary data which included **simple** questionnaire sheet for personal and medical data and Behavioral pain scale (FLACC scale) that was used to assess pain intensity during venipuncture. **Results of the present study revealed that** there were a significant decrease in pain intensity in ice massage and acupressure groups in comparison to the control group ($p\text{-value} \leq 0.003$) Moreover ice massage was slightly better than acupressure ($p\text{-value} \leq 0.000$, $P \leq 0.003$). **The study concluded** that acupressure and ice massage were effective in reducing the pain during venipuncture. **The study recommended** the use of acupressure and ice massage as routine interventions for pain management in children.

Keywords: *Acupressure, Ice massage, Huko point, Pain, Venipuncture, Thalassemia.*

Introduction

Thalassemia is the common genetic diseases belonging to the family of inherited disorders of hemoglobin synthesis characterized by the impaired formation of globin chains of hemoglobin and approximately 240 million child carry beta thalassemia worldwide and each year about 60 million child will be added to this figure (Bala & Sarin, 2014). In Egypt, Thalassemia is the commonest chronic hemolytic anemia (CHA). The carrier rate of this disease varies between 5.3-9% and the gene frequency is 0.03%. It was estimated that 1000/ 1.5 million per year live birth born with thalassemia disease (Hakeem, et al., 2018).

The thalassemia is usually managed by frequent blood transfusion which done by insertion of venous catheter in the blood vessels , this procedure was done continually to manage the child's condition and it is considered an invasive procedure which may cause pain for children. Pain caused by medical invasive procedures such as venipuncture causes physical and emotional strain in children. Also, pain can disrupt the communication between nurses and children due to stress and anxiety and hence inhibit treatment procedures and care. Since venipuncture is considered a preservative treatment in manage children with thalassemia, nurses must maximize their effort to diminish discomfort and strain for

children (Nagaty, et al., 2014) & (Abazari, et al., 2016).

Pain management is a critical element in the plan of care for children. Treating pain reduces anxiety during invasive procedures, decreases the necessity for physical restraints, reduces anxiety regarding later procedure and prevents short- and long-term consequences of inadequately treated pain. Pain management can achieve by using different methods of pharmacological and non-pharmacological treatments (Shini, et al., 2014).

The non-pharmacological methods of pain management are considered as useful, desirable strategies, cheap, easy to use by children, family and health care providers and not require physician order. Acupressure and ice massage are methods of these non-pharmacological intervention that decreasing pain without the use of special equipment and it can be done just by the hands (Sadat, et al.,2011).

Acupressure technique 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. In acupressure the fingertip, the thumb or a dulled instrument is used to apply gentle, firm pressure to specifically designated sites as huko point to control pain. The pressure may be applied in one motion followed by releasing, in a circular motion for some minutes. The motion of applying and then releasing pressure is thought to facilitate secretion of

internal opioids and thus reduces the sensation of pain in any portion of the child body (Faroukh, et al., 2016).

Although acupressure points are the same as acupuncture points (acupoints), needle insertion is not used in acupressure. Thus, acupressure is less likely to have any of the potential complications which have been associated with acupuncture such as fainting, infection, bleeding, and hepatitis. Acupressure can be used alone or in combination with other therapies for managing illnesses without causing any kind of complications (Raddadi, et al., 2017).

Ice massage is another type of these non-pharmacological treatments which entails massaging acupuncture points. Researchers think that, the effect of ice massage results from involvement of the pain gate control system. Indeed, when the impulses caused by shaking scratching and ice massage reach the posterior horn of the spinal cord, they act like a valve and guide pain to the higher brain centers and thus alleviate pain (Shahla, et al., 2017).

Huko point (Li4) that used in this study is located on the back of the hand in the middle of the angle between the first and second bones of the palm, between the thumb and the index finger on the back of the hand. This point is the most important numbness point whose stimulation alleviates pain in the body (Faroukh, et al., 2016).

