



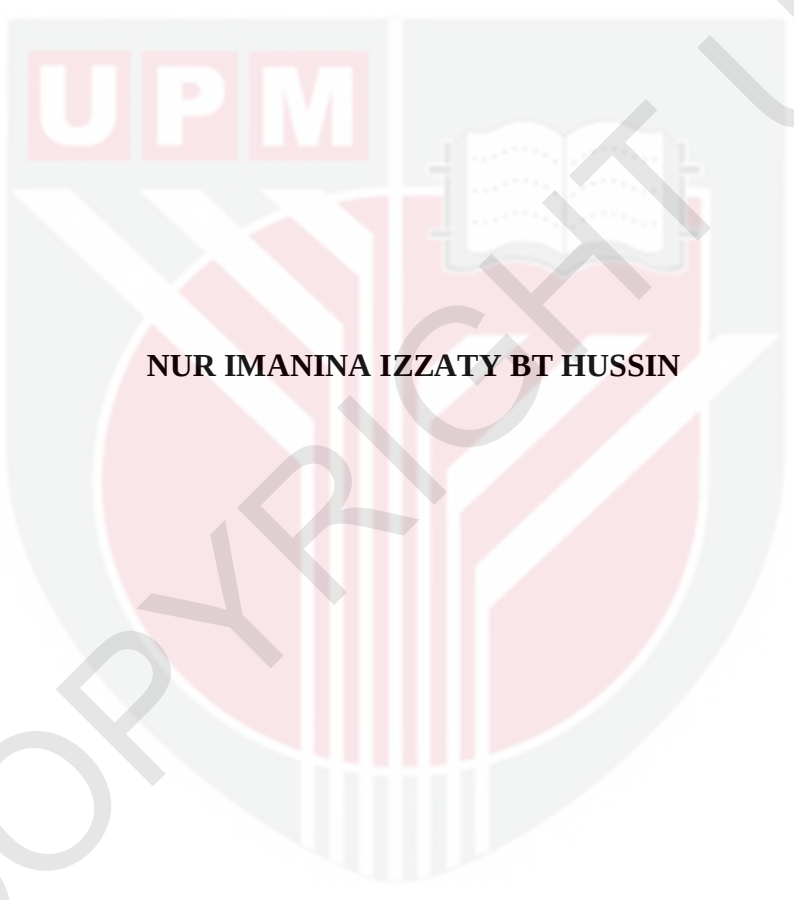
UNIVERSITI PUTRA MALAYSIA

***FACTORS ASSOCIATED WITH FLUID ADHERENCE AMONG
PATIENTS UNDERGOING HEMODIALYSIS IN SELECTED DIALYSIS
CENTRES IN SELANGOR***

NUR IMANINA IZZATY BT HUSSIN

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SELANGOR**

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UNIVERSITI PUTRA MALAYSIA

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BY

NUR IMANINA IZZATY BT HUSSIN

A project submitted as a partial fulfilment of the requirement for the degree of
Bachelor of Science (Dietetics) from the Faculty Medicine and Health Sciences,
Universiti Putra Malaysia.

This project entitled “Factors associated with the fluid adherence among patients undergoing hemodialysis in selected dialysis centres in Selangor” was prepared by Nur Imanina Izzaty bt Hussin and submitted to the Faculty of Medicine and Health Sciences as a partial fulfilment of the requirement for the degree of Bachelor of Science (Dietetics) from the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

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ABBREVIATIONS

Abbreviations

Meaning

CKD

Chronic Kidney Disease

ESRD

End-Stage Renal Disease

HD

Hemodialysis

IDWG

Interdialytic Weight Gain

RRT

Renal Replacement Therapy

WHO

World Health Organization

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ABSTRACT

FACTORS ASSOCIATED WITH FLUID ADHERENCE AMONG HEMODIALYSIS PATIENTS IN SELECTED DIALYSIS CENTRES IN SELANGOR

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Patients with End Stage Renal Disease (ESRD) who undergo hemodialysis (HD) treatment often had difficulties in managing their diet and fluids. This study determined the associations of socio-demographic, sodium intakes, perceived social support and perceptions on fluid restriction with fluid adherence among HD patients. A cross-sectional study was conducted among 92 HD patients in selected dialysis centres in Selangor, Malaysia. The patients completed interview-based questionnaires on socio-demographic, social support (Multidimensional Perceived Social Support Questionnaire) and perceptions on fluid restriction. A 2-day dietary data were obtained and information on interdialytic weight gain (IDWG) were retrieved from medical records as secondary data. Half of the patients were aged between 41- 60 years old with 90% were married while 61% claimed that they have met with dietitian before and received nutrition advice. Over half (59.8%) had met the fluid allowance that is recommended for HD patients while only 29% had good perceptions towards fluid restriction. The proportion of patients who met recommended sodium intake was 70.7% and 81.5% had good IDWG. In general, the patients obtained moderate social support with perceived social support from friends was significantly lower than the other two subscales. There were significant correlations between IDWG with perceived social support ($r = -0.023$, $p = 0.033$), sodium intake ($r = 0.302$, $p = 0.003$) and perceptions on fluid restriction ($r = -0.270$, $p = 0.009$) among HD patients. There were also significant associations between ethnicity, educational level, marital status and fluid adherence among HD patients ($p < 0.001$). The present study provides better insight on fluid adherence among HD patients for future measures and intervention. It is imperative to emphasize the restriction of sodium and fluid intake for the optimal control of fluid adherence among HD patients. Adequate social support from friends is crucial for the optimal control of fluid adherence. The understanding of the perceptions of fluid restriction suggesting that controlling fluid intake is very important. Further research regarding factors associated with fluid adherence among HD patients is recommended.

ABSTRAK

FAKTOR-FAKTOR YANG BERKAITAN DENGAN PEMATUHAN CECAIR DI KALANGAN PESAKIT YANG MENJALANI HEMODIALISIS DI PUSAT DIALISIS YANG DIPILIH DI SELANGOR

