Hemodialysis Patients' Compliance and Adherence Behaviors to Renal Replacement Therapy in Two Dialysis Centers in Iloilo City

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Abstract

Introduction: Approximately 120 per million population develop kidney failure, translating to about 10,000 Filipinos needing to replace their kidney function per year. If without the appropriate intervention, those having kidney failure will surely die. The study aims to evaluate the compliance of hemodialysis (HD) patients to renal replacement therapy (RRT) in two dialysis centers in Iloilo City, and to compare the prevalence of non-adherence in between groups.

Methods: A cross-sectional study where subjects answered the End-Stage Renal Disease–Adherence Questionnaire (ESRD-AQ).

Results: Of the 102 patients, 59.8% (n=61) were enrolled. The mean age was 47 years with average HD vintage of 30 months. More females were non-adherent to HD treatment, 17.1% vs.15.4%; whereas more males were non-adherent to the remainder descriptors (medications, 11.5% vs. 8.6%; fluid restriction, 23.1% vs. 17.1%; and diet recommendations 30.8% vs. 25.7%). There were less non-adherent patients than adherent ones (HD attendance, 9,803.92 vs. 50,000; medications, 5,882.35 vs. 53,921.57; fluid restriction, 11,764.71 vs. 48,039.22; and diet, 16,666.67 vs. 43,137.25 per 100,000). There were significant differences in their behaviors toward HD attendance (p=0.000); shortening of HD treatment (p=0.000); duration of shortening HD (p=0.000); adherence to medications (p=0.000); to fluid (p=0.000); and to diet (p=0.000). Both groups demonstrated the same level of perception and understanding towards the importance of HD (p=0.306 and 0.096, respectively). There was no significant difference in their perception to medications (p=0.427); however, figures illustrate a significant difference in their levels of understanding towards its importance (p=0.001). Adherent subjects have better perception and understanding in fluid restriction regimen and dietary recommendations as data show significant differences in between groups (p=0.000 and 0.000; and p=0.001 and 0.004, respectively).

Conclusion: The compliance of adherent subjects to HD treatment, medications, fluid restriction protocol and dietary recommendations was more adequate. The non-adherent subjects were less prevalent than adherent subjects.

Keywords: renal replacement therapy, end-stage renal disease adherence questionnaire, adherence behaviors and compliance

Introduction

Registries in the United States and Europe scale show increasing prevalence and incidence rates of end-stage renal disease (ESRD). The prevalence being 479 to 1,500 cases per million inhabitants and the incidence being 75 to 308 cases per million inhabitants depending on the region studied.[1,2] In 2008, archives from the Philippine National Statistics Office revealed kidney diseases as the 10th leading cause of morbidity and mortality.[3] From being comparable to Southeast-Asian neighbors, the Philippines having been regarded as a chronic kidney disease (CKD) country, is now leading in incidence at 2.6 per 100,000 in 2003 to 9.75 per 100,000 having the in 2008.[4] According to the Philippine Renal Disease Registry (2009), diabetes mellitus (DM) was responsible for 42% of kidney diseases among dialysis patients, while hypertension contributed another 25%, closely followed by kidney inflammation at 20%, with slight male preponderance at 57% and with a mean age of 53 years.[4,5] Approximately 120 per million population develop kidney failure, translating to about 10,000 Filipinos needing to replace their kidney function per year. Of these, around 86% undergo dialysis, whereas only about 14% could afford transplantation, as these treatments are expensive.[5,6] If without the appropriate intervention–either renal replacement therapy (RRT) or kidney transplantation, those having kidney failure will surely die.[5] Emerging evidence suggest that patient noncompliance with treatment regimen undermines the effectiveness of medical care that more often than not results in progression of the primary disease which frequently leads to development of more

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complications.[7] Likewise, foregoing data indicate that negative perception of disease and non-adherence to the recommended treatment may lead to unfavorable clinical outcomes in patients on maintenance hemodialysis (HD). However, there seems to be a paucity of researches that addresses clinical outcomes in the end stage renal disease population as a function of patients' illness perceptions and their degree of adherence to recommended treatment.[8]

