THE LEVEL OF ADHERENCE TO TREATMENT REGIMEN AND HOLISTIC HEALTH STATUS OF PATIENTS FROM SELECTED HEMODIALYSIS UNITS: BASIS FOR NURSING INTERVENTIONS

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Abstract

Background and Objective: The vital aim of any prescribed medical treatment was to attain certain desired outcomes in the disease management patients. But despite all the best recommendations and best intentions on the part of the healthcare team, those outcomes might not be met if the patients were not compliant.

Method: This study used descriptive correlational cross-sectional design; 72 patients were selected randomly from the list of available patients in two free-standing hemodialysis units in Quezon City. Clinical measures and two valid, reliable Questionnaires (ESRD-AQ and HHAT-D) were used to assess adherence and holistic health status. Utmost confidentiality and compliance to data privacy were implemented. Responses were analyzed using descriptive and inferential statistics.

Findings: Patients were Moderately Adherent to their over-all treatment regimen and were in Moderate Holistic Health Status according to the Holistic Health Assessment. Faulty prioritization of activities, Financial Constraints, Forgetfulness, Inability to avoid restricted foods, and Inability to control oral fluid intake were top factors identified to affect the patients' adherence. There was also a significant relationship between adherence and holistic health status.

Conclusions: Cognitive Behavior Therapy, Strategies to minimize forgetfulness in medication, and Motivational Interviewing may be recommended as nursing interventions to strengthen the adherence of hemodialysis patients to their treatment regimen and in turn increase their holistic health status.

Keywords: Renal, Holistic Health, Adherence, Hemodialysis.

Introduction

The vital aim of any prescribed medical treatment was to attain certain desired outcomes in the disease management patients. But despite all the best recommendations and best intentions on the part of the healthcare team, those outcomes might not be met if the patients were not compliant. Adherence was the extent to which a person's behavior such as taking medications, following a diet, and executing lifestyle changes, corresponds with agreed recommendations from a health care provider [5]. It required the patient's agreement or conformity with the treatment recommendations given to him or her. Nevertheless, Non-adherence seemed to be common for most Americans [12]. Most dialysis patients drank fluids more than their limit or prescribed amount, or eat foods outside of their prescribed therapeutic diet from time to time. While this presented a problem, in most cases their staff was able to observe that the patients were still making a sincere effort to follow the regimen [2]. There were some patients, however, who deliberately disregard the medical regimen and verbalized to the staff that they had no intention of following it. For these few patients, their non-adherence were not only increasing their risk for hard to manage complications, but also made it difficult for their physicians and nurses to continue working with them. Reduced adherence to hemodialysis had been reported to be the most common cause of failure of the patient's body to respond to medications and hemodialysis treatment itself. Furthermore, poor adherence increased the risk of complications in ESRD patients such as chronic anemia, brain dysfunction, congestive heart failure, decreased function of the white blood cells, excessive bleeding, infections, bone weakness and respiratory complications. Non-adherence also caused financial burden or increased cost of medical care by having additional unnecessary laboratory tests, dosage adjustments in medications, changes in treatment plan, emergency visits and hospitalization. Lastly, the major concern that non-adherence was able to cause was the association with increased rate of mortality and morbidity [2].

This study described the Holistic Health Status and the Level of Adherence to treatment regimen of

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ESRD patients on maintenance hemodialysis from selected Hemodialysis units in Quezon City. Specifically, it sought to answer the following objectives:
1. To determine the level of adherence of the hemodialysis patients to their treatment regimen according to:1.1. Hemodialysis Attendance;1.2. Medication Compliance; 1.3. Dietary Compliance; and 1.4. Fluid Restriction Compliance; 2. To identify the holistic health status of hemodialysis patients; 3. To determine the factors that affect the level of adherence of the hemodialysis patients to their treatment regimen according to:3.1. Hemodialysis Attendance;3.2. Medications Compliance; 3.3. Dietary Compliance; and 3.4. Fluid Restriction Compliance; 4. To identify significant relationship between the hemodialysis patient's level of adherence to treatment regimen and their holistic health status; and 5. To draw nursing interventions based from the findings of the study.