NUR IMANINA IZZATY HUSSIN

Pesakit dengan Penyakit Buah Pinggang Tahap Akhir (ESRD) yang menjalani rawatan hemodialisis (HD) sering mengalami kesukaran dalam menguruskan diet dan pengambilan cecair.. Kajian ini adaalah untuk menentukan hubungan antara sosio-demografi, sokongan sosial, pengambilan cecair dan natrium dan persepsi terhadap pengawalan cecair dengan pematuhan cecair di kalangan pesakit HD. Kajian keratan rentas dilakukan di kalangan 92 pesakit HD di pusat dialisis terpilih di Selangor, Malaysia. Pesakit melengkapkan soal selidik berdasarkan temu bual mengenai sosio-demografi, sokongan sosial dan persepsi mengenai pengawalan cecair. Maklumat berkaitan pengambilan diet selama 2 hari diperoleh dari pesakit dan data kenaikan berat badan interdialitik (IDWG) dari rekod perubatan mereka atas kebenaran pesakit. 51.1% pesakit berusia antara 41-60 tahun dengan 90% telah berkahwin sementara 61% mendakwa bahawa mereka pernah bertemu dengan pegawai dietetik sebelum ini dan mendapat nasihat pemakanan. Lebih separuh (59.8%) mematuhi kadar pengambilan cecair yang disyorkan untuk pesakit HD sementara hanya 29% mempunyai persepsi yang baik terhadap pengawalan cecair. 70.7% pesakit memenuhi pengambilan natrium yang disyorkan adalah dan 81.5% mempunyai IDWG yang baik. Secara umumnya, pesakit memperoleh sokongan sosial yang memuaskan dengan sokongan sosial dari kawan-kawan yang paling rendah berbanding kategori sokongan sosial yang lain. Terdapat hubungan negatif yang signifikan antara sokongan sosial dan IDWG ($r = -0.023$, $p = 0.033$), hubungan positif antara pengambilan natrium ($r = 0.302$, $p = 0.003$) dan IDWG dan hubungan negatif antara persepsi terhadap pengawalan cecair ($r = -0.270$, $p = 0.009$) dan IDWG di kalangan pesakit HD. Kajian ini mendapati hubungan yang signifikan antara etnik, tahap pendidikan, status perkahwinan dengan pematuhan cecair di kalangan pesakit HD ($p < 0.001$). Kajian ini memberikan gambaran yang lebih baik mengenai pematuhan cecair di kalangan pesakit HD untuk langkah dan intervensi masa depan. Sebaiknya penyelidikan lebih lanjut mengenai faktor-faktor yang berkaitan dengan pematuhan cecair di kalangan pesakit HD dijalankan pada masa akan datang. Adalah mustahak untuk menekankan sekatan pengambilan natrium dan cecair untuk kawalan optimum pematuhan cecair di kalangan pesakit HD. Sokongan sosial yang mencukupi dari rakan sangat penting untuk kawalan pematuhan cecair secara optimum. Pemahaman mengenai persepsi kawalan cecair menunjukkan bahawa mengawal pengambilan cecair adalah sangat penting. Sebaiknya penyelidikan lebih lanjut mengenai faktor-faktor yang berkaitan dengan kepatuhan cecair di kalangan pesakit HD.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Chronic Kidney Disease (CKD) is a significant public health concern yet life-threatening disease that often under-diagnosed, irreversible and with progressive renal dysfunction that may eventually lead to end-stage renal disease (ESRD). Diagnosis of CKD is made according to estimated glomerular filtration rate (eGFR), at which eGFR is less than 60 mL/min/1.73 m² on at least two occasions of 90 days apart (Wouters et al., 2016). On the other hand, as patients gradually lost its kidney functions, eGFR will reduce accordingly, and will progress to the final stage which is termed as End Stage Renal Disease (ESRD) or CKD stage five, a stage whereby permanent loss of kidney function is anticipated.

Globally, the number of ESRD patients has increased substantially in both developed and developing countries (Ting et al., 2018). Malaysia is not exempted from the wave. National surveillance survey showed that the prevalence of CKD has increased from 9.1% in 2011 to 15.5% in 2018 (Nephrology Services & Department of Public Health Ministry of Health Malaysia, 2018). Indeed, the incidence and prevalence of patients with ESRD has been on an upward trend for the past 20 years, which is largely driven by the increased of aging populations as well as the pandemic of chronic diseases particularly diabetes mellitus and hypertension (Bujang et al., 2017).

When patients permanently lost their kidney functions, renal replacement therapy (RRT) in the form of long-term dialysis which include hemodialysis (HD) and peritoneal dialysis (PD) or kidney transplantation are needed for survival (Surendra et

al., 2019). Despite kidney transplantation is the best option, however, due to insufficient of organ donor availability, hemodialysis (HD) treatment has been the most efficient and practical procedure for patients with ESRD management (Naalweh et al. 2017). The 24th Report of the Malaysian Dialysis and Transplant Registry in 2016 recorded a total of 39,711 patients receiving dialysis treatment in which 35,781 on HD procedure (90%) and 3930 on PD treatment (10%). In other words, the prevalence of dialysis patients has growing rapidly that reach almost 40,000 in 2016. As in most of other countries, hemodialysis (HD) is the most predominant approach of ESRD management in Malaysia in which more than 90% of the patients with ESRD rely on HD as treatment modality (Chan et al., 2019). This is true as PD is grossly underutilized regardless of the vigilant effort by the government to advocate PD as the choice of dialysis modality (Chan et al., 2012) as well as attributable to the increasing availability of HD treatment facilities in Malaysia (Bujang et al., 2017), mainly from the non-governmental organisations and private dialysis centres.

Despite life-saving, patients undergoing HD are require to adhere to drug treatments together with diet and fluid restrictions to sustain their health (Efe & Kocaöz, 2015), which include strict dietary restriction on intakes of potassium, phosphate and fluid to reduce undesirable accumulation of harmful wastes, electrolytes and fluids in the body (Barnett et al., 2007). Although HD treatment permits the patients to handle with symptoms but it can cause serious physical, psychological, social and economic problems to the patients. This probably may increase the emotional tension among the patients and optimal adherence to treatment become more challenging (Efe & Kocaöz, 2015). Among the treatment adherences, fluid and diet restrictions are commonly reported, and had been documented as the main difficulties faces by ESRD patients on dialysis (Amaral & Crist, 2015). Poor adherence to fluid restriction can cause high interdialytic weight gain (IDWG) which can result into cardiovascular mortality and morbidity (Amaral & Crist, 2015). Besides that,

prolonged non-adherence to fluid restriction can cause chronic fluid overload which can result in various severe complications such as lower extremity edema, ascites, left ventricular hypertrophy, congestive heart failure, hypertension, short of breath and pulmonary vascular congestion that eventually will lead to increased morbidity and mortality in patients with ESRD (Chironda & Bhengu, 2016). Thus, fluid adherence is very crucial among HD patients for the overall quality of life and better survival of the patients.

Non-adherence to fluid intake is prevalent among HD patients, with great variations across different populations, ranged from 25.4 to 79.5% (Kim et al., 2010; Kugler et al., 2005; Mellon et al., 2013; Qiu & He, 2015; Feng et al., 2008). In Malaysia, existing studies confirmed the high prevalence of fluid non-adherence among HD patients (Chan et al., 2019; Yusop et al., 2013). While Yusop et al. (2013) reported approximately 30% of their HD patients adhered to fluid restriction, more recent study showed that less than 15% of HD patients adhered to fluid restriction (Chan et al., 2019), highlighting non-adherence to fluid adherence is deemed a serious condition among HD patients in Malaysia. On the other hand, non-adherence to fluid among patients undergoing hemodialysis was more common compared to non-adherence to diet, medication or dialysis (Ahrari, Moshki, and Bahrami, 2014). This was supported by study in Australia (Jia et al., 2016) and Singapore (Chen et al., 2017). Fluid non-adherence may highly related to a strong sensation of thirst and xerostomia (dry mouth) that were experienced by most HD patients (Silva et al., 2014) or attributed to environmental factors, beliefs, and co-morbid complications as patients may not differentiate on the differences between needing and wanting to drink (Chen et al., 2017).

1.2 Problem Statement

According to World Health Organization (2003), adherence is defined as “*a measure of the individual’s behavioral change according to the recommendations of the health care team regarding medication use, diet and lifestyle change*”. The adherence of HD patients to their treatments, especially to the fluid restrictions is very challenging due to physiological and psychological problems (Efe & Kocaöz, 2015).

