Effect of Acupressure on Thirst among Children Undergoing Hemodialysis

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Abstract

Thirst is the most common oral pathology manifestation in children undergoing hemodialysis. This symptom may lead to dehydration, depression and affect their quality of life. Non-traditional therapy such as acupressure has been recommended to be used for reducing thirst in children undergoing hemodialysis. ***Objective:*** *Assess the effect of acupressure on thirst in children undergoing hemodialysis.* ***Setting:*** *The study was conducted at the Hemodialysis Unit at Alexandria University Children's Hospital.* ***Subjects:*** *A convenience sampling of 30 children undergoing hemodialysis comprised the study subjects, their ages ranged from 6-18 years.* ***Tools:*** *Two tools were used to collect the data of the study. Tool One: Socio Demographic and Medical Data of Children Undergoing Hemodialysis Interview Sheet, Tool Two: Dialysis Thirst Inventory Questionnaire.* ***Results:*** *Half of children reported very often thirsty before acupressure intervention. This percentage showed slightly decrease to 43.3% at the first week. Moreover, this percent decreased to 20% at the second week. Small proportion of those children (3.3%) reported that they had very often thirsty at the third and fourth weeks of the study period.* ***Conclusion:*** *Acupressure had great effect in reducing children's thirst intensity.* ***Recommendation:*** *Acupressure needs to be incorporated in pediatric hemodialysis unit policy and protocols to decrease thirst.*

Keywords: Acupressure, Thirst, Hemodialysis, Children.

Introduction

Chronic Renal Failure (CRF) is a major public health problem affecting children in both poor and developing countries (Becherucci et al., 2016). Chronic Renal Failure may be aggravated by congenital or acquired conditions. Congenital defects of the kidney or the urinary tract are considered the most common causes of CRF in children less than five years. While, acquired forms of CRF may be related to glomerulonephritis that are predominantly common in children more than five years (Maalej et al., 2018; Wong et al., 2017).

Worldwide, there are more than 30 in every 100.000 children are suffering from CRF each year and the rate increased with age from 4 to 6 years (Naritata et al., 2017). In the United

Kingdom (2016), the incidence of CRF in children less than 16 years was 9 per million age related populations (Plumb et al., 2018). According to the records of Out Patients Clinics and Dialysis Units of 11 universities in Egypt, 1018 patients were suffering from CRF and the age of 56.7% of them ranged from 1 to 19 years (Shaban, 2021).

Chronic Renal Failure is a devastating illness with many long-term consequences. It leads to an irreversible deterioration of renal function that gradually progresses to End-Stage Renal Disease (ESRD) (Hockenberry et al., 2021; Devarajan et al., 2020). Generally, hemodialysis (HD) is the most prevalent alternative therapy that is used in advanced and permanent kidney failure in pediatric patients. According to the International Pediatric Nephrology Association [IPNA] (2018), it was estimated that 12.9 per million of children less than 19 years were treated by hemodialysis (HD). Hemodialysis (HD) is defined as a medical procedure that involves using a special machine to filter waste products from the blood and to restore normal constituents again to it (National Kidney Foundation [NKF], 2015).

Thirst is a pervasive, intense and undertreated symptom for children undergoing HD. It is the craving for fluids that evokes the instinct of children to drink water and consume more amount of fluid than they required. It is an essential mechanism involved in fluid balance (Said & Mohammed, 2013). The sensation of thirst plays an important role in the consumption of water or other fluids to rehydrate the body in order to keep body functions working properly. It arises from a lack of fluids and/or an increase in the concentration of osmolites such as salt (Bossola et al., 2020). Thirst result in excessive fluids intake and inter-dialytic weight gain in patients undergoing HD (Bruzda-Zwiech et al., 2018) that may lead to serious complications such as hypertension, congestive heart failure and death (Dehghanmehr et al., 2017; Lewicki et al., 2013).

Effective management of thirst can be accomplished using pharmacological and non-pharmacological techniques complementing each other. Non-pharmacological techniques include mechanical measures such as chewing gum and acupressure or hydrotherapy such as sucking ice, saliva substitutes, mouth washes, behavioral and psychological interventions (Fan et al., 2013).

