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Prevalence of Non-adherence to Diet and Fluid Restrictions Among Adults Undergoing Hemodialysis

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ABSTRACT: Non-adherence to the prescribed diet and fluid regimen causes toxic, fluid, and metabolic end products to accumulate in the blood, increasing morbidity and mortality in hemodialysis patients. The objective of the study is to estimate the prevalence of non-adherence to diet and fluid restrictions in adults who are on hemodialysis. A cross-sectional design was used to assess the prevalence of non-adherence to dietary and fluid restriction among adults undergoing hemodialysis. 110 participants who met the eligibility criteria were recruited consecutively for the study by employing the purposive sampling technique. Data collection was done using a dialysis diet and fluid non-adherence questionnaire (DDFQ) and using medical records for bio-chemical parameters. The mean age of the participants was 55.04±12.37 years and 70.9% were males. The median duration of CKD and HD was 39(24-60.25) and 21.5(10-36.25) months respectively. 80% of the study subjects were not adherent to prescribed diet regimens based on both subjective and objective parameters. Concerning fluid restriction, 84.5% and 69.1% were not adherent to fluid regimen according to subjective and objective measures respectively. 66.4% were having mild to moderate degrees of non-adherence to diet restriction and 56.4% were with moderate to severe degrees of fluid non-adherence. Only, a few patients undergoing hemodialysis were adherent to dietary and fluid restrictions. New interventions should be developed to improve adherence, with special emphasis on dialysis-specific education and motivation by the dialysis workforce.

KEYWORDS: Chronic kidney disease, hemodialysis, adherence, non-adherence, diet, fluid

I. INTRODUCTION

Chronic kidney disease (CKD) is becoming a major health concern around the world[1]. CKD is a serious public health hazard that affects about 10% of the world's population. Kidney illness was the 12th most prominent cause of death in the 2015 Global Burden of Disease Study, accounting for 1.1 million deaths worldwide[1]. The highest rates of CKD were seen in Latin America, Europe, East Asia, and the Middle East, where about 12% of the population has the disease. South Asia (7%) and Sub-Saharan Africa (7%) had the lowest prevalence rates[1,2].

II. RELATED WORK

In India, precise longitudinal data on the prevalence of CKD is currently unavailable. The incidence of end-stage renal disease (ESRD) is 229 per million people, according to Modi and Jha, which is more than double what has been assumed for a long time. (100/million)[3]. According to Singh AK et al, 17.2% of people had CKD, with ~6% having stage 3 or worse[4]. In another study by Varma et al, the prevalence of CKD in India is 13–15.04% with stages 1, 2, and 3 as 6.62%, 5.40%, and 3.02% respectively[5]. Every year, more than 100,000 new patients enrol in renal replacement therapy[6].

CKD is a global public health issue that affects people of all cultures.[1]. In patients with chronic kidney diseases, dialysis is a critically important treatment that prolongs the survival time and improves the quality of life. The success of this complex therapy (i.e. hemodialysis) demands certain mandatory tasks such as self-management skills, multi-pharmacological regimen, continuous monitoring, restriction, and modification of fluid and diet[7–9]. More than half of hemodialysis patients are projected to be non-adherent in some way within a month, and up to 70% of patients fail to restrict their fluid consumption adequately[7]. This high rate of non-adherence is critically important as even occasional episodes of serious non-compliance can have a serious impact on mortality and morbidity[7,10,11]. Adherence to diet and fluids has a pivotal role in renal failure management. A significant number of dietary restrictions are imposed traditionally and uniformly on hemodialysis patients. Dietary and fluid adherences are quintessential components in the management of ESRD patients[12]. It is no exaggeration to state that the dialysis



dietary regimen is one of the most restrictive, and these restrictions may frustrate many patients, leading to poor adherence. Noncompliance with dietary and fluid intake by patients can result in a build-up of toxic fluids and metabolic end-products in the bloodstream, increasing morbidity and premature death [13,14]. In their study in Iran, Ahrari et al found that non-compliance with diet and fluid restrictions is a major cause of treatment failure and poor outcomes in patients with ESRD. However, the elements that make it difficult for patients to adhere to their dietary limitations are unknown [15]. Through their study about Jordanian HD patients, Khalil et al suggested that identification of the factors that may worsen dietary and fluid non-adherence may lead to improved therapeutic interventions[14].