Fluid adherence can be influenced by numerous factors which includes sex (Silva et al., 2014), age, sociocultural characteristics, health status, knowledge of existing disease as well as familial and environmental conditions (Efe & Kocaöz, 2015), marital status, educational level (Chironda and Bhengu 2016; Safdar, Baakza, and Kumar, 2014; Ibrahim et al., 2015), employment status (Ibrahim et al., 2015) and duration of HD treatment (Ipema et al., 2016; Chilcot, Wellsted, and Farrington 2010; Lee and Molassiotis 2002). Despite studies on fluid adherence among HD patients were available in other countries such as Egypt, Brazil, Iran and Singapore, such studies are scarce in Malaysia. To the best of knowledge, there were only three studies on fluid adherence among dialysis patients in Malaysia to date (Barnett et al., 2008, Chan et al., 2012, Yusop et al., 2013). Nevertheless, the above studies did not identify determinants of poor fluid adherence among hemodialysis patients, which are deemed important for the optimal clinical management of HD patients. Hence, the present study can enhance our knowledge about fluid restriction as well as factors that may associate with fluid adherence among HD patients in Malaysia. It is hope that by identifying factors that influence fluid adherence will allow the relevant parties in the formulation of better treatment plan in minimizing complications of fluid overload and hence attribute to better quality of life and survival rate among HD patients.

As mentioned in previous paragraph, the etiology of fluid non-adherence is multifactorial, being sociodemographic (such as age, sex, marital status, education level). However, findings had always been inconsistent (Silva et al., 2014; Safdar, Baakza, and Kumar, 2014; Ipema et al., 2016; Ibrahim, Hossam and Belal, 2015; Chilcot, Wellsted and Farrington, 2010). Therefore, attributable to findings discrepancies, this study aims to investigate the association of socio-demographic background with fluid adherence among HD patients in the local context.

Similarly, the association between social support and fluid adherence had been inconsistent. While social support has no significant relationship with dietary and fluid adherence in several studies (Kimmel et al., 1995; Moran et al., 1997), higher level of social support was associated with higher level of fluid adherence in other studies (Ahrari, Moshki, & Bahrami 2014; Kara et al., 2007). Presence of social support, especially from patients' family members and friends is believed to help with the care and management of diseases, which eventually facilitate with the compliance of fluid restriction (Kara et al., 2007). According to a study in Turkey, without strong social support for the HD patients, it can cause stress, anxiety and psychological changes that will lead to reduced immune function and increased mortality rate among the patients (Efe & Kocaöz, 2015). Therefore, social support is very crucial to enhance quality of life and improve survival rate of the HD patients. However, there is a paucity of studies addressing the correlation of social support and fluid adherence among HD patients in Malaysia. Considering the potential prominent role of social support, this study aims to identify the association between social support and fluid adherence in patients undergoing hemodialysis in Malaysia.

Fluid and sodium intake control are very crucial among HD patients attribute to the kidneys' incapability in maintaining fluid and sodium balance (Altay et al., 2008). Sodium

intake control is very important to manage the fluid intake since it is the leading cause of thirst sensation (Correa et al. 2017). Patients who did not control the sodium intake tend to perceive a greater difficulty in controlling the fluid intake which eventually will lead to fluid overload. Earlier studies showed that HD patients with high IDWG will be likely to experience uncontrolled sodium and fluid intake (Kara et al., 2007; Kugler et al., 2005). To the best of knowledge, how sodium and fluid intake may influence fluid adherence has received little attention in the local context. Hence, this study is conducted to investigate the potential correlations between intake of sodium and fluid with fluid adherence among HD patients.

Earlier studies demonstrated the importance of patients' perception on knowledge and skills in order to implement fluid restriction among HD patients (Jia et al. 2016; Chen et al., 2017) as patients' knowledge is the chief facilitator in fluid adherence along with the accurate self-assessment and supportive social support (Chironda and Bhengu, 2016). Previous study found that low acceptance of fluid restrictions among HD patients may be correlated with strong thirst sensation and xerostomia experienced by the patients (Silva et al., 2014). However, findings had been inconsistent (Safdar, Baakza, and Kumar, 2014; Lee & Molassiotis, 2002). The later study showed that despite being more knowledgeable about fluid restrictions, young and more educated HD patients did not demonstrate better fluid adherence compared to their older and less educated counterparts (Lee & Molassiotis, 2002), indicating fluid adherence is a multifactorial in etiology and deserves more studies.

To sum up, this study aims to determine the associations between socio-demographic, social support, fluid and sodium intake, patients' perceptions on fluid restriction and fluid adherence among patients undergoing hemodialysis in Selangor.

1.3 Research Questions

- 1) What is the fluid adherence rate among patients undergoing hemodialysis in selected dialysis centres in Selangor?
- 2) What are the socio-demographic, social support, fluid and sodium intake, patient's perception on fluid restriction and fluid adherence among patients undergoing hemodialysis?
- 3) Are there associations between socio-demographic background, social support, fluid and sodium intake, patient's perception on fluid restriction and fluid adherence among patients undergoing hemodialysis?

1.4 Significance of Study

This study aimed primarily to fill the research gap that has been missing as there is a lack of studies to investigate specifically on fluid adherence among patients undergoing hemodialysis. There are relatively more studies that focus on dietary intake such as potassium, phosphate and sodium among the kidney failure patients, while such studies on fluid adherence is to be likely limited especially in Malaysia context, despite the latter is often a main issue among HD patients. Hence, it is hope that this study would create a new information and in depth for the new researchers especially among patients undergoing hemodialysis in Malaysia as well as to take into account on the significant of the fluid adherence among hemodialysis patients.

The primary reason for this study is to provide a sufficient knowledge for the nutrition support team, health practitioner, nurses to gain new information and updated scientific knowledge to properly solve the problems based on this research findings and acknowledge

on the platform of references in assessing the fluid adherence among the patients undergoing hemodialysis especially in Malaysia context. Moreover, the patients themselves can achieve better quality of life due to the findings that is related with fluid adherence among hemodialysis patients. New research can be done by this research can provide baseline information to do further research on it.

1.5 Objectives

General Objectives

To determine associations between socio-demographic background, sodium intake, perceived social support and patient's perception on fluid restriction with fluid adherence among patients undergoing hemodialysis in selected dialysis centres in Selangor.

Specific Objectives

1. To determine the fluid adherence rate among patients undergoing hemodialysis in selected dialysis centres in Selangor.
2. To determine the socio-demographic background of patients undergoing hemodialysis in selected dialysis centres in Selangor.
3. To assess the sodium intake among patients undergoing hemodialysis in selected dialysis centres in Selangor.

4. To determine the perceived social support among patients undergoing hemodialysis in selected dialysis centres in Selangor.
5. To assess the patient's perception on fluid restriction among patients undergoing hemodialysis in selected dialysis centres in Selangor.
6. To determine the associations between socio-demographic background, sodium intake, perceived social support and patient's perception on fluid restriction with fluid adherence among patients undergoing hemodialysis in selected dialysis centres in Selangor.

1.6 Research Hypothesis

There are significant associations between socio-demographic background, sodium intake, perceived social support and patient's perception on fluid restriction with fluid adherence among the patients undergoing hemodialysis in selected dialysis centres in Selangor.