Methodology

Based on a Descriptive Correlational Cross-sectional design, a sample of 72 hemodialysis patients (21 – 59 years old) as calculated on G-power software (Germany; version 3.1.9.2) using the following parameters: two-tailed test, effect size of 0.9, 5% error probability and 95% confidence level, were selected randomly from the list of available patients in two free-standing hemodialysis units in Quezon City who fit in the following inclusion criteria: Adult Patients (20 to 59 years old); Chronic Kidney Disease regardless of etiology; At least 6 months duration of hemodialysis; On non-emergent treatment; Only with none to mild complications; and Able to communicate effectively (able to read and write). Clinical measures and two valid, reliable Questionnaires such as the End Stage Renal Disease Adherence Questionnaire (ESRD-AQ) by Kim et. Al, (2012) and the Holistic Health Assessment Tool for Patient on Maintenance Hemodialysis (HHAT-D) by Singhania and Mandalika (2012) were used to assess adherence of patients to (hemodialysis attendance, medication compliance, dietary compliance, and fluid restrictions) and their holistic health status [4,6]. Utmost confidentiality and compliance to data privacy and ethical institution review board were implemented. Mean and Standard Deviation was applied to obtain the level of adherence as well as the holistic health status, while Pearson's Moment Correlation Coefficient and Coefficient of Determination (r^2) were applied to determine the significant relationship and accuracy of relationship between the two variables respectively [1, 4].

Results and Discussion

Table 1: Demographic Profile of The Respondents from Selected Hemodialysis Units A & B in Quezon City

Demographic Profile	A (n=36) n (%)	B (n=36) n (%)	Total (N=72) n (%)
Age (in years)			
21 to 30	4 (11)	4 (12)	8 (11)
31 to 40	4 (11)	5 (15)	9 (15)
41 to 50	11 (31)	11 (32)	22 (26)
51 to 59	17 (47)	14 (41)	31 (30)
Sex			
Male	17 (47)	16 (44)	33 (46)
Female	19 (53)	20 (56)	39 (54)
Hemodialysis Length of Treatment (in months)			
Mean ± Standard Deviation	26.24 ± 20.11	36.53 ± 33.52	26.14 ± 20.11
Range	7 – 96	7 – 168	7 – 168

A total of seventy-two (n=72) respondents completed the End-Stage Renal Disease Adherence Questionnaire (ESRD-AQ) together with the Holistic Health Assessment Tool for Patients on Maintenance Hemodialysis (HHAT-D) with a response rate of 98.63% or 72 out 73. Majority of the respondents were middle age adults, with an age range 41 to 59 years. Most of the respondents (54%) were females. The average hemodialysis length of treatment that a respondent had undergone was 26.14 months with a standard deviation of 20.11 and range of seven to 168 months.

Below are the specific problems raised in relation to the level of adherence to treatment regimen and holistic health status of hemodialysis patients in selected hemodialysis units in Quezon City, Philippines:

Table 2: The Adherence Rate of Patients in Hemodialysis Units A & B in Quezon City, Philippines

Areas of Adherence	A (n = 36)	Adherence Rate	B (n = 36)	Adherence Rate	Total (N=72)	Overall Adherence Rate	Qualitative Interpretation
Hemodialysis Attendance	17	47.2%	24	66.7%	41	56.9%	Moderately Adherent
Medication Compliance	20	55.6%	28	77.8%	48	66.7%	Highly Adherent
Dietary Compliance	15	41.7%	28	77.8%	43	59.7%	Moderately Adherent
Fluid Restriction Compliance	20	55.6%	26	72.2%	46	63.9%	Moderately Adherent
Average		50.0%		73.6%		61.8%	Moderately Adherent
Legend: 0% to 33% = Poorly Adherent; 34% to 65% = Moderately Adherent; 66% to 100% = Highly Adherent							

