

# Effect of Filmed Behavioral Modification Modeling on Anxious and Cooperative Behaviors during Arterio-Venous Fistula Puncture among Children Undergoing Hemodialysis

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**Abstract:** Filmed Modeling (FM) is an innovative distraction technique which can be incorporated in situational anxiety for behavioral modification particularly among children with Chronic Renal Failure (CRF) undergoing Hemodialysis (HD) who are exposed to repeated Arterio-Venous Fistula (AVF) puncture twice or three times per week for the rest of their life. **Objective:** The aim of this study was to determine the effect of filmed behavioral modification modeling on anxious and cooperative behaviors during AVF puncture among children undergoing HD. **Setting:** This study was conducted at the Kidney Dialysis Unit that provides HD service for children in Alexandria University Children's Hospital at El-Shatby and Sporting Students' Hospital, in Egypt. **Subjects:** The study subject comprised of 60 children with CRF undergoing HD aged from 4- 6 years and scheduled for HD three times per week via AVF regularly. **Tools:** Three tools were used to collect necessary data, namely: Children's Characteristics and Medical Data Sheet, Venham 6 Point Index Scale and Frankle 4-Point Index Scale. **Results:** The main study findings showed that a statistical significant differences were evident in children's anxious and cooperative behaviors during AVF puncture among study and control groups ( $P=0.000$ ). **Conclusion:** It can be concluded that FM as a method of behavioral modification has a positive effect on reducing anxious and uncooperative behaviors of children with CRF undergoing HD during AVF puncture. **Recommendation:** Health care professionals should use FM as a behavioral modification method to reduce the anxious and uncooperative behaviors of children undergoing HD with AVF puncture.

**Keywords:** Filmed modeling; Behavioral modification; Anxious behavior; Cooperative behavior; Arterio-venous fistula puncture; Hemodialysis.

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## I. INTRODUCTION

Chronic Renal Failure (CRF) is an irreversible deterioration in renal function in which the body ability to maintain metabolic, fluid and electrolytes balance fails, resulting in uremia <sup>(1)</sup>. It usually progresses to End Stage Renal Disease (ESRD) which is a devastating disorder characterized by gradual loss of kidney function with increased mortality and morbidity rates <sup>(2)</sup>. It leads to severe complications if improperly managed as metabolic acidosis, cardiovascular diseases, hyperkalemia, anemia, hypertension and impaired growth in addition to poor psychosocial adjustment <sup>(3)</sup>. It is a major health problem occurring in about 18.5- 58.3 per million children globally in 2018 <sup>(4)</sup>.

Renal replacement therapies (RRT) are the principle treatment that maintain excretory function in acute disease and prolong life in those with ESRD. The primary modalities are dialysis and transplantation. Dialysis is an accepted and effective procedure in the treatment of uremia. It is a process of removing waste products and excess body fluids and regulating electrolytes. It has two types; peritoneal dialysis and hemodialysis (HD) <sup>(3,5)</sup>.

Hemodialysis is the most common method used to treat CRF since 1960s. It is a process that repeatedly cleans the blood of accumulated waste products, where blood is allowed to circulate outside the body through a filter that removes wastes and extra fluids, the clean blood is then returned to the body. There are about 600.000 children worldwide who have been treated with maintenance HD <sup>(6)</sup>. According to the United States renal data system in 2016, 87.3% of all incident cases including children began RRT with HD <sup>(7)</sup>.

One important step before starting HD is preparing a vascular access, i.e., a site on the body from which the blood is removed and returned. Three methods are used to gain access to blood, an intravenous catheter, Arterio-Venous Fistula (AVF) and a synthetic graft. Arterio-venous fistula is considered the gold standard for vascular access in HD in children. Pain during AVF puncture remains a common problem in children undergoing HD. Pain inflicted by insertion of a large cannula into AVF is a significant cause of concern for children on regular HD <sup>(8)</sup>.

Hemodialysis has saved millions lives since its initial discovery. Maintenance HD is effective for a child awaiting renal transplantation or for whom renal transplantation is impossible. This technique allows a modest life span and may give access to the opportunity of a transplant. Hence, children with CRF are dependent on HD for the rest of their lives. Repeated AVF puncture are major source of distress for young children by virtue of its considerable large gauge needle. Thus, it is essential to reduce procedural pain and anxiety, especially among young children scheduled for repeated AVF puncture <sup>(5,6)</sup>.

