

## Leg Crossing and Hand Gripping Techniques: Its Effect on Fear and Physiological Measures of Children during Vein Puncture.

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### Abstract

**Background:** Venipuncture is the most frequent unpleasant invasive technique that is typically performed on children. This process makes children anxious and afraid. **So, this study aimed** to investigate the effects of leg crossing and hand gripping techniques on fear and physiological measures of children during vein puncture. **Research design:** A quasi-experimental design was utilized in this study. **Setting:** This study was carried out in the pediatric intermediate care unit at Assiut university children hospital. **Sample:** Included a purposive sample of 60 school age children were selected. They were assigned randomly into two equal groups: Leg crossing, hand gripping group and control group. **Tools of data collection:** Three tools were used **Tool I:** A structured interviewing questionnaire to assess personal, medical data of studied children, and factors affecting children's fear. **Tool II:** Physiological measurements of children to measure vital signs and oxygen saturation. **Tool III:** Children's fear scale. **Results:** showed that there was a highly statistically significant difference between two groups regarding fear level  $p < 0.01$  and physiological measurement  $p < 0.05$ . **Conclusion:** Hand gripping and leg crossing techniques were effective for reducing fear level and maintaining stable physiological measures during vein puncture. Therefore, it is **Recommended** that the use of leg crossing, and hand gripping techniques should be integrated as a part of routine daily care for children during vein puncture.

**Keywords:** Fear, Hand gripping, Leg crossing, Physiological measures & Vein puncture.

### Introduction

Pediatric patients frequently experience discomfort, fear, and moderate to severe pain during venipuncture procedures, which is a routine procedure utilized in medical settings. Nearly 83% of young children between the ages of 2.5 and 6 years, 51% of children between the ages of 7 and 12, and 28% of teenagers experience high levels of fear during painful procedures such venipuncture. Additionally, fear during uncomfortable medical or therapeutic treatments does not fade away with age or time, which might cause pediatric patients to put off or avoid receiving medical attention. This suggests that managing fear is necessary. (Suleman et al., 2022)

Children who have a strong fear of needles or a phobia of blood injection injuries are more likely to experience a vasovagal reaction (fainting) when confronted with the feared event. The vasovagal response is sometimes referred to as diphasic, when an increase in blood pressure and heart rate is followed by an excessively compensatory, abrupt reduction in blood pressure and heart rate that reduces cerebral blood supply and ultimately results in unconsciousness. (McMurtry et al., 2015)

Vasovagal symptoms (VVS) are exacerbated by blood and needle phobias. Fear has been identified as

a significant factor in VVS, which can result in hypotension and bradycardia and force patients to refuse critical medical interventions. Therefore, it is advised to adopt tactics like leg crossing and hand grasping to assist kids stay calm and maintain their usual physiological measures during vein puncture. (Andrewski, 2022)

Leg crossing and hand-gripping techniques work to enhance mean artery pressure (MAP) during isometric muscular contraction, which is the basis for their positive effects. By doing so, presyncope is treated with an increase in brain perfusion, which prevents unconsciousness. On the idea that isometric muscular contraction raises blood pressure, isometric counter-pressure maneuvers (ICM) were developed. The effectiveness and simplicity of ICM make it a suggested treatment option for people with recurring vasovagal symptoms. (Mitro et al., 2019)

Nurses are in a special position to decrease children's fear and discomfort during vein puncture because parents and children frequently tell them things that they do not tell doctors and because they are frequently in contact with a sick child. The most crucial responsibilities of a pediatric nurse are controlling pain, calming a child's concerns while in the hospital, and relaxing his family before their child

arrives for an assessment and treatment. To the child, the nurse should explain what disease, discomfort, hospitalization, examinations, and treatment entail. (Abu-Elenen et al., 2018)

### Significance of study:

Venipuncture and fear from insertion of needle that cause changes in physiological measures can have a negative effect on physiological and psychological health of children. The main skills of leg crossing, and hand gripping techniques are taught easily to nurses, children, and their family members. It can be used at home as it is a simple, safe, and cost-effective technique that helps children to decrease fear, promote growth and improve quality of lives.