Nurses acting a key role in identifying causes of pain, minimize exposure to painful medical procedures, proactively assessing and treating pain. Also teaching the child and family about non pharmacologic methods of pain management, and reduction of pain by applying comfort measure. Nurses must be evaluating efficacy of treatment methods by paralleling pre and post treatments and watching for the side effect frequently (American Academy of pediatrics, 2016). It is also important to assist the child and their parents when using the technique in order to make sure that they are using the technique correctly (Terri & Susan, 2013).

Significance of the study

Venipuncture and unrelieved pain can have an adverse effect on the physiological and psychological well-being of children. In Egypt, there are few studies examining the effect of huko point ice massage and acupressure as a noninvasive method to relieve venipuncture pain. Today, pain management has focused on the use of drugs that affect the sensory awareness of pain, which may have an additional adverse effect on children health condition. Also, not all nurses believe in the use of complementary and alternative approaches to relief pain related to nursing procedures.

The basic skills and elements of ice massage and acupressure are easy to teach to healthcare providers, children and their family members. It can be used for treatment a wide spectrum of pains and diseases. It can be applied at home as it is a simple, cost-effective and safe technique and provide children with a less threaten and painful life condition, more growth and to improve quality of their lives (Abazari, et al., 2016).

Aim of the Study

The aim of this study was to assess the efficacy of acupressure and massage with ice for huko point on pain intensity during venipuncture in children with thalassemia..

Research hypothesis

- 1.Children who receive an acupressure and massage with ice for huko point experience less pain than those who were in control group.
- 2.There is a difference in pain intensity among thalassemic children exposure to application of an acupressure and massage with ice for huko point.

Subjects & Method

Research design:

True experimental research design was utilized in this study.

Setting

This study was conducted at blood disease unit and blood transfusion center at Assuit university children hospital.

Subjects

The study subjects included 90 school age children suffered from thalassemia (6 to 12 year's old) of both sex. They were selected randomly and divided into three groups by using simple random technique.

Group I: Acupressure technique group

Group II: Ice massage group

Group III: Control group receiving no intervention.

Inclusion criteria included

- 1.School age children suffered from thalassemia from 6-12years old.
- 2.Children free from other chronic diseases.
- 3.The score of pain before venipuncture was zero.
- 4.Children need peripheral IV line insertion in the upper extremities.

Exclusion criteria included

- 1.Children with mental disorders.
- 2.Children who received analgesic and hypnotic before venipuncture.
- 3.Prolonged duration of catheter insertion (over a minute).
- 4.Inflammation or neuropathic disorders caused by diabetes or fractures in the massage point.

Tools of data collection

Two tools were used to collect the required data for this study:

Tool (1): A structured questionnaire sheet

It was developed by the researcher to collect the required information and it includes the following two parts

Part one: Personal data of studied children and their parents such as (age, residence, sex, birth order, care giver attendance, parent's education and occupation).

Part two: Medical data of studied children such as (age at diagnosis, duration of disease, length of hospital stay, IV type, venipuncture site and any related problem in site of venipuncture).

Tool (2): Behavioral pain scale (FLACC scale)

(Face, Leg, Activity, Cry and Consolability).

Which was adapted from Nilson et al., (2008) and used to assess pain in children aged 5-16 years and consists of five elements: Face, Leg, Activity, Cry and Consolability. Each section has a score (0-2). Higher scores show more response to pain. The score of each section was written separately and then scores of all five sections were added to calculate the total score. Total Score range was from 0 (lowest or no pain) to 10 (highest or severe pain).

Scoring system of FLACC scale

0 = no pain

1-3 = mild pain

4-6 = moderate pain

7-10 = severe pain

Methods of data collection

- Research proposal was approved from Ethical Committee in the faculty of Nursing.
- An official permission was obtained from the director of Hematology unit at Assiut University Children Hospital to collect the necessary data for this study after explanation of the purpose and nature of the study.