Acupressure is non-invasive form of traditional Chinese medicine that is common throughout Chinese society as a way of maintaining general health (Yang et al., 2010). It involves gentle but firm pressure or massage with finger over certain acupoints by licensed practitioners. Stimulation of the residual secretory capacity of salivary glands through acupressure is well known to be effective in relieving thirst (Yang et al., 2017).

Acupressure is suggested to produce several physiological effects such as stimulation of the autonomic nervous system that causes the release of neurotransmitters and neuromodulators. It increases also the peripheral blood flow which may in turn stimulate saliva production (Bossola et al., 2018; O'Sullivan & Higginson, 2010). It can relief thirst when the stimulation is sufficiently strong to stimulate the nerves that innervate the salivary glands (Ferrerira et al,. 2016) .

Significance of the study:

Controlling the fluid intake for the patients undergoing HD to reduces the detrimental effects of fluid overload on

morbidity and mortality (Ker & Gangadharan, 2019). Managing and preventing children's thirst using non-pharmacologic techniques as acupressure in an effective and safe manner to relieve children's thirst and prevent the serious complications that are associated with interdialytic weight gain.

Aims of the Study

This study aims to assess the effect of acupressure on thirst in children undergoing hemodialysis.

Research Hypothesis

Children undergoing hemodialysis who receive acupressure exhibit less thirst than those who don't.

Materials and Method

Materials

Design: A quasi experimental research design was used in the present study.

Setting: The study was conducted at the Hemodialysis Unit in Smouha at Alexandria University Children's Hospital.

Subjects: A convenient sample of 30 children undergoing HD who were admitted to the previously mentioned setting will comprise the subjects and fulfilled the following criteria: Age ranged from 6-18 years, children undergoing hemodialysis for at least 3 months, free from diabetes mellitus, ischemic heart disease, and autoimmune disease.

The study sample was estimated based on the Epi info program which is used to estimate the sample size using the following parameters: It was based on the following: Population size = 33 children undergoing hemodialysis, the expected frequency=50%, the acceptable error=10% and the confidence coefficient =95% and the minimum sample size = 28

Tools: Two tools were used to collect data of the study:

Tool I: Socio Demographic and Medical Data of Children Undergoing Hemodialysis Interview Sheet:

This tool will be developed by the researcher to obtain socio-demographic and medical data of children undergoing hemodialysis. It was included two parts:

Part one : Socio-demographic data of children: It included age, gender, residence and level of education.

Part two : Medical data of children: It included onset of disease, frequency and duration of hemodialysis.

Tool II : Thirst Inventory Questionnaire:

This tool was adopted from Bots et al., (2004) to assess the degree of thirst for patients undergoing hemodialysis. It was comprised of 7 validated items, each item had 5 point Likert scale was ranged from never which equals 1 to very often which equals 5. The responses to the seven items will be categorized as follows: Never thirsty=7 points, Almost never thirsty =14 points, occasionally thirsty= 21 points, fairly often thirsty= 28 points and very often thirsty =35 points.

Method

- Approval from the Ethical Research Committee of the Faculty of Nursing was obtained.
- An official approval for conducting the study was obtained from the responsible administrative personnel after explaining the aim of the study.
- Initially, the researcher determined the site of Lianquan (CV-23) acupoint which is located on the anterior midline of the neck in the depression

above the hyoid bone. After that, the researcher determined the site of ChengJiang (CV- 24) acupoint which is located on the center of the mentolabial groove directly below the lower lip. For the Yifeng (TE17) acupoint, the researcher determined its site which is located on the posterior to both ear lobes in the depression between the mandible and mastoid process. Finally, the researcher determined the site of Dicang (ST-4) acupoint which is located on the face directly below the pupil of the eye when the child focuses his / her eye forward and lateral to the corner of the mouth.