### Aim of study:

This study aimed to investigate the efficacy of leg crossing and hand gripping techniques on fear and physiological measures of children during vein puncture.

### Research hypotheses:

Children who receive leg crossing and hand gripping techniques are expected to have less fear and change in physiological measures than those who receive only routine hospital care.

### Theoretical definitions

**Leg crossing:** Crossing the lower extremities simultaneously with tensing of leg muscles, and abdominal muscles for maximal tolerated time.

**Hand gripping:** flexion of all fingers of hands by using rubber ball forming a fist leading to contraction of the muscles of hand that help the child to be relaxed.

(Fathalla & Ghoneim, 2018)

### Operational definition

**Physiological measures:** involves observation of variables attributable to normative functioning of systems and subsystems in the human body. Such as vital signs (heart rate, blood pressure, respiratory rate, and body temperature) and oxygen saturation.

### Subject and Methods

**Research design:** A quasi-experimental research design was utilized in this study.

**Setting:** This study was conducted at pediatric intermediate care unit at Assuit university children hospital.

**Subjects:** The study subjects included a purposive sampling of 60 children during venipuncture from (6 years to 12 years old) of both sexes. By using G power analysis with a confidence interval of 99.9%, precision levels of 5%, and a p-value  $\leq 0.05$ , the sample was determined. They were chosen based on the following inclusion criteria:

- Children of both sexes aged from 6-12 years.

- All children who had stable hemodynamic (pulse rate, blood pressure and respiratory rate).
- Children were able to follow verbal commands (conscious and cooperative) and divided into two groups.

Children were classified randomly by even numbers that referred to study group and odd numbers that referred to control group.

**Group I (Study group):** Children received leg crossing and hand gripping techniques.

**Group II (Control group):** Children received routine hospital care.

### Exclusion criteria include:

- All children with upper, lower limb pathology and neurological or muscular diseases.
- Children who receive sedation and anesthesia.
- Unconscious or comatose children.

**Tools of data collection:** Three tools were utilized to collect the required data for this study:

### Tool (1): Structured interviewing questionnaire sheet

It was developed by the researcher to gather the required information and it included three parts: -

**Part 1: Personal characteristics** of children such as age, gender, birth order and residence.

**Part 2: Medical data of children** such as:-

Diagnosis, duration of hospital stays, past hospitalization, duration and causes of past hospitalization. It also included data related to venipuncture such as vein puncture site (hand, foot and/or skull), number of insertion trials, indications of vein puncture (intravenous cannulation or taking a blood sample), size of the IV cannula and problem of the site of vein puncture (swelling, redness of the puncture site and venous leak).

**Part 3: Factors affecting children' fear** during vein puncture:

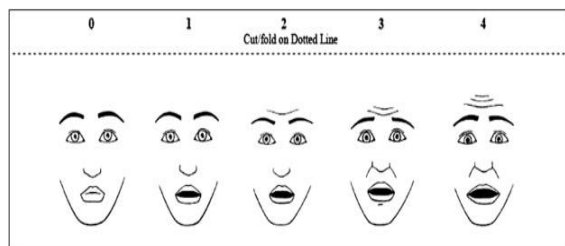
It was created by the researcher, and it included presence of noisy devices or monitors, explaining procedure to the child, a good relationship between the child and nurse, presence of parents during vein puncture, parent's reaction during vein puncture and children temperament during vein puncture.

### Tool (2): Physiological measurements of Children:

It involved vital signs that were measured and compared between two groups such as (children's heart rate, respiratory rate, oxygen saturation, and blood pressure).