A pilot study: A pilot study was carried out on 10% (9) of school age children with thalassemia to test the clarity and applicability of the tools and to estimate time needed to fulfill each sheet and the final form was developed. The children were excluded from total sample.

Validity of study tool one was tested by measuring its contents validity index by five expert jury in both Pediatric Nursing and Pediatrics fields.

Reliability and validity of study tool two was assessed by Terri et al., (2010) and it was ($r=0.7, p<0.001$)

A written consent was taken from parents for participation of their children in the study after explaining the aim and nature of the study.

Field of the work

This study was carried out through a period of five months from the beginning of February (2017) to the end of June (2017). The researcher went to hospital two days per week from 8 am to 11 am to take the children from hematology unit and blood transfusion center after explaining the aim and nature of the study to parents of children and also obtain written parent consent for participation of their children in the study. Confidentiality and privacy of the researcher was asserted and explained to parent that this data was used only for the purpose of the study. The time needed for every child was 20 minutes (10 minutes for applying intervention and this was done by the researcher and 10 minutes for filling questionnaire sheet from parent and patient sheet which include information about personal and medical data of studied children and this also was done by the researcher).

- Assessment of personal data of studied children and their parents was done by the researcher by using tool one (part1) for all three groups.
- Assessment of medical data of children was taken from patient sheet. It was done by the researcher by using tool one (part2) for all three groups.
- Assessment of pain level was done before and during a venipuncture. Then, to detect the huku point, the child's thumb was placed in the abduction position; in this case, a muscular prominent peak (related to the thumb adductor) was the huku point.

Intervention

Acupressure: In the study group (1), The researcher 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 immediately after applying acupressure, venipuncture was performed.

Ice massage: In the study group (2), some icy marbles (2 cm in diameter) were placed in plastic gloves and then were wrapped into one-layer cotton cloth. The researcher massaged the child's hand slowly and rotationally with icy marbles 5 minutes before penetrating the vein. Each time, maximum pressure was for one minute, and massage was stopped for 10 seconds. This intervention lasted for 5 minutes.

The control group (3), children were received the routine care only.

The assessment of pain was done two times, one time before the intervention to ensure that pain score was zero and second time was done during venipuncture.

Ethical considerations

Research proposal was approved from Ethical Committee in the Faculty of Nursing, there were no risk for study subject during application of the study, confidentiality and privacy of the studied children were asserted by the researcher. Explanation of the aim and nature of the study was done to parents of children. The right to refuse to participate in the study was emphasized to the children's parents. Written parent consent for participation of their children in the study was taken before the study.

Statistical analysis

Data entry and data analysis were done by using SPSS program (Statistical Package for Social Science) version 20. Data were presented as number, percentage, mean and standard deviation. Chi- square test and fisher exact test were used to compare qualitative data and Mann- whitney test and ANOVA test were used to compare quantitative data. Spearman correlation was used to measure correlation between age and pain score. P value considered statistically significant when $p < 0.05$.

Results

Table (1): Percentage and frequency distribution of studied children regarding to their personal data.

Items	Group I (Acupressure) (n= 30)		Group II (Ice massage) (n= 30)		Group III (Control) (n= 30)		P-value1	P-value2	P-value3
	No.	%	No.	%	No.	%			
Child age: (years)							0.744	0.941	0.001*
6 - < 8	13	43.3	8	26.7	13	43.3			
8 - < 10	9	30.0	11	36.7	9	30.0			
10 – 12	8	26.7	11	36.7	8	26.7			
Mean ± SD	8.21 ± 1.71		9.41 ± 1.92		8.35 ± 2.18				
Age at diagnosis (years)							0.735	0.763	0.468
Mean ± SD	1.19 ± 1.05		1.22 ± 1.34		1.36 ± 1.29				
Range	0.2 - 5.0		0.1 - 6.0		0.1 - 6.0				
Child's gender							0.668	0.121	0.466
Male	17	56.7	15	50.0	20	66.7			
Female	13	43.3	15	50.0	10	33.3			
Child's birth order							0.085	0.634	0.562
First	5	16.7	9	30.0	7	23.3			
Second	10	33.3	3	10.0	7	23.3			
Third	9	30.0	7	23.3	7	23.3			
Fourth or more	6	20.0	11	36.7	9	30.0			
Residence							0.347	0.519	0.766
Urban	5	16.7	8	26.7	7	23.3			
Rural	25	83.3	22	73.3	23	76.7			

