EFFECT OF HEMODIALYSIS PATIENTS′ KNOWLEDGE RELATED TO TYPES OF FOOD RICH FLUID ON INTERDIALYTIC WEIGHT GAIN AMONG HEMODIALYSIS PATIENTS

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Abstract:

Despite recent advances in knowledge and improvements in the technology of the hemodialysis, the prognosis of patients receiving hemodialysis (HD) remains poor due to in insufficient knowledge about nutrition which result in interdialytic weight gain. Education enables hemodialysis patients overcome interdialytic weight gain, correct the nutritional habit, improve knowledge, and awareness. ***Aim of the study***: to evaluate effect of hemodialysis patients′ knowledge related to types of food rich fluid on interdialytic weight gain among hemodialysis patients. ***Method***: quasi experimental study design was used. ***Setting***: New General Mansoura Hospital. Purposive sample of this study composed of 70 adult hemodialysis patients who met inclusion criteria included in this study. ***Tools:*** *two tools used in this study, h*emodialysis patients' knowledge questionnaire about types of food rich fluid & interdialytic weight gain measurement. ***Results:*** the result revealed significant improvement in hemodialysis patients' knowledge related to types of foods rich fluid which was poor (mean ± SD = 2.17± 2.25) during pre test, and good (mean ± SD = 6.78± 2.24) during poet test. There was significant reduction of interdialytic weight gain. ***Conclusion:*** increase hemodialysis patients□ knowledge about types of foods rich fluid has a positive effect on reduction interdialytic weight gain.

Key words: Food, hemodialysis, interdialytic weight gain, patients' knowledge.

Introduction:

Hemodialysis is one of renal replacement therapy used to remove accumulated toxins and excess fluid resulting from loss of kidney functions [1].

Hemodialysis (HD) is the most common form of dialysis, typically requiring the patient to attend hospital three times per week [2]. Despite recent advances in knowledge and improvements in the technology of the hemodialysis, the prognosis of patients receiving hemodialysis (HD) remains poor due to non adherence to nutritional guidelines which result in interdialytic weight gain (IDWG) which is mainly result from salt and water ingestion between hemodialysis sessions, which directly reflects the compliance with diet and fluid restriction[3].

The most frequent measure of HD patient's adherence to fluid is (IDWG) which is used as an outcome measure. IDWG should be less than 2.5 kg or 5% of dry body weight between sessions to lower the risk of volume overload between thrice-weekly dialysis, [4]. HD patients are characterized by having more difficulties in accommodating their condition and usually no compliance to fluid intake until the complications of non-adherence [5].

2. Aim of study:

Evaluate the effect of hemodialysis patients' knowledge related to types of food rich fluid on interdialytic weight gain among hemodialysis patients.

3. Subjects & Method

3.1-Study Design:-

Quasi- experimental research design was used in this study.

3.2- Setting:-

This Study was conducted at hemodialysis unit at New General Mansoura Hospital.

3.3- Subjects:-

A purposive sample of 70 hemodialysis patients were entered in the study.

3.3.1 Inclusion criteria

- Adult male and female patients between 20- 60 years old.
- End stage renal disease patients who started regular hemodialysis at least three months ago, three sessions a week[6].
- Patients with regular hemodialysis for Patients had a documented history of interdialytic weight gain of greater than 5% of dry weight between dialysis treatments over the last month [7].

3.3.2 Exclusion criteria

- Ascetic patients for any medical causes.
- Patients who receive parenteral nutrition or nasogastric tube feeding.
- Patients with BMI more than 25 kg/m².
- Patients with communication disability such as blindness, deafness, and aphasia; not having received a psychiatric diagnosis.

3.4. Tools of the study:-

Two tools were used in this study

Tool 1: Hemodialysis patients' knowledge questionnaire sheet

This tool was developed by researcher based on recent literature review and were utilized to collect data pertinent to the study. It consisted of two parts (8,9,10,11,12,13,14,15) .

Part A: Socio-demographic characteristics and medical data sheet:

This part used to assess socio-demographic characteristics such as age, gender, marital status, educational level, residence, reason of hemodialysis and years of hemodialysis.

Part B: Hemodialysis patients' knowledge about types of food rich fluid.

This part had (9) items that cover the main types of food rich fluid.

-All subjects need to respond "Yes," "No," to each question. A correct answer was scored = 1; an incorrect answer was scored = 0. With total score ranged from 0 to 15. The level of knowledge was classified according to good, fair, and poor for overall knowledge. A score of 75% = (11-15) were classified as "Good", from 74% to 50% = (7-10) classified as "fair", and a score <50% =(0-6) was classified as "poor" [16].

