

## Effect of nursing interventions on thirst and interdialytic weight gain of patients with chronic kidney disease subjected to hemodialysis

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### Abstract:

**Introduction:** Chronic kidney disease (CKD) is a common condition that describes the gradual loss of kidney function. Severe thirst distress is frequent in haemodialysis (HD) patients, and some studies have noted a positive relationship between thirst and an increased interdialytic weight gain (IDWG). **Objectives:** Objectives of this study were to assess the effectiveness of nursing intervention on thirst distress and interdialytic weight gain among patients with CKD subjected for hemodialysis (HD); relationship between thirst distress and interdialytic weight gain; association between background variables and thirst distress. The clinical outcomes included were thirst distress and interdialytic weight gain among patients with CKD subjected for HD. **Methods and Materials:** An experimental pretest posttest control group design was utilized in the study on a 40 patients with CKD subjected to HD in the dialysis unit at a tertiary care teaching hospital in South India.

**Results:** In the study group, nine (45.00%) were between the age of 21-30 years, nine (45.00%) in the study group were male. Thirst distress and interdialytic weight gain (IDWG) was reduced in the study group after nursing intervention. **Conclusion:** Sucking ice cubes reduced thirst distress and improves compliance among patients with CKD subjected to HD.

**Keywords:** Chronic Kidney Disease, Interdialytic weight gain, Hemodialysis, Thirst distress, nursing strategies

### Introduction:

The CKD burden is increasing rapidly worldwide. US has seen a 30% increase in prevalence of chronic kidney disease (CKD) in the last decade<sup>2</sup>. In India, given its population >1 billion, the rising incidence of CKD is likely to pose major problems for both healthcare and the economy in future years. Indeed, it has been recently estimated that the age-adjusted incidence rate of ESRD in India to be 229 per million population (pmp)<sup>2</sup>, and >100,000 new patients enter renal replacement programs annually in India<sup>3</sup>. Of the patients who are started on dialysis, 69 to 71% die on dialysis or stop treatment due to financial reasons, the

majority within the first three months of initiation of dialysis, and only 17 to 23% of patients end up having a kidney transplant. Of the 8 to 10% who continue to be on haemodialysis, 60% receive irregular treatments, only 2 to 4% are started on continuous ambulatory peritoneal dialysis (CAPD). A common problem faced by haemodialysis patient is thirst. It is a frequent and stressful symptom specially being in a temperate country where the summer temperatures exceeds 35 degrees, patients with kidney failure have increased thirst and find it difficult to control it, as a result they consume more than their required amount of fluid.

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Thirst is a common problem for people on dialysis, and if the patient feels thirsty, it probably means he/she is trying to stay within the fluid limits. Giovannetti<sup>4</sup>(2009) found that 86% of chronic haemodialysis patients complained of increased thirst. The six major known factors affecting thirst in a human are potassium depletion, acute increase in plasma urea, hyperglycemia, plasma sodium concentration, angiotensin II and psychological factors.

Venkat<sup>5</sup> (2006) stated that the most common problems found among patient undergoing haemodialysis are fever (50% to 60%), dyspnoea (20% to 30%), pulmonary embolism causing chest pain (13%), ischemic heart disease (50%), intradialytic hypotension (10% to 50%), hypertension (85%), generalized pruritus (20% to 70%), and thirst distress (95%). These factors prompted us to consider ways that we could intervene to reduce thirst and IDWG through specific nursing interventions. Therefore as a result we felt the need to do a study on the effectiveness of ice chip sucking on the IDWG and thirst distress in patients subjected to haemodialysis. The purpose of the study was to determine the effect of specific nursing intervention on thirst distress and IDWG. The use of ice chips sucking and 4th hourly mouth wash has been a remedial for over many years to decrease thirst but not at the cost of increasing weight. The aim of the study is to determine the effect of nursing intervention on thirst distress and interdialytic weight gain among patients with CKD subjected for hemodialysis. The main objectives of the study were to assess the thirst distress and interdialytic weight gain among the patients with CKD subjected for HD.