P-value¹: Comparison between group I and group II

P-value²: Comparison between group I and group III

P-value³: Comparison between group II and group III

Chi- square test ,Mann- whitney test

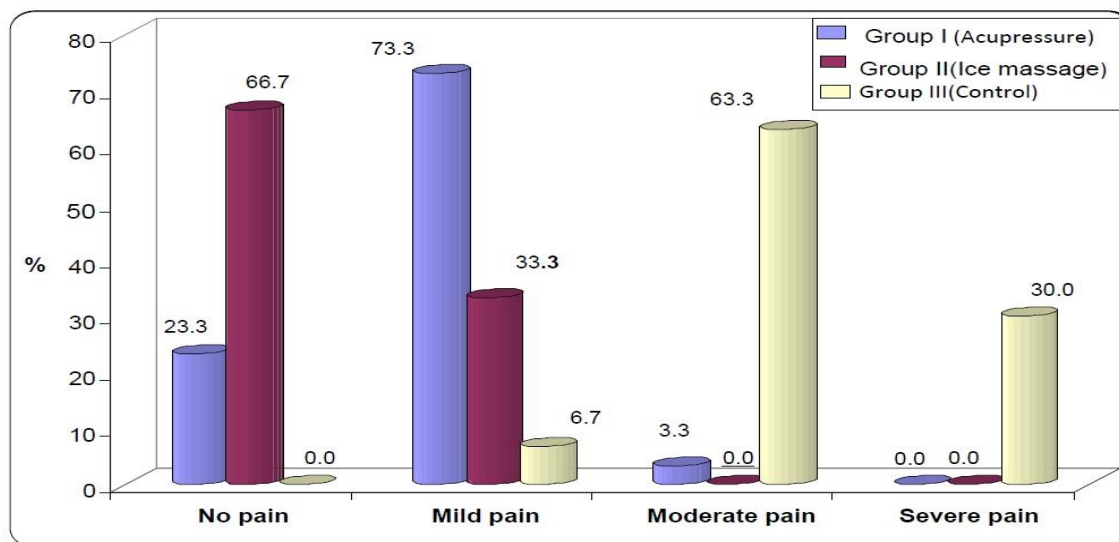
Table (2):- Percentage and frequency distribution of studied children regarding to their medical data.

Items	Group I (Acupressure) (n= 30)		Group II (Ice massage) (n= 30)		Group III (Control) (n= 30)		P-value ¹	P-value ²	P-value ³
	No.	%	No.	%	No.	%			
Length of hospital stay: (days)							--	0.492	0.492
1 day	30	100.0	30	100.0	28	93.3			
2 or more	0	0.0	0	0.0	2	6.7			
4-7days	0	0.0	0	0.0	0	0.0			
Duration of disease: (years)							0.47	0.900	0.051
Mean ± SD	7.03 ± 2.13		8.18 ± 2.00		7.06 ± 2.46				
IV type							--	--	--
Blood or blood components	30	100.0	30	100.0	30	100.0			
Isotonic, Hypertonic or Hypotonic fluid	0	0.0	0	0.0	0	0.0			
Venipuncture site:							0.165	0.194	0.551
Basilic vein	3	10.0	1	3.3	2	6.7			
Cephalic vein	2	6.7	0	0.0	2	6.7			
Dorsal metacarpal vein	18	60.0	14	46.7	10	33.3			
Median cubital vein	6	20.0	12	40.0	13	43.3			
Radial vein	1	3.3	3	10.0	3	10.0			
Size of IV cannula							--	--	--
22 G	30	100.0	30	100.0	30	100.0			
20-24-26G	0	0.0	0	0.0	0	0.0			
Venipuncture manufactures:							0.671	1.000	0.424
Successful on the first day	26	86.7	28	93.3	25	83.3			
Repeated	4	13.3	2	6.7	5	16.7			
No. of repetitions:							0.264	0.558	0.527
Mean ± SD	2.50 ± 0.58		2.00 ± 0.00		2.60 ± 1.34				
Related problems in site of venipuncture							1.000	1.000	0.492
Yes	1	3.3	0	0.0	2	6.7			
No	29	96.7	30	100.0	28	93.3			
Type of problems							--	--	--
Redness	0	0.0	0	0.0	1	50.0			
Hematoma	0	0.0	0	0.0	1	50.0			
Infiltration	1	100.0	0	0.0	0	0.0			

