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ORIGINAL ARTICLE
ORİJİNAL ARAŞTIRMA

The Effect of "Quantum-Touch" on Peripheral Intravenous Cannulation Pain, Fear, and Anxiety in Children Aged 7-12 Years Old; Randomized Controlled Study

7-12 Yaş Arası Çocuklarda Periferik İntravenöz Kateter Yerleştirme İşlemi Sırasında Uygulanan "Quantum-Touch" Uygulamasının Ağrı, Korku ve Anksiyete Düzeyine Etkisi; Randomize Kontrollü Çalışma

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ABSTRACT

Aim: This study aimed to assess the impact of Quantum-Touch on pain, fear, and anxiety during peripheral intravenous cannulation among children aged 7 to 12 years in the pediatric emergency unit.

Material and Method: A randomized controlled study was conducted with 111 children aged 7 to 12 years in the pediatric emergency unit. Data were collected using the 'Information Form,' 'Faces Pain Scale-Revised,' 'Children's Anxiety Meter-State,' and 'Children's Fear Scale'.

Results: In the Quantum-Touch group, the scores on the 'Faces Pain Scale-Revised,' 'Children's Anxiety Meter-State,' and 'Children's Fear Scale' were significantly lower than those in the control group during the peripheral intravenous cannulation ($p<0.001$).

Conclusion: It was revealed that Quantum-Touch is an effective method for reducing pain, anxiety, and fear in children aged 7 to 12 years during peripheral intravenous cannulation in pediatric emergency units. Pediatric nurses should consider learning and implementing Quantum-Touch techniques to manage pain, anxiety, and fear in pediatric patients.

Keywords: Quantum touch, pain, intravenous cannulation, fear, anxiety, emergency department

ÖZ

Amaç: Bu çalışmanın amacı 7-12 yaş arası çocuklara periferik intravenöz kateter yerleştirme işlemi işlemi sırasında uygulanan Quantum-Touch'ın işlem sırasında oluşan ağrı, korku ve anksiyete üzerindeki etkisini değerlendirmektir.

Gereç ve Yöntem: Randomize kontrollü deneysel çalışma çocuk acil servisinde 7-12 yaş arası 111 çocuk ile yürütülmüştür. Veriler 'Bilgi Formu', 'Revize Edilmiş Yüz İfadeleri Ağrı Skalası', 'Çocuk Korku Ölçeği' ve 'Çocuk Anksiyete Skalası-Durumluluk Ölçeği' ile toplanmıştır.

Bulgular: Periferik intravenöz katater yerleştirme işlemi sırasında Quantum-Touch grubundaki çocukların 'Revize Edilmiş Yüz İfadeleri Ağrı Skalası', 'Çocuk Korku Ölçeği' ve 'Çocuk Anksiyete Skalası-Durumluluk Ölçeği' puanları kontrol grubundaki çocuklardan daha düşüktü ($p<0.001$).

Sonuç: Quantum Touch uygulamasının 7-12 yaş arası çocuklarda çocuk acil ünitelerinde periferik intravenöz katater yerleştirme işlemi sırasında ağrı, anksiyete ve korkuyu azaltmada etkili bir yöntem olduğu belirlendi. Pediatri hemşiresi çocukların ağrı, anksiyete ve korkularını yönetmek için Quantum Touch yöntemini öğrenmeli ve uygulamalıdır.

Anahtar Kelimeler: Quantum touch, intravenöz katater, ağrı, korku, anksiyete; acil servis

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INTRODUCTION

The procedure of peripheral intravenous cannulation is one of the most frequently performed invasive procedures in pediatric emergency units. Children's experiences and reactions during establishing intravenous access can vary at different developmental stages, owing to various sources of pain and anxiety (1,2). In this context, the most prevalent experiences encountered typically encompass sensations of pain, fear, and anxiety (3,4). Literature provides evidence of the successful implementation of various non-pharmacological methods in reducing the levels of pain, anxiety, and fear experienced by children during the procedure of establishing intravenous access in pediatric emergency units (4-7).

Quantum touch is a therapeutic technique based on using energy to support the body's natural healing processes (8). The fundamental principle of Quantum-Touch is to facilitate the balanced readjustment of the body's energy field (9). To balance and harmonize the body's energy field, Quantum Touch combines various breath techniques, hand positions, and body awareness exercises. These practices direct a positive energy flow and activate the individual's life force energy (10). According to the literature, Quantum Touch can be applied for various purposes, including alleviating acute and chronic pain (such as muscle, joint, and headache), reducing stress and anxiety to induce relaxation, and accelerating healing after injury and trauma (8,10). Nevertheless, there is currently no existing study in the literature that assesses the effectiveness of Quantum-Touch in reducing pain, anxiety, and fear during intravenous cannulation procedures in a pediatric emergency unit. Consequently, the primary objective of this study is to investigate the impact of Quantum-Touch application during peripheral intravenous cannulation on pain, fear, and anxiety levels in children aged 7 to 12 within a pediatric emergency unit.