- The acupressure was performed by the researcher for three minutes during the hemodialysis session for each previously mentioned acupoints (Yang et al., 2010).
- Thirst was assessed weekly for four times at the end of the first, second, third and fourth week by using tool two.
  - The researcher applied the acupressure for children for three times/ week for 4 weeks (Yang, et al., 2010).
  - The acupressure performed in a circular movement, in clockwise direction for three minutes for each acupoints during hemodialysis session.
  - Data for this study was collected for a period of 8 months from August 2020 to March 2021.

Ethical considerations:

a. A written informed consent (Appendix VII) was obtained from every child's parent after explaining the aim of the study.
b. Children's participation was voluntary.
c. The child had the right to withdraw from the study at any time.
d. Parents were ascertained about the confidentiality of their children's data.
e. Privacy was considered.

Statistical Analysis

Frequency was expressed in number and percent. The mean, standard deviation and coefficient of variation were determined for each category of IPASS handover. Coefficient of variation ≤ 0.3 indicated less variability of the panel members' opinions.

The Kendall coefficient of concordance was used to evaluate the agreement among raters. All statistical analyses were carried out with SPSS statistical software version 25.0 for Windows (IBM Corp., New York, NY, USA). A two-tailed p-value <0.05 was considered statistically significant.

Results

Table (1) It was clear from the table that, the mean age of children in studied group was 10.05 ± 1.76 years. Slightly more than half of children (56.7%) in studied group were females. The table also clarifies that, 80.0 % of children in the studied group were from rural area. It was also observed that all children (100%) in studied group was in the primary schools.

Table (2) It was revealed from the table that 43.3% of children in the studied group had chronic renal failure from three to less than four years. Moreover, it was found that, 59.9% of children in studied group initiated hemodialysis session since three to five years. As regards the frequency of HD sessions, the table clarifies that the majority of children (90%) received HD session three times per week respectively. Concerning duration of

hemodialysis, the table revealed that 83.3% of children spent 3 hours on hemodialysis machine.

Table (3) The table showed that none of children of acupressure group reported that they had never been thirst before and first week after acupressure intervention. At the second week, this percent increased to 23.3% among those children. Further increase was observed (33.3% and 60%) among children in the third and fourth week respectively. Before acupressure intervention, it was found that none of children reported that they had almost never thirsty. This percent showed slight increase (13.3%) in the first week .While at the second week, this percent decrease to 10%. On the other hand, the percentage of children who reported that they had almost never thirst increased to 43.3% in the third week. This percent showed decrease to 23.3% at the fourth week.

The same table also illustrated that 20% of children of acupressure group reported that they had occasionally thirsty before and at the first week after applying acupressure intervention. While, 33.3% of those children reported that they had occasionally thirsty during the second week. This percentage declined to 20% and 13.3% at the third and fourth week respectively. The results of the current study also clarified that, 30% of children reported fairly often thirsty and this percent decreased to 23.3% and 13.3% in the first and second week respectively. None of those children reported that they had fairly often thirsty at the third and fourth week. Furthermore, half of those children (50%) reported very often thirsty before acupressure intervention. This percentage showed slightly decrease to 43.3% at the first week. Moreover, this percent decreased to 20% at the second week. Small proportion of those children (3.3%) reported that they had very often thirsty at the third and fourth weeks of the study period. It was revealed from the table that, there was no statistical significance difference between before and after first week of applying the acupressure. While, there were highly statistical significance difference between before and after the second, third and fourth weeks of applying the acupressure ($P<0.001$ for each).

Discussion

Thirst is a real stressful and pervasive symptom that is facing children undergoing hemodialysis. It arises from lack of fluids or an increase in concentration of osmolites such as salt (Bossolo et al., 2020). The finding of the current study revealed that half of children undergoing hemodialysis reported that they had very often thirst before the acupressure intervention (table 3). This finding could be justified by the fact that loss of kidney function in children undergoing hemodialysis have sodium and water retention due to loss of nephron function and loss of tubular function. They result in the urinary excretion to become runny and thus lead to dehydration (Ardiyanti A, 2015; O'callaghan, 2009). This dehydration will increase the osmolality in cells and increase thirst intensity (Ardiyanti A, 2015 and Kowalak,et al., 2011).

