Animus Manendi: An Analysis of Factors Affecting Compliance with Dietary and Fluid Restrictions among Hemodialysis Patients in Selected Hospitals in Iligan City, Philippines

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Abstract

According to National Kidney and Transplant Institute (NKTI) kidney diseases, End Stage Renal Disease (ESRD) is the 7th leading cause of death in the Philippines in 2014. The Department of Health (DOH) states that approximately 23,000 Filipinos underwent dialysis due to kidney failure in 2013, nearly four times higher than the 4,000 cases recorded in 2004 [1]. Compliance with fluid and dietary instructions is a critically significant factor in the health and well-being of hemodialysis patients [2]. Successful treatment of ESRD patients by hemodialysis requires the cooperation of the patient in sustaining a strict diet and restricting fluid [3]. It has been reported that 78% of the hemodialysis patients are non-compliant to their diet and fluid therapy because of the alteration in their long-standing personal habits and life style [3].

This study aims to analyze the factors affecting compliance with dietary and fluid restrictions among hemodialysis patients. This research, conducted from November 2017 to April 2018, used descriptive-correlational- comparative research design, purposive sampling method, and modified questionnaire based on End Stage Renal Disease Adherence Questionnaire (ESRD-AQ) to assess the compliance with dietary and fluid restrictions among 35 hemodialysis patients in Iligan City, Philippines: 15 from Gregorio T. Lluch Memorial Hospital (GTLMH) and 20 from Adventist Medical Center (AMC).

Using Pearson Correlational Coefficient, results revealed that while age (r: 0.134), gender (r: 0.13), and economic status (r: 0.036) have no significant relationship with the respondents' compliance with dietary and fluid restrictions, marital status has a strong direct relationship (r: 0.20), educational attainment has a strong inverse relationship (r: -0.20) as well as length of hemodialysis treatment (-0.21). This indicates that respondents who are married have significantly greater level of compliance than single respondents; respondents with lesser educational attainment have greater level of compliance than those with higher educational attainment and respondents with longer length of hemodialysis treatment have greater level of compliance. This study's marital status results are in consonance with the study by Tanno., *et al*. (2012) [4], which showed that unmarried status has been associated with an increased frequency of unhealthy lifestyle behaviors, depression, low socioeconomic status and non-adherence to medical treatment. On the other hand, this study's educational attainment results are in consonance with the study by Green., *et al*. (2001) [5] which showed that limited health literacy is prevalent in patients receiving chronic hemodialysis and may be associated with adverse outcomes including mortality. Hence, the study elucidates that the respondents' demographic profile, particularly marital status and educational attainment, makes a significant difference in the level of compliance with dietary and fluid requirements. This information could be integrated in planning care for hemodialysis patients, especially in enhancing the effectiveness of health teachings to unmarried and otherwise highly educated clients.

***Keywords:** End Stage Renal Disease; Hemodialysis; Demographic Profile, Fluid and Dietary Compliance; Philippines*

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Introduction

End Stage Renal Disease (ESRD), a devastating medical, social, and economical problem for patients and their families. The incidence and prevalence of chronic kidney disease (CKD) are on the rise. In our country, majority of patients with end stage renal disease (ESRD) had started and maintained hemodialysis as a form of renal replacement therapy.

The Philippines is one of the countries with a high risk population when it comes to renal disease because of numerous cases of diabetes, high blood pressure and other hereditary diseases, all of which can lead to kidney malfunction and even heart attack. In fact, among the leading causes of kidney failure in the country are diabetes (41%), inflammation of the kidney (24%) and high blood pressure (22%) (Council for health and development). According to National Kidney and Transplant Institute (NKTI) kidney diseases [1], especially End Stage Renal Disease (ESRD) is the 7th leading cause of death in the country. The Department of Health (DOH) states that approximately 23,000 Filipinos underwent dialysis due to kidney failure in 2013, nearly four times higher than the 4,000 cases recorded in 2004 [1].