1.7 Conceptual Framework

Figure 1.0 shows the proposed conceptual framework of this study. The associations between socio-demographic, sodium intakes, perceived social support and patient's perception on fluid restriction with fluid adherence among patients undergoing hemodialysis in selected dialysis centres in Selangor will be determined. Socio-demographic background, sodium intake, perceived social support and patient's perception on fluid restriction are the independent variables, while fluid adherence is the dependent variables.

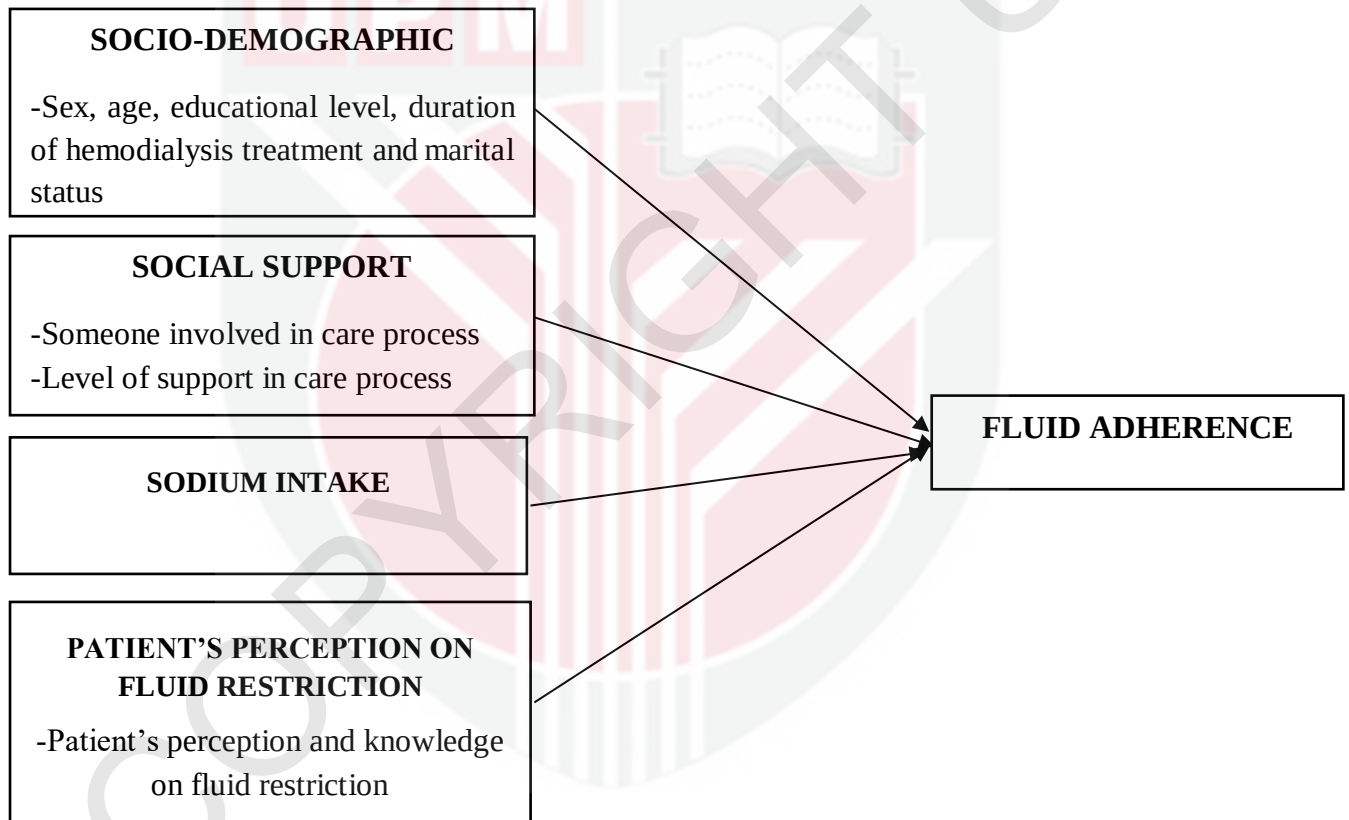


Figure 1.0: The conceptual framework on factors that may associate with fluid adherence among patients undergoing hemodialysis

CHAPTER 2

LITERATURE REVIEW

2.1 Fluid Adherence among hemodialysis patients

In patients with Chronic Kidney Disease (CKD), the functions of the kidney are gradually declining, leading to a decrease in the rate of glomerular filtration that will lead to interfering in the removal of waste from the bloodstream and accumulation of waste in the blood (Opiyo et al., 2019). Therefore, hemodialysis (HD) procedure has been developed as one of Renal Replacement Therapy (RRT) as an effective, safe and competent approach of ESRD patient care (Jansen et al., 2013). The procedure demands that patients be dialyzed for about 4 hours a day three days a week and they must also comply with dietary and fluid restrictions (Fincham & Kagee, 2008).

Basically, the main objective of HD is to stabilize the intracellular and extracellular fluid volume that would be a function of normal kidney. This is achieved by carrying waste products such as urea from the blood to the dialysate and by transporting solutes such as bicarbonate from the dialysate to the blood (Omari et al., 2019). Inevitably, some potential lifestyle changes will affect the HD patients, especially on the psychological and social life of the patients (Kara, 2006).

Adherence can be defined as the extent to which a person's behaviour corresponds with medical or health advices, for example, taking medicines, following diets, or implementing lifestyle changes (Takaki & Yano, 2006). End Stage Renal Failure (ESRD) patients undergoing HD procedure should limit their fluid intake in order to avoid fluid overload, which can lead to negative consequences in patients

(Newmann & Litchfield 2005; Charra 2007). This is because patients undergoing HD are usually oliguric or anuric, so their tendency to build up fluid has to be managed wisely by restricting the consumption of sodium and fluid as well as by ultrafiltration during dialysis procedures (Ali, 2014).

In addition, patients are limited to about 700 - 1 000 ml of water a day have to maintain fluid weight gains around 0.5 and 1 kg between two dialysis sessions. Excess fluid in the body can cause accumulation of fluid around the lungs, resulting in breathing difficulties and increased blood pressure, while hypertension, pulmonary oedema, congestive heart failure, and decreased patient survival are correlated with chronic fluid overload (Fincham & Kagee, 2008). Hence, compliance to fluid restriction is critical to patients' quality of life and survival.

Patient compliance to the treatment is a crucial indicator of effective control of chronic diseases. Studies have shown, however, that patients could not abide to the targeted level of diet, fluid restrictions and drug treatment (Acar & Güneş, 2018). A study found that 98.3% of their HD-treated patients reported non-compliance to diet and 95.0% to fluids restraint (Smith et al., 2011).

Furthermore, other studies also reported 81.4% and 58.1% of HD patients to be non-compliance to diet regime, while 74.6% and 68.1% of patients undergoing HD to be non-adherence towards their fluid restriction (Kara et al., 2007; Kugler et al., 2005). Therefore, several studies highlighted that the most common indicator of fluid compliance in HD patients is Interdialytic Weight Gain (IDWG), which is used as an outcome measure (Holmberg and Stegmayr, 2009). Non-compliance to fluid restrictions was found to be more prevalent among younger, married patients and those with poorer perceived levels of social support (Kara, Caglar, and Kilic, 2007).