Many study findings suggested that patients on hemodialysis should have their diet and fluid restrictions evaluated regularly.[12,13,15]. Moreover, there is no significant data available about the Indian population regarding the prevalence of non-adherence to fluid and dietary restriction and its impact on health-related outcomes. The available study lacks adequate sample size and strength, which makes the scene tough to generalize[16]. Moreover, these studies, heavily depend on either subjective or objective measures of adherence and failed to compile these measures. Hence the researchers decided to estimate the prevalence of diet and fluid non-adherence using both subjective and objective measures.

III. METHODOLOGY

Objectives

The objective of the study was to estimate the prevalence of diet and fluid non-adherence among adult patients undergoing hemodialysis.

Methods

Study design

The data on the prevalence of diet and fluid non-adherence were collected in a cross-sectional manner as the baseline information of a randomized controlled trial to assess the efficacy of nurse-led interventions on adherence to diet and fluid restrictions in adult patients undergoing hemodialysis (**Trial registration:** CTRI/2019/06/019894)

Study setting and population

The study was conducted in the dialysis unit of a tertiary care hospital in south India. The population of this study included the outpatients of end-stage renal disease patients undergoing hemodialysis. The baseline data on the prevalence of non-adherence was assessed from May 2019 to January 2021.

Sampling technique and sample size

A purposive sampling technique was adopted for the study. Eligible ESRD patients who were undergoing maintenance HD in the dialysis unit were sequentially recruited to the study. In this study, a sample size of 110 was estimated using the Openepi software with 80% power and a 5% significance level to achieve the maximum effect at 80%.

Eligibility criteria for recruitment

Individuals aged between 20 and 80 years with a medical diagnosis of ESRD and undergoing maintenance hemodialysis at least for the last 3 consecutive months, able to read and understand the language Malayalam or English, alert and oriented during HD, able to communicate with the researcher were included in this study. Patients, who were not willing to participate in the intervention, with a medical diagnosis of functional psychosis or organic brain disorders, with compromised cognitive functions, any sensory impairment, excluded from this study.

Ethical consideration

The permission was taken from the institute's ethical committee to conduct the study(NIMS/IEC/2019/01/01). Participation of subjects in the study was purely voluntary. It was informed and guaranteed that the participants had full right to refuse or withdraw from the study at any stage, and it would not affect their nursing and medical care in any means.

Measurements and scoring

The tool consists of 2 sections. Section I- includes socio-demographic and clinical data of the subjects. The following demographic information was collected through a self-reported questionnaire before initiating the NLI viz: age, gender, education, marital status, employment, household income, duration of CKD, and HD. Additionally, clinical-



symptomatology variables (level of edema, fatigue, muscle cramps, dyspnea, pruritis, and blood pressure) and some biochemical parameters (serum sodium, creatinine, urea, calcium, uric acid, and hemoglobin) were also measured. Section II included the measurement of both subjective and objective parameters of non-adherence to dietary and fluid restrictions. The subjective adherence was measured using the self-reported dialysis diet and fluid non-adherence questionnaire (DDFQ) and the objective adherence was measured using anthropometric & biochemical parameters (inter-dialytic weight gain, serum potassium, and serum phosphorus).

The DDFQ is a self-report tool developed by Vlaminck et al to measure the behaviours associated with adherence behaviour to diet and fluid restrictions in HD patients.[17] It has four subscales, two of which are concerning diet non-adherence (frequency and severity), while the other two are for fluid non-adherence (frequency and severity). The number of non-adherent days in the previous two weeks was used by the participants to determine the frequency of NA to diet and fluid [17]. The severity of non-adherence was also graded on a 5-point Likert scale ranging from 0 (no) to 5 (very severe).

The objective parameters of non-adherence (NA) were carefully selected based on the guideline of the National kidney foundation and evidence from the related literature.[18–22] This study included interdialytic weight gain (IDWG) as an objective parameter of NA to fluid restriction. IDWG is a strong predictor of mortality in HD patients. Many studies reported that IDWG is directly associated with fluid control status among HD patients.[23–26] For this study, the objective NA to fluid restrictions was defined as interdialytic weight gain (IDWG) > 2.5kg. In this study, IDWG was defined as the difference between pre-dialytic weight and the weight at the end of the last dialysis session.[21,25,27]. In this study, a pre-dialytic serum value of either phosphorus (P) level > 5.5 mg/dl or potassium (K) level > 5.5 mEq/L or both were considered as the definition of objective NA to dietary restriction in HD patients.[19,21,25,27–29]

Data collection procedure

Researchers identified the participants sequentially, introduced themselves, and explained the purpose of the study. The data was collected during the HD session. Informed consent was obtained and the subjects were interviewed by using structured questionnaires. A face-to-face interview was employed to collect data from participants. The data on non-adherence was collected using the structured self-reported questionnaire. Biochemical and clinical data were collected from the patients, medical records.