There is also an alarming level of renal disease worldwide with more than 500 million persons, about 10% of the adult population suffering from some form of damage to the kidneys. Over 1.5 million of them are kept alive through dialysis or kidney transplant. National Center for Chronic Disease Prevention and Health Promotion consolidate the information gathered from 150 countries and showed 3,010,000 patients were being treated globally for End Stage Renal Disease (ESRD) at the end of 2012 and the number of patients is growing faster than the world population with a growth rate of 7% (Council for Health and Development) [1].
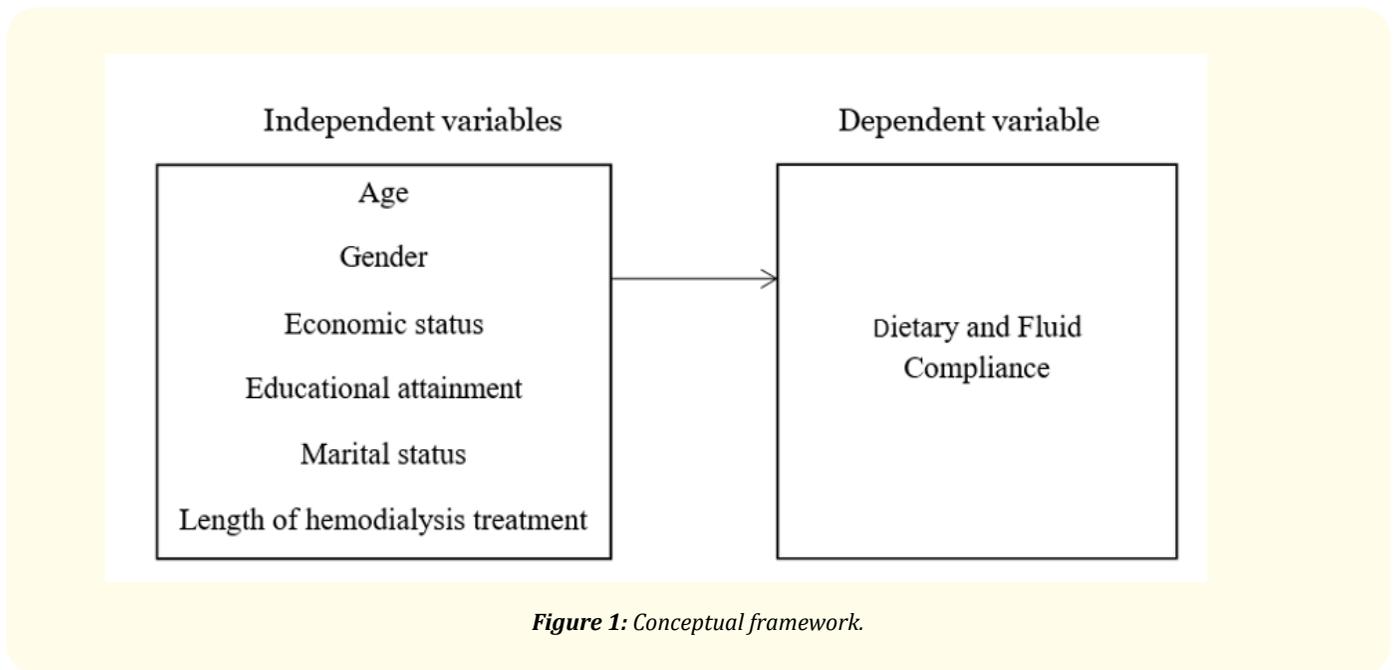
Conceptual framework

Figure 1: Conceptual framework.