Children from 4-6 years are in the pre-operational stage (4-7 years) according to Piaget's cognitive developmental theory, at this stage medical experiences may be perceived as a threat and elicit children's anxiety as they are not able to use logical reasoning. Hemodialysis session appointment is an anxiety provoking situation, which raises children's avoidance behaviors and anxiety level <sup>(3,9)</sup>. Several pharmacological interventions have been developed to manage children's anxiety. However, the American Academy of Pediatrics recommended using of non-pharmacologic ones <sup>(10)</sup>.

Cognitive behavioral therapy (CBT) has been found efficient in managing anxiety and avoidance behavior <sup>(11)</sup>. Filmed modeling (FM) is one of the few evidence-based CBT designed to manage children's anxiety and to modify their behavior as well <sup>(12)</sup>. Behavioral modification refers to a means of changing behavior through various techniques used to replace undesirable behaviors with desirable ones. These techniques have been used to treat various problems among children, such as, enuresis, separation and general anxiety. There are four main components of behavior modification namely; positive reinforcement, negative reinforcement, positive punishment and negative punishment. Positive reinforcement denotes the using of a reward for positive behavior to make sure the child continues with the desired behavior. It is the most effective method of shaping and modifying the child's behavior and it can be incorporated with FM <sup>(13)</sup>.

Modeling refers to learning by observation and children could reproduce the same behavior exhibited by the model in the same situation. It was described by Bandura in (1967) as a process which can reduce children's avoidance behavior, fear and anxiety <sup>(14)</sup>. Modeling can be conducted in two forms: live or filmed. Live models as siblings or parents are used for pre- appointment teaching of the expected behavior to the child <sup>(15)</sup>.

The main goal of FM is to reduce anxiety associated with distressing procedures as AVF puncture through play combined with developmentally appropriate education. This help children gain mastery over the events they will experience <sup>(16)</sup>. Social learning theory predicts that anxiety response in children can be amended by observing a model undergoing the anxious stimulus without experiencing negative consequences using Tell-Show-Do technique i.e. the children should be told what will be done. Then, shown through simulation what will happen before starting the procedure <sup>(15)</sup>. Additionally, reinforcement of the appropriate behavior of the model is a crucial element of FM. It prompts learning, modifying the child's undesired behavior as well as performance of the appropriate behavior after receiving the rewards <sup>(17)</sup>.

No studies have been conducted to determine the effect of FM as a behavioral modification technique on anxious and cooperative behaviors among children with CRF undergoing HD during AVF puncture. Since, AVF puncture seen especially distressing and painful for children, this specific anxiety should be addressed separately as a special issue in

behavioral modification of children. So, the pediatric nurses have a crucial role in providing care for children with CRF undergoing HD during AVF puncture. The objective of her care is to encourage compliance with scheduled HD sessions to sustain their life. This could be attained through incorporating behavioral modifications techniques as FM in clinical practices.

#### **Aim of the study**

This study aimed to determine the effect of filmed behavioral modification modeling on anxious and cooperative behaviors during AVF puncture among children Undergoing HD.

#### **Operational definition:**

**Filmed modeling:** It is a cognitive behavioral method for behavioral modification of children. It refers to learning by observation and children may reproduce behavior exhibited by the model in the same situation. This could be attained via (Tell-Show-Do technique).

**Behavioral modification:** It is a means of changing the child's behavior through various techniques as positive reinforcement used to replace undesirable behaviors with desirable ones.

#### **Research Hypotheses:**

1. Children who receive filmed behavioral modification modeling intervention exhibit less anxious behaviors during AVF puncture than those who do not.
2. Children who receive filmed behavioral modification modeling intervention exhibit more cooperative behaviors during AVF puncture than those who do not.

## **II. MATERIALS AND METHOD**

### **Materials**

#### **Research Design:**

A quasi- experimental research design was used to accomplish this study.

#### **Setting:**

This study was conducted at the Kidney Dialysis Unit that provides HD service for children in Alexandria University Children's Hospital at El-Shatby and Sporting Students' Hospital, in Egypt.

#### **Subjects:**

A convenient sample of 60 children with CRF attended the previously mentioned setting who fulfilled the following criteria comprised the subjects:

- Undergoing regular HD sessions three times per week via AVF.
- Age ranged from 4- 6 years (according to Piaget's classification)<sup>(9)</sup>.
- Free from mental disabilities that affect their understanding.