### Tool (3): Children's Fear Scale (CFS)

The CFS scale was adopted from (McMurtry et al., 2011) to assess fear level in children **fig. (1)**. This scale is composed of a row of five faces with a face that expresses no fear on the far left and a face that expresses intense fear on the far right. Scores on the CFS were converted to numerical scores.



**Fig. (1): Children's Fear Scale**

(McMurtry et al., 2011)

Fear was categorized into four levels namely:

Zero =no fear

3=severe fear

1=mild fear

4=extreme fear

2=moderate

#### Methods of data collection:

- The Nursing Faculty's Ethical Committee gave the research proposal approval.
- The director of the pediatric intermediate care unit at Assuit University Children Hospital gave his official permission for the data collection required for this study.
- **A pilot study:** 10% (6) of the children participated in a pilot study to assess the clarity, applicability of the sheet and to estimate the time needed to fulfill sheet. No modifications were made, so children who participated in the pilot study were included in the study.
- **Validity** of tool 1 and tool 2 were tested by using contents validity (CV). A jury of 3 experts in both Pediatric Nursing and Pediatrics fields. Contents validity index (CVI) of tool 1 was 90% and CVI of tool 2 was 84%.
- **Reliability:** the internal consistency of reliability was carried out using alpha Cronbach's test and its result was  $r = 0.86$ .
- **The validity and reliability** of tool 3 was checked by (McMurtry et al., (2011) and it was (78%) and (0.93), respectively.
- **A written consent** was obtained from parents for their children's participation in the study after clarification of the purpose and nature of the study.

#### Field of the work:

This study was conducted over a period of three months from the beginning of November (2022) until the end of January (2023). The researcher visited the hospital three days per week from 8 am to 12 pm to interview the children from pediatric intermediate care unit. Every child needs 30 minutes of time. (15 minutes for explaining how to perform techniques of leg crossing and hand gripping and this was completed by the researcher who also spent 15 minutes filling out a questionnaire from parents and children's sheet which involved personal and medical data of studied children, and this also was done by the researcher).

#### Intervention

- The researcher attended the pediatric intermediate care unit and assessed physiological measures and fear as a baseline data of children before venipuncture, then made random assignment of children to study and control groups. Children in the control group received routine hospital care whereas children in the study group received leg crossing and hand gripping techniques.
- Each child was individually interviewed by the researcher. Then, the researcher explained the techniques to each child and divided the techniques into simple steps. Prior to venipuncture, the researcher assisted youngsters in doing the techniques numerous times to make sure they could execute them quickly and accurately.
- The following leg crossing technique was used **fig. (2):**
  - During venipuncture, the child was in a supine position with elevating the head of the bed (30-45 degrees).
  - The child's legs were crossed at the ankles.
  - The child was instructed to tense his or her abdominal muscles.
  - The child was instructed to take a deep breath while keeping arms relaxed.
  - This was done before and during venipuncture for 5-10 minutes.



**Fig. (2): Leg crossing technique**

- The child was asked to grasp a rubber ball in the hand then ask the child to open and close his/her hand in this ball as part of a hand gripping method **fig. (3)**. This was done before and during venipuncture for 5-10 minutes.



**Fig. (3): Hand gripping technique**

- Before, during, and after vein puncture, the researcher measured each child's respiration rate,

heart rate, blood pressure and oxygen saturation by using a monitor and assessed their level of fear.

- In the control group, children received routine hospital care. Without intervening, the researcher evaluated children in this group before, during, and after the venipuncture process, and then they were compared to the other group.

#### Ethical considerations

The Faculty of Nursing ethical committee gave its approval to the research proposal; the application process posed no risk to the study subjects. The researcher affirmed the confidentiality and privacy of the youngsters under study. The researcher clarified the purpose of the study and scope to the parents of children. The parents of the youngsters were reminded of their right to decline their child's participation in the

study. Before the study, parents' written approval to have their children participate in it was obtained.