As shown in figure 1 the age, gender, economic status, educational attainment and marital status are the independent variables in this study. The study aims to determine if the independent variables mentioned has a direct effect on the dependent variable which is the dietary and fluid compliance of hemodialysis patients. We considered these variables based on facts and other studies. Firstly, in terms of age, studies have shown that persons who are younger comply less to hemodialysis due to the fact that younger respondents have more difficulty in understanding the importance of compliance with hemodialysis for the betterment of their health status [5]. Secondly, in terms of gender females have shown fewer adherences to recommended dietary habits for people undergoing hemodialysis due to their emotional tendencies experienced comparing it to the opposite sex [6]. Gender may not be a good predictor of compliance due to its in-

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consistent conclusions. The way that gender determines adherence level is unknown so further research should be done. Thirdly, in terms of economic status, facts have showed that hemodialysis is an extensive and costly treatment to patients suffering from kidney failure therefore when money is a variable, respondents' economic status is significant because it correlates ability to pay [7]. Fourthly, in terms of educational attainment, studies have showed that patients with limited health literacy may have difficulty understanding written medical information, communicating with healthcare providers, and navigating the increasingly complex healthcare system. Studies in various patient populations demonstrate an association of limited health literacy with poorer health- related knowledge, lower use of preventive health services, and increased risk of hospitalization, decreased medication adherence, greater probability of depressive symptoms, poorer health status, higher healthcare costs, and increased mortality [5]. Fifthly, in terms of marital status, unmarried people have been reported to be associated with an increased frequency of unhealthy lifestyle behaviors, depression, low socioeconomic status and non-adherence to medical treatment. These factors have also been shown to be associated with mortality in hemodialysis patients. Marriage is potentially a strong social support system. For married persons, a primary source of social support could be their spouses [4]. Lastly, in terms of length of hemodialysis treatment, younger, male, working patients and those with longer duration on hemodialysis were found more likely to be non-compliant [8]. This finding agrees with the study of Lee SH., *et al*. 2002 that patients with more hours on HD per week were found to be more fluid noncompliant. Working patients and those whose diet was prepared by someone else in the family were also more likely to be noncompliant. On the other hand, dietary and fluid compliance fall on dependent variables. Dietary compliance is significant to the health status of the respondents because the kidneys are unable to cope with excess fluid and other metabolic wastes. The content of foods consumed by patients who have undergone dialysis should be balanced carefully [9]. Similarly, not adhering to fluid restrictions can lead to fluid overload and possibly complications such as pulmonary congestion that would take a detrimental effect on the health status of the respondents [10].

Methods

This research, conducted between November 2017 and April 2018, used a descriptive-correlational-comparative research design in analyzing the methods for dietary compliance of hemodialysis patients. This research design was used in this study to describe the demographic profile of the respondents, to correlate the respondents' demographic profile with compliance to dietary and fluid restrictions and to compare the respondents' effects to dietary compliance when grouped according to demographic profile. Through the respondents' performance in answering the questionnaire, the researcher were able to evaluate its effectiveness after the application of the said methods. This study was conducted at the dialysis unit of Gregorio T. Lluch Memorial Hospital (GTLMH) and Adventist Medical Center (AMC). Gregorio T. Lluch Memorial Hospital GTLMH is a city-owned Tertiary hospital with 119-bed capacity and occupancy rate of 126% daily located at Pala-o, Iligan City. Adventist Medical Center-Iligan formerly Mindanao Sanitarium and Hospital is a 130 bed capacity tertiary hospital which is located at Andres Bonifacio Ave, Iligan City. The researcher chose Gregorio T. Lluch Memorial Hospital (GTLMH) and Adventist Medical Center (AMC) hemodialysis patients as the subject for their study. The researcher identify these hospitals that have the facility to accommodate hemodialysis. The researcher's chose 35 respondents from both hospitals whose age ranges from 18 - 85 years old. The researcher gave the respondents a brief and concise preface of the study to be conducted. The respondents were told that their cooperation and involvement to this study is optional, that if they choose to participate, their personal data will always be kept confidential, and that they will be informed of the test and study results. A questionnaire was handed to the participating individual. The researcher used purposive sampling method in this study. Purposive sampling is a method that relies on the judgments of the researcher when it comes to the respondent or case being studied. In this technique, the researcher had a particular characteristics of population that of interest. In this study, the researcher chose two (2) hospitals that have the characteristics that can answer the research questions. The chosen 35 hemodialysis patients from the respective hospitals were the respondent of this study. The researcher used 14 items questionnaire which was modified from the study of Kim., *et al*. (2011) were used to assess the correlation between the demographic profile of hemodialysis patients in Gregorio T. Lluch Memorial Hospital (GTLMH) and Adventist Medical Center (AMC) and their compliance to dietary and fluid restriction of hemodialysis. The questionnaire was delimited by the researcher and remove items that does not meet the researcher objectives. The questionnaire includes four (4) parts. Part I aimed to gather information on the respondent's personal and demographic data as to his/her name (optional), age, gender, economic status, monthly income and marital status. Part II covers general information which contains the start of hemodialysis and the respondents company to hemodialysis. Part III aimed to gather information