Data analysis

SPSS version 21 was used to analyse the data. The Kolmogorov-Smirnov (KS) test was used to examine the distribution of continuous data. For normally distributed continuous data, the mean and standard deviation (SD) were used, whereas, for variables that were not distributed normally, the median and interquartile range were used. For analysis purposes, the study subjects were categorized as adherent or non-adherent to diet and fluid prescriptions based on subjective and objective parameters. The calculation was as follows: the subjective dietary non-adherence was a composite score of the number of non-adherent days and the degree of deviation from the dietary prescription (frequency X severity). Similarly, the subjective non-adherence to fluid was a composite score of the number of non-adherent days and the degree of deviation from the fluid prescription (frequency X severity). These calculations were made from the DDFQ tool. The composite score ranged from 0 (adherent) to 56 (severe non-adherence). A score of zero was considered as adherent and above zero was considered as non-adherent to diet and fluid.

IV. RESULTS

Table 1: Socio-demographic profile of subjects

Variables	Total n=110(%)
Age category	
<45 years	24(21.8)
>45 years	86(78.2)
Gender	
Male	78(70.9)
Female	32(29.1)
Educational status	
No formal education	4(3.6)
High school	45(40.9)

Graduate	52(47.3)
Postgraduate	9(8.2)
Marital status	
Married	101(91.8)
Unmarried	8(7.3)
Others	1(0.9)
Type of residence	
Urban	15(13.6)
Semi-urban	60(54.5)
Rural	35(31.8)
Type of family	
Nuclear family	94(85.5)
Joint family	16(14.5)
Employment status	
Currently working	43(39.1)
Currently not working	67(60.9)
Patient's socioeconomic status (Rs. per month)	
<10000	6(5.5)
10001-25,000	43(39.1)
25,001-50,000	54(49.1)
>50,000	7(6.4)
Mean age (years)	55.04±12.37

The mean age of the participants was 55.04±12.37 years and ranged from 23 to 79 years. Most of the participants were above 45 years of age (78.2%), 70.9% were males, 47.3% were graduates, 91.8% were married, 54.5% were living in semi-urban areas, 85.5% were having nuclear families, 60.9% were currently not working, and 49.1% were having monthly income between Rs. 25001 to 50,000.

Table 2: Baseline clinical-symptomatology of subjects

Variables	Total n=110(%)
Edema	
Absent	5(4.5)
Mild	45(40.9)
Moderate	46(41.8)
Severe	11(10.0)
Very severe	3(2.7)
Fatigue	
Absent	3(2.7)
Mild	45(40.9)
Moderate	44(40.0)
Severe	18(16.4)
Muscle cramp	
Absent	24(21.8)
Mild	53(48.2)
Moderate	25(22.7)
Severe	8(7.3)
Dyspnea	
Absent	21(19.1)
Only with strenuous exercise	49(44.5)
When hurrying	21(19.1)
While walking	13(11.8)
Stops walking for breath	6(5.5)
Pruritis	
Absent	41(37.3)
Mild	52(47.3)
Moderate	14(12.7)



Severe	3(2.7)
Inter dialytic weight gain(Mean±SD)	2.79±0.49
Duration of kidney disease (months): Median (IQR)	39(24-60.25)
Duration of undergoing hemodialysis(months): Median (IQR)	21.5(10-36.25)
Pre HD SBP (Mean±SD)	148.05±19.81
Pre HD DBP (Mean±SD)	85.09±7.69