MATERIAL AND METHOD

The research was confirmed by the Clinical Research Ethics Committee of the hospital (Date:19.01.22, No:10) and the Istanbul Provincial Health Directorate (Date: 01.08.22, No:2022/14). Written consent was obtained from the parents and verbal consent was taken from the children. The study was conducted in accordance with the principles set out in the Declaration of Helsinki.

Design

This study aimed to assess the impact of Quantum-Touch on pain, fear, and anxiety during peripheral intravenous cannulation among children aged 7 to 12 years old in the pediatric emergency unit. The study was conducted as a randomized controlled trial (clinical trial ID: NCT05828264).

Participants

The target population for this study consisted of children aged 7 to 12 years and their parents who were at a pediatric emergency unit in Istanbul between August and December 2022. The study's sample included children and parents who met the inclusion criteria. In prior research, the sample size calculation aimed for a moderate effect size (d: 0.50) related to the effects of the Quantum-Touch method on pain, anxiety, and fear levels during peripheral intravenous cannulation in children. Based on a power of 80% (1 - β error), a confidence level of 95% (α error), and a moderate effect size (d: 0.50); the calculation indicated that each group required 51 children (G*Power 3.1.9.4). To account for potential data dropout, the sample size was increased by 10%, resulting in a total of 112 children (Control group= 56; intervention group= 56). However, due to one child in the control group using an analgesic three hours before the study, the study was completed with 111 children (**Figure 1**).

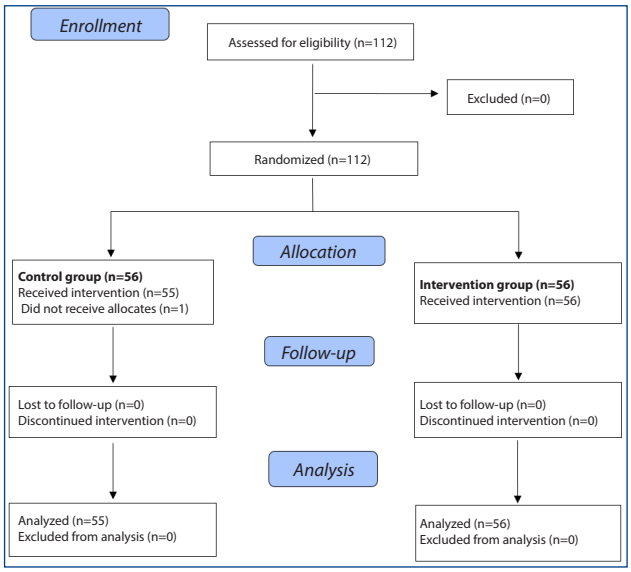

Figure 1. CONSORT flow diagram

Inclusion Criteria of the Study: being willing, being 7 to 12 years old, having no chronic or mental health issues, having no history of sedative, analgesic, or narcotic substance use within the 6 hours before presentation, and the absence of a chronic pain-causing disease. Additionally, participants were required to be treated in the yellow area of the triage system (3-level triage system: red, yellow, green).

Exclusion Criteria of the Study: refuse to participate, having visual or auditory impairments, having chronic or mental health issues, failure to establish vascular access at the first attempt, hospitalization due to a life-threatening illness or condition, and being treated in the red area of the triage system.

Randomization

The researcher employed randomization to partition the participants into groups, maintaining an equitable 1:1 allocation ratio, and subsequently assigned two permutations (1-2) to each group using a random number generator (https://www.randomizer.org). Allocation concealment was ensured through the utilization of a computer-generated number table. Initially, a total of 112 children underwent eligibility assessment, yet one child in the control group was excluded due to antecedent analgesic usage three hours preceding the study. Consequently, the final participants comprised 111 children.

Data Collection Instruments

Information Form: This form includes questions regarding the child's age, gender, whether they were accompanied by a parent during the procedure, and their level of fear related to the peripheral intravenous cannulation.