Table 2 shows the over-all adherence rate was 61.8% or **Moderately Adherent** [9]. An adherence rate range of 0% to 33% was considered Poorly Adherent, 34% to 65% were considered Moderately Adherent, and 66% to 100% were considered Highly Adherent [9]. The following specific adherence rates were reported: 56.9% of respondents were moderately adherent to Hemodialysis Attendance; 66.7% of respondents were highly adherent to for Medication Compliance; 59.7% of respondents were moderately adherent to Dietary Compliance; and 63.9% of respondents were moderately adherent to Fluid Restriction Compliance by. In comparison with the study by Kim et al (2012), the following adherence rates were reported: Highly Adherent to Hemodialysis Attendance by 77.6% of respondents; Highly Adherent for Medication Compliance by 94.8% of respondents; Highly Adherent for Dietary Compliance by 87.9% of respondents; and Highly Adherent as well for Fluid Restriction Compliance by 89.6% of respondents.

Comparing the adherence rates between this study and the study above, it was observed that the adherence rates in this current study were lower [1, 4]. The lower adherence rates were maybe due to the difference in terms of setting, which were two different countries with different cultural issues that may affect the delivery of healthcare. Comparing the adherence rates of this study to its neighboring country, Malaysia, it can be observed that the rates obtained in this study were slightly better as compared to the adherence rates, which were as follows: 52.43% Over-all adherence rate was lower than what was obtained in this study [1]. Specific areas of adherence however had the following comparisons: 91% adherence rate (highly adherent) for Hemodialysis attendance, which was higher than the data obtained in this study; 66.5% adherence rate (highly adherent) for Medication Compliance, which was slightly lower; 24.5% adherence rate (poorly adherent) for Fluid Restriction Compliance, lower than this study and 27.7% adherence rate (poorly adherent) for Dietary Compliance which was lower than this study. The over-all adherence rates in this study as compared to Chan et al (2012) were relatively better may be due to the adequate knowledge on the importance of the entire treatment regimen in dialysis [1].

Table 3: The Holistic Health Status Qualitative Interpretation of Scores

Holistic Health Assessment Score Range	Holistic Health Assessment Qualitative Interpretation
1 – 15	High Health
16 – 30	Moderate Health
31 – 45	Low Health

The holistic health status was determined through the use of Holistic Health Assessment Tool for Patient on Maintenance Hemodialysis (HHAT-D) as developed by Singhania and Mandalika (2012). The assessment tool comprised of nine components: Anthropometry and Body Composition, Dietary Assessment, Clinical Assessment for Gastrointestinal Symptoms, Clinical Assessment for Respiratory Symptoms, Functional Capacity, Co-morbidity, Fat Loss Assessment, Muscle Wasting Assessment, and Psychological Assessment, which cannot be treated separately and with intention of viewing all components as a whole. Each component had a score of 1 (normal) to 5 (very severe) thereby obtaining scores ranging from 9 (High Health) to 45 (Low Health). This tool pointed out that the lower the score, the better was the Holistic Health Status. Please refer to Table 3 for a

better perspective of the Qualitative Interpretation of Holistic Health Status [9]. The average holistic health status of the respondents (N=72) from Hemodialysis Units A & B were **16.79 (S.D. =7.41)**

or Moderate Health. This result was consistent with the findings in the study by Singhania and Mandalika (2012) [9].