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about the respondents compliance to fluid restriction, importance of fluid restriction, difficulty in limiting fluid intake and importance of weighing. Part IV aimed to gather information about the respondents compliance to diet restriction, importance to diet restriction and difficulty in following diet restrictions. The questionnaire uses a combination of Likert scales which consist of strongly agree, agree, disagree and strongly disagree and multiple choices as well as dichotomous questions (yes/no). The frequency of compliance were assessed for the last 14 days while intensity of non- compliance were evaluated on a 4-point rating scale, where responses ranged from 1 as "very seldom" to 4 as "all of the time". The researcher conducted a pilot study to test the questionnaire. The internal consistency or Cronbach's alpha was 0.79 which indicates an acceptable level of Internal Consistency. A combination of objective and subjective measures were used to access the compliance rates in order to increase the reliability and validity of the compliance results. Firstly, the researcher sent a letter that is signed by the researcher, the researcher's adviser, the research coordinator and the dean of the college, the letter is then sent to the head of each participating hospital to have a formal and legal approach in using their facility and patients. Then informed consent were given to the respondents of the study. The respondents were told that their cooperation and involvement to this study is optional, that if they choose to participate, their personal data will always be kept confidential, and that they were informed of the test and study result. The test purpose, benefits, and procedures were explained. The researcher introduced and discussed the content of the questionnaire. The respondents were then handed each with a questionnaire to fill. The researcher gave the respondents enough time to answer. Before leaving the researcher ensure that the respondents were able to answer the necessary items on the questionnaire.

Results and Discussion

Variables	Their compliance to dietary and fluid restriction (Pearson)
Age	0.134 No significant positive relationship
Gender	0.13 No significant relationship
Educational Attainment	-0.2 Significant relationship
Economic Status	0.036 No significant relationship
Marital Status	0.2 Significant relationship
Length of hemodialysis treatment	-0.21 Significant slight inverse relationship

Table 1: The relationship among demographic profile of the respondent and their compliance to dietary and fluid restrictions.

Table 1 shows the Pearson of the variables, indicating that there is no significant relationship between their compliance to dietary and fluid restriction and most of the demographic profile.

Age has no significant relationship with their compliance to dietary and fluid restrictions. This result is unexpected this is so because there were positive correlations between age and compliance on dietary ($r = 0.186$, $p < 0.05$), fluid ($r = 0.385$, $p < 0.01$) respectively, indicating younger subjects were more non-compliant to the therapeutic regimen compared to their older age counterparts [8]. Other studies have also reported that older age was associated with higher compliances to fluid restriction and medication prescription. Possible explanations are older patients may have more structured lifestyle that accommodates the demands of the treatment regimen while younger patients may perceive themselves as less vulnerable to negative health outcomes, confirming the existence of an "intentional noncompliance". The finding that younger patients were more likely to be non- compliant to treatment recommendation may lead to the future poorer quality of life and higher rates of mortality among these dialysis patients [8].

Gender has a no significant relationship with the level of compliance with dietary and fluid. This result is unexpected because women were more compliant to diet and fluid restriction than men and these findings are similar to other studies. Female hemodialysis patients had consistently reported to have a lower adjusted hazard ratio for mortality compared to their male counterparts in Malaysia. It is likely that women are more health conscious than men [8].