Faces Pain Scale-Revised (FPS-R): This scale was used to assess the pain level in children. It comprises six facial expressions rated on a scale ranging from 0 to 10, reflecting the intensity of pain, where '0' represents no pain, and '10' indicates very severe pain. This scale is commonly utilized for children aged 4 to 12 and is a recognized and validated assessment tool for measuring pain levels in children. It has been utilized in numerous studies (11).

The Children's Fear Scale (CFS): The scale was developed by McMurtry et al. (2011) to evaluate children's fear levels (12). The Turkish validity and reliability were performed by Özalp Gerçeker et al. This scale employs a set of five facial expressions: '0' represents a neutral expression, '1' indicates very slight fear, '2' signifies a mild degree of fear, '3' indicates an elevated level of fear, and '4' corresponds to the highest possible level of fear (13).

Children's Anxiety Meter-State (CAM-S): This scale was developed by Ersig et al. (2013) to assess children's anxiety levels (14). The Turkish version's validity and reliability were confirmed by Özalp Gerçeker et al. This scale is appropriate for children aged 4 to 12 (13).

Data Collection Process

Before the procedure

The researcher explained the purpose and method of the study to all groups before the peripheral intravenous cannulation. Participants completed the Information Form. The introduction of the measurement instruments and their scoring methods was presented to both the child and their parent. It was made clear to the child that their parent would be present beside them during the procedure. The peripheral intravenous cannulation procedure followed the routine practices of the relevant unit. Prior to the procedure, the Children's Fear Scale (CFS) and Children's Anxiety Meter-State (CAM-S) forms were assessed and scored by the children, parents, and Nurse X.

During and after the venous access procedure

Quantum-Touch Group: In this group, the Quantum-Touch technique was administered by Nurse (Y), who held certification for its application. While the child patient was in a comfortable position (either lying down or sitting), Nurse (Y) performed the Quantum-Touch energy application by gently touching the child's back/head. Nurse (Y) placed her fingertips in the middle of the back, between the shoulder blades, and on both sides of the child's head, just above the ears, without massaging. The Quantum-Touch energy application commenced approximately 3 minutes before the peripheral intravenous cannulation procedure, without initiating the. Following this, Nurse (X), a member of the research team, carried out the peripheral intravenous catheter procedure. The catheterization was performed using the left hand/arm and typically took around 3 minutes. A 24-gauge peripheral catheter was used. To ensure consistency in the procedure, Nurse (X) with 14 years of experience in pediatric nursing, performed the peripheral intravenous catheter insertion for all children in the study. The same nurse (X) administered the intravenous catheter to all participants to minimize procedural differences. The Quantum-Touch application continued throughout the procedure and for approximately 3 minutes after completion. During the procedure, the child, parent, and Nurse (X) independently assessed and scored the child's pain, fear, and anxiety levels.

Control Group: In the control group, the peripheral intravenous cannulation procedure adhered to the clinic's standard practice, and Nurse (X), a participating researcher, performed the procedure. During this process, the child, parent, and Nurse (X) independently evaluated and scored the child's pain, fear, and anxiety levels. The catheterization procedure, which involved using a 24-gauge peripheral catheter and the left hand/arm, typically took 3 minutes. For consistency in the procedure and to minimize variations, Nurse (X), an experienced pediatric nurse with 14 years of expertise, conducted the peripheral intravenous catheter insertion for all children in the study. This approach ensured uniformity in the intravenous catheterization procedure across all participants

Data Analysis

The analysis of the data was conducted using the SPSS 28. Descriptive statistics such as mean, standard deviation, frequency, and percentage distributions were employed to assess the descriptive data. Pearson chi-square and Mann Whitney U were employed to evaluate the homogeneity of socio-demographic characteristics

among the children in the two groups. The Mann-Whitney U test was employed to investigate differences in pain, anxiety, and fear mean scores between the two groups. To assess the concordance between the mean scores reported by children, parents, and nurse for FPS-R, CAM-S, CFS, and the Intraclass Correlation (ICC) was utilized. p< .05 was accepted as statistically significant.

RESULTS

Descriptive characteristics of the children were well-distributed and homogeneous across the groups (**Table 1**). When analyzing the average scores of CAM-S and CFS before the peripheral intravenous cannulation among the different groups, it was found that there was no statistically significant difference between the groups (**Table 2**). The mean scores of the FPS-R, CAM-S, CFS across different groups, a statistically significant difference was determined between the groups (p<0.001). Specifically, the intervention group has lower pain, fear, and anxiety scores than the control group (**Table 3**).