Interdialytic weight gain (IDWG) is defined as the amount of weight gained from the end of one dialysis session to the beginning of the next session. It can be calculated by subtracting the patient's weight before the dialysis treatment to the patient's weight after the dialysis treatment of the previous session (Everett et al., 2010). The amount of weight gained between the consecutive HD sessions are associated with the accumulation of fluid. Efe & Kocaöz (2015) proposed that the recommended IDWG for HD patients is 2.5 kg or below 4.5% of their dry weight. Smith et al. (2011) claimed that 10-20% of HD patients usually experience high IDWG which is defined as $\geq 5.7\%$ of the patient's estimated dry weight. Meanwhile, based on Clinical Practice Guideline of Ministry of Health Malaysia, interdialytic weight gain of HD patients should be less than 4% of their dry weight (Hooi et al., 2017).

Interdialytic weight gain was statistically higher among of compliant patients than that of non-compliant patients (Ibrahim, Hossam, & Belal, 2015). Hence, IDWG is a useful indicator to address fluid adherence levels among HD patients because these patients have reduced functions of kidneys with little or no urine to be excreted out. So, it is expected that their body accumulate fluids which causes weight gain between two consecutive HD sessions. If compliance to fluid restriction is assured, the adverse effects of the procedure reduce, the burden of the caregiver decreases, the patients' quality of life improves, psycho social health problems decrease and the life expectancy will also increase (Kara, 2007; Kutner, 2001). Hence, the compliance to fluid restriction is very crucial among HD patients.

2.2 Factors associated with fluid adherence

Several factors were found to influence fluid adherence among hemodialysis patients and these are elaborate further as the following sub-headings.

2.2.1 Socio-demographic background

The important role of compliance to HD treatment does not portray a new era of concern; however, it is crucial to assess socio-demographic background that can directly or indirectly affect therapy adherence (Theodoritsi et al., 2016). Research findings reported associations between non-adherence of fluid restriction with socio demographic factors such as age, sex and education level, duration of dialysis, vascular access, anxiety, depression, smoking and non-adherence to alcohol use (Akman et al., 2007; Clark, Farrington, & Chilcot, 2014; Higgins, 2006; Jin, Sklar, Min Sen Oh, & Chuen Li, 2008; Russell et al., 2011).

In general, adherence towards fluid restriction was found to be better when patients' age increased. This was supported in several studies whereby non-compliance to fluid restriction was more frequent in young patients (Ahrari, 2014; Kugler et al., 2005; Takaki et al., 2003; Vlamincx et al., 2001). Earlier local study also reported fluid adherence was higher among older HD patients as compared to their younger HD counterparts (Chan et al., 2012). Fluid consumption with foods may be reduced in the elderly patient due to shopping and cooking issues, decreased sensation of taste and smell that eventually lead to decreased appetite to eat (Hansen, 2001). Younger patients typically have a huge desire to eat, followed by a higher consumption of sodium and fluid. On the other hand, a greater comorbidity usually associated with a younger age might also influence adherence towards fluid adherence (Illaverde, Ofre, & En, 2005).

Female patients were found to comply better to fluid recommendation when compares to their male counterparts (Acar & Güneş, 2018; Chan et al., 2012). However, other study showed that gender is not a critical factor influencing compliance to drug treatment, but adherence to drug treatment was found to be higher in female than male (Sharaf, 2016). Inconsistency exists however. For example, Cutaia et al. (2014) found male patients adhered more to fluid and sodium restrictions than female patients. This was attributed to female patients were found to be more likely to face difficulties in adhering to the diet regime and fluid restriction than male patients.

Research has shown that unmarried patients tend to be non-compliance towards fluid restriction than married patients (Kara et al., 2007). In other words, marital status correlates significantly with the adherence to fluid restriction. A study conducted by Ibrahim et al. (2015) revealed that 50% of the non-compliant patients were unmarried and 25% of them were divorced. This is supported by other study that reported 100% of single HD patients and only 49.2% of married patients had difficulties in restriction fluid intake (Ahrari et al., 2014).

On the other hand, earlier local study showed education level was not associated with fluid adherence among HD patients (Chan et al., 2012), which was in contrast with other studies (Alikari et al., 2018; Fincham & Kagee, 2008; Sharaf, 2016). While higher education was associated with better fluid adherence in some studies (Fincham & Kagee, 2008; Sharaf, 2016), inconsistency existed (Alikari et al., 2018). For example, improved patient education was observed to lead to slowing the progression of kidney failure and increase the surviving rate of HD patients (Fincham & Kagee, 2008). Indeed, the higher the educational level of HD patients, the higher the level of knowledge and adherence to fluid restriction. It was postulated that HD

patients with a high level of education can fully comprehend the importance of the HD treatment more effectively. On the other hand, it was reported patients with high level of education had difficulty to comply with diet and fluid restriction due to the need to fulfil with their jobs or professional requirements (Alikari et al., 2018). It is interesting to know knowledge and high education level have been proved to be the predominant facilitator for successful compliance to fluid control, through appropriate self-assessment, positive psychological influence and supportive social contacts (Chironda & Bhengu, 2016). More works are warranted in this aspect.

In addition, patients with longer duration on hemodialysis were found to be more comply with fluid adherence (Lee & Molassiotis, 2002). This is attributed to HD patients with prolonged duration of dialysis have extensive knowledge of the procedure and its management, therefore are more determined to comply with the fluid restriction than new HD patients (Alikari et al., 2018). However, earlier local study reported an opposite finding (Chan et al., 2012). It is postulated that ESKD patients may be more eager to change their dietary habits to meet the requirement of a newly-received life-saving hemodialysis treatment. As time passes, HD patients may feel bored and easily get frustrated with the need to comply with long lists of dietary and fluid restrictions. Patients new to dialysis treatment may also receive more social support and were therefore higher degree of compliant is expected (Lam, Twinn & Chan, 2010). 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 identify the individual's perceived barrier, explore patients' willingness and readiness to make changes to their dietary habits to achieve the optimum effect of compliance.

2.2.2 Sodium intake

HD patients should be recommended to consistently restrict the consumption of salt and fluid to optimize thirst monitor, encourage lesser fluid intake and IDWG, to reduce water retention in the body (Ferraz et al., 2014). Two measure strategies related to fluid restriction include limiting salt consumption and restricting fluid intake, which are the key problems that patients experience (Amaral & Crist, 2015). In addition, the recommendations for fluid intake in a day deviates from 500 to 1000 ml in conjunction to daily urine output, however 4.0-4.5% of weight gain as a percentage of dry weight in patients with ideal dietary intake and salt limitation may be acceptable (Ipema et al., 2016). Fluid restriction is seen to be more difficult compared to dietary restrictions for HD patients. Besides, fluid restriction is seen to be more difficult compared to dietary restrictions for HD patients.

Compliance to fluid restriction was undoubtedly complicated by environmental conditions, beliefs and co-morbid complications as the patents were confused of the differences between the need and the desire to drink (Hong et al., 2017). Moreover, when HD patients consume excessive fluid intake, it causes immediate reactions such as excessive IDWG, increased blood pressure, shortness of breath and extreme muscle cramping (Everett et al., 2010). Extended hypervolemia may result in hypertension, pulmonary edema, congestive heart failure, leading to lower patient survival (Barnett et al., 2007). In order to manage fluid intake, HD patients are advised to avoid spicy foods, choose thick soups, drink room temperature water, avoid sun exposure and limit alcohol intake, which may improve IDWG (Amaral and Crist (2015).