In the United States, over 485,000 people have CKD, a progressive kidney disease that may lead to HD. Hemodialysis involves a complex regimen of treatment, medication, fluid, and diet management.[8] Patients who are on dialysis are well suited for studying compliance with therapy because treatment is prolonged and intensive, and medical regimens are clear cut and easily determined with objective measures.[7] Khalil, et al. (2010) indicated that depressive symptoms are the most common psychological complication among patients with ESRD. Only little is known about the mechanisms responsible for this association; however, depressive symptoms are considered a risk factor for increased morbidity and mortality.[9] Also, other data show that ESRD patients who are on maintenance HD with negative discernments of the condition, and who are non-adherent to the recommended treatment may succumb to unfavorable clinical outcomes.[10] In 2005, over 312,000 patients were underwent HD in the United States, where dialysis non-adherence rates range from 8.5% to 86%.8 Moreover, noncompliant behavior by these dialysis patients not only endangers their life in the long run, but also results in negative effects within a day or two. Despite severe consequences, noncompliance with their medical regimen is the norm for dialysis patients rather than the exception.[7] According to Bame, et al. (1993), arbitrary progression of the primary disease and a greater likelihood of complications can result from patient nonconformity with treatment regime, which in turn emasculates the effectiveness of medical care. Dialysis therapy treatment non-adherence, including treatment, medication, fluid, and diet non-adherence, significantly increases the risk of morbidity and mortality.[8] There is a great paucity of research which addresses clinical outcomes in the ESRD population, and the correlation between: the patients' perceptions of their illness, and their degree of adherence to recommended treatment, hence this study.

The results of this study will benefit all ESRD patients. It will put forward strategies for provision of better medical care thereby improving the quality life of their ESRD patients. This can enhance compliance to the prescribed treatment regimen, thus translating into lesser complications. This may lead to patients resuming their work if they are still able. Also, health care providers will similarly be aided in entertaining lesser morbid complications which arise from non-adherence to the treatment protocol; increase their awareness of the issues that surround these patients, paving way for improvement in the delivery of the health care system, and address these issues that can be controlled to promote better adherence.

Administrative bodies can likewise gain knowledge of the drawbacks and difficulties encountered by these patients, who happen to be are on the receiving end of the paradigm; such that, this study can light the way in the formulation of an improved guideline for better health care delivery.

The general objective of this study is to evaluate the compliance of HD patients' to RRT in two dialysis centers in Iloilo City, and to compare the prevalence of non-adherence in between groups. Specifically, to compare the adherence behaviors of HD patients among two dialysis centers, with the following as subsets: HD treatment attendance, medications, fluid restrictions, and diet recommendations; and to compare dialysis patients' perception, and levels of understanding to treatment adherence behaviors.

Methods

This is a cross-sectional, analytic study that will be done in two HD centers in Iloilo City. The end-stage renal disease adherence questionnaire (ESRD-AQ) was utilized in one session. A minimum sample size of 43 is required to detect a significant difference at a power of 0.9 with 95% confidence using the G*Power Version 3.1.5.

Inclusion criteria

A subject will be eligible for inclusion in this study if all of the following criteria apply at baseline:

1. 19-years-old and above
2. diagnosed with ESRD and treated with HD for at least 3 months
3. received HD for three to four hours per session, at least once a week
4. independent and performs self-care activities (such as ability to walk and eat without assistance);
5. Iliving in a home setting
6. subject or his/her legally acceptable representative is willing to provide written informed consent

Exclusion criteria

1. on peritoneal dialysis
2. uremic patients who are not able to give informed consent
3. patients who are not able to answer the questionnaire

Data collection technique

Eligible participants completed the ESRD-AQ for patients requiring in-center HD. A paper-and pencil instrument designed to measure HD patients' treatment adherence behaviors in four dimensions: HD attendance, medication

use, fluid restrictions, and diet recommendations.[11] Kim et al. (2010) generated the items based on in-depth literature reviews and in consultation with clinical experts, such as nephrologists and nephrology researchers, HD nurses, and renal dietitians. This questionnaire consists of 46 questions/items divided into five sections. The first section pursues general information about patients' ESRD and RRT-related history (five items), and the remaining four sections ask about treatment adherence to HD treatment (14 items), medications (nine items), fluid restrictions (10 items), and diet recommendations (eight items).