The sample size was estimated using Epi info statistical program using the following parameters; population size 150, expected frequency 50%, 95% confidence coefficient with 10% acceptable error. The minimum sample size was estimated to be 59 children with CRF undergoing HD.

**Children were randomly assigned into two groups,** 30 children received filmed behavioral modification modeling intervention (study group). The next 30 children received routine hospital care (control group).

#### **Tools:**

Three tools were used to collect the necessary data:

**Tool One: Children's Characteristics and Medical Data Sheet:**

This tool was developed by the researcher to collect the following:

- **Children's characteristics** such as age, sex, birth order, residence.
- **Children's Medical data** such as onset of the disease, initiation of HD sessions and frequency of HD sessions per weeks.

**Tool Two: Venham 6 Point Index Scale:** This scale was developed by Venham and Kremer (1979) <sup>(18)</sup> to quantify the anxious behaviors of 4-6 years-old children in the Tell-Show-Do and FM groups to modify the child's behavior. It is consisted of 6 items. The scale items were rated from relaxed to out of contact and were given numeric digit from zero to five respectively as follows:

- 0 = Relaxed: smiling, willing, able to conserve, displays behavior desired by the researcher.
- 1 = Uneasy: concerned, may protest to indicate discomfort, hands remain down or partially raised. Tense facial expression, 'high chest'. Capable of cooperating.
- 2 = Tense: tone of voice, questions and answers reflect anxiety. During stressful procedure, verbal protest, crying, hands tense and raised, but not interfering very much. Protest more distracting and troublesome. Child still complies with request to cooperate.
- 3 = Reluctant: pronounced verbal protest, crying. Using hands to try to stop procedure. Treatment proceeds with difficulty.
- 4 = Interference: general crying, body movements sometimes needing physical restraint. Protest disrupts procedure.
- 5 = Out of contact: hard loud swearing, screaming unable to listen, trying to escape. Physical restraint required.

#### **Tool Three: Frankle 4-Point Index Scale**

This scale was developed by Frankle (1962) <sup>(19)</sup> to quantify the cooperative behaviors of 4-6 years old children in the Tell-Show-Do and FM groups to modify the child's behavior. It is consisted of four items. The scale items were ranked from definitely negative to definitely positive as follows:

- Definitely negative: refusal of treatment, crying forcefully, fearful, or any other overt evidence of extreme negativism.
- Negative: Reluctant to accept treatment, uncooperative, some evidence of negative attitude but not pronounced, sullen, withdrawn.
- Positive: Acceptance of treatment, at times cautious, willingness to comply with the researcher, at times with reservation but patient follows the researcher's directions cooperatively.
- Definitely positive: Good rapport with the researcher, interested in the procedure, laughing and enjoying the situation.

#### **Method**

- 1- An official approval for conducting the study was obtained from the responsible administrative personnel after explaining the aim of the study.
- 2- Tool one was developed by the researchers.
- 3- Content validity of the tools was done by five experts in the pediatric nursing field and recommended changes were done.
- 4- Reliability of Tool Two and Tool Three was asserted using Cronbach's Coefficient Alpha test ( $r = 0.89$  and  $0.86$  respectively).
- 5- A pilot study was carried out on 6 children to test the applicability and clarity of the tools. Accordingly, the necessary modifications were done. Those children were excluded from subject.
- 6- Subjects were assigned into two groups. Study group was received FM intervention for behavioral modification. Control group was received routine hospital care.

- 7- Characteristics of children and medical data were assessed using tool One for all children of both groups.
- 8- Anxious behaviors of children were assessed before and during AVF puncture using tool Two.
- 9- Cooperative behaviors of children were assessed before and during AVF puncture using tool Three.

**10 – Filmed modeling was done for behavioral modification as follows:**

- The children were directed to a quiet room to watch a filmed model.
- The film showed AVF puncture for a child model consisting of Tell-Show-Do technique within a period of 20 minutes.
- The child in the film was cooperative and he was positively reinforced by a reward at the end of the procedure because he exhibited the desired behavior.
- The child who received AVF puncture was reinforced by age appropriate toy.