P-value¹: Comparison between group I and group II Chi- square test ,Mann- whitney test

P-value²: Comparison between group I and group III

P-value³: Comparison between group II and group III



Figure(1): Total score of studied children's pain in the control & study groups after receiving intervention (ice massage or acupressure) during venipuncture according to their pain FLACC scale.

Table (3): The relation between studied children gender and Pain score level post intervention.

Items	Pain score (Acupressure) (n= 30)				Pain score (Ice massage) (n= 30)				Pain score (Control) (n= 30)			
	No pain	Mild pain	Moderate pain	Severe pain	No pain	Mild pain	Moderate pain	Severe pain	No pain	Mild pain	Moderate pain	Severe pain
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
Child gender												
Male	4	12	1	0	12	3	0	0	0	2	13	5
Female	3	10	0	0	8	7	0	0	0	0	6	4
P-value	0.668				0.121				0.466			

Fisher exact test

Table (4): Correlation of studied children age with their total pain score level among groups I, G II & G III post intervention.

Items		Age (years)	
		r-value	P-value
Degree of pain	Group I	-0.062	0.744
	Group II	0.014	0.941
	Group III	-0.652	0.001*

Spearman correlation test

Table (1): Shows percentage and frequency distribution of studied children regarding to their personal data. It was revealed that more than two fifth of subjects in group I and group III (43.3%) were in the age group (6 - < 8), while more than one fourth of subject in group II (26.7%) were in the age group (6 - < 8). It was also found that the age at diagnosis in group I ranged from two months-five years with the mean \pm SD equal to 1.19 ± 1.05 , while the range of age at diagnosis in group II & group III

were equal (from one month –six years) with the mean \pm SD equal to 1.22 ± 1.34 & 1.36 ± 1.29 respectively. Also more than half of subjects were males. Regarding residence the majority of study and control groups were from rural area.

Table (2): Presents percentage and frequency distribution of studied children in the study and control groups regarding to their medical data. It was noted that no statistically significant difference was found between pain score level and medical data in

all groups. It was also found that all of children (100%) in group I and group II their length of hospital stay were one day, while in group III only (6.7%) their length of hospital stay were two days. It was also showed that duration of disease in group I, II, III were 7.03 ± 2.13 , 8.18 ± 2.00 and 7.06 ± 2.46 respectively. In addition, All children (100%) in both groups I, II, III the IV type were have blood or blood components and sizes of IV cannula were 22 G. Regarding venipuncture site, It noticed that two thirds (60.0%) of children in group I and more than two fifth (46.7%) of children in group II were given in dorsal metacarpal vein, while more than two fifth (43.3%) of children in group III were given in median cubital vein. As regard to venipuncture manufactures, it was observed that the majority (83.3%), (86.7%), (93.3%) of children in group III, I, II respectively were installed IV cannula in the first try.

Table (3): Illustrates the relation between studied children gender and pain score level post intervention. It was noticed that there were no statistically significant difference was found between pain score level and studied children gender between three groups.