Scoring system of individual item in the questionnaire

A panel of expert clinicians and patients confirmed content and face validity of the tool. Seven experts (two nephrologists, a nurse practitioner, two HD nurses, and two renal dietitians) with extensive clinical and research experience in the care for patients with ESRD on maintenance HD were invited to assess content validity of the ESRD-AQ. Moreover, all scale scores were able to discriminate clearly between adherent and nonadherent patients, indicating that the instrument is a valid measure of adherence behaviors.

In addition, the ESRD-AQ adjusts scores for question numbers 14 ("During the last month, how many complete dialysis treatments did you miss?"), 18 ("During the last month, when your dialysis treatment was shortened, what was the average numbers of minutes?"), and 26("During the past week, how often have you missed your prescribed medicines?"), depending on the reasons for not adhering. For example, patients with medical reasons for missing or shortening the HD treatment (such as having HD access problems or physical symptoms during HD) obtained a full score.[11]

Interpretation of scores from among the questions

The adherence behavior subscale is scored by adding the responses to questions 14, 17, 18, 26, and 46. The weighting system for scores was determined based on the degree of importance relevant to clinical outcome of each dimension. For example, missing or shortening HD has been reported to have a stronger association with mortality of patients with ESRD than other components of adherence behavior; therefore, it was given more weight in computing the adherence scores.[12,13]

Translation of the questionnaire to local dialect

For better comprehension among the local respondents, this questionnaire was translated to the dialect "Hiligaynon". It was pilot tested randomly among the CKD patients (n=30) confined in the different wards of this medical center, namely medical, surgical and obstetrics/gynecology ward.

Table I. Demographic profile of hemodialysis patients enrolled in this study

Demographic Profile	n (%)
Total number of patients on hemodialysis	102
Hospital-based kidney unit Free-standing dialysis center	23 (22.5) 79 (77.5)
Total number of patients enrolled	61 (59.8)
Hospital-based kidney unit Free-standing dialysis center	15/61 (24.6) 46/61 (75.4)
Gender	
Males Females	26 (42.6) 35 (57.4)
Mean age ± SD (years)	47.57 ± 12.41
Age range (years)	22 – 76
Mean vintage months ± SD (months)	30.18 ± 33.80
Vintage range (months)	7 – 200

Data Analysis

All analyses were performed using SPSS version 20.0 and Epi Info™ Version 7.0. Prevalence and other frequency measures were used to analyze qualitative data, whereas t-test and Mann Whitney U were used in the quantitative data analysis.

Ethical Considerations

In obtaining and documenting informed consent, adherence to ICH GCP guideline E6 and to the ethical principles that have their origin in the declaration of Helsinki. Prior to the beginning of the trial, the ethics review committee's written approval/favorable opinion of the protocol, written informed consent form and any other written information to be provided to the subjects. Before any trial-related procedure begins, written informed consent must be obtained from the subject or his/her legally acceptable representative. All research data will be confidential.

Results

There were a total of 102 patients were having HD treatments at the Hospital-based Kidney Unit (n=23), and at free-standing Dialysis Center (n=79). However, 59.8% (n=61) patients satisfied the inclusion criteria and completed the ESRD-AQ.

As shown in Table I, more than 75% of the participants in this study came from the freestanding HD center. Females constitute 57.4% (n=35) of the sample. The mean age of the subjects was 47.57 years ± 12.41 (standard deviation (SD)), with age range noted at 22 to 76 years. Since the start of maintenance HD, the participants in this study had