11. The control group was received routine hospital care.

12. Comparison between two groups was done to evaluate the effect of FM as a behavioral modification technique on anxious and cooperative behaviors during AVF puncture among children with CRF undergoing HD.

**Ethical considerations** were considered all over the study phases as the following:

- Written informed consent of children's parent was obtained after explaining the aim of the study.
- Parents were ascertained about confidentiality of children's data and privacy was guaranteed.
- Parents have the write to withdraw at any time.

**Statistical analysis:** The collected data were coded and transferred into especially designed formats, so as to be suitable for computer feeding. The Statistical Package for Social Sciences (SPSS version 21) was utilized for data analysis and tabulation. The 0.05 level was used as the cut off value for statistical significance and the following statistical measures were used. Descriptive statistics: Count, percentage Arithmetic means, standard deviation. The analytical statistics included: Chi square Test, Fisher's Exact Test, Marginal Homogeneity Test.

### III. RESULTS

Table (1) illustrates characteristics of children among study and control groups. It was clear from the table that, the age of 80.0% of children among study group and 66.7% of those among the control group was 6 years old years with mean age  $5.70 \pm 0.651$  and  $5.43 \pm 0.858$  years respectively for children of both groups. Female children constituted 50% of children among study group and 46.7% of those among control group. It was obvious that, half (50.0%) and 40.0% of children among study and control groups respectively were the third child and more. Concerning residence, it was found that 50.0% of children among study group and 46.7% of those among control group were from rural area. No statistical significant difference was found between two groups. The two groups are thus matched in this respect.

Medical history of children among study and control groups is portrayed in Table (2). It was observed that, 80.0% and 83.0% of children among study and control groups respectively had CRF from 5 to 10 years. The current study also showed that 53.4 % of children among study group and 63.3 of those among control group were initiated the treatment of HD sessions since less than 5 years. All children (100%) of study and control groups received HD three times per week.

Table (3) explores children's anxious behaviors before and during AVF puncture among study and control groups. It was apparent that, 26.6% of children among study group who had relaxed behavior before AVF puncture increased to 70% during AVF puncture. Moreover, 20% of those who demonstrated uneasy behavior before AVF puncture raised to 30.0% during AVF puncture. On contrary, 23.3% of children who had tense behavior before AVF puncture dropped to 0.0% during AVF puncture.

Concerning, reluctant and interference behaviors, it was found that 6.7% of children among study group exhibited those behaviors before AVF puncture. While, none of those children demonstrated reluctant and interference behaviors during AVF puncture. In addition, 16.7% of those children exhibited out of control behavior, whereas, during AVF puncture,

none of them demonstrated out of control behavior. A statistical significant difference was evident in children's anxious behavior among study group before and during AVF puncture where  $^{MH}P=0.0000$ .

The table also revealed that, 26.6% of children among control group who had relaxed behaviors before AVF puncture remained the same during AVF puncture. Moreover, the percentage of children among control group 13.4% who had uneasy behaviors did not change during AVF puncture. It was noticed that, 16.7% of children among control group who demonstrated tense behavior before AVF puncture slightly declined to 10.0% during AVF puncture. On the other hand, 3.3% of reluctant children AVF puncture increased to 10.0% during AVF puncture. In addition, the percentage of children 20% who had uneasy and interference behaviors before AVF puncture did not change during that injection. No statistically significant difference was detected between before and during AVF puncture among control group ( $^{MH}P=0.344$ ).

Table (4) presents children's cooperative behaviors before and during AVF puncture among study and control group. It was obvious from the table that, negative behaviors decreased among children of study group where 20% of children who exhibited definitely negative behavior before AVF puncture decreased to none of them during AVF puncture. In addition to slightly more than half (56.7%) of children who had negative behavior before AVF puncture declined to none of them during AVF puncture injection. On the other hand, positive behavior increased among those children where 23.3% of children who had positive behavior increased to one third (33.3%) during AVF puncture. Furthermore, none of those children experienced definitely positive behavior before AVF puncture. While, during AVF puncture this percent accelerated to 66.6%. There was a statistical significant difference in children's cooperative behavior among study group before and during AVF puncture where  $^{MH}P=0.0000$ .

The table also showed that, 30.0% of children among control group expressed definitely negative behavior before AVF puncture. This percent increased to 56.7% among those children during AVF puncture. Moreover, 40.0% of children who had negative behavior and 30.0% of those who had positive behavior before AVF puncture declined to 13.3% and 16.7% respectively during AVF puncture. On contrast, definitely positive behavior increased among those children to 13.3% during AVF puncture.