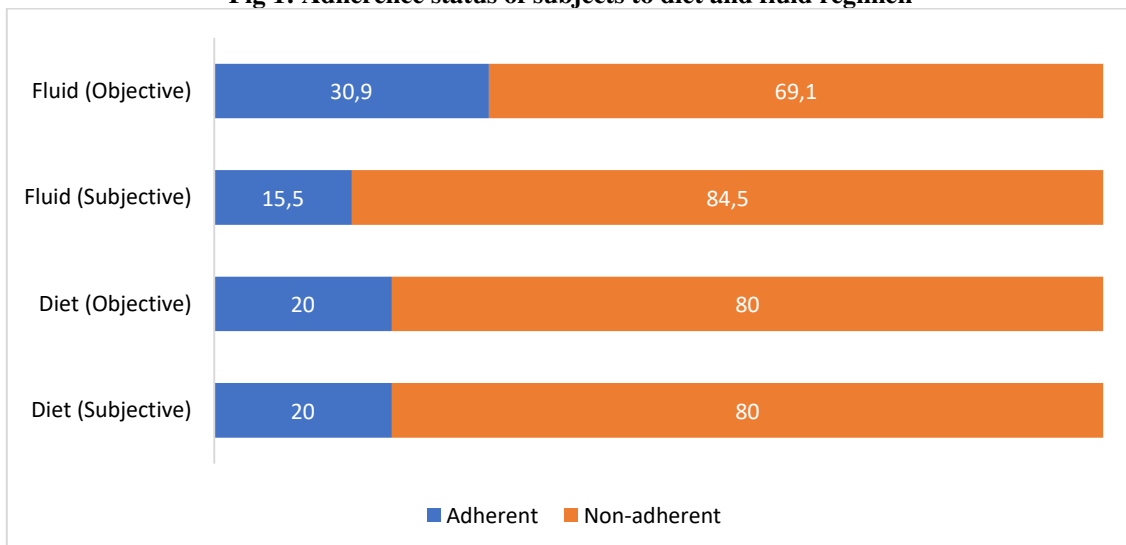
As shown in Table 2, of the 110 study participants, 41.8% were having a moderate degree of edema, 40.9% were having mild fatigue, 48.2% were having mild cramps, 44.5% were having dyspnea only with strenuous activities, and 47.3% were having mild pruritis. The mean IDWG, SBP, and DBP were 2.79±0.49 kg, 148.05±19.81 mmHg, and 85.09±7.69 mmHg respectively. The median duration of CKD and HD was 39(24-60.25) and 21.5(10-36.25) months respectively.

Table 3: Baseline serum biochemical profile of subjects

Variables	Total n=110(%)
Sodium	138.11±4.1
Potassium	5.77±1.02
Creatinine	10.98±2.56
Urea	128.31±40.42
Hemoglobin	7.57±1.45
Calcium	8.31±0.72
Phosphorous	6.25±1.23
Uric acid	7.16±1.45

The mean value of serum sodium, potassium, creatinine, urea, hemoglobin, calcium, phosphorous, and uric acid was 138.11±4.1 meq/l, 5.77±1.02 meq/l, 10.98±2.56 mg/dl, 128.31±40.42 mg/dl, 7.57±1.45 g/dl, 8.31±0.72 g/dl, 6.25±1.23 mg/dl, and 7.16±1.45 mg/dl respectively.

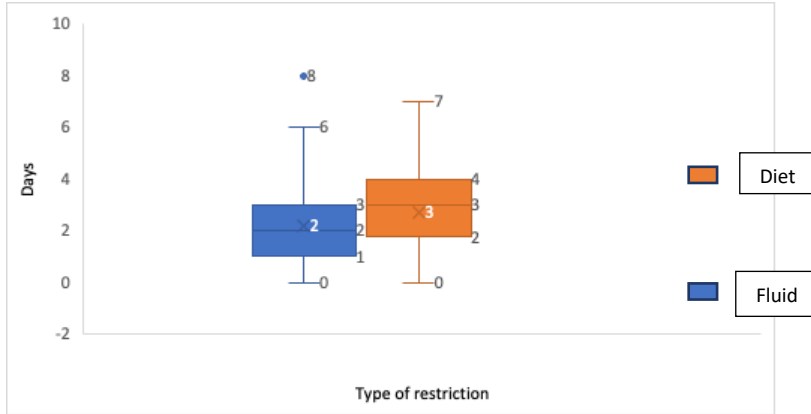
Fig 1: Adherence status of subjects to diet and fluid regimen



As shown in Figure 1, 80% of the study subjects were not adherent to prescribed diet regimens based on both subjective and objective parameters. With regard to fluid restriction, 84.5% and 69.1% were not adherent to fluid regimen according to subjective and objective measures respectively.