Table II. Sociodemographic data of study participants: adherers vs. non-adherers

Adherence Area Descriptor	Hemodialysis A(n)/B(n) = 51/10		Medication A(n)/B(n) = 55/6		Fluid A(n)/B(n) = 49/12		Diet A(n)/B(n) = 44/17	
	A n (%)	B n (%)	A n (%)	B n (%)	A n (%)	B n (%)	A n (%)	B n (%)
Gender								
Male	22 (84.6)	4 (15.4)	23 (88.5)	3 (11.5)	20 (76.9)	6 (23.1)	18 (69.2)	8 (30.8)
Female	29 (82.9)	6 (17.1)	32 (91.4)	3 (8.6)	29 (82.9)	6 (17.1)	26 (74.3)	9 (25.7)
Age								
Young	8 (80.0)	2 (20.0)	9 (90.0)	1 (10.0)	6 (60.0)	4 (40.0)	5 (50.0)	5 (50.0)
Middle-aged	38 (86.4)	6 (13.6)	40 (90.9)	4 (9.1)	37 (84.1)	7 (15.9)	34 (77.3)	10(22.7)
Older	5 (71.4)	2 (28.6)	6 (85.7)	1 (14.3)	6 (85.7)	1 (14.3)	5 (71.4)	2 (28.6)
Education level								
High school or lower	1 (2.0)	0 (0.0)	1 (1.8)	0 (0.0)	1 (2.0)	0 (0.0)	0 (0.0)	1 (5.9)
Vocational school	3 (5.9)	0 (0.0)	3 (5.5)	0 (0.0)	2 (4.1)	1 (8.3)	2 (4.6)	1 (5.9)
Some college	8 (15.7)	1 (10.0)	8 (14.5)	1 (16.7)	8 (16.3)	1 (8.3)	6 (13.6)	3 (17.6)
College graduate or higher	39 (76.4)	9 (90.0)	43 (78.2)	5 (83.3)	38 (77.6)	10 (83.3)	36 (81.8)	12 (70.6)
Marital status								
Never married	9 (17.6)	0 (0.0)	9 (16.4)	0 (0.0)	6 (12.2)	3 (25.0)	6 (13.6)	3 (17.6)
Married	39 (76.5)	10 (100)	43 (78.1)	6 (100)	40 (81.6)	9 (75.0)	36 (81.8)	13 (76.5)
Separated, widowed	3 (5.9)	0 (0.0)	3 (5.5)	0 (0.0)	3 (6.1)	0 (0.0)	2 (4.5)	1 (5.9)
Current employment								
Yes	7 (13.7)	1 (10.0)	8 (14.5)	0 (0.0)	6 (12.2)	2 (16.7)	6 (13.6)	2 (11.8)
No	44 (86.3)	9 (90.0)	47 (85.5)	6 (100)	43 (87.8)	10 (83.3)	38 (86.4)	15 (88.2)
Cause of kidney failure								
Diabetes mellitus	22 (43.1)	5 (50.0)	26 (47.3)	1 (16.7)	22 (44.9)	5 (41.7)	20 (45.5)	7 (41.2)
Hypertension	14 (27.5)	3 (30.0)	15 (27.3)	2 (33.3)	14 (28.6)	3 (25)	14 (31.8)	3 (17.6)
Glomerulonephritis	11 (21.6)	2 (20.0)	10 (18.1)	3 (50.0)	10 (20.4)	3 (25)	7 (15.9)	6 (35.3)
Others	4 (7.8)	0 (0.0)	4 (7.3)	0 (0.0)	3 (6.1)	1 (8.3)	3 (6.8)	1 (5.9)
HD vintage (months)								
Mean ± SD	5.7 ± 1.6	1.2 ± 0.4	6.0 ± 1.4	0.8 ± 0.4	5.5 ± 1.5	1.5 ± 0.5	4.9 ± 1.4	1.9 ± 0.6
Range	7 – 200	21 – 65	7 – 200	21 – 65	7 – 200	21 – 65	7 – 200	21 – 65

Table III. Chi-square tests for adherence of hemodialysis patients to the respective descriptors in this study when grouped according to age

Adherence area descriptor	Hemodialysis A(n)/B(n) = 51/10		Medication A(n)/B(n) = 55/6		Fluid A(n)/B(n) = 49/12		Diet A(n)/B(n) = 44/17	
	A n (%)	B n (%)	A n (%)	B n (%)	A n (%)	B n (%)	A n (%)	B n (%)
Young	8 (80.0)	2 (20.0)	9 (90.0)	1 (10.0)	6 (60.0)	4 (40.0)	5 (50.0)	5 (50.0)
Middle-aged	38 (86.4)	6 (13.6)	40 (90.9)	4 (9.1)	37 (84.1)	7 (15.9)	34 (77.3)	10(22.7)
Older	5 (71.4)	2 (28.6)	6 (85.7)	1 (14.3)	6 (85.7)	1 (14.3)	5 (71.4)	2 (28.6)
Total	51 (83.6)	10 (16.4)	55 (90.2)	6 (9.8)	49 (80.3)	12 (19.7)	44 (72.1)	17 (27.9)
χ^2	1.10		0.18		3.14		3.02	
df	2		2		2		2	
P value	0.578		0.912		3.028		0.221	

Numbers in parentheses indicate row percentages.