Table (5) clarifies comparison between children's anxious behaviors before and during AVF puncture among study and control groups. Children's anxious behavior before AVF puncture revealed that 26.6% among children of study group were relaxed. The percent of those children increased to 70% during AVF puncture. Meanwhile, the percent of relaxed children among control group was remained the same (26.6%) before and during AVF puncture.

The table also revealed that 20% of children among study group were uneasy before AVF puncture. This percent increased to 30.0% during AVF puncture among those children. While, the percent of children who had uneasy behavior among control group (13.4%) did not change between before and during AVF puncture.

Children anxiety behavior also reflected that 23.3% of children among study group were tense before AVF puncture. None of those children experienced tense behavior during AVF puncture. Meanwhile, 16.7% of children among control group experienced tense behavior before AVF puncture. This percentage slightly declined to 10.0% during AVF puncture.

Reluctant and interference behaviors reflected that only 6.7% of children among study group before AVF puncture had those behaviors and none of them during AVF puncture. On the other hand, before AVF puncture the percentage (3.3%) of children among control group who had reluctant behavior increased to 10.0% during AVF puncture. Moreover, the percentage (20.0%) of children who had interference behavior did not decrease during AVF puncture.

Regarding, out of contact behavior, it was found that 16.7% of children among study group exhibited that behavior before AVF puncture. This behavior did not observe during AVF puncture. In contrast, 20% of children among control group who had out of contact behavior did not change during AVF puncture. There was a statistical significant difference during AVF puncture among children's anxious behavior of study and control groups ( $^{FEP}=0.000$ ).

Comparison between children's cooperative behaviors before and during AVF puncture among study and control groups is discussed in table (6). It was evident that, 20% of children among study group exhibited definitely negative behavior before the AVF puncture. During AVF puncture, none of those children exhibited that behavior. Meanwhile, 30.0% of

children among control group exhibited definitely negative behavior before AVF puncture. This percent jumped to 56.7% during AVF puncture.

In relation to negative behavior, slightly more than half of children among study group were demonstrated negative behavior. None of those children had negative behavior during AVF puncture. Moreover, 40% of children of control group who demonstrated negative behavior before AVF puncture declined to 13.3% during AVF puncture.

Fortunately, 23.3% of children among study group who had positive behavior before AVF puncture increased to 33.3% during AVF puncture. On contrary, 30 % of children of control group who had positive behavior before AVF puncture declined to 16.7%. Although, none of children of both groups had definitely positive behavior before AVF puncture, this percent increased among children of study group to 66.7% compared to 13.3% of children of control group. A statistical significant difference was evident during AVF puncture among children's cooperative behavior of study and control groups ( $F_{EP} = 0.000$ ).

#### IV. DISCUSSION

Filmed behavior modification modeling is an innovative non-pharmacologic distraction technique which can be incorporated in situational anxiety and avoidance behavior among children especially for those with children undergoing HD<sup>(20,21)</sup>. Tell-Show-Do technique is considered the backbone of the child's behavior guidance and education. Several studies have showed its positive effect on minimizing anxiety<sup>(22, 23)</sup>.

Generally, children have relatively limited communication skills and are not able to express their anxiety. Their behavior is essentially a reflection of their inability to cope with the undesired emotions. So, the children usually attempt to escape the impending event. The subsequent change in behavior seen is often a manifestation of anxiety in a child who has no other way to cope or informing others of his difficulty. Behavior management aims to educate children the suitable coping strategies<sup>(7)</sup>. The findings of the current study showed that FM is an efficient in the reduction of children's anxious behaviors and the children experienced more relaxed behaviors during AVF puncture.

A statistical significant difference was evident in children's anxious behavior between before and during AVF puncture among study group. Another statistical significant difference between both groups during AVF puncture was detected in children's anxious behavior. This result could be attributed to the fact that children's anxious behavior can be vicariously extinguished by observing the anxious stimulus without experiencing negative consequences through learning by modeling.