#### Statistical analysis

Statistical Package for Social Science (SPSS) version 25 was used for data entry and analysis. The content of tools was examined, categorized, and coded by the researcher. Mean and standard deviation were used to describe continuous variables, whereas number and percentage were used to represent categorical variables. To compare qualitative data, chi-square analysis was performed. Comparing the study and control groups was done using a one-way ANOVA. The correlation between two variables was examined using Pearson's correlation coefficient. P value <0.05 was considered statistically significant.

### Results

**Table (1): Percentage distribution of studied children regarding to their personal data (n=60)**

Items	Study group (n= 30)		Control group (n= 30)		P-value
	No.	%	No.	%	
<b>Child's age: (years)</b>					
6 - < 7	4	13.3	11	36.7	0.06
7 - < 9	9	30.0	11	36.7	
9 - < 11	11	36.7	4	13.3	
11-12	6	20.0	4	13.3	
Mean ± SD	8.83± 1.93		7.73 ± 1.96		
<b>Child's gender:</b>					
Male	14	46.7	12	40	0.73
Female	16	53.3	18	60	
<b>Birth order of child</b>					
First	9	30	13	43.3	0.41
Second	8	26.7	9	30	
Third	7	23.3	6	20	
Fourth or more	6	20	2	6.7	

**Table (2): Percentage distribution of studied children regarding their medical data (n=60)**

Items	Study group (n= 30)		Control group (n= 30)		X <sup>2</sup>	P-value
	No.	%	No.	%		
<b>Past hospitalization</b>						
Yes	20	66.7	21	70	0.08	0.78
No	10	33.3	9	30		
<b>Causes of previous admission</b>						
	n=20		n=21		3.4	0.6
Diabetes mellitus type 1	7	35	7	33.3		
Pneumonia	6	30	5	23.8		
Acute gastroenteritis	4	20	5	23.8		
Febrile convulsion	3	15	4	19.1		
<b>Duration of Past hospitalization</b>						
1 day	0	0.0	0	0.0	2.3	0.5
2:3 days	4	20	5	23.8		
4:5 days	6	30	6	28.6		
6:7 days	3	15	4	19		
>7 days	7	35	6	28.6		
Mean ±SD	6.5± 2.9		4.56 ± 1.8			

X<sup>2</sup> =Chi- square test

Table (3): Comparison between studied children regarding physiological measurements (n=60)

Items	Study group (n= 30)			Control group (n= 30)			F – test	P-value
	Before	During	After	Before	During	After		
	Mean ±SD			Mean ±SD				
<b>Physiological measurements of children</b>								
Systolic blood pressure	86.6 ±9.7	103±9.4	107±9.4	93.6±9.6	88.57±9.7	93.6±9.6	7.9	0.007**
Diastolic blood pressure	50±7.5	65.9±6.9	69.5±7.6	54.6±6.3	50.97±5.8	55±5.8	5.77	0.02*
Heart rate	81.9±6.8	95.97±7.05	99.9±7.2	85±7.6	80.23±7.2	85.3±6.9	2.85	0.000**
Respiratory rate	31.4±3	24.57±2.38	20.6±1.9	26.9±2.8	30.03±3.2	25.3±3.1	36.3	0.000**
Oxygen saturation	92.3±2.3	96.53±1.3	98.6±1.2	94.01±1.7	90.43±1.6	95.2±1.3	10.7	0.002**