Table IV. One-way ANOVA of respondents adherence to hemodialysis descriptors in this study when grouped according to age

	Sum of squares	df	Mean square	F	*p*-value
Between age groups	7429.3	2	3714.6	119.3	< 0.00001
Within age groups	1805.7	58	31.1		
Total	9234.9	60			

Table V. Point prevalence of hemodialysis patients with the parameter descriptors

Parameter descriptor	Adherent		Non-adherent	
	n (%)	Prevalence rate cases per 100,000	n (%)	Prevalence rate cases per 100,000
Hemodialysis treatment	51 (83.6)	50,000.00	10 (16.4)	9,803.92
Medications	55 (90.2)	53,921.57	6 (9.8)	5,882.35
Fluid restriction protocol	49 (80.3)	48,039.22	12 (19.7)	11,764.71
Diet recommendations	44 (72.1)	43,137.25	17 (27.9)	16,666.67

Table VI. Summary of known group analysis on the questions that specifically address patients' adherence behaviors

Behavior to treatment	Adherers (n)/ Non-adherers (n)	t-test	*p*-value
HD attendance	51/10	- 24.901	0.000
Shortening HD	56/5	- 12.241	0.000
Duration of shortening of HD	52/9	- 20.842	0.000
Adherence to medication	55/6	- 8.382	0.000
Adherence to fluid restrictions	49/12	- 12.857	0.000
Adherence to diet restrictions	44/17	- 10.843	0.000

Table VII. Summary of known group analysis on the questions that address patients' perception and understanding levels of adherence behaviors

Behavior to treatment		Adherers (n)/ Non-adherers (n)	Mann-Whitney U	Z	*p*-value
HD attendance	Perception	51/10	230.000	- 1.024	0.306
	Level of understanding as to importance	51/10	205.000	- 1.664	0.096
Medication	Perception	55/6	131.000	- 1.335	0.427
	Level of understanding as to importance	55/6	38.500	- 3.964	0.001
Fluid restrictions	Perception	49/12	111.000	- 4.004	0.000
	Level of understanding as to importance	49/12	114.000	- 4.445	0.000
Dietary recommendations	Perception	44/17	191.500	- 3.316	0.001
	Level of understanding as to importance	44/17	224.500	- 2.845	0.004

an average HD vintage of 30.18 ± 33.80 (SD) months, the vintage range was from seven to 200 months.

Table II shows that there are more female subjects who were non-adherent to HD treatment as compared to males (n=6 (17.1%) vs. n=4 (15.4%), whereas there were more non-adherent males to the remainder parameter descriptors (medications n=3 (11.5%) vs. n=3 (8.6%); fluid restriction n=6 (23.1%) vs. n=6 (17.1%); and diet recommendations n=8 (30.8%) vs. n=9 (25.7%)) than females. Majority have finished college or higher. More than 75% of these subjects were also married. Likewise, data show that more than 80% of the samples are not employed at present, and a little over 40% of the enrolled patients in this study have diabetes mellitus as the cause of their kidney failure.

Table III shows that majority of the respondents were compliant to their HD schedules (83.6%, $\chi 2 = 1.10$, df = 2, p= 0.578), to the prescribed medications (90.2%, $\chi 2 = 0.18$, df = 2, p= 0.912), to the fluid restriction protocol (80.3%, $\chi 2 = 3.14$, df = 2, p= 3.028), and to the dietary advices (72.1%, $\chi 2 = 3.02$, df = 2, p= 0.221). The result shows that the difference in the compliance among the three age groups: the younger (19 – 35 years old), the middle aged (30 – 60 years old) and the

older (above 60 years old) was not statistically significant. Likewise, Table IV shows that there is a significant difference in the adherence of the respondents to the respective descriptors when grouped according to age ($F(2,58) = 119.3$, $p = <0.00001$).

According to the 2010 Census of Population and Housing by the National Statistics Office, the Province of Iloilo has a population of 2,230,195 comprising about 2.4% of the whole Philippine population (92,337,852). With the aforementioned data, the computed prevalence of HD patients (in two dialysis centers) in Iloilo City is 4.57 cases per 100,000 population (n=102).