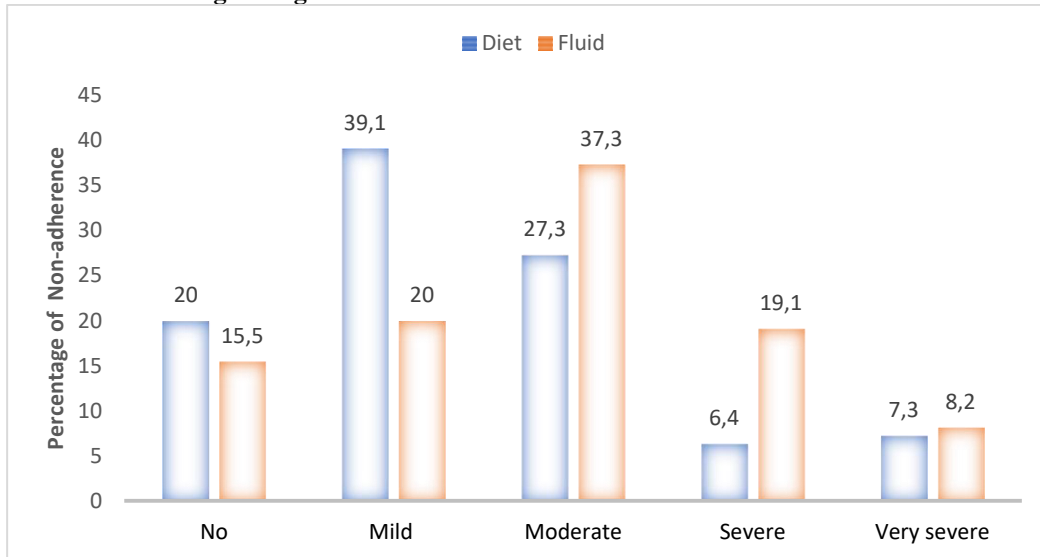


Fig. 2: Median days of non-adherence to diet and fluid restrictions



As shown in Figure 2, the median (IQR) frequency of diet and fluid non-adherence in the last 14 days before data collection was 2(1-3) and 3(2-4) respectively.

Fig.3: Degree of non-adherence to diet and fluid restrictions



Of the 110 study subjects (**Fig 3**), 7.3% very severely deviated from the diet restriction whereas, 8.2% very severely deviated from the fluid prescriptions. 66.4% were having mild to moderate degrees of non-adherence with diet restriction and 56.4% were with moderate to severe degrees of fluid non-adherence.

V. DISCUSSION

The current study was conducted to estimate the prevalence of diet and fluid non-adherence in adults undergoing hemodialysis. Hemodialysis is the most sought-after treatment modality for ESRD as renal transplant is not always possible because of constraints like non-availability, inadequate infrastructure, and financial derisory. Adherence to diet and fluid restrictions are mandatory to bring down morbidity and mortality among dialysis patients.



In our study, it is revealed that 80% were not adherent to dietary restriction as estimated by both subjective and objective measures. Whereas, 84.5% and 69.1% were not adherent with fluid restrictions as assessed by subjective and objective methods respectively. 66.4% were having mild to moderate degree of non-adherence with diet restriction and 56.4% were with moderate to severe degree of fluid non-adherence. This result shows criticality of the situation. The contributing factors for such higher-level non-adherence could be financial constraints, lack of knowledge and motivation, and scarcity of resources. In this study, the median duration of dietary and fluid non-adherence was 2 (1-3) and 3 (2-4) days respectively in the last 14 days before data collection. This alarming condition indicates the need for a vital role to be played by the dialysis caring team as an active educator, counsellor, and motivator.

According to Anson et al, more than half of hemodialysis patients are non-adherent in some way within a month, and up to 70% of patients fail to effectively control their fluid intake.[30]. Using the self-report DDFQ, Khalil et al found that half of the patients (50%) reported non-adherence to fluid restriction, and almost half (44%) perceived themselves to be non-adherent to dietary restrictions, which is lower than the higher prevalence shown in the current study. According to the same study, only 9% of patients were non-adherent to fluid prescriptions when measured by mean interdialytic weight gain; however, our study found that 69.1% of patients were non-adherent to fluid prescriptions as measured by IDWG. When serum potassium, phosphorus, and BUN were used as predictors of dietary adherence, 56 percent of the patients were non-adherent to dietary restrictions, whereas, in the current study, it was 80 percent.[14].