Acupressure is noninvasive, safe and easy to implement. Therefore, it is well suited for application in clinical practice to alleviate thirst (Li et al., 2014).The finding of the current study revealed that there were a highly significant reduction in thirst intensity at the second, third and fourth weeks of study period (table 3). These findings could be interpreted by the fact that acupressure could restore the normal

body functions by stimulating the autonomic nervous system to release neuropeptides (neuropeptide vasoactive intestinal polypeptide, neuropeptide Y, substance P, calcitonin gene-related peptide, neurokinin A), which increase saliva production to quench thirst (Bossola et al., 2018).

From another perspective, acupressure can increase in paraffin stimulated saliva secretion that have a regulatory effect on the salivary gland and thus decrease thirst intensity (Ni, et al., 2019). Yildirim Keskin, et. al (2021) were congruent with the current study.As they conducted a study about the effect of acupressure applied among patients receiving hemodialysis treatment on severity of thirst and quality of life. They reported that acupressure increased the amount of saliva and decreased the severity of thirst and affect positively on their quality of life. Moreover, Yang et al., (2010) concluded that acupressure may be effective in improving salivary flow rates and thirst intensity.

Conclusion

Based on the findings of the current study, it can be concluded that acupressure intervention was effective in reducing children's thirst.

Recommendations

In line with the findings of the study, the following recommendations are made:

1. Acupressure should be incorporated in the pediatric hemodialysis unit policy to decrease thirst among children undergoing hemodialysis.
2. Nurses in the hemodialysis unit should attend in-services training courses and workshops regarding acupressure intervention to practice it efficiently and easily.
3. Children undergoing hemodialysis and their mothers should be trained by specialists in acupressure to practice it at their homes.

Table (1): Percent Distributions of Socio-Demographic Characteristics of Children Undergoing Hemodialysis (n=30).

Socio-demographic Characteristics	No.	%
Age/Year		
7-	6	20.0
9-	12	40.0
11-13	12	40.0
Min. – Max.	7.0 – 13.0	
Mean ± SD	10.05 ± 1.76	
Gender		
Male	13	43.3
Female	17	56.7
Residence		
Rural	24	80.0
Urban	6	20.0
Level of education		
Primary school	30	100.0
Preparatory school	0	0.0

Table (2): Percent Distributions of Medical Data of Children Undergoing Hemodialysis (n=30).

Medical data	No.	%
Onset of disease /years		
Less than 1year	5	16.7
1-	2	6.7
2 -	5	16.7
3 -	13	43.3
4 – 5.	5	16.6
Mean ± SD	2.57±1.24	
Initation of hemodialysis session /years		
• Less than 1year	5	16.7
• 1-	7	23.4
• 3 - 5 years	18	59.9
Frequency of hemodialysis		
Twice /week	2	6.7
Three times /week	27	90.0
Four times /week	1	3.3
Duration of hemodialysis		
3 hours	25	83.3
4 hours	5	16.7
Mean ± SD	3.17 ± 0.38	

Table (3): Percent Distributions of the Degree of Thirst among Children Before and After Applying Acupressure (n=30).

Degree of Thirst among Children	Before Applying Acupressure		After Applying Acupressure							
			First week		Second week		Third week		Fourth week	
	No.	%	No.	%	No.	%	No.	%	No.	%
• Never thirsty	0	0.0	0	0.0	7	23.3	10	33.3	18	60
• Almost never thirsty	0	0.0	4	13.3	3	10	13	43.3	7	23.3
• Occasionally thirsty	6	20	6	20	10	33.3	6	20	4	13.3
• Fairly often thirsty	9	30	7	23.3	4	13.3	0	0.0	0	0.0
• Very often thirsty	15	50	13	43.3	6	20	1	3.3	1	3.3
^{Fr}p			P_1: 0.307		P_2: <0.001*		P_3: <0.001*		P_4: <0.001*	

P_1: statistical difference between before and first week of intervention.
P_2: statistical difference between before and second week of intervention.
P_3: statistical difference between before and third week of intervention.
P4: statistical difference between before and fourth week of intervention.

*: Statistically significant at $p \leq 0.05$.

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