Table V demonstrates the point prevalence (PP) of HD patients with the parameter descriptors of this study. There were more adherent subjects to the different parameter descriptors of RRT than non-adherent ones. The prevalence for non-adherence to diet recommendations is 16,666.67 cases per 100,000(n=17,27.9%), whereas the prevalence for non-adherence to medications was only 5,882.35 cases per 100,000.

Table VI shows the summary of known group analysis on the questions that specifically address patients' adherence behaviors. Quantitative data was analyzed using t-test with the *p*-value set to be significant when less than 0.05, while Table VII summarizes the known group analysis on the questions that address patients' perception and understanding levels of adherence behaviors. Mann-Whitney U was determined and the *p*-value was set at less than 0.05 for significance.

Discussion

End-stage renal disease is a growing public health concern and non-adherence to treatment has been associated with poorer health outcomes in this population.[14] The Philippine Renal Disease Registry in its Annual Report for 2011 stated that there was an 8.9% increase in the number of patients on dialysis from 8,922 in 2009 to 9,716 patients in 2010, where 9,133 (94%) were on HD and 583 (six percent) on peritoneal dialysis.[15] The Philippines is a CKD country and since 2008 took lead with 9.75 Filipinos having the disease.

Although HD effectively contributes to long term survival, morbidity and mortality of dialysis patients remains high, more commonly secondary to cardiovascular diseases.[16-20] The 2003 US Renal Data System Annual Report shows that 32% to 33% of patients on HD survive to the fifth year of treatment, and 70% of patients who have kidney transplants are alive after five years.[21] Restriction of certain nutrients, and removal of waste metabolites from the blood by regular dialysis are the two pillars from which a HD regimen is based on. Central to effective management of patients with ESRD is adherence to this therapeutic regimen. Adherence refers to "the extent to which a person's behavior – taking medication, following a diet, and/or executing lifestyle changes - corresponds (to) the agreed recommendations from a health care provider."[22] Successful HD depends on four factors: fluid restriction, dietary guidelines, medication prescriptions, and attendance at HD sessions.[23] Fluid restrictions can be as severe as a maximum 500 mL of fluid intake daily, depending on the residual diuresis. Patients receiving HD report a large preoccupation with thirst, rank fluid adherence as distressing,[24] and often embark on fluid and dietary binges.[25] Prescribed dietary restrictions limit sodium, potassium, and protein intake. The goals of the medication regimen are to treat or prevent cardiovascular comorbid conditions and keep a stable mineral blood balance, for instance by giving phosphate binders,[26] this regimen consists of an average of 12 different drugs.[27] Attendance at the prescribed dialysis sessions implies both regular attendance (no skipping of sessions) and full completion of the sessions (no shortening of a session).

Causes of kidney failure

Dialysis therapy treatment non-adherence, including treatment, medication, fluid, and diet non-adherence, significantly increases the risk of morbidity and mortality. The causes of chronic kidney disease in the patients enrolled in this study were diabetes mellitus (n=22, 43.1%), hypertensive nephrosclerosis (n=14, 27.5%), glomerulonephritis (n=11, 21.6%), and others (n=4, 7.8%). This was reflective to that of the national populace.[4]

Prevalence of non-adherence

Appointment non-adherence refers to data gathered by the dialysis staff about missed and shortened treatments, along with the total treatment time missed. Missed treatments, the percentage of nonattendance, are the number of sessions skipped compared with the number of sessions prescribed during a specific time. Shortened treatments are the percentage of the prescribed time of the attended sessions a patient actually receives dialysis or the percentage of appointments shortened by a certain amount of time. The total missed treatment time covers both the skipping and the shortening dimensions of appointment non-adherence; this time is the percentage of time a patient received dialysis compared with the total time prescribed in both attended and unattended sessions. These definitions provide a clear and easy measure of nonadherence and are therefore recommended.