Indian study carried out by Sakthivel et.al (2013)<sup>(24)</sup>, showed similar findings, where they reported that the basic behavior management techniques and use of audiovisual modeling can reduce anxiety and disruptive behavior in children undergoing pantomographic examination. The previously mentioned results are also in accordance with a randomized clinical trial study done by Paryab and Arab (2014)<sup>(25)</sup> about the effect of FM on the anxious and cooperative behavior of 4-6 years old children during dental treatment. Such similarity between the present study and two previously mentioned studies could be due to the stressful medical procedure in addition to using of Venham Index Scale which used to quantify the anxious behavior.

Additionally, Martin and Cohen (2012)<sup>(26)</sup> showed that modeling may be especially useful for children with limited experience with the medical procedure or environment. Furthermore, Salmon (2006)<sup>(27)</sup> mentioned that, younger children may not have the cognitive capacity to understand that puppets dolls represent him or herself; modeling (in person, video, or computer) may be more developmentally appropriate.

Furthermore, Demore and Cohen (2005)<sup>(28)</sup> reported that distraction can promote a positive emotional state (e.g., happy, laughing), which can be incompatible with pain and distress. So, when selecting distraction stimuli, it is advised to take into account multiple sensory modalities such as vision, hearing, and touch in addition to consideration of both timing and individual factors.

The current study also revealed that, children positive cooperative behavior increased among study group better than the control group during AVF puncture. A statistical significant difference was evident among study group before and during AVF puncture. Such results are in congruence with a retrospective study done by Sharma and Tyagi (2011)<sup>(29)</sup> about behavior assessment of children in dental setting. They reported that simple tell show do and live modeling had great

impact on increasing positive response among children. They also concluded that modeling is very effective in achieving treatment goal in all age groups. The finding of the current study could be explained in the light of the fact that FM distracts the child attention away from stressful stimuli and increases the child interest to sequence of the film. Distraction also appears to function through manipulation of attention. Brain has a limited capacity to focus attention on stimuli. Therefore, once this system is depleted via an engaging activity (e.g., movie), there are fewer sources left for the child to devote to attending to a painful stimuli. In addition to the diversion of attention framework, Cohen (2002)<sup>(30)</sup> argued that distraction disrupts classical condition, whereby attention is diverted away from pain-inducing stimuli in the environment. Generally, Distraction has been shown to minimize children’s anxiety, avoidance behavior and pain while simultaneously maximizing their coping.

**V. CONCLUSION**

In the light of the current study, it can be concluded that FM as a method of behavioral modification has a positive effect on reducing anxious and uncooperative behaviors of children with CRF undergoing HD during AVF puncture.

**Recommendations:** the following recommendations are suggested:

- Replicate the study on a larger sample of children with CRF undergoing HD.
- Health care professionals should use FM as a behavioral modification method to reduce the anxious and uncooperative behaviors of children undergoing HD with AVF puncture.
- Educational training about behavioral modification methods as FM should be provided to health care professionals.

**Table 1: Characteristics of the Children among Study and Control Groups**

Characteristics of the Children	Study group (n=30)		Control group (n=30)		Test of Significance
	No.	%	No.	%	
<b>Age (years)</b>					FET = 1.761 P=0.433
4	3	10.0	7	23.3	
5	24	80.0	20	66.7	
6	3	10.0	3	10.0	
Mean± SD	5.70±0.651		5.43±0.858		
<b>Sex</b>					X <sup>2</sup> =0.067 P=0.796
Male	15	50.0	16	53.3	
Female	15	50.0	14	46.7	
<b>Birth order</b>					X <sup>2</sup> =0.642 P=0.725
First	8	26.7	9	30.0	
Second	15	50.0	12	40.0	
Third and more	7	23.3	9	30.0	
<b>Residence</b>					X <sup>2</sup> =0.796 P=0.067
Urban	15	50.0	16	53.3	
Rural	15	50.0	14	46.7	

X<sup>2</sup> = Chi Square test

FET = Fisher’s Exact Test

\*Significant at P < 0.0

**Table 2: Medical History of the Children among Study and Control Groups**

Medical History of the Children	Study group (n=30)		Control group (n=30)		Test of Significance
	No.	%	No.	%	
<b>Onset of Chronic Renal Failure (Years)</b>					FET= 0.064 P =0.739
< 5	6	20.0	5	16.7	
5-10	24	80.0	25	83.3	
<b>Initiation of Hemodialysis sessions (Years)</b>					FET= 0.065
< 5	16	53.4	19	63.3	