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Educational attainment has an inverse relationship with the level of compliance with dietary and fluid

Health literacy is the ability to obtain, process, and understand health information to make appropriate health decisions. Limited health literacy is now recognized as an important public health concern. Patients with limited health literacy may have difficulty understanding written medical information, communicating with healthcare providers, and navigating the increasingly complex healthcare system [5]. No significant relationship were detected between compliant and non-compliant patients in their education level (Hossam I., *et al*. 2015). Knowledge scores on potassium and phosphorus were negatively correlated with compliance on dietary (r = −0.345, p < 0.01) and medication (r= −0.278, p < 0.05), respectively. On the other hand, there were no significant correlations between knowledge scores on fluid or sodium with dietary, fluid or medication compliance. These findings suggest that higher knowledge on dietary aspects may not associated with better compliance rates [8].

Economic status has no or negligible relationship with the level of compliance of dietary and fluid restrictions. There were no significant associations between compliance indicators and family income [8]. The worldwide incidence of kidney failure is on the rise and treatment is costly; thus, the global burden of illness is growing. Kidney failure patients require either a kidney transplant or dialysis to maintain life [7]. The same study suggest that the costs of dialysis around the world can vary widely according to many local market conditions, including local production and distribution factors, import duties, the presence or absence of local suppliers and purchasing power. Hemodialysis (HD) cost is driven largely by the fixed costs of facility space and staff. Other items that factor into the cost of HD are additional facility costs such as maintenance and utilities, and the costs of transportation to and from the HD facility.

Marital status has a positive relationship with level of compliance with dietary and fluid restrictions

Marital status is an important social factor that is associated with mortality from all causes and mortality from CVD. The effect of marital status on mortality may be mediated by several factors. Unmarried status has been reported to be associated with an increased frequency of unhealthy lifestyle behaviors, depression, low socioeconomic status and non-adherence to medical treatment. In addition, unmarried persons are likely to have more traditional cardiovascular risk factors and increased levels of inflammatory markers. These factors have also been shown to be associated with mortality in hemodialysis patients. Marriage is potentially a strong social support system. For married persons, a primary source of social support could be their spouses [4].

There is significant slight inverse relationship between length of time receiving therapy in months and level of compliance to dietary and fluid restrictions. This depict that the longer the patient in therapy the less compliant they become. According to Chan YM., *et al*. (2012) [8], The subjects with longer duration on hemodialysis were more non- compliant. This finding concurs with other studies of Lee SH (2002) [11], Kimmel PL., *et al*. (2000) [12], Oka M., *et al*. (1999) [13]. It is postulated that end stage renal disease patients may be more eager to change their dietary habits to meet the requirement of a newly-received life-saving hemodialysis treatment. However, as time passes, these patients may feel bored and easily get frustrated with the need to comply with long lists of dietary and fluid restrictions [14]. Patients new to dialysis treatment may also receive more social support and were therefore higher degree of compliant is expected [14]. However, over the long run, it may be difficult for patients to resist the wide variety of food available. In view of this, healthcare providers should identified the individual's perceived barrier; explore patients' willingness and readiness to make changes to their dietary habits to achieve the optimum effect of compliance.

Variables	Their compliance to dietary and fluid restriction (T-test) Tabular Value - 1.671
Age (20 - 35 y.o vs. 36 - 50 y.o vs. 51 - 65 y.o vs. 66 - 80 y.o)	t = 5.37747 Significant difference
Gender (male vs. female)	t = 5.729 Significant difference
Educational Attainment (Elementary Graduate vs. High School Graduate vs. College Graduate)	t = 5.377 Significant difference
Economic Status (< 79,000 vs. > 80,000)	t = 5.239 Significant difference
Marital Status (married vs. Single)	t = 5.681 Significant difference
Length of hemodialysis treatment	t = 9.096 Significant difference

Table 2: *The differences among demographic profile of the respondent and their compliance to dietary and fluid restrictions.*