#### **Materials and Methods:**

An experimental pretest posttest control group design was utilized in the study. 40 patients with CKD subjected to HD in the dialysis unit at a tertiary care teaching hospital in Chennai. The patients were selected conveniently and they were assigned to the study and control group using lottery method. The following inclusion criteria were used to select patient daily fluid allowance of 700-1500 ml, ideal weight

between 45-76 kg, the age between 20-50 years and those who are willing to participate in the study and also accessibility to refrigerator, at least three weekly sessions of haemodialysis for 4 hours.

The study was conducted after obtaining permission from Institutional Ethics Committee. The purpose of the study was explained to the participants clearly and written informed consent was obtained before starting the study. Confidentiality was maintained throughout the conduct of the study. Pretest was conducted on the day of hemodialysis which is considered as the 1st day of the study participant, on background variables, Thirst Distress and Interdialytic Weight Gain. The Thirst Distress Scale was constructed by Welch (2002) to measure the intensity of thirst. Patient is expected to express his/her level of thirst in a 5 point scale. The reliability of the thirst distress tool was 0.8. The interpretation of the Thirst distress scale was <15 - Mild thirst distress, 16-22 - Moderate thirst distress, 23-30 – severe thirst distress. The interpretation of interdialytic weight gain was 1kg - Good, 2kg - Average, 3kg- Poor.

The study group participants were given specific nursing interventions of sucking ice cubes of 5ml each with a maximum allowance of 10 cubes per day and mouthwash of 100 ml of water, with a maximum of 5 mouth washes per day for 3-4 minutes these interventions were explained on a one to one basis using an education pamphlets that emphasizes the need to adhere to ideal weight control and the consequence of not doing so. The participants who were selected for the control group received the routine nursing care which included pre dialysis, intra dialysis and post dialysis care. Posttest was done on the 4th day of dialysis.

**Results:** Descriptive statistics like frequency, percentage, mean and standard deviation were used to assess the background variables. Inferential statistics like independent 't' test was used to compare the scores between the study and the control group, paired 't' test was used to compare the scores within the group. Chi-square test was used to find out the association between the thirst distress and IDWG and the background variables.

**Description of demographic variables:**

The frequency, percentage distribution of demographic variables among patients with CKD subjected to hemodialysis in accordance with their age, gender, education, occupation, income and residence. In the study group, nine (45.00%) were between the age of 21-30 years, seven (35.00%) were between the age group of 31-40 years, four (20.00%) were between 41-50 years. In the control group most of the patients, eight (40.00%) of them were distributed to 41-50 years and 31-40 years respectively. With regard to gender, nine (45.00%) in the study group and ten (50.00%) in the control group were male. In the study group eleven (55.00%) of them were females and in the control group ten (50.00%) were females.

**Description of clinical variables:**

Most of the patients, sixteen (80.00%) in the study

group and the control group had diabetes mellitus. 11(55.00%) had cardio vascular disease both in the study group and the control group.

**Thirst distress**

During pretest, 12(60.00%) of the study group patients had moderate and 11(55.00%) of the control group patients had severe thirst distress (See table 3). During posttest, 16(80.00%) patients had mild in the study group and 11(55.00%) in the control group had moderate thirst distress. The study group had decreased levels of thirst distress when compared to the control group in the posttest which was statistically significant at the level of  $p < 0.01$  (Table 4).

**Table 1: Frequency, percentage distribution and chi-square value of demographic variables among patients with CKD subjected to hemodialysis in the study group and control group (n=40)**

Sl.No.	Demographic variables	Study group (n=20)		Control group (n=20)		$\chi^2$ p value
		No.	%	No.	%	
1.	<b>Age in years</b>	4	20.00	4	20.00	2.619 0.270 (NS)
	a.21-30	9	45.00	8	40.00	
	b.31-40	7	35.00	8	40.00	
	c.41-50	0	00.00	0	00.00	
	d.51-60					
2.	<b>Gender</b>	9	45.00	10	50.00	2.222 0.136 (NS)
	a.Male	11	55.00	10	50.00	
	b.Female					
3.	<b>Education</b>	6	30.00	7	35.00	6.200 0.185 (NS)
	a. Non-literate	3	15.00	9	45.00	
	b. Primary education	11	55.00	4	20.00	
	c. Higher secondary					
4.	<b>Occupation</b>	6	30.00	4	20.00	0.844 0.839 (NS)
	a. Daily wages	3	15.00	8	40.00	
	b. Home maker	11	55.00	8	40.00	
	c. Professional	0	00.00	0	00.00	
	d. Retired					
5.	<b>Monthly Income (in</b>	10	50.00	5	25.00	10.694