Tool 11: Interdialytic weight gain assessment sheet

This tool was developed and developed by the researcher after reviewing recent related review to assess interdialytic weight gain for hemodialysis. It included two parts as follow:

Part A: Anthropometric Measurements.

- Height in meter and weight in kilogram were taken.
- Body mass index (BMI) was calculated by dividing the weight in kilogram on the square of height in meter (kg/m²). Standards classify BMI into several categories; < 20 /underweight, ≥ 20 :< 25/ normal, ≥ 25:< 30 / overweight, ≥30 : < 40 / obese, and ≥40 / morbid obese [17].

Part B: Interdialytic weight gain measurement

This part included three items as follow:

- Pre dialysis weight in kilogram.
- Post dialysis weight in kilogram.

- Interdialytic weight gain within 12 consecutive sessions, which calculated by subtracting post dialysis total body fluid volume of one session from pre dialysis total body fluid volume of the next session, then take mean of the twelve measurements. This procedure was conducted by Watson formula.

Watson Formula.

This formula was used for calculation the total body water volume in adult male and female through predialysis patient weight each session and anthropometric measurements [18].

Watson Formula for Women:
TBW = (−2.097 + [0.1069 × height] + [0.3362 × body weight]).

Watson Formula for Men
TBW = (2.447 + [0.0956 × age] + [0.1074 × height] + [0.3362 × body weight]).

Scoring system for interdialytic weight gain [19].

Mean of IDWG "Within 12 sessions"	Poor fluid adherence	Good fluid adherence
	> 2.5 kg	≤ 2.5 kg

3.5 Method:
- Official approvals for conducting the study were obtained from Faculty of Nursing of Mansoura University as well as the ethical committee of Faculty of Nursing of Mansoura University.
- Official approval for conducting the study obtained from the responsible administrative personnel of International Mansoura Hospital.
- Tool I and II part A &C were developed by the researcher based on recent literature review.
- Tool II part B was adopted by the researcher without change in its content based on literature review.
- Tools validity was conducted by a group of in medical staff and nursing staff.

- Pilot study was conducted on 10% of the subjects (8) patients to check feasibility and applicability of the tools, help the researcher to determine the time needed for answering the questionnaire sheet and they were excluded from total statistical analysis score. The needed correction and modifications were made.

Data collection
- Data collection extended over a period of six months started from the 1st of April, 2016 till the end of September 2016.
- The framework of the study was carried out according to 4 phases:-

Assessment phase:-
- This phase included screening all the hemodialysis patients (235) medical records to choose the hemodialysis patients with interdialytic weight gain more than or equal 2.5 kg through measuring mean interdialytic weight gain within last twelve hemodialysis sessions.
- Those patients who agreed to participate in the study and fulfill the inclusive and exclusive criteria included in this study (78) patients.
- Knowledge of patients with interdialytic weight gain and their socio demographic data were assessed in the presence of the researcher for period of two weeks using tool (I).
- Anthropometric measurements such as body weight, height and body mass index were assessed using tool (II), part (A).
- Body weight of patients was assessed before and after hemodialysis session within 12 consecutive sessions to calculate WG using tool (II), part (B).
- This phase lasted from the first of April 2016 to the middle of June 2016.

Planning phase:
- Based on the findings of assessment phase, goals and expected outcomes were formulated.

- In this phase the nutritional guidelines included types of food rich fluid were developed by the researcher based on the available published guidelines that presented in the related literature such as national, international books, scientific journal as well as, patients needs that carried out in the assessment phase.
- The developed nutritional guidelines were translated from English to Arabic language, supplemented by photos, illustrations to help the patients to understand of the content.

Implementation phase:
- In this phase the nutritional guidelines about types of food rich fluid were implemented by the researcher based on several factors that carried out in the assessment phase.
- The instructions about the developed nutritional guidelines were presented in the form of sessions for hemodialysis patients with interdialytic weight gain as follow:-

The first session:-
- It covered definition and signs and symptoms of interdialytic weight gain

The second session:-
- It covered foods and fruits rich with fluid, and healthy life style to decrease sense of thirst.

The third session:
- It covered re-demonstration about content of previous two sessions.
- The time of the sessions was arranged within the schedule of hemodialysis patients' sessions to save time, decrease overload for attending to the unit.
- These sessions were carried out in the waiting area for explaining the developed nutrional guidelines using questions and discussion throughout the interview as follow:-
- The morning shift patients received teaching session after termination of their HD session.