F - test =One-way ANOVA

Significant P <0.05\*

Highly significant P < 0.001\*\*

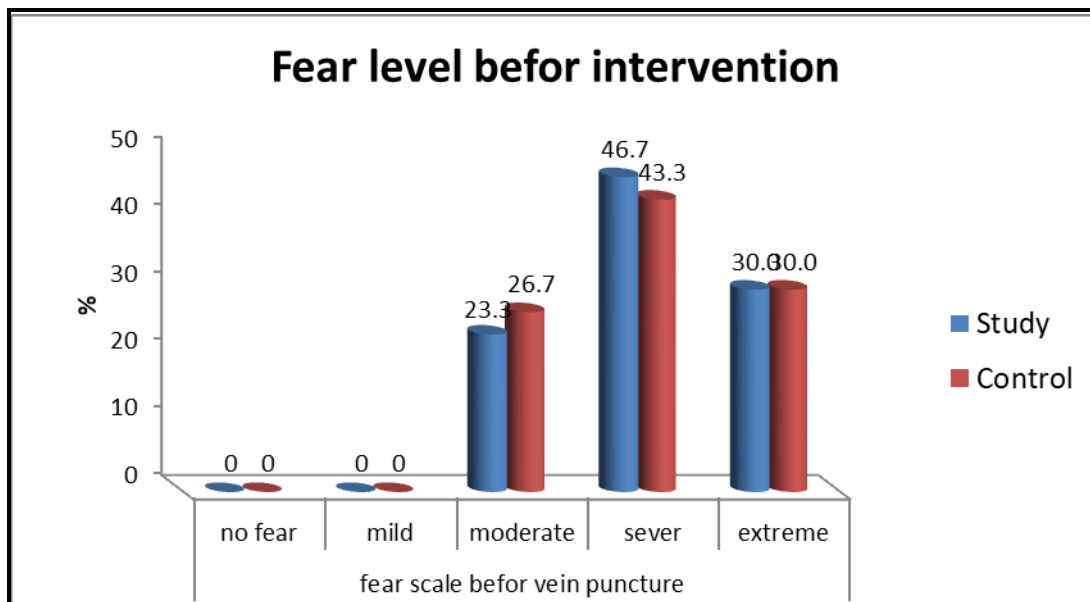


Figure (4): Comparison between studied children's fear level before intervention (leg crossing and hand gripping). (n=60)

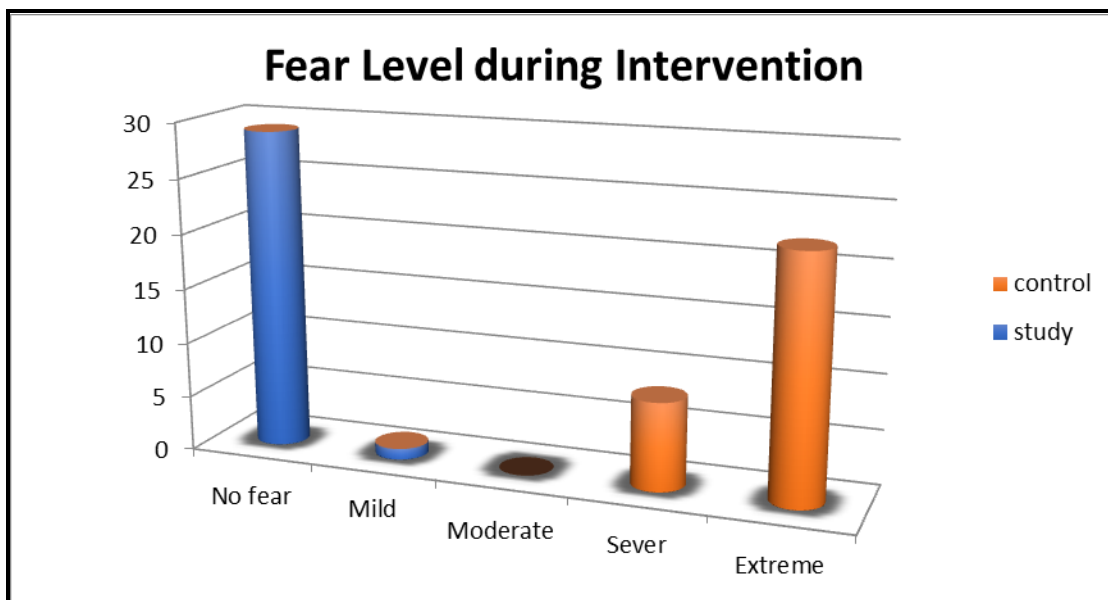


Figure (5): Comparison between studied children's fear level during intervention (leg crossing and hand gripping). (n=60)