Table 4: Factors Affecting The Level of Adherence to Treatment Regimen of Patients from Hemodialysis Units A & B in Quezon City

Areas of Adherence	Non-adherers	Factors
Hemodialysis Attendance	21/ 72 Missed Dialysis	• Faulty Prioritization of Activities • Vascular Problems • Transportation Problems
Medication Compliance	24/72 Missed Medications	• Financial Constraints • Forgetfulness
Dietary Compliance	29/72 Failed to follow dietary recommendations	• Inability to control and avoid restricted foods
Fluid Restriction Compliance	26/72 Failed to strictly follow fluid restriction	• Inability to control oral fluid intake during hot weather

The factors affecting the patients' adherence were identified through the use of End Stage Renal Disease Adherence Questionnaire [4]. In area of adherence: compliance to Hemodialysis Attendance, 21 out of 72 respondents had incidence of missed dialysis treatment within the past month. Top reason for the missed dialysis attendance was due to faulty prioritization of activities. These include having a vacation, and attending family affairs among others. Other reasons included vascular access problems such as having non-functional Arterio-Venous Fistula, Blocked polytetrafluoroethylene (PTFE) Graft, and malfunctioning Intra-jugular Catheter; and transportation problems. Deeper analysis was done based on provided explanations on responses shared by respondents during their interaction with the researcher during their submission of the filled out questionnaire. The researcher welcomed their interactions despite explanations were not being asked for the purpose of eliciting more detailed data. Sixteen respondents felt well enough to skip dialysis and prioritize attending to personal appointments despite knowing the importance of attendance.

In Medication Compliance, 24 out of 72 had an incidence of missed medication intake. Financial constraint was a great factor for respondents to miss drinking medications regularly especially when they ran out of support from government agencies. The dialysis package of the Philippine Government comprising of the 90-day dialysis treatment (90 sessions) per year coverage and the issuance of fourteen syringes Erythropoietin injections to prevent the occurrence of Anemia was clearly not enough for all types of patients needing maintenance hemodialysis. Forgetfulness to take medication was another factor in non-adherence, this was consistent with the findings of Chan at al (2012), which stated that Forgetfulness, associated side effects/complications and complexity of the

prescribed medications treatment were the three major factors perceived by patients contributing to noncompliance to medications. Interventions to address forgetfulness will be needed [1].

Twenty-nine out of 72 had an incidence of diet non-adherence. This was due to their difficulty avoiding food cravings outside of dietary recommendations. They missed eating foods that they loved thus tending to cheat with their diet. Sodium and protein restriction was a foundation in the treatment of chronic kidney disease (CKD) and of its metabolic consequences. Maintaining a low-protein diet was considered tedious, unpalatable and difficult to achieve [7]. Consistent with the findings were the factors for dietary noncompliance identified by Chan et al (2012): need to change eating habits and inability to resist favorite foods and the complexity of dietary recommendation [1].

Twenty-six out of 72 had an incidence of non-adhering to the fluid restriction. Majority admitted that they have no control over their fluid intake. This was due to the need to drink fluids to swallow the number of prescribed medicines and hot weather experience. The findings were consistent again with the study by Chan et al (2012), which revealed that most of the subjects admitted that compliance to fluid prescription was the most difficult and challenging aspect, especially during hot weather [1].

Significance of Relationship between Adherence and Holistic Health Status

Adherence and Holistic Health Status scores were encoded in Microsoft Excel 2010 Edition and were imported in Minitab Statistical Software Version 18.1 (Massachusetts, U.S.A). A Pearson's Product Moment Correlation Coefficient was done to measure the strength of association between the overall adherence level to treatment regimen and holistic health status. Table 5 summarizes the

correlations between the Areas of Adherence and Holistic Health Scores.

Table 5: Summary of Correlations between the Areas of Adherence and HHAT-D Scores

Areas of Adherence	HHAT-D Scores (r)	r^2	P Value	Remarks
Hemodialysis Attendance	-0.5995	0.3594	0.00001	Significant
Medication Compliance	-0.2241	0.0502	0.58551	Not Significant
Dietary Restriction	-0.1363	0.0185	0.25466	Not Significant
Fluid Restriction	-0.4504	0.2029	0.00007	Significant
Overall Adherence	**-0.6557**	**0.4299**	**0.00001**	**Significant**

The correlation between overall level of adherence and holistic health status (p = 0.0001) can be seen that there was significant relationship between the hemodialysis patients' level of adherence to treatment regimen and holistic health status. The negative correlations were expected as the lower the Holistic Health Score, the better was the health status, which was in opposite direction of the Adherence Score, which showed that the higher the Adherence Score, the better was the Adherence level.