Sodium plays a significant role in regulating thirst as well as fluid intake. This is because Chronic Kidney Disease (CKD) patients are at a greater risk of sodium retention because their kidneys do not completely excrete sodium through urine as normal people do (Gkza & Davenport, 2017). Evidence has shown that many HD patients drink in response to the perception of osmometric thirst sensation normally caused by uncontrolled sodium intake (Sharaf, 2016). Furthermore, Sarkar et al (2006) reported that uncontrolled sodium consumption leads to increased water intake, which eventually leads to increased IDWG. This can cause over hydration in HD patients which may result in intradialytic cramping, hypotensive events, fatigue due to treatments and cardiovascular diseases (Sharaf, 2016). Therefore, National Kidney Foundation has set a guideline that ESRD patients should restrict their dietary sodium intake to only 5 g per day.

Besides, research has revealed that despite significant dietary sodium restrictions, many HD patients consume more sodium than is recommended. They mentioned that factor to consider correlated with the difficulties of salt restriction in HD patients is the dysfunction of the salt taste, which inhibits patients from sensing the salt taste appropriately, resulting in more salt intake than prescribed (Tanaka et al., 2019). Therefore, HD patients should adhere to their fluid restriction appropriately because poor adherence to fluid not only can increase progression of disease processes, but it can also cause additional medical treatments due to complications (Everett et al., 2010).

2.2.3 Perceived Social support

There is an increasing concern in perceived social support as it can strongly influence the outcome of the diseases through multiple courses such as enhancing the coping mechanisms of the patients, reducing stress, aiding in practical issues, for instance, access to health services, and improving psychological capabilities and therapy adherence including fluid restriction (Ahrari et al, 2014; Kara et al., 2007; Patel et al., 2005). The most critical aspects that influenced non-adherence to fluid restriction are the social support from medical staff, organization and religion as well as help from friends and families (Sayers et al., 2008). Knowing that social support is correlated with longevity and well-being of the HD patients, it may have significant clinical benefits for the patients as it can guide clinical practice, therefore encourage and strengthen support systems for patients (Kara et al., 2007).

Furthermore, study found that healthcare professionals, such as dietitians, physicians and nurses, have been frequently criticized for playing a significant role in enforcing the prescribed limits on diet and fluid (Hong et al., 2017). According to Kara et al. (2007), low level of support from family and friends was associated with fluid non-adherence, with the strongest perceived social support recorded was from the family, followed by significant others and friends. Successful family and close friends support can buffer and control stress, depression, hopelessness, perceived burden of illness, acceptance of disease, access of health care services, and problem solving, thus making it much easier for patients to adapt to treatment (Al-Arabi 2003; Hansen, 2001; Kimmel et al., 1998; McNett, 1987; Patel et al., 2005). Chronic Kidney Disease (CKD) and its treatments can limit day-to-day tasks, employment status, marriage and family life as well as social relationships which can lead to stressful and

anxious feeling due to feel of socially isolated. Therefore, social support in HD patients is said to increase survival and quality of life (Chironda & Bhengu, 2016).

2.2.4 Patients' perceptions to fluid restriction

As HD progresses, a more detrimental effect on the quality of life encountered by HD patients is anticipated as they are imposed to multiple lifestyle limitations and modifications (Finnegan & Thomas 2013). This signifies the need to understand patients' perceptions on prescribed fluid intake to achieve a maintained positive health outcome (Hong et al., 2017). Although understanding patients' perceptions of their illness can influence how they deal with and adapt to their disease, patients' knowledge, capabilities, life experiences, and socio-cultural background may facilitate their response towards disease (Ibrahim, Tong, & Desa, 2011). It is interesting to find that HD patients who comply to their fluid requirements understand better about the possible health hazards accompanied with non-compliance to fluid restriction than those who do not understand about it (Opiyo et al., 2019).

Kim and Evangelista (2010) reported that negative perceptions of fluid restrictions are associated with low fluid compliance levels in patients with ESRD on hemodialysis. Their findings propose that clinical outcomes may be affected by specific perceptions towards adherence behaviors such as adherence to fluid restriction in hemodialysis patients. However, there was a study reported that it was proven that positive perception of disease was not a factor affecting the level of adherence to diet and restriction of fluid. This is because despite the positive perception of disease, the rationale of non-compliance to diet or restriction of fluid may be demonstrated by the duration of disease and level of education of the patients itself (Acar & Güneş, 2018).

CHAPTER 3

METHODOLOGY

3.1 Study Design

This was a cross-sectional study aimed to determine the associations between socio-demographic, sodium intake, perceived social support, patient's perception on fluid restriction and fluid adherence among patients undergoing hemodialysis in Selangor.

3.2 Study Location

This study was conducted in Selangor in which it is a state on the west coast of Peninsular Malaysia, encircling the capital Kuala Lumpur. It is the most developed state in Malaysia where it has great infrastructure and facilities with a high standard of living and the lowest poverty rate in the country. Selangor has the total area of 7 931 km² with the capital city of Shah Alam. The estimated total population in Selangor was 6.47 million in 2018 based on the adjusted Population and Housing Census of Malaysia 2018 (Department of Statistics Malaysia, 2018). Selangor was chosen as the study location as it has the greatest number of dialysis centers in Malaysia, with approximately one-third of hemodialysis centers in Malaysia are located in Selangor and the Federal Territory (Lim & Lim, 2005).

3.3 Sample Size

In this study, the sample size was calculated using a formula of sample size for correlation studies by Cole (1997). Table 3.1 below shows the calculation of sample size for this study.

$$n = \frac{(z_{1-\alpha/2} + z_{1-\beta})^2}{r^2 / (1-r^2)} + 5$$

(Cole, 1997)

Where

n= the calculated sample size

$Z_{1-\alpha/2}$ = z score for level of significance α in two-sided test

$Z_{1-\beta}$ = z score for power of the test

r = correlation

Table 3.1: Sample size calculation

Correlation studies	Correlation, r	Sample Size, n
Association between socio-demographic backgrounds with fluid adherence in HD patients.		$n = \frac{(1.96 + 1.28)^2}{(-0.34)^2 / (1 - (-0.34)^2)} + 5$ $n = 85 + 10\%^*$
Correlation of age with interdialytic weight gain (Ifudu et al., 2002).	r = -0.34	= 94 respondents
Correlation of duration HD treatment with fluid compliance among HD patients (Ibrahim et al., 2015).	r = 0.75	$n = \frac{(1.96 + 1.28)^2}{(0.75)^2 / (1 - 0.75^2)} + 5$ $n = 13 + 10\%^*$ = 14 respondents
Correlation between patients' perception on fluid restriction and fluid adherence among patients undergoing hemodialysis (Sharaf et al., 2016).	r = 0.60	$n = \frac{(1.96 + 1.28)^2}{0.60^2 / (1 - 0.60^2)} + 5$ $n = 24 + 10\%^*$ = 26 respondents

The calculated sample size ranged from 13 to 85 respondents. For a better study power, the highest sample size calculated from the study on the relationship between interdialytic weight gain, body weight and nutrition in HD patients (Ifudu et al., 2002) was considered for this study. After taking into account possible non-responses or recording error, the sample size was added with 10% which resulting in a total of 94 respondents included in this study.