**Table (4): Correlation between studied children age and fear level during intervention (n=60)**

Items	Groups	Age (years)	
		r-value	P-value
Fear level	Study group	-0.39	0.03*
	Control group	-0.27	

*r-value = Pearson's correlation coefficient**Significant P <0.05\****Table (5): Relation between studied children gender and fear during intervention (n=60)**

Group type	Child's gender				X2	p- value	
	Male n=14		Female n=16				
	N	%	N	%			
Study group	No fear	8	57.1	10	62.5	1.26	0.53
	Mild fear	6	42.9	5	31.3		
	Moderate fear	0	0.0	1	6.2		
	Sever fear	0	0.0	0	0.0		
	Extreme fear	0	0.0	0	0.0		
	Total	14	100	16	100		
Control group	Male n=12		Female n=18		4.55	0.50	
	No fear	0	0.0	0			0.0
	Mild fear	0	0.0	0			0.0
	Moderate fear	0	0.0	0			0.0
	Sever fear	4	33.3	4			22.2
	Extreme fear	8	66.7	14			77.8
Total	12	100	18	100			

*X2=Chi- square test*

**Table (1):** Shows percentage distribution of studied children related to their personal data. It was noted that no statistically significant difference was found between the two groups regarding their personal data. Finding revealed that more than one third (36.7%) of subjects in study group were in the age group (9 -< 11years) in comparison with more than one third (36.7%) of subject in control group were in the age group (6 - < 7 years, 7 - < 9 years). Also, more than half (53.3%) of subjects in the study group were females in comparison with fewer than two thirds (60.0%) in control group. Regarding birth order, less than one third (30.0%) of subjects in study group in comparison with more than one third (43.3%) of subjects in control group was the first among their siblings.

**Table (2):** Shows percentage of studied children related to their medical data. It was noticed that no statistically significant difference was found between the two groups related to their medical data. It was also showed that about two thirds (66.7%) of subjects in study group had previous hospitalization in comparison with less than three fourths (70.0%) in control group. It was also found that one third (35.0%) of subjects in study group in comparison with one third (33.3%) of subjects in control group cause of previous admission was diabetes mellitus type one. It was also found that more than one third (35.0%) of subjects in study group in comparison with more than one quarter (28.6%) of subjects in

control group stayed in the hospital during their previous admission > 7 days.

**Table (3):** Shows comparison between studied children regarding their physiological measurements. It was found that there were statistically significant differences between the two groups related to physiological measurements. During the intervention, it was observed that systolic and diastolic blood pressure, heart rate, and oxygen saturation increased with mean  $\pm$  SD (103 $\pm$ 9.4, 65.9 $\pm$ 6.9, 95.97 $\pm$ 7.05, 96.53 $\pm$ 1.3) in study group while decreased in control group with mean  $\pm$  SD (88.57 $\pm$ 9.7, 50.97 $\pm$ 5.8, 80.23 $\pm$ 7.2, 90.43 $\pm$ 1.6). It was also observed that respiratory rate decreased during intervention with mean  $\pm$  SD 24.57 $\pm$ 2.38 in study group while increased in control group with mean  $\pm$  SD 30.03 $\pm$ 3.2.

**Figure (4):** Shows comparison between studied children's fear level before intervention (leg crossing and hand gripping). It was noted that there was no statistically significant difference between the two groups related to fear level before intervention.

**Figure (5):** Shows comparison between studied children's fear level during intervention (leg crossing and hand gripping). It was noticed that there was a highly statistically significant difference between two groups related to fear level during intervention. It was noticed that subjects in study group don't experience any extreme fear during intervention in contrast to fewer than three fourths (73.3%) of

subjects in control group. Also, the majority (96.7%) of subjects in study group had no fear experience during intervention in comparison with none of the children in control group had no fear experience during intervention.