- The afternoon shift patients received teaching session before starting their HD session.
- Each discussion lasted for 10-15 minutes. In each discussion, the researcher reinforced the patients to follow the prescribed diet.
- The colored hand out was distributed to the patients and family members to be a guide for types of food rich in fluid.
- This phase lasted two weeks from the fist of August 2016 to the middle August 2016.

Evaluation phase
- This phase focused on evaluation the effect of types of food rich in fluid on HD patients with IDWG for two times using the same tools applied in the pre test.
- **First time:** - at the beginning of the study as baseline measurement (pretest).
- **Second time**: - after two weeks from applications of nutritional guidelines and extended for 12 consecutive HD sessions.
- Comparison of each finding to evaluate the effect of types of food rich in fluid on patients' knowledge and IDWG

4- Results:
- The data collected were analyzed statistically and categorized into 4 main parts as follow:-
- **Part A: -** Socio-demographic characteristics (table 4.1).
- **Part B: -** This part include, knowledge of HD patients about types of food rich fluid (table 4.2) and HD patients knowledge about complications of increase fluid intake (table 4.3).
- **Part C: -** Interdialytic weight gain measurements using Watson formula (table 4.4).
- **Part D : -** Correlations (table 4.5).

Table (4.1): Socio-demographic characteristics of HD patients with IDWG (No = 70):

- **In relation to sex**, it can be observed that more than half (60%) of study sample were male. **As regarding** the age, this table revealed that (48.6%) of studied patients were in the age group of 51-60 years, while 11.4% were in age group of 20-35 years.
- **Concerning residence**, the table showed (72.9%) of studied patients live in rural areas. As regarding to marital status (95.7%) of studied patients were married.
- **Concerning to the educational level**, nearly about two fifths of studied patients was illiterate and read & write (42.9.6%-38.6%).
- **In addition to**, more than two thirds of the studied patients (70.4%) not work. As for hemodialysis years, the table clarifies that (48.6%) spent 5-10 years on HD therapy.
- Finally, table shows that (55.7%) developed renal failure due to chronic diseases while, about one third (35.7%) due to renal diseases.

Table 4.2: Hemodialysis patients' knowledge related to types of food rich fluid.

- As regarding to hemodialysis patients' knowledge regarding diet rich sodium, the table clarifies that about half of study sample during pre test didn't know that using ice piece sublingual helps in decreasing fluid intake compared to (1.4%) during post test. Also, (55.7%) didn't know that normal fluid intake per day is one liter during pretest compared to (1.4%) during post test. Therefore, three quarters of the sample didn't know that normal interdialytic weight gain between two consecutive sessions is 2 kg during pre test compared to (4.3%) in post test. About four quarters of the sample didn't know that soup is calculated from fluid intake during pre test compared to (25.7%) during post test.

- The majority of the sample (90%) didn't know that ice cream and jelly are calculated from fluid intake during pre test which decreased during post test about one half (47.1 %& 55.7%) respectively. It is clear from the table that there is significant improvement between pre test (Mean score ± SD 2.17 ± 2.25) and post test (Mean score ± SD 6.78 ± 2.24), P value is 0.000.

Table 4.3: Total score of hemodialysis patients' knowledge.

This table shows that the majority of the study sample (92.9%) had poor knowledge score during pre test compared to (41.4%) during post test. In addition to (7.1%) of the study sample had moderate knowledge score during pre test compared to (58.6%) during post test.

Table 4.4: Interdialytic weight gain measurements

This table shows that there is significant improvement in between mean interdialytic weight gain during pre test and post test (4.08 ± 0.91 & 2.89 ± 0.87) respectively. **As regarding to**, total body water volume, it was noticed that there is significant difference between mean total body water volume during pre test and post test (40.00±7.83 &39.60±6.91) respectively.

Table 4.5: Fluid adherence among studied hemodialysis patients.

In relation to, fluid adherence among studied hemodialysis patients this table clarify that the majority of the study sample (98.6%) had poor fluid adherence during pre test compared to (40%) during post test. While, the minority of the sample (1.4%) has good fluid adherence during pre test compared to (60%) during post test. It is clear from the table that there is significant improvement between pre test compared to post test, P value is 0.023.

Table 4.6 correlations between variables.

- The table shows significant correlations between knowledge about types of food rich fluid and both of interdialytic weight gain and total body water.
- In addition to, significant correlations between total body water and interdialytic weight gain.
- **Finally**, significant correlations between total body water IDWG.