3.4 Respondents

Respondents for this study were recruited from selected dialysis centers in Selangor. The selection of respondents was based on pre-determined inclusion and exclusion criteria, as depicted.

3.4.1 Inclusion criteria of respondents

- Malaysian citizens, men or women
- Aged from 18 and above
- Undergo hemodialysis treatment for at least 6 months
- Able to respond to the questions and provide verbal and written consent.

3.4.2 Exclusion criteria of respondents

- Patients with hearing difficulties or un-communicative
- Patients with recent hospitalizations (past 3 months) prior to data collection
- Hemodialysis patients with hepatitis B and/or hepatitis C

3.5 Sampling procedures

Sampling procedure used for this study was purposive sampling. The list of hemodialysis centers in Selangor was obtained from the National Registry of Dialysis. Patients that undergoing hemodialysis in the listed dialysis centers are being selected ($n = 3$), which includes Bangi Dialysis Centre, Pusat Hemodialisis Cheras, and MAA Medicare, Cheras. After receiving approval from 3 hemodialysis centers in Selangor, it was estimated that at least 30 hemodialysis patients that met the inclusion criteria were recruited for this study. Figure 3.1 shows the sampling procedure used in the study.

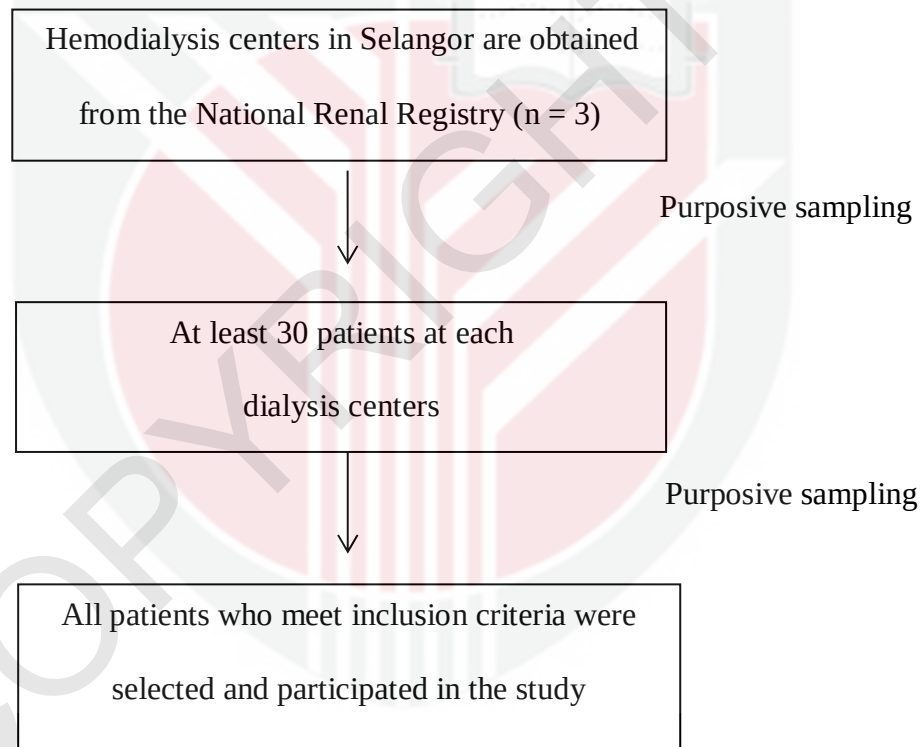


Figure 3.1 Sampling Procedure

3.6 Study instruments

Research instruments used in this study were a set of pre-tested structure questionnaires, 2- days diet recall and anthropometric measurements. A face-to-face interview was conducted to obtain information on the questionnaire and dietary intake, while anthropometric measurements were performed according to standard protocols. Information obtained through the questionnaire include socio-demographic background and perceived social support. The investigator and the selected subjects do not any conflict and relationship.

3.6.1 Socio-demographic background

Socio-demographic background of the patients which includes age, sex, educational level, marital status and duration of HD treatments were ascertained.

3.6.2 Sodium Intake

Sodium intake was assessed using a 2-days diet recall on dialysis day and non-dialysis day. Respondents were requested to recall and report all food and beverages consumed on the respective days. A phone call interview was conducted for diet recall upon respondents' request. Respondents were required to provide information about meal time, type of food items and ingredients, method of cooking and who prepare the food and brand name. To reflect intake of sodium, patients were requested to report as detail as possible on fluid consumption such as tea, coffee, carbonated drink and fruit juices, daily water consumption as well as the possible consumption of table salt, soy sauce or processed food. Data obtained were entered into Nutritionist ProTM Nutrition Analysis Software (2005) for the analysis of fluid and sodium intake. The fluid and sodium content

from the food was using the reference from Malaysia and USDA databases. The data was then transferred into IBM SPSS Statistics Version 22. Compliance on fluid and sodium intake is ascertained when compare with the nutrient prescription as recommended by Ministry of Health Malaysia (2003).

3.6.3 Perceived Social support

Multidimensional Scale of Perceived Social Support (MSPSS) was used to evaluate the level of social support among the respondents. The MSPSS is a questionnaire that consists of 12- item instrument that evaluate perceived social support which focussing on three sources, namely Family, Friends and Significant Others (Zimet et al., 1988). The questionnaire is straightforward, understandable and easy to administer in a short period and is psychometrically sound (Theodoritsi et al., 2016). The scale consists of 3 sub-scales which comprised of the source of support that includes support from family, friends, and significant others. Each support group is comprising of 4 items; family's support (3, 4, 8, 11), friends' support (6, 7, 9, 12) as well as significant other's support (1, 2, 5, 10) (Theodoritsi et al., 2016). Next, the items will be rated on a 7-point rating scale that range from 1 (very strongly disagree) to 7 (very strongly agree) with the possible marks ranging from 12 to 84 (Tonsinget al., 2012). The overall score will reflect the level of perceived social support by the HD patients with the higher the score, the higher the perceived social support (Theodoritsi et al., 2016). Moreover, MSPSS has shown to have a good to excellent internal consistency and test-retest reliability with Cronbach's alpha ranged from 0.81 to 0.94 (Wongpakaran et al., 2011). As for this research, Cronbach's alpha calculated was 0.964 which indicates that the results of the likert scales were closely related as a set of groups and considered as good internal consistency.

3.6.4 Patients' Perception on Fluid Restriction

Patients' perceptions on fluid restriction was assessed using a questionnaire that emphasizes on the knowledge and perceived fluid adherence among patients undergoing hemodialysis. Examples of questions included the importance of fluid control, method to control fluid intake and food and beverages that can be considered as fluid based on patients' knowledge and understanding. The questionnaire comprised of 29 questions with 3 scales; 1= Yes, 2= No, 3=Don't know and 4= Not applicable. Patients' perceptions and knowledge about fluid restriction were compared with their readings on IDWG.