Table 1. The descriptive characteristics of the children

Group	Control group (n=55) M ± SD		Intervention group (n=56) M ± SD		Test	p
Age	9.52±1.68		9.26±1.70		1405.00*	0.419
	n	**(%)**	**n**	**(%)**		
Gender					0.075**	0.785
Girl	24	(43.6)	23	(41.1)		
Boy	31	(56.4)	33	(58.9)		
Afraid of the intravenous cannulation					2.033**	0.154
Yes	45	(81.8)	51	(91.1)		
No	10	(18.2)	5	(8.9)		
The person accompanying the child during intravenous cannulation					1.481**	0.224
Mother	48	87.3	44	778.6		
Father	7	12.7	12	21.4		

*Mann Whitney U testi **: Pearson Chi-Square, M: Mean, SD: Standard Deviation

Table 2. Distribution of anxiety and fear scores before the peripheral intravenous cannulation

Variables	Control Group (n=55) M±SD	Intervention Group (n=56) M±SD	Test*; p
Children's Anxiety Meter-State			
Children	4.85±1.72	5.48±2.07	1216.000*; p=0.053
Parent	5.03±1.91	5.57±2.05	1278.500*; p=0.118
Nurse	5.00±1.89	5.55±1.95	1255.500*; p=0.089
ICC**, p	0.973; p<0.001	0.986; p<0.001	
Children's Fear Scale			
Children	2.32±1.21	2.69±1.1 2	1267.000*; p=0.092
Parent	2.34±1.22	2.73±1.13	1258.500*; p=0.083
Nurse	2.35±1.23	2.71±1.09	1279.500*; p=0.017
ICC**, p	0.999; p<0.001	0.983; p<0.001	

*: Mann Whitney U test; ICC**: Intraclass Correlation Coefficient; M: Mean, SD: Standard Deviation

Table 3. Distribution of pain, anxiety and fear scores during the peripheral intravenous cannulation

Variables	Control Group (n=55) M±SD	Intervention group (n=56) M±SD	Test*; p
Faces Pain Scale-Revize			
Children	4.03±1.36	2.10±0.96	439.000*; p<0.001
Parent	4.14±1.43	2.14±0.99	448.500*; p<0.001
Nurse	4.00±1.38	2.10±0.97	464.500*; p<0.001
ICC**, p	0.984; p<0,001	0.992; p<0.001	
Children's Anxiety Meter-State			
Children	6.83±1.86	2.64±1.78	110.000*; p<0.001
Parent	6.87±1.84	2.66±1.76	135.000*; p<0.001
Nurse	6.84±186	2.66±1.75	125.000*; p<0.001
ICC**, p	0.998; p<0.001	0.989; p<0.001	
Children's Fear Scale			
Children	3.36±0.77	1.12±0.76	193.500*; p<0.001
Parent	3.34±0.78	1.19±0.79	189.000*; p<0.001
Nurse	3.34±0.77	1.16±0.78	192.500*; p<0.001
ICC**, p	0.997; p<0.001	0.980; p<0.001	

*: Mann Whitney U test; ICC**; Intraclass Correlation Coefficient; M: Mean, SD: Standard Deviation

DISCUSSION

The present study revealed that the Quantum-Touch is an effective method for reducing children's pain during peripheral intravenous cannulation. There is currently no study in the literature that examines the effectiveness of quantum touch in reducing pain, anxiety, and fear during peripheral intravenous cannulation in a pediatric emergency unit. Therefore, the results were compared with studies conducted with different energy and touch therapies. The effect of the reiki therapy was investigated by Thrane et al., (2022) among hospitalized children who receiving palliative care, and the study results are coherent with our study's findings (15). Thrane et al. found that reiki has medium and medium-to-large clinical effect size on reducing pain (15). Other studies have also stated that reiki effectively reduces children's pain (16-18). The effects of touch on pain perception and analgesia have been investigated in several studies (8,10,19). Goldstein et al. (2018) conducted a study investigating brain-to-brain coupling in pain and interpersonal touch (20). The study revealed a correlation between partner touch during painful experiences and brain-to-brain coupling within the alpha-mu band, with this coupling being linked to the phenomenon of touch-related analgesia. Another research conducted by Savallampi et al. (2023) established a connection between social touch, activation of brain networks, and the alleviation of interventional pain (21). Additionally, Kikuchi et al. (2018) revealed that self-touch can suppress painful sensations and thermal pain (22). While the specific mechanism of the quantum touch effect on pain is not addressed clearly in the literature, it suggests that touch, particularly social/emotional touch, can have

analgesic effects and modulate pain perception through brain-to-brain coupling, physiological coupling, and the induction of pain-protective emotional states. Further research is needed to explore the potential mechanisms underlying the quantum touch effect on pain among children.