5. Discussion

Hemodialysis therapy has become worldwide general health problem as the total number of hemodialysis patients number has been increased worldwide and the financial cost is increased substantially. Hemodialysis (HD) is one of the most effective and important renal replacement therapy that can save life of patients with renal failure [21].

As regarding age group, it was revealed from the current study that, two fifths of the studied patients were middle aged. This finding was on the line with [22] who studied evaluation of patients' knowledge in outpatient clinic and mentioned that two fifths of patients were middle aged.

Concerning gender of the studied patients, the current study showed that about three fifths of studied hemodialysis patients were male, while two fifths were female these findings were in the line with [23] who mentioned that two thirds from the study sample were men and two fifths were female. **In the contrary**, [24] in his study about Factors related to interdialytic weight gain in hemodialysis patients reported that two thirds of the studied hemodialysis patients were male and one third was female.

In relation to marital status of the **studied** hemodialysis patients, this study revealed that the majority of hemodialysis patients were married. **On the contrary**, a study conducted by (**Secord et al., 2016**) [25] mentioned that four fifths of the study patients were married.

This study showed that about half of the studied patients developed renal failure due to chronic diseases, this finding was supported by (**Djukanovi , 2015**) [26] who reported that about one half of the hemodialysis patients developed renal failure due to chronic disease.

Concerning educational level, of the studied hemodialysis patients, the current study revealed that the minority of the studied hemodialysis patients was highly educated; this finding was on the line with [27] who mentioned that the minority of the patients were highly educated. While, the current study showed that two fifths of the hemodialysis patients were illiterate. On the contrary, a study carried b [28] he reported that the minority of the patients were illiterate.

Regarding numbers of meals, eaten per day which was reported by hemodialysis patients, the current findings showed that two thirds of HD patients consumed three or four meals per day; this finding was on the line with [29] who mentioned HD patients consume 4 meals a day.

The current study revealed significant improvement in patient's nutrional knowledge during post test which agreed by [30].

The current study emphasized that increase hemodialysis patient knowledge had positive effect on improving adherence of hemodialysis patients to nutritional guidelines this finding was supported by [31] who mentioned that the nutritional education for hemodialysis patients achieved better patient´ adherence post intervention. On contrast, a study conducted by [32] had shown that no effect of increasing knowledge on improving patient's adherence to the prescribed treatment.

The current study results showed that there were statistical significant relations

in between patient's knowledge and their educational level, this finding agreed by [33] who found a relation in between educational level and knowledge in HD patients.

This study revealed that no significant correlation between the patients' nutritional knowledge and the duration of hemodialysis, which agreed by [34] who reported that duration of hemodialysis has no effect on hemodialysis patients knowledge, this returns to educational level has the major effect in acquiring knowledge. **On contrast**, [35] reported that there was relation in between patient's knowledge and HD duration.

Concerning interdialytic weight gain, the current studied showed significant Interdialytic weight gain reduction post intervention was supported by [36] as they founded that HD patient's teaching regarding fluid and minerals restrictions had a positive effect on reduction of interdialytic weight gain. In addition to, another study conducted by [37] agreed with me as he founded significance decrease in IDWG, observed post educational intervention.

In my opinion, this reduction in IDWG back to increase HD patient's knowledge as some of the patients know dietary restrictions and the other patients had not received any education regarding the nutritional guidelines before. Moreover, HD patients may forget information about nutritional guidelines and complications of noncompliance because it is only communicated verbally with no written media but in the current study colored booklet delivered to each patient.

On contrast, a study conducted by [38] reported that there was no differences seen in IDWG, also, [39] reported that most of HD patients still have fluid overload after hemodialysis sessions. **In my opinion**, this may be due to most of the HD patients mentioned they cannot continue to eat low sodium diet, also they cannot eat the food they used to eat, no written media, and they didn't know that foods rich fluids "hidden fluids" which should be decreased[40].

The current study showed significant reduction in the mean score of total body water volume during post test, this finding was supported by [41] who reported significant reduction in total body water was observed after intervention. On the contraryو [42] reported that most of HD patients still have fluid overload after hemodialysis sessions.

Regarding body mass index, this study revealed that there was significant reduction in BMI during post test, which agreed with [43] who mentioned that there is lower BMI after intervention, this reduction in body mass index **back to** decrease total body water and interdialytic weight gain. **On contrast,** [44] mentioned that BMI remained relatively constant.

This study revealed significant correlation between BMI and IDWG which agreed by [45] who mentioned that there was correlation between IDWG and BMI, **in my opinion**, this correlation achieved due to good adherence to developed nutritional guidelines and decrease fluid intake.