Beerappa and Chandrababu in their study stated that the good adherence rate was 46.6%, and fair adherence was 51.6% for fluid restrictions, whereas, 60–68.3% good adherence, and 20–30% fair adherence for dietary restrictions[16]. This study shows that the HD patients are non-adherent at varying levels with the dietary and fluid restrictions imposed by the health care team. This study emphasizes the importance of developing certain specific strategies to enhance their knowledge and the need to adopt behavioural changes to be stringent with treatment modalities. Non-adherence to diet and fluid restriction is a significant factor contributing to mortality and morbidity among CKD patients. The nursing workforce has a tremendous role to enhance patients' knowledge through systematically developed teaching-learning sessions and also motivating them to be in line with diet and fluid restriction. This study estimated that the prevalence of non-adherence is very severe among hemodialysis patients. Hence it recommends the nursing fraternity find out specific interventions to resolve this problem and the efficacy of such intervention should be verified through high-quality randomized controlled trials.

VI. CONCLUSION

This study shows that very few patients undergoing hemodialysis are adherent to fluid and dietary restrictions. This finding signifies the importance of developing new interventions to improve adherence. The dialysis nurses must give continuous dialysis-specific education and motivation to the concerned patients. The study should be taken as an eye-opener in the existing boom of non-adherence and randomized clinical trials to be carried out to establish standardized interventions to enhance strict adherence among hemodialysis patients.

REFERENCES

1. Wang H, Naghavi M, Allen C, et al.: Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet*. 2016, 388:1459–544. 10.1016/S0140-6736(16)31012-1
2. Neuen BL, Chadban SJ, Demaio AR, Johnson DW, Perkovic V: Chronic kidney disease and the global NCDs agenda. *BMJ Glob Health*. 2017, 2:e000380. 10.1136/bmjgh-2017-000380
3. Jha V, Modi G: Uncovering the rising kidney failure deaths in India. *The Lancet Global Health*. 2017, 5:e14–5. 10.1016/S2214-109X(16)30299-6
4. Singh AK, Farag YM, Mittal BV, et al.: Epidemiology and risk factors of chronic kidney disease in India – results from the SEEK (Screening and Early Evaluation of Kidney Disease) study. *BMC Nephrology*. 2013, 14:114. 10.1186/1471-2369-14-114
5. Varma PP: Prevalence of chronic kidney disease in India - Where are we heading? *Indian J Nephrol*. 2015, 25:133–5.
6. Raj R, Ahuja KD, Frandsen M, Jose M: Symptoms and their recognition in adult haemodialysis patients: Interactions with quality of life. *Nephrology (Carlton)*. 2017, 22:228–33. 10.1111/nep.12754
7. Kistler BM, Fitschen PJ, Ikizler TA, Wilund KR: Rethinking the restriction on nutrition during hemodialysis treatment. *J Ren Nutr*. 2015, 25:81–7. 10.1053/j.jrn.2014.08.008