Table (4): Presents correlation of studied children age with their total pain score level among three groups I, II & III post intervention. It was found that, there were statistically significant negative correlation between studied children age with their total pain score level with p-value (0.001*) in control group only but there no correlation were found between studied children age with their total pain score level in the two study groups.

Figure(1): Demonstrate the total score of studied children's pain in the control & study groups after receiving intervention (ice massage or acupressure) during venipuncture according to their pain FLACC scale. It was found that the highest percentage of the children who had mild pain was in group I (73.3%) followed by group II who had no pain (66.7%) and group III who had moderate pain (63.3%).

Discussion

Pain is a universal experience affects children of all ages, even preterm infants. Pain is a major source of distress for children and their families as well as health care providers. Children may experience pain as a result of disease processes, injuries, invasive procedures, and surgical interventions. Pain in children can lead to serious physical and emotional consequences (Hockenberry & Wilson 2015) There for, this study was done to determine efficacy of acupressure and massage with ice for huko point on pain intensity during venipuncture in children with thalassemia.

The findings of current study revealed that, highly statistically significance difference was found among acupressure group and control group as regard to pain score level (P.Value =0.000*). The majority of studied children in the acupressure group had mild pain compared to only six percentages of children in control group. Also about one third of children in control group had severe pain compared to none in the acupressure group and the mean pain intensity in acupressure group was 1.33 ± 1.06 while that in controlled group was 5.83 ± 1.68 (Figure 1). These results were consistent with Pouraboli, et al., (2016) they conducted a similar study on the effect of pressure of huko point on behavioural responses to pain during catheter insertion in children with thalassemia on eighty-six children and reported that acupressure group had significantly lower pain levels than control group during catheter insertion and also agreement with Parisa, et al., (2015) who studied the effect of acupressure on venipuncture pain among 6–12 years-old hospitalized children on eighty children and they found that the mean pain intensity in acupressure group was 3.35 ± 1.8 while that in controlled group was 8.65 ± 1.5 .

Also, these results were supported by Arai, et al., (2008) who found that pain intensity in the acupressure group decreased significantly compared with the control group and go on the line with the results of the study by Shahriar, et al., (2018) who conducted the study on the effect of ice massage and acupressure at huko point on the severity of the venipuncture pain in children undergoing hemodialysis on fifty- nine children and indicated that the pain was significantly reduced. This could be interpreted in the light of gate control theory by the fact that, acupressure at specific point passes pleasurable impulses to the brain at a rate four times faster than painful stimuli. Continuous impulses shut the neural 'gates' and slower messages of pain from reaching the brain and helps to improve or strengthen the pain perception threshold of body. Based on the location of stimulation, pressure-generation activates the small myelin nerves in the muscles and pass stimulations to the higher nerve centers including spinal cord, midbrain, hypothalamus and pituitary axis. In addition, according to biochemical mechanism, acupressure involves the stimulation of acupoints that leads to complex neuro-hormonal responses. It involves the counteraction among hypothalamic- pituitary-adrenocortical axis that leads to overproduction of cortisol and cause a relaxation response. Also, it modulates the physiological response by increasing endorphin and serotonin transmittance to the brain and specific organs through nerves and meridians (Piyush, et al., 2017).

The current study also denoted that highly statistically significance difference was found between ice massage group and control group regarding regarding pain score level as the children demonstrated high significantly low pain scores in ice massage group than those in control group during venipuncture (figure1). This finding was in agreement with **Abazari, et al., (2016)** who reported that the average pain score in ice massage group was 0.65 ± 0.75 while that in controlled group was 2.56 ± 1.58 respectively and also were in agreement with **Navjot, et al., (2013)** who studied the effect of ice pack application at site prior to venipuncture on intensity of pain and founded that statistically significant reduction in pain during venipuncture between two groups.