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Table 2 present the T test of the variables, indicating that there is a significant difference between the respondent and their compliance to dietary and fluid restrictions when they are grouped according to most of the demographic profile. Healthcare professionals should recognize the factors hindering compliance from the patients' perspective while assisting them with appropriate skills in making necessary changes possible. Compliance rates of dietary, fluid, and dialysis were 27.7%, 24.5% and 91.0%, respectively. Younger, male, working patients and those with longer duration on hemodialysis were found more likely to be non-compliant. Lacks of adequate knowledge, inadequate self-efficacy skills, forgetfulness and financial constraints were the major perceived barriers towards better compliance to fluid, dietary, and dialysis, respectively [8]. When the level of compliance to dietary and fluid restriction and between those with 20 - 35 years of age, 36 - 50 years of age and at-risk ages 51 - 65 years of age, 66 - 80 years of age is compared, the T test is 5.37747, therefore, there is significant difference in the level of compliance of dietary and fluid restriction when grouped according to age. When the level of compliance to dietary and fluid restriction and between male and female is compared, the T test is 5.729, therefore, there is significant difference in the level of compliance of dietary and fluid restriction when grouped according to gender. When the level of compliance to dietary and fluid restriction and between those with educational attainment of Elementary Graduate, High school Graduate and College Graduate is compared, the T test is 5.377, therefore, there is significant difference in the level of compliance of dietary and fluid restriction when grouped according to educational attainment. When the level of compliance to dietary and fluid restriction and between those with educational attainment of Elementary Graduate, High school Graduate and College Graduate is compared, the T test is 5.377; therefore, there is significant difference in the level of compliance of dietary and fluid restriction when grouped according to educational attainment.

When the level of compliance to dietary and fluid restriction and between those with economic status of 79,000 below and 80,000 above is compared, the T test is 5.239, therefore, there is significant difference in the level of compliance of dietary and fluid restriction when grouped according to economic status. When the level of compliance to dietary and fluid restriction and between those with marital status of single (single, widow) and married is compared, the T test is 5.681; therefore, there is significant difference in the level of compliance of dietary and fluid restrictions when grouped according to marital status. When the level of compliance to dietary and fluid restrictions and between the length of their therapy in months is compared, the T test result is 9.096; therefore, there significant difference in the respondents' level of compliance when grouped according to their length of therapy in months.

Based on the results of the study:

1. Majority of the respondents were 51 - 65 years old (40%), male (57%) have greater risk for developing ESRD, college graduate (54%), with monthly income ranging from Php 1,000-9,999 (68%) and married (74%).

2. In terms level of compliance to dietary and fluid restrictions, 16 or 46% of the respondents are high compliant, 15 or 143% of the respondents are very high compliant, 3 or 8% of the respondents are moderate compliant, while the 1 or 3% of the respondent are low compliant.

3. The study shows that age has no significant relationship with their compliance to dietary and fluid restrictions. Same with gender and economic status whom showed no relationship to dietary and fluid compliance. Unlike marital status, educational attainment and length of haemodialysis treatment that yields a positive relationship with level of compliance with dietary and fluid restrictions.

4. Age, gender, educational attainment, economic status, marital status and length of haemodialysis treatment have a significant difference between the respondent and their compliance to dietary and fluid restrictions when they are grouped according to most of the demographic profile.

Conclusion

Hence the study elucidates that while age, gender, and economic status have no significant relationship with the respondents' compliance with dietary and fluid restrictions, marital status has a significant direct relationship; and educational attainment and length of hemodialysis treatment has a significant inverse relationship with dietary and fluid restrictions. This information could be integrated in planning care for hemodialysis patients, especially in enhancing the effectiveness of health teachings to unmarried and otherwise highly educated clients.

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Ethics Approval

The study was approved by the Mindanao State University Iligan Institute of Technology (MSU-IIT) Ethics Committee.

Conflict of Interest

Author declares that there is no conflict of interest.

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