**Table (4):** Shows correlation between studied children's age and fear during intervention. It was observed that there was a negative statistically significant correlation between children's age and fear between two groups during intervention.

**Table (5):** Shows relation between studied children's gender and fear during intervention. No statistically significant relations were found between studied children gender and fear.

### Discussion

One of the most frequent, frightening, and unpleasant procedures done on children inside and outside of hospital is venipuncture. Interventions should therefore be made to minimize this unpleasant and upsetting experience. Because it may alter children's memories of procedural pain, fear, and the consequent acceptance of future unpleasant healthcare interventions, fear management is even more crucial. Thus, the need for a proper technique is essential to reduce venipuncture-related discomfort and fear. (Elela et al., 2023).

The results of this study demonstrated a statistically significant difference between the control group, the leg-crossing group, and the hand-gripping group in relation to physiological measurements (systolic and diastolic blood pressure, respiratory rate, and oxygen saturation) taken just before, during, and after vein puncture. **Table (3)**

The results of the current study demonstrated that systolic, diastolic blood pressure, heart rate and respiratory rate were within normal ranges. in children during intervention in study group than in control group. This finding was consistent with **Abdel-Mohsen et al., (2022)** who carried out a study about "Effect of Leg Crossing and Hand Gripping Techniques on Reducing Vasovagal Symptoms Associated with Vein Puncture in Pediatric Patients" who revealed that after venipuncture systolic, diastolic blood pressure, heart rate and respiratory rate were within normal ranges in leg crossing group and hand griping group compared to control group.

These study findings agreed with **Mitro & Lazurova, (2019)** who conducted a study about "Hemodynamic differences in isometric counter-pressure maneuvers and their efficacy in vasovagal syncope". It was reported that there is increase in systolic and diastolic blood pressure during leg techniques (SBP  $72.1 \pm 15.1$  mmHg vs.  $124.6 \pm 23$  mmHg,  $p < 0.0001$ ). There was an increase in the heart rate. ( $90.1 \pm 28.5$ /min vs.  $112.1 \pm 23.2$ /min,  $p < 0.001$ ).

These study results disagreed with those of **Adlakha et al. (2018)** who conducted a study about "Association between baseline blood pressures, heart rates, and vasovagal syncope in children and adolescents". It was revealed that there were no statistically significant differences between cases and controls regarding systolic blood pressure.

From the perspective of the researcher, this might be because leg crossing and hand gripping techniques are thought to be an effective strategy during vein puncture that reduce orthostatic load, increase central blood flow, and move blood from dependent vascular beds in the legs to the central thoracic compartment, increasing stroke volume and cardiac output and raising all physiological measures like blood pressure, heart rate, and oxygen saturation.

The present study's findings indicated that there was a highly significant difference between the study and control groups regarding the fear level of the children studied before and during intervention. In comparison with the control group, children in the study group experienced less fear during the intervention. **Figure (1, 2)**

These results agreed with **Abdel-Mohsen et al., (2022)** who conducted a similar study titled "Effect of Leg Crossing and Hand Gripping Techniques on Reducing Vasovagal Symptoms Associated with Vein Puncture in Pediatric Patients" and revealed that before intervention leg crossing, and hand gripping groups were very afraid. While these groups were fearless after the intervention. Additionally, the control group were severely fearful before intervention. Also, they were extremely fearful after the intervention.

These results were in agreement with **Petronella, (2017)** who carried out a study about "Comparison of children's venipuncture fear and pain: randomized controlled trial of mela and j-tip needleless injection system" and revealed that in both treatment groups, fear scores after procedure were significantly fewer than fear scores before procedure ( $p < 0.002$ ).

According to the study, this might be the result that children were able to relax and feel less afraid during vein puncture due to use of techniques like hand gripping and leg crossing.