Prevalence of non-adherence to appointments

Various studies have documented prevalence to appointment non-adherence. In studies in which the delivered dialysis dose was determined by assessing

appointment non-adherence, the relationship between the dose and higher mortality[28-30] or higher blood pressure[31] was significant. Skipping at least one dialysis session per month has been associated with a 25% to 30% higher risk of death.[28,29] Shortening frequently more than 10 minutes (=three times per month) also has been associated with increased mortality.[28]

In a study done by Hecking et al. (2004), the number of sessions skipped in the month before patients were enrolled in the study was taken from among the random sample of kidney centers in France (20 centers, N=672, n=20, PP=2,976.19 per 100,000), Germany (21 centers, N=571, n=5, PP=875.66 per 100,000), Italy (20 centers, N=600, n=53, PP=8,833.33 per 100,000), Spain (20 centers, N=570, n=38, PP=6,666.67 per 100,000) and United Kingdom (20 centers, N=620, n=78, PP=12,580.65 per 100,000).

In this study, there were 10 patients who were non-adherent to the HD appointment from a total of 102 in two dialysis centers, the computed prevalence was 9,803.92 per 100,000. Most of those who were classified as non-adherent would miss their dialysis appointment due to financial constraints (n=8), whereas two specified having difficulty in transportation (these patients were from the Island of Guimaras, and for the month prior the study was conducted, storm breakthroughs frequented the whole of Panay).

Prevalence of non-adherence to medications

Non-adherence with the medication regimen is usually assessed by using self-reports or pre-dialysis serum levels of phosphate, although the degree to which the results of assessment of phosphate-binding medication can be extrapolated to the rest of the medication regimen (calcium supplements, vitamins B and C, folic acid, cardiovascular drugs) is not known. The weak correlation between self-reports and phosphate measurements (r= –0.24)[32] may be due to the fact that factors other than taking medication (dietary adherence, for example) also affect serum levels of phosphate.[33] Assessment of serum calcium, which is generally low in cases of non-adherence, is a complementary method for evaluating adherence to use of phosphate binders.

In a study by Lin and Liang (1997), 86 patients in two dialysis centers in Taiwan were ask to self-report adherence with medication intake, 15 patients claimed to have been non-adherent, the computed prevalence was 17,441.86 per 100,000. Also, in another study by Curtin et al. (1999), self-reports as well as electronic monitoring and patient-reported pill count were used to evaluate 135 patients' adherence to anti-hypertensives or phosphate binders in 11 centers in the United States in 6 weeks' times. It was scored either as perfect adherence, minor non-adherence: <20% of prescribed medications not taken; or major non-adherence: >20% of prescribed medications taken. For the self-reports, there was 47% major non-adherence, 45% minor non-adherence and 7.0% adherence for anti-hypertensives; and there was 73% major non-adherence, 25% minor non-adherence for the phosphate binders.

In this study, 9.8% (n=6) were non-adherent to the medications, the computed prevalence rate was 5,882.35 per 100,000. There were more females who were non-adherent as compared to males.

Prevalence of non-adherence to fluid restriction protocol

Non-adherence to fluid restrictions can lead to fluid overload and possibly complications such as pulmonary congestion. Fluid non-adherence can be assessed by measuring a patient's weight gain between two HD sessions, called interdialytic weight gain (IWG), or weight loss during a session, called intradialytic weight loss (IWL). Non-adherence with fluid restrictions results in excess weight gain between two dialysis sessions (IWG), which is lost again during a dialysis session (IWL). Indirect measurement of non-adherence to fluid restriction is also possible by self-report. Vlaminck et al. (2002) did a study in 10 dialysis center at Flanders involving 564 patients where self-reports of fluid adherence in the past 14 days were gathered. There were 72% (n=406) who admitted at least a mild (score ≥ 1) non-adherence.

In another study done by Kugler et al (2005), a total of 916 patients from six centers in Germany and 12 centers in Belgium who self-reported fluid adherence for the past 14 days were included. Seventy-four per cent (n=678) admitted at least a mild (score ≥ 1) non-adherence.

In this study, 19.7% (n=12) were non-adherent to fluid restriction protocol. The computed prevalence rate was 11,764.71 per 100,000. Most of the adherent patients have claimed that they (n=40/49, 81.6%) have experienced difficulty of breathing, and was either rushed to the dialysis unit for an emergency HD or to the emergency room for confinement, thus after that have been compliant to the regimen prescribed thereafter.