Hemodialysis attendance (p = 0.00001) and Fluid Restriction (p=0.00007) indicated significant relationship with the holistic health scores. The significance may be expected as it had the greatest weight on the overall adherence score due to association to increased mortality rate when not adhered to [4]. It had a weight of 600 points as compared to the other areas of adherence, which only had 200 points each. This also explained the 36% and 20% of variations in the holistic health status were due to Hemodialysis attendance and Fluid Restriction compliance respectively. Medication compliance (p=0.5855) and Dietary Restriction compliance (p=0.2547) indicated an insignificant relationship with the holistic health scores as it only explained the 5% and 1% of the variations in the holistic health status. For this reason, this only validated the given weight of scores to the ESRD-AQ, which showed that Medication Compliance and Dietary Restriction Compliance may only have a minor effect on the patient's level of adherence [4].

Nursing Interventions Drawn from the Study

The nursing interventions were drawn based on the factors affecting the level of adherence to treatment regimen as identified by the respondents in this study. It focused on behavior modification in order to help the hemodialysis patients adhere to the changes needed for the maintenance of their optimum health condition. Further discussion on these nursing interventions was as follows:

Cluster 1: Hemodialysis Attendance

To address the factor of faulty prioritization of activities, Cognitive behavior therapy (CBT) as nursing intervention was beneficial for raising dialysis compliance, providing evidence to strengthen nursing care for end-stage renal disease patients administered with dialysis in daily clinical practice [11].

Cluster 2: Medication Compliance

To address Financial Constraint, the nurse may collaborate with social workers of their respective institutions for funding and networking for the availability of the patient's maintenance medications. To address Forgetfulness, below are some recommended interventions:

1. Educate the patient about their medicine using simple and layman terms in order for the patient to have a better understanding.
2. Advise the patient to take medications at the same time every day to prevent them from forgetting to take their scheduled medications.
3. Help the patient relate their medication consumption with their daily activities. For example, the nurse may direct the patient to take their anti-hypertensive medications after breakfast and their cholesterol modulator medications before bed.
4. The nurse may advise the patient to use the pill box that can facilitate them to take their medications.
5. Patients may use alarms on smartphones as a reminder to take their medicine on time [10].

Cluster 3: Dietary Compliance

Based on literatures found, thereby presenting a behavior change problem. Therefore, Motivational Interview should be the main intervention fit to be used based on the factors of non-adherence to dietary compliance that was identified in this study. In addition to Motivational Interview, a simplified diet consisting of six clear points may be beneficial for local adaptation and can be easily managed by CKD patients [6, 7, 8, 10, 11].

Cluster 4: Fluid Restriction Compliance

To address the top factor of inability to control fluids, Motivational Interview and Strategies to control thirst may be an appropriate nursing intervention. Limiting the amount of liquid intake on a daily basis can be difficult but is important to prevent additional fluid accumulation and unwanted

complications that may lead to emergencies. Motivational Interview remains to be the main intervention to be used to ensure fluid restriction compliance especially to those patients that has no interest to comply [10, 11, 12].

Recommendations and Conclusion

In conclusion, Cognitive Behavior Therapy, Strategies to minimize forgetfulness in medication, and Motivational Interviewing may be recommended as nursing interventions to strengthen the adherence of hemodialysis patients to their treatment regimen and in turn increase their holistic health status. These findings now imply that strategies should be placed as part of the nursing curriculum as well as to be provided as in-service training programs for nurses in order to increase the adherence of patients and subsequently attain higher holistic health status. Longitudinal research on a larger sample and an in-patient setting may be necessary to further validate the findings of this study and to attain a better picture of the level of adherence pattern and holistic health status by Filipino patients on maintenance Hemodialysis.

Conflict of Interest

The author declares there are no significant competing financial, professional, or personal interests that might have influenced the performance or presentation of the work described to this manuscript.