	<b>Rs.)</b> a.<10,000 b.10,001-20,000 c.20,001-30,000 d.>30,000	6 4 0	30.00 20.00 00.00	9 6 0	45.00 30.00 00.00	0.005**
6.	<b>Residence</b> a. Urban b. Rural c. Suburban	10 4 6	50 20 30	2 8 10	10 40 50	1.333 0.513 (NS)

**Table 2: Frequency, percentage distribution and chi-square value of clinical variables among patients with CKD subjected to heamodialysis in the study group and control group (n=40)**

Sl.No.	Demographic variables	Study group (n=20)		Control group (n=20)		$\chi^2$ p value
		No.	%	No.	%	
1.	<b>Co-morbid condition</b> A. Diabetes mellitus i. Yes ii. No B. Cardio-vascular disease i. Yes ii. No	16 4 11 9	80.00 20.00 55.00 45.00	16 4 11 9	80.00 20.00 55.00 45.00	3.399 0.132 (NS) 3.579 0.563 (NS)
2.	<b>Habit of Smoking</b> a. Yes b. No	8 12	40.00 60.00	8 12	40.00 60.00	3.175 0.365 (NS)
3.	<b>Dry weight(kgs)</b> a.45-55 b.56-65 c.66-75	5 10 5	25.00 50.00 25.00	5 10 5	25.00 50.00 25.00	3.444 0.137 (NS)
4.	<b>Total No. of Dialysis</b> a.21-30 b.31-40 c.>41	3 5 12	15.00 25.00 60.00	3 5 12	15.00 25.00 60.00	3.854 0.145 (NS)
5.	<b>Serum sodium (mEq/L) levels</b> a.135-145 b.>146	4 16	20.00 80.00	4 16	20.00 80.00	3.756 0.179 (NS)
6.	<b>Potassium(mEq/L)</b> a.<3.5 b.3.6-4.0 c.4.1-4.5 d.>4.6	0 0 0 20	00.00 00.00 00.00 100.00	0 0 0 20	00.00 00.00 00.00 100.00	4.000 0.175 (NS)

**Table 3: Frequency and percentage distribution of level of thirst distress among the patients with CKD subjected to HD in the study and the control group during the pretest and posttest (n=40)**

	Study group (n=20)						Control group (n = 20)					
	Mild		Moderate		Severe		Mild		Moderate		Severe	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Pretest	1	5.00	12	60.00	7	35.00	0	0.00	9	45.00	11	55.00
Posttest	16	80.00	4	20.00	0	0.00	0	0.00	11	55.00	9	45.00

**Table 4: Mean Difference, Standard Deviation, Independent 't'-test and p value of the thirst distress among patients with CKD subjected to heamodialysis in the study and control group (n=40)**

Duration	Thirst distress				Independent 't' test value	p value
	Study group (n = 20)		Control group (n = 20)			
	Mean difference	SD	Mean difference	SD		
Pretest	2.30	0.57	2.55	0.51	-1.459	0.936
Posttest	1.20	0.14	2.45	0.51	-8.535	0.004**

**Interdialytic weight gain**

During the pretest, 19(95.00%) of the study group patients had average interdialytic weight gain, in the posttest 15(75.00%) had average interdialytic weight gain (Table 5). In the control group during the pretest 20(100.00%) of the patients had poor score and in the posttest three (15.00%) were having poor score 17(85.00%) had average score.

**Table 5: Frequency and percentage distribution of interdialytic weight gain among the patients with CKD subjected to heamodialysis in the study and the control group during the pretest and posttest (n=40)**

	Study group (n=20)						Control group (n = 20)					
	Poor		Average		Good		Poor		Average		Good	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Pretest	0	00.00	19	95.00	1	5.00	0	0.00	20	100.0	0	0.00
Posttest	0	00.00	15	75.00	5	25.00	3	15.00	17	85.00	0	0.00

Table 6 depicts that the study group had better levels of inter dialytic weight gain score when compared to the control group in the posttest which was significant at the level of  $p < 0.01$ . The stated hypothesis was that there will be a significant difference in the level of thirst distress and IDWG among patients who are subjected to specific nursing interventions than who do not. Hence the stated hypothesis was accepted.