8. Mollaoğlu M, Kayataş M: Disability is associated with nonadherence to diet and fluid restrictions in end-stage renal disease patients undergoing maintenance hemodialysis. *Int Urol Nephrol*. 2015, 47:1863–70. 10.1007/s11255-015-1102-1
9. Vijay VR, Kang HK: Efficacy of nurse-led interventions on dialysis-related diet and fluid non-adherence and morbidities: protocol for a randomized controlled trial. *Journal of Global Health Reports*. 2019, 3:e2019083. 10.29392/joghr.3.e2019083
10. Benner D, Burgess M, Stasios M, Brosch B, Wilund K, Shen S, Kistler B: In-Center Nutrition Practices of Clinics within a Large Hemodialysis Provider in the United States. *Clin J Am Soc Nephrol*. 2016, 11:770–5. 10.2215/CJN.09270915
11. Chen SS, Al Mawed S, Unruh M: Health-Related Quality of Life in End-Stage Renal Disease Patients: How Often Should We Ask and What Do We Do with the Answer? *Blood Purif*. 2016, 41:218–24. 10.1159/000441462
12. Victoria A, Evangelos F, Sofia Z: Family Support, Social and Demographic Correlations of Non-Adherence among Haemodialysis Patients. *American Journal of Nursing Science*. 2015, 4:60. 10.11648/j.ajns.s.2015040201.21
13. Khalil AA, Darawad M, Al Gamal E, Hamdan-Mansour AM, Abed MA: Predictors of dietary and fluid non-adherence in Jordanian patients with end-stage renal disease receiving haemodialysis: a cross-sectional study: *Dietary and fluid nonadherence and hemodialysis*. *J Clin Nurs*. 2013, 22:127–36. 10.1111/j.1365-2702.2012.04117.x
14. Khalil AA, Darawad MW: Objectively measured and self-reported nonadherence among Jordanian patients receiving hemodialysis: Dietary and fluid nonadherence. *Hemodial Int*. 2014, 18:95–103. 10.1111/hdi.12093
15. Ahrari S, Moshki M, Bahrami M: The Relationship Between Social Support and Adherence of Dietary and Fluids Restrictions among Hemodialysis Patients in Iran. *Journal of Caring Sciences*; EISSN 2251-9920. Published Online First: 2014. 10.5681/jcs.2014.002
16. Beerappa H, Chandrababu R: Adherence to dietary and fluid restrictions among patients undergoing hemodialysis: An observational study. *Clinical Epidemiology and Global Health*. 2019, 7:127–30. 10.1016/j.cegh.2018.05.003
17. Vlaminc H, Maes B, Jacobs A, Reyntjens S, Evers G: The dialysis diet and fluid non-adherence questionnaire: validity testing of a self-report instrument for clinical practice. *J Clin Nurs*. 2001, 10:707–15. 10.1046/j.1365-2702.2001.00537.x
18. Clinical Practice Guidelines for Hemodialysis Adequacy, Update 2006. *American Journal of Kidney Diseases*. 2006, 48:S2–90. 10.1053/j.ajkd.2006.03.051
19. Kugler C, Maeding I, Russell CL: Non-adherence in patients on chronic hemodialysis: an international comparison study. *J Nephrol*. 2011, 24:366–75. 10.5301/JN.2010.5823
20. Matteson ML, Russell C: Interventions to improve hemodialysis adherence: A systematic review of randomized-controlled trials. *Hemodialysis International*. 2010, 14:370–82. <https://doi.org/10.1111/j.1542-4758.2010.00462.x>
21. Mellon L, Regan D, Curtis R: Factors influencing adherence among Irish haemodialysis patients. *Patient Education and Counseling*. 2013, 92:88–93. 10.1016/j.pec.2013.01.023
22. Ozen N, Cinar FI, Askin D, Mut D, Turker T: Nonadherence in Hemodialysis Patients and Related Factors: A Multicenter Study. *Journal of Nursing Research*. 2019, 27:e36. 10.1097/jnr.0000000000000309
23. Flythe JE: Turning the Tide: Improving Fluid Management in Dialysis through Technology. *JASN*. 2017, 28:2260–2. 10.1681/ASN.2017050491
24. Hecking M, Moissl U, Genser B, et al.: Greater fluid overload and lower interdialytic weight gain are independently associated with mortality in a large international hemodialysis population. *Nephrol Dial Transplant*. 2018, 33:1832–42. 10.1093/ndt/gfy083
25. Ozen N, Cinar FI, Askin D, Mut D, Turker T: Nonadherence in Hemodialysis Patients and Related Factors: A Multicenter Study. *J Nurs Res*. 2019, 27:e36. 10.1097/jnr.0000000000000309
26. Tamaura Y, Nishitani M, Akamatsu R, et al.: Association Between Interdialytic Weight Gain, Perception About Dry Weight, and Dietary and Fluid Behaviors Based on Body Mass Index Among Patients on Hemodialysis. *J Ren Nutr*. 2019, 29:24–32.e5. 10.1053/j.jrn.2018.04.009
27. Ghahfarokhi MM, Mohammadian S, Nezhad BM, Kiarsi M: Relationship between spiritual health and hope by dietary adherence in haemodialysis patients in 2018. *Nursing Open*. 2020, 7:503–11. <https://doi.org/10.1002/nop2.412>
28. Esmaeil R, Ahmadi H, Jannati Y, Khalilian A, Espabodi F: The relationship between perceived social support and self- efficacy with diet adherence among hemodialysis patient. *Avicenna Journal of Nursing and Midwifery Care*. 2013, 21:59–67.
29. Kugler C, Vlaminc H, Haverich A, Maes B: Nonadherence With Diet and Fluid Restrictions Among Adults Having Hemodialysis. *Journal of Nursing Scholarship*. 2005, 37:25–9. 10.1111/j.1547-5069.2005.00009.x
30. Anson HM, Byrd MR, Koch EI: Cognitive behavioral treatment to improve adherence to hemodialysis fluid restrictions: a case report. *Case Rep Med*. 2009, 2009:835262. 10.1155/2009/835262



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