In addition, these results were similar to the results of the study done by **Shahla, et al., (2017)** they demonstrated that ice massage effectively and significantly reduced pain in comparison with the control group. Also it was consistent with **Davtalab, et al., (2016)** who studied the effect of valsalva maneuver and ice massage at huko point on pain intensity within the needle insertion to the arteriovenous fistula for children undergoing hemodialysis on seventy children and they reported that the average pain scores related to the needle insertion have been decreased compared to control group. This can be explained in the light of gate control theory by that large fiber stimulation with neural impulses that transmit to the spinal cord may be provoking. If this stimulation is continuous it can cause a 'closed gate of pain transmission' and as a result reduction of pain sensation. Also, research clearly suggested that ice massage of huko point can block the sensory fiber and decreases skin sensations by numbing the nerve endings **Shahla, et al., (2017)**.

Results of present study from comparison between ice massage and acupressure showed that both method of acupressure and ice massage reduced children's pain significantly, there were a significant difference ($P\text{-Value} = 0.003^*$) between two methods while ice massage was more effective than acupressure (figure 1) this results was in agreement with **Shahriar, et al., (2018)** & **Pouraboli et al., (2015)** who cited that the effect of ice massage on reducing the pain intensity was higher than acupressure, the reason can be a neural block in which cold-generated neurons are transmitted exclusively to delta A fibers, and stimulation of the A-shaped thick fibers results in eliminating the pain. Regarding the relationship between child gender and pain score level post intervention. No statistically significance differences was found between the pain score level and child gender in all groups during

venipuncture (table3). This result goes on line with **Abazari, et al., (2016)**, **Shahriar, et al., (2018)** and **Sadat, et al., (2011)** Who found no significant differences between the two sexes in the study and control groups. In contrary to other studies which reported differences in expressions of pain during invasive procedures between girls and boys, our results were contradict with **Urden, et al., (2009)** who noted that females' pain threshold is lower than male. Also with **Myers, et al., (2006)** who carried out the study on sex, gender, and age: contributions to laboratory pain responding in children and adolescents on two -hundred and forty child and showed that, a significant relationship existed between boys and girls in response to pain.

Finally, the current study indicated that, there were a significant negative correlation between studied children age and the pain score level in control group (Table4) as age increases, the tolerance to pain increases too. These findings were in accordance with **Bagheriyan, et al., (2012)** their results showed that there were a significant reverse relationship between age and pain score, so that by increasing age, the score of reported pain decreased. While in contrast with **Vajihe, et al., (2017)** they carried out the study about the effects of huko point ice massage and 2% lidocaine gel on arteriovenous fistula puncture-related pain in hemodialysis patients and **Parisa, et al., (2015)** who stated that demographic characteristics of children as age were not significantly correlated with their pain intensity. It can be explained by the researcher as the fact that cognitive level is a key factor affecting a child's pain perception and response and usually goes hand in hand with the child's age. As cognitive level typically increase with age, that lead to more understanding and coping with pain. In addition, as the child cognitive level increase, his or her ability to communicate information about pain increase and this help health care provider to give appropriate care to children because they recognize the child problem.

Conclusion

Based on the results of the present study, it could be concluded that acupressure and massage with ice for huko point were effective in reducing the intensity of pain during venipuncture in children with thalassemia and statically significant differences were found between the study groups and the control group. Massage with ice was slightly better than acupressure in pain relief for children with thalassemia during venipuncture.

Recommendations

Based on the results of the current study, the following recommendations are suggested:

- Health care providers should be encouraged to use the appropriate types of non-pharmacological intervention, e.g, massage with ice and acupressure to reduce the intensity of pain in children during any invasive procedures.
- Using acupressure and massage with ice should be accepted as routine interventions for pain management in children.
- Educational programs should be provided to increase knowledge and skills of health care professional particularly new nurses in applying non-pharmacological intervention to reduce pain intensity in children during any invasive procedures and also teach it to parents and encourage using with each venipuncture experience.
- Acupressure should be included in the curriculum of nursing sciences as a cheap and effective non pharmacological method for pain management.
- This study should be replicated and expanded to include a larger sample, focusing on outcomes with different children populations undergoing a variety of procedures in various settings.

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