5-10	14	46.6	11	36.7	P =0.747
<b>Frequency of Hemodialysis sessions (Weeks)</b>					
Three times	30	100.0	30	100.0	-----
Twice	27	90.0	28	93.3	

FET = Fisher’s Exact Test

\*Significant at P < 0.05

**Table 3: Children's Anxious Behaviors Before and During Arterio-venous Fistula Puncture among Study and Control Groups (Intra- Group Comparison)**

Children's Anxious Behavior	Study Group (n=30)				Test	Control Group (n=30)				Test
	Before arterio-venous fistula puncture		During arterio-venous fistula puncture			Before arterio-venous fistula puncture		During arterio-venous fistula puncture		
	No.	%	No.	%		No.	%	No.	%	
Relaxed	8	26.6	21	70.0	MH <sub>P</sub> = 0.000*	8	26.6	8	26.6	MH <sub>P</sub> =0.343
Uneasy	6	20.0	9	30.0		4	13.4	4	13.4	
Tense	7	23.3	0	0.0		5	16.7	3	10.0	
Reluctant	2	6.7	0	0.0		1	3.3	3	10.0	
Interference	2	6.7	0	0.0		6	20.0	6	20.0	
Out of Contact	5	16.7	0	0.0		6	20.0	6	20.0	

MH<sub>P</sub>= P value of Marginal Homogeneity Test

\*Significant at P < 0.05

**Table 4: Children's Cooperative Behaviors Before and During Arterio-venous Fistula Puncture among Study and Control Groups (Intra- Group Comparison)**

Children's Cooperative Behavior	Study Group (n=30)				Test	Control Group (n=30)				Test
	Before arterio-venous fistula puncture		During arterio-venous fistula puncture			Before arterio-venous fistula puncture		During arterio-venous fistula puncture		
	No.	%	No.	%		No.	%	No.	%	
-Definitely Negative	6	20.0	0	0.0	MH <sub>P</sub> = 0.000*	9	30.0	17	56.7	MH <sub>P</sub> =0.467
-Negative	17	56.7	0	0.0		12	40.0	4	13.3	
-Positive	7	23.3	10	33.3		9	30.0	5	16.7	
-Definitely Positive	0	0.0	20	66.7		0	0.0	4	13.3	

MH<sub>P</sub>= P value of Marginal Homogeneity Test

\*Significant at P < 0.05

**Table 5: Comparison between Children's Anxious Behaviors Before and During Arterio-venous Fistula Puncture among Study and Control Groups (Inter- Group Comparison)**

Children's Anxious Behavior	Before Arterio-venous Fistula Puncture				Test	During Arterio-venous Fistula Puncture				Test
	Study group (n=30)		Control group (n=30)			Study group (n=30)		Control group (n=30)		
	No.	%	No.	%		No.	%	No.	%	
	No.	%	No.	%		No.	%	No.	%	
Relaxed	8	26.6	8	26.6	FET=0.066 P= 0.748	21	70.0	8	26.6	FET=15.71 0 P =0.000*
Uneasy	6	20.0	4	13.4		9	30.0	4	13.4	
Tense	7	23.3	5	16.7		0	0.0	3	10.0	
Reluctant	2	6.7	1	3.3		0	0.0	3	10.0	
Interference	2	6.7	6	20.0		0	0.0	6	20.0	
Out of Contact	5	16.7	6	20.0		0	0.0	6	20.0	

FET= Fisher’s Exact Test

\*Significant at P < 0.05

**Table 6: Comparison between Children's Cooperative Behaviors before and After Arterio-venous Fistula Puncture among Study and Control Groups (Inter- Group Comparison)**

Children's Cooperative Behavior	Before Arterio-venous Fistula Puncture				Test	During Arterio-venous Fistula Puncture				Test
	Study group (n=30)		Control group (n=30)			Study group (n=30)		Control group (n=30)		
	No.	%	No.	%		No.	%	No.	%	
- Definitely Negative	6	20.0	9	30.0	FET=0.013 P= 1.711	0	0.0	17	56.7	FET=15.7 10 P =0.000*
- Negative	17	56.7	12	40.0		0	0.0	4	13.3	
- Positive	7	23.3	9	30.0		10	33.3	5	16.7	
-Definitely Positive	0	0.0	0	0.0		20	66.7	4	13.3	

FET = Fisher's Exact Test

\*Significant at P < 0.05

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