**Table 6: Mean Difference, Standard Deviation, Independent 't'-test and p value of interdialytic weight gain score among patients with CKD subjected to hemodialysis in the study and control group (n=40)**

Duration	Interdialytic weight gain				Independent 't' test value	p value
	Study group (n = 20)		Control group (n = 20)			
	Mean difference	SD	Mean difference	SD		
pretest	1.95	0.22	2.00	0.00	-1.000	0.324
posttest	1.75	0.14	2.15	0.36	-3.107	0.004**

#### **Association between thirst distress and demographic variables:**

There was no significant association between the thirst distress and demographic variables.

#### **Discussion:**

Researchers have found that a large number of maintenance HD patients are accompanied with thirst, xerostomia and saliva reduction<sup>9,10,11</sup>. In our study, high thirst scores were observed in 4 (20%) maintenance HD patients, which was lower than some other studies<sup>12,13,14</sup>, which might be caused by lacking of enough cases. But the xerostomia scores in maintenance HD patients in our study were lower than patients in other studies<sup>15</sup>.

This is similar to the findings of Porcu,<sup>1</sup> (2007) who described that severe thirst distress is frequent in HD patients. The goal of the explorative study was to describe the perception of thirst and correlate symptoms in HD patients, and verify the correlation between thirst intensity and the IDWG. The study was performed on an opportunistic sample of patients treated in the dialysis unit of a city hospital in the North-East of Italy. The sample of 107 patients was

composed of 71 males (66%). The average age was 68 years (SD 12, median 70 years). Fluid restriction causes severe physical discomfort and 66% of the respondents declared a thirst level of more than 7 on the VAS scale.

During the pretest, 19 (95.00%) of the study group patients had average interdialytic weight gain, in the posttest 15 (75.00%) had average interdialytic weight gain. These findings were similar to the study conducted by Davenport<sup>6</sup> (2009) with 175 adult diabetic haemodialysis patients attending outpatient HD thrice weekly audited during a 1-week interval. Both absolute and percentage inter-dialytic weight gain was lowest in the group with the best diabetic control, Poor diabetic control may increase thirst and salt intake, leading to increased inter-dialytic weight gains, associated with systolic hypertension, and as such, diabetic control is an important facet in the management of the diabetic haemodialysis patients.

Similar findings were revealed by Nowicki<sup>7</sup>, (2009) which inferred that angiotensin II promotes sodium retention and influences the central regulation of fluid intake. By limiting sodium intake, they hypothesized that a more effective inhibition of the

renin angiotensin-aldosterone axis with the combined ACEI and angiotensin receptor antagonist administration may reduce thirst there by decreasing inter dialytic weight gain (IWG) in HD patients. Bots, Brand, Veerman<sup>8</sup> (2004) explained that patients receiving HD have to maintain a fluid-restricted diet. Severe thirst can induce noncompliance to this diet, resulting in an increase of inter dialytic weight gain (IWG = weight predialysis - postdialysis) associated with poor patient outcomes.

The limitation of the study was confined to a small number of samples due to difficulty in enrolling samples within the limited duration and the duration of the intervention was limited to five days. The current study findings recommend the following study to be conducted; the same study can be replicated with larger samples; a study can be carried on assessment of knowledge, skill and attitude on thirst distress and IDWG; explorative study on lived in experiences can also be studied.

## CONCLUSION

This pretest and posttest control group design was conducted to assess the effectiveness of nursing interventions on thirst distress and interdialytic weight gain among the patients with CKD subjected to HD. This finding suggests the importance of specific nursing interventions of educating the patients to suck ice cubes of 5ml each with a maximum allowance of 10 cubes per day and mouthwash of 100 ml of water, with a maximum of 5 mouth washes per day for 3-4 minutes using education pamphlets. Future research needs to explore the lived in experience of patients with HD.

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