Prevalence of non-adherence to diet recommendations

Dietary non-adherence has been assessed by using indirect measures such as patients' self-reports and direct measures such as pre-dialysis serum levels of potassium, phosphate, urea nitrogen, and creatinine as well as pre-dialysis normalized protein catabolic rate. Non-adherence with sodium intake guidelines is measured by determining IWG or IWL, because excessive sodium intake causes thirst and leads to fluid nonadherence.[34] Kugler et al. (2005) demonstrated that there 81.4% of 916 patients from Germany and Belgium were at least mildly non-adherent to the diet recommendations.

In this study, 27.9% (n=17) were non-adherent to the diet recommendations, the computed prevalence was 16,666.67 per 100,000. There were also more females who were non-adherent to the dietary restrictions. Also notable was the 18% (n=11) who were unable to avoid certain restricted food.

Behaviors of patients to treatment

Table VI shows the summary of known group analysis on the questions that specifically address patients' adherence behaviors. It shows that there is a significant difference in the behaviors of adherent and non-adherent patients towards: HD attendance (p=0.000); shortening of HD treatment (p=0.000); duration of shortening of HD (p=0.000); adherence to medications (p=0.000); adherence to fluid restrictions (p=0.000); and adherence to dietary restrictions (p=0.000).

Perception and understanding levels of adherence behaviors

Table VII shows the summary of known group analysis on the questions that address patients' perception and understanding levels of adherence behaviors. There was no significant difference in the perception of both adherent and non-adherent CKD patients towards HD attendance (p=0.306), as do in their understanding towards the level of importance of attending to the HD treatment on schedule (p=0.096). Both adherent and non-adherent patients have the same level of perception and understanding towards the importance of HD in their condition. There was no significant difference in the perception on adhering to the prescribed medications for both the adherent and non-adherent patients (p=0.427). Both parties perceived that they need to take the prescribed medications because it was important. However, there was a significant difference in the levels of understanding on the importance of medications between the adherent and non-adherent subjects (p=0.001). The non-adherers know that it is important to take the prescribed medications, but they are limited to do so either because of the following: 13% due to financial constraints, they are limited by the cost of the medications (n=8); 8.2% said they forgot to take the medications (n=5); and 4.9% claimed they forgot to order medications (n=3). Most correlate their need to take the medications with how they feel and would allocate their limited financial resources to other matters, like tuition fees of their children, and food – but they know that they need to take the prescribed medications.

There was a significant difference on the perception and understanding the level of importance to follow the fluid restriction regimen in both adherers and non-adherers (p=0.000, and p=0.000 respectively). Both groups know that they need to limit their fluid intake. For the dietary restrictions, there was a significant difference on the perception and understanding level of importance for both the adherers and non-adherers (p=0.001, and p=0.004 respectively). Most of the non-adherers claimed that they feel that they need more nutrients as they feel weak more often than usual. Also, one compelling reason was that more often than not, they don't have the appetite hence they eat whatever they crave for.

Recommendations

With the data gathered and interpreted, the following recommendations are suggested: Firstly, the standard of care should be afforded to all patients coming from all walks of life. The quality of care should not be different merely because the patient is chronically ill. Stricter implementation of quality assurance and quality control in health care delivery, alongside a more holistic approach with interventions utilizing a cognitive or cognitive/behavioral component. The behavioral model may consist of positive reinforcement, shaping, and self-monitoring, and the cognitive model may consist of a counseling intervention designed to modify health beliefs. Secondly, administrative reforms are needed to facilitate better delivery of health care services to among patients. Also, stricter implementation of quality assurance and quality control to police excellent health care accessibility and opportunity in all HD centers. Identify other government agencies that can provide support to chronically ill patients. And lastly, a larger-scale multi-center study done in both hospital-based and free-standing HD centers to compare their approaches and its effectiveness to control non-adherence to RRT. To compare the adequacy of HD among adherent and non-adherent patient who are on HD.

Conclusion

The compliance of adherent subjects to RRT was more adequate compared to those of non-adherent ones. The non-adherent subjects were less prevalent than adherent subjects. When grouped according to age, there was no significant difference in the compliance of the respondents to the respective descriptors, however there was a significant difference in their adherence thereof. There was a significant difference in the behaviors of adherent and non-adherent patients towards HD attendance, shortening of HD treatment, duration of shortening of HD, adherence to medications, adherence to fluid restrictions, and adherence to dietary restrictions.

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