6. Conclusion:

Improving hemodialysis patients knowledge about types of food rich fluid increase adherence to fluid intake which has a direct effect on decreasing interdialytic weight gain.

The commonest barrier of hemodialysis patients' non adherence is poor knowledge about types of food rich in fluids, in addition to, they don't know normal interdialytic weight gain.

7. Recommendations:

- Arabic, colored booklet regarding type of food rich fluid should be available in each hemodialysis hall and given to each hemodialysis patient.

- Orientation about type of food rich fluid for hemodialysis patients should be established for newly hemodialysis patient.
- Periodically and continuously evaluation of hemodialysis patients' knowledge and interdialytic weight gain to improve patients' health status and decrease frequency of interdialytic weight gain complications.
- Large colored poster includes photos for types of food rich fluid should be available in the waiting areas in the hemodialysis units.

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Table (4.1)

Items	No	%
Sex		
- Male	42	60
- Female	28	40
Age		
- 20-35 years	8	11.4
- 36-50 years	28	40
- 51-60 years	34	48.6
Marital status		
- Single	0	0.0
- Married	67	95.7
- Divorced	1	1.4
- Widow	2	2.9
Residence		
- Rural	51	72.9
- Urban	19	27.1
Educational level		
- Illiterate	30	42.9
- Read &write	27	38.6
- Secondary	8	11.4
- University	5	7.1
Occupation		
- Work	20	28.6
- No work	50	71.4
hemodialysis years		
- < 5 years	14	20
- 5-10 years	34	48.6
- › 10 years	22	31.4
Cause of renal failure		
- Renal disease	25	35.7
- Chronic disease	39	55.7
- Renal and chronic disease	1	1.5
- Others (drugs- genetic diseases)	5	7.1
Activity level		
- Low	10	14.3
- Medium	54	77.1
- High	6	8.6

Table 4.2

Items	Pre test				Post test			
	Know		Don't know		Know		Don't know	
	No	%	No	%	No	%	No	%
Ice piece decrease sense of thirst	36	51.4	34	48.6	69	98.6	1	1.4
Drinking one liter fluid per day	31	44.3	39	55.7	69	98.6	1	1.4
2kg IDWG between sessions	18	25.7	52	74.3	67	95.7	3	4.3
Yoghurt rich with fluid	8	11.4	62	88.6	56	80	14	20
Soup rich with fluid	13	18.6	57	81.4	52	74.3	18	25.7
Ice cream rich with fluid	7	10	63	90	37	52.9	33	47.1
Jelly rich with fluid	7	10	63	90	31	44.3	39	55.7
Watermelon rich with fluid	21	30	49	70	48	68.6	22	31.4
Mango rich with fluid	11	15.7	59	84.3	46	65.7	24	34.3
Mean ±SD	2.17±2.25				6.78±2.24			
Significance score	P value = 0.000**				t=15.943			

* Significant if (p ≤ 0.05)

** Highly significant (p ≤ 0.001)

Table 4.3

Level	Pre test		Post test		Significance test	
	No	%	No	%	P	X²
Good	0	0.00	0	0.00	0.5*	3.809
Fair	5	7.1	41	58.6		
Poor	65	92.9	29	41.4		

* Significant if (p ≤ 0.05)

** Highly significant (p ≤ 0.001)

Table 4.4

Items	Pre test Mean ±SD	Post test Mean ±SD	P value	T value
Body mass index	25.20±3.56	25.16±2.4	0.000**	0.195
Interdialytic weight gain	4.08±0.91	2.89±0.87	0.000**	10.762
Total body water "Watson formula"	40.00±7.83	39.60±6.91	0.000**	0.917

* Significant if ($p \leq 0.05$)

** Highly significant ($p \leq 0.001$)

Table 4.5

Items	Pre test		Post test		Significance test	
	No	%	No	%	P	X²
Poor adherence	69	98.6	28	40	0.023*	0.676
Good adherence	1	1.4	42	60		

* Significant if ($p \leq 0.05$)

** Highly significant ($p \leq 0.001$)

Table 4.6

Variables	P value	r value
knowledge about types of food rich fluid score pre and post	0.000 **	0.422
Food rich fluid and interdialytic weight gain "post"	0.000**	-0.637
Knowledge of food rich fluid and total body water "post"	0.004*	-0.337
Total body water and body mass index "post"	0.000**	0.484
Total body water and interdialytic weight gain "post"	0.046*	0.212

* Significant if ($p \leq 0.05$)

** Highly significant ($p \leq 0.001$)