The findings of this study provide significant insights into the efficacy of quantum touch as a method for reducing children's anxiety during peripheral intravenous cannulation. Peripheral intravenous cannulation, often associated with pain and discomfort, has been a source of anxiety for many pediatric patients. Utilizing alternative approaches, such as Quantum-Touch, to alleviate this anxiety offers a promising pathway to enhance the overall healthcare experience for children. The findings of this study underscored the potential of Quantum-Touch as a viable intervention within the realm of pediatric healthcare. Similarly, Thrane et al., (2022) found that the reiki method effectively reduces the anxiety of the children receiving palliative care (15). A systematic review of randomized clinical trials conducted by Anderson and Taylor (2011), stated that healing touch decreased anxiety, pain, and depressive behaviors; and increased relaxation and a sense of well-being (23). Quantum Touch, as a form of energy therapy, is based on harnessing life force energy to facilitate healing and induce relaxation. Applying these principles in clinical settings, particularly in addressing venipuncture-related anxiety, holds considerable promise. Notably, this study focused on a pediatric population, known for its vulnerability to heightened anxiety in medical environments. Children often lack the cognitive tools to fully grasp medical procedures, which can result in increased fear and apprehension. The positive outcomes observed in this study suggest that Quantum-Touch has the potential to serve as a child-friendly intervention, addressing the emotional needs of young patients. However, while the results are promising, several factors warrant consideration. Firstly, the precise mechanism through which Quantum Touch reduces anxiety remains somewhat elusive. Although the study's findings indicate a clear reduction in anxiety levels, further research is needed to elucidate the specific physiological and psychological processes at play. Furthermore, it is essential to explore the long-term sustainability of the observed effects, as anxiety reduction during a single venipuncture procedure may not necessarily lead to broader and lasting effects on a child's overall anxiety levels.

The findings of the present study align with existing research that supports the effectiveness of psychological interventions in alleviating fear among children undergoing venipuncture. These results offer valuable insights into the potential advantages of incorporating Quantum Touch within a pediatric medical context. A study conducted by Birnie et al. (2018), has highlighted the beneficial effects of psychological interventions in reducing fear and anxiety among children undergoing medical procedures (24). Additional support for the utility of psychological interventions in medical settings is found in the work of Uman et al., who conducted a systematic review emphasizing the effectiveness of various strategies, such as attention distraction, hypnosis, and coping skills training, in reducing fear among children and adolescents during medical procedures (25). The current study contributes to this existing body of knowledge by introducing Quantum Touch as a novel approach, shedding light on its potential as a complementary tool in pediatric healthcare. A noteworthy aspect of this research is its recognition of the intertwined nature of pain-related fear and anxiety. The interplay between pain, fear, and anxiety has the potential to perpetuate a self-sustaining cycle, where each element contributes to the exacerbation of the others (26). The findings of this current study, which highlight the potential of Quantum-Touch in reducing fear, may indirectly contribute to breaking the cycle of pain-related fear and anxiety, ultimately leading to a more positive medical experience for children undergoing peripheral intravenous cannulation procedures. In conclusion, this study provides important results on the effectiveness of psychological interventions in reducing fear and anxiety in children during medical procedures. By demonstrating the viability of Quantum-Touch as an approach, this study paves the way for further research and exploration within pediatric healthcare. These findings emphasize the importance of addressing emotional well-being alongside physical health, promoting a holistic and patient-centered approach to medical practice.

CONCLUSION

The results of this study provide significant insights into the efficacy of quantum touch as an effective approach for reducing pain, anxiety, and fear in 7-12-year-old pediatric patients undergoing peripheral intravenous cannulation procedures. The results of this study extend beyond the emergency healthcare context and contribute to broader knowledge about integrative and alternative interventions for managing pediatric anxiety, pain, and fear. Further research including randomized controlled trials and long-term follow-up studies is recommended to determine the therapeutic potential of quantum tapping. Additionally, it is recommended to conduct training programs on the integration of quantum touch into traditional pediatric care.

ETHICAL DECLARATIONS

Ethics Committee Approval: The research was confirmed by the Clinical Research Ethics Committee of the hospital (Date: 19.01.22, No:10) and the Istanbul Provincial Health Directorate (Date: 01.08.22, No:2022/14).

Informed Consent: Informed consent form did not obtained from the participants due to the nature of the study.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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