According to the correlation between child's age and fear, the results of the present study showed that there was statistically significant negative correlation between studied children's age with their fear level (**table 4**). This finding agreed with **Elela et al., (2023)** who carried out a study about "Effect of Distraction Strategies on Pain Intensity and Fear among Children with Leukemia Undergoing Venipuncture." and revealed that when age increased, the fear score decreased by 0.24 points with a p-value of 0.001.

This finding was also in agreement with **Mi-Kyoung & Mi-Young, (2021)** who conducted a study about "Effect of Distraction Intervention for Needle-Related Pain and Distress in Children: A Systematic Review and Meta-Analysis." and who reported that there was negative correlation between age and fear degree. With ageing, fear intensity reduces.

This may be explained by all these because the cognitive level normally increases with age, thereby influencing the child's comprehension of fear and its impact and his or her choices for coping mechanisms. Additionally, a child's capacity to convey information regarding fear improves as their cognitive level does. No statistically significant differences were found in the relationship between the child's gender and fear level between the study and control groups during venipuncture (**Table 5**). This result disagreed with **Singh et al., (2022)** who carried out a study about "Needle fear among children during mass measles rubella (MR) injectable vaccination campaign in North India: an observational study." who noted that girls were 2.58 times more likely than boys to experience needle fear ( $p < 0.001$ ).

From the perspective of a researcher, this difference in gender is due to boys having the same way to express fear or cry as girls.

According to the study's analysis of children's personal data, the majority of studied children were from 6-11 years **table (1)**. These findings supported by **Fathalla & Ghoneim, (2018)** who conducted a study about "Leg crossing and hand-gripping interventions: its effect on reducing of vasovagal symptoms associated with vein puncture in pediatric patients" who stated that the most of children were school aged.

Concerning to gender, the current study showed that most of studied children were female. This finding was consistent with **Ibrahim et al., (2018)** who conducted a study about "Effect of Using Non-Pharmacological Methods on Relief of Pain and Fear among Children Undergoing Venipuncture." who reported that the males made up the minority of children and the girls made up the majority.

This result was contradicted with **Nejlaet al., (2018)**, who carried out a study about "Efficacy of Distraction Methods on Procedural Pain and Anxiety by Applying Distraction Cards and Kaleidoscope in Children." who stated that the most of children were males, and the fewer were females.

As regard to rank of children among siblings, the findings of the present study showed that more than one third of subjects in the study group were first compared to more than one third of subjects in control group. This finding is contradicted with **Elela et al., (2023)** who carried a study about "Effect of Distraction Strategies on Pain Intensity and Fear

Among Children with Leukemia Undergoing Venipuncture" who reported that around one third of studied children were second.

According to the study's findings regarding medical data, the findings of the present study indicated that there was no significant difference between all medical data of the studied children **table (2)**. The findings of the present study showed that; it was found that majority of studied children had a previous history of hospitalization complain from diabetes mellitus type one. This finding counter to **Öztürk & Topan, (2019)** who carried out a study about "Investigation of the fear of 7–18-year-old hospitalized children for illness and hospital" who demonstrated that more than half of the children (59.7%) had a previous history of hospitalization, and the cause of previous admission was acute diseases such as upper respiratory and lower respiratory tract infections (58.1%).

## Conclusion

**On the basis of the findings of the current study**, it could be concluded that leg crossing, and hand gripping techniques were successful in reducing fear and maintaining stable physiological measures during venipuncture.

## Recommendations:

**Based on the findings of the current study, the following suggestions can be made:**

1. Leg crossing and hand gripping techniques can be incorporated into routine daily care for children during vein puncture.
2. Leg crossing and hand gripping techniques are advised to be utilized as standard care procedures for reducing children's fear during venipuncture because they are inexpensive, simple to use, and have no complications.
3. An additional study should be carried out to include a larger number of samples, with an emphasis on outcomes with different children groups undergoing a variety of procedures.
4. Close monitoring of children before/after venipuncture is important to identify any change in physiological measures.

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