Acknowledgment

References

1. Chan, Y.M., Zalilah, M.S. and Hii, S.Z., (2012). "Determinants of Compliance Behaviours among Patients Undergoing Hemodialysis in Malaysia". PLoSONE, 7(8), 1-7, doi:10.1371/journal.pone.0041362.
2. Clark, S., Farrington, K., and Chilcot, J., (2014). "Nonadherence in Dialysis Patients: Prevalence, Measurement, Outcome, and Psychological Determinants". Seminars in Dialysis. 27(1), 42-49, doi:10.1111/sdi.12159.
3. Khalil, A.A., Susan K. Frazier, S.K., Lennie, T.A., and Sawaya, P.B., (2011). "Depressive Symptoms and Dietary Adherence in Patients with End-Stage Renal Disease", J Ren Care, 37(1), 30-39. doi: 10.1111/j.1755-6686.2011. 00202.x. PMCID: PMC3058847. NIHMSID: NIHMS228551. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/PM C3058847/ J Ren Care. Author manuscript; available in PMC Mar 1, 2013.
4. Kim, Y., Evangelista, L.S., Phillips, L.R., Pavlish, C., and Kopple, J.D., (2010). "The End-Stage Renal Disease Adherence Questionnaire (ESRD-AQ): Testing The Psychometric Properties in Patients Receiving In-Center Hemodialysis". Nephrol Nurs J., 37(4), 377–393. PMCID: PMC3077091. NIHMSID: NIHMS258802
5. Madeiro, A.C., Machado, P.D.L.C., Bonfim, I.M., Braqueais, A.R. and Lima, F.E.T.L., (2010). "Adherence of Chronic Renal Insufficiency Patients to Hemodialysis". Acta Paulista de Enfermagem, Print Version ISSN 0103-2100, 23(4), São Paulo 2013, http://dx.doi.org/10.1590/S0103-21002010000400016. English version Retrieved from http://www.scielo.br/scielo. php?pid=S0103-21002010000400016&script= sci_arttext&tlng=en).
6. Nasiri M, Kheirkhah F, Rahimian B, Ahmadzadeh B, Hasannejad H, Mohammad Jafari R., (2013). "Stressful factors, coping mechanisms and quality of life in hemodialysis patients". Iran Journal of Critical Care Nursing, 6(2), 119-126.
7. Riccio, E., Pisani, A., Bellizzi, V., et al., (2016). "6-tips diet: a simplified dietary approach in patients with chronic renal disease", A clinical randomized trial. Clinical and Experimental Nephrology, 20(3), 433–442 https://doi.org/10.1007/s10157-015-1172-5.
8. Salimi C., Momtazi S., Zenuzian S., (2016). "A Review on Effectiveness of Motivational Interviewing in the Management of Diabetes Mellitus". Journal of Psychology and Clinical Psychiatry, 5(4): 00294. DOI: 10.15406/jpcpy. 2016.05.00294.
9. Singhania, P.R. and Mandalika, S., (2012). "Holistic health assessment tool for patients on maintenance hemodialysis". Indian Journal of Nephrology, 22, 269-274.
10. Wang, J., Yue, P., Huang, J., Xie, X., Ling, Y., Jia, L., Xiong, Y., and Sun, F., (2017). "Nursing Intervention on the Compliance of Hemodialysis Patients with End Stage Renal Disease: A Meta-Analysis Nursing Intervention on the Compliance of Hemodialysis Patients with End-Stage Renal Disease: A Meta-Analysis". Blood Purification 2018, 45, 102-109.
11. Wong, M., Ghebleh, P., and Phillips, S., (2017). "Tips for Dialysis Patients with Fluid Restrictions". Journal of Renal Nutrition, 09, https://doi.org/10.1053/J.JRN.2017.06.001.
12. United States Renal Disease System (USRDS), (2013). "United States Renal Disease Registry", Retrieved from: http://www.usrds. org/adr.as.