3.7 Data Collection and Ethics Approval

Data collection for this study began on February 2020 after obtained the ethical approval from the Ethics Committee for Research involving Human Subjects Universiti Putra Malaysia (JKEUPM), with reference number of JKEUPM-2020-160. Next, the permission to conduct the study in several hemodialysis centers around Selangor were obtained. Moreover, respondents that met the inclusion criteria were given information sheets explaining the purpose of this study as well as informed consent was sought prior to the administration of the questionnaires. A set of questionnaires was used to gather information on respondents' socio-demographic background, social support and their perceptions on fluid restriction. This was accompanied with the collection of 2-days dietary data (one day diet recall and one day food record), phone call interview was conducted upon respondents' request or respondents who were illiterate.

3.8 Pre-test

A total of six hemodialysis patients who met the inclusion criteria (5% of total sample size) were tested as respondents as they have similar characteristics with the actual respondents before the real execution of data collection of the study. Pre-test was conducted to test-run the flow during the actual data collection. Duration needed to complete for pre-test was taken into consideration to estimate the duration of data collection with the actual respondents. After the pre-testing, the questionnaire and the questions asked during face-to-face interview were reassessed and improvised to ensure the actual data collection run smoothly and to enhance the understanding of respondents towards the questions asked so that the appropriate and important information can be obtained. Respondents that had been involved in the pre-test were not included in the actual data collection.

3.9 Data Analysis

All the statistical analysis performed were using IBM SPSS Statistics Version 22. Univariate analysis used to analyze the descriptive data and the results were presented as frequencies and percentages for categorical variables and as means and standard deviation for continuous variables. Pearson's product moment correlation was used to test the correlations between continuous variables such as fluid and sodium intakes, perceived social support, perceptions on fluid restriction with fluid adherence. Chi-square test was used to test the associations between categorical variables such as the association between sociodemographic background with fluid adherence. The level of statistical significance was set at $p < 0.05$.

CHAPTER 4

RESULT & DISCUSSION

This chapter presented the study findings that aimed to determine the associations between socio-demographic background, sodium intake, perceived social support and patients' perceptions on fluid restriction with fluid adherence among hemodialysis patients. The total of patients recruited was 92 with an overall response rate of 97.8%.

4.1 Socio-demographic background of the patients

The socio-demographic background of the hemodialysis patients was shown in Table 4.1. There are equal numbers of male and female patients. Majority of the patients were Malay (77.2%), followed by Chinese (18.5%) and Indians (3.3%). The ethnicity distribution of the study was comparable with the general ethnicity composition of the population of Malaysia (Department of Statistics Malaysia, 2011). The mean age of the patients was 55.8 ± 11.0 , ranged from 26 to 78 years old. A majority of the patients aged between 41- 60 years old (51.1%), followed by older persons (37.0%) and 21 to 40 years old (12.0%), respectively. Approximately 90% of the patients were married with half of them had secondary educational level. Besides, 95.7% of the respondents reported hemodialysis as their primary dialysis modality while two-third of them claimed that they have met with dietitian before and received nutrition advice. The mean duration of hemodialysis treatment was 5.5 ± 4.7 years.

Table 4.1 Socio-demographic background of the patients

Socio demographic variables	n (%)	Mean ± SD
Sex		
Male	46 (50.0)	
Female	46 (50.0)	
Ethnicity		
Malay	71 (77.2)	
Chinese	17 (18.5)	
Indian	3 (3.3)	
Others	1 (1.1)	
Age (years)		55.8 ± 11.0
21-40	11 (12.0)	
41-60	47 (51.0)	
61-80	34 (37.0)	
Marital status		
Single	11 (12.0)	
Married	80 (87.0)	
Divorced	1 (1.1)	
Education level		
No formal	1 (1.1)	
Primary	13 (14.1)	
Secondary	51 (55.4)	
Tertiary	27 (29.3)	
Other modality treatment (Peritoneal Dialysis)		
Yes	4 (4.3)	
No	88 (95.7)	
Met dietitian before		
Yes	59 (64.1)	
No	33 (35.9)	
Hemodialysis duration (years)		5.5 ± 4.7

4.2 Sodium and fluid intakes among patients

As shown in Table 4.2, mean fluid intake of patients was 982.3 ± 383.2 mg/day ranged from 200 to 2405 ml per day, and is higher than the recommendation according to Medical Nutrition Therapy for renal patients at 750 to 1000 ml in a day (Ministry of Healthy, 2005). Based on the findings, more than half of the patients (59.8%) adhered to the fluid restrictions of less than 1000 ml a day, meanwhile 40.2% of the patients have fluid intake of more than 1000 ml a day with the maximum intake of 2400 ml a day.

Besides, mean sodium intake was 1512.0 ± 933.6 mg ranged from 91.97 to 4738.03 mg per day, in which more than two thirds of the patients (70.7%) consumed less than 2000 mg sodium per day, while 29.3% of the patients has sodium intake of more than 2000 mg a day. Salt intake of hemodialysis patients should be controlled to not more than 2000 mg per day (Ferraz et al., 2014).

Table 4.2: Fluid and sodium intakes among hemodialysis patients

Intakes	n (%)	Mean $\pm$ SD	Range
Fluid intake		982.3 ± 383.2	200 - 2405
≤ 1000 ml	55 (59.8)		
>1000 ml	37 (40.2)		
Sodium intake		1512.0 ± 933.6	91.97 – 4738.03
≤ 2000 mg	65 (70.7)		
>2000 mg	27 (29.3)		

4.3 Perceived Social Support

Based on Table 4.3, the means score of social support perceived by patients was 57.6 ± 18.6 . Besides, the mean perceived scores were 21.7 ± 6.6 , 21.2 ± 6.8 and 14.8 ± 8.4 for family, significant others and friends, respectively. Perceived social support from friends was significantly lower than the other two subscales. Earlier study also showed that perceived social support from friends was lower among hemodialysis patients as compared to family or significant others (Theodoritsi et al., 2016).

The score for each subscale was categorized into low, intermediate and high. Among all the patients, 77.2% of them perceived high family support while only 9.8% of them felt otherwise. Moreover, in terms of friend support, 39 out of 92 patients reported that they have low friends support while 34 of them showed they received high support from their friends. Next, as for the other significant support, 73.9% of the patients showed that they received great support from their other significant individuals, while only 12% of patients reported contrarily.

Table 4.3: Perceived social support of respondents according to subscales

Subscales	n (%)	Mean $\pm$ SD
Family support (n=28)		21.7 $\pm$ 6.6
Low	9 (9.8)	
Intermediate	12 (13.0)	
High	71 (77.2)	
Friend support (n=28)		14.8 $\pm$ 8.4
Low	39 (42.4)	
Intermediate	19 (20.7)	
High	34 (36.9)	
Other significant support (n=28)		21.2 $\pm$ 6.8
Low	11 (12.0)	
Intermediate	13 (14.1)	
High	68 (73.9)	
Total score (n=84)		57.6 $\pm$ 18.6

4.4 Patients' Perceptions on Fluid Restriction

Patients' knowledge on fluid restriction was unsatisfactory, with mean knowledge score was 3.75 ± 1.1 out of a possible score of 6 as shown in Table 4.4.1. This is further supported that only 27% of the patients had good knowledge on fluid restriction. Study suggested that patient's adherence on fluid restriction is strongly influenced by personal beliefs, cultural morale and knowledge of the renal diet (Rambod & Peyravi, 2010). Among all, 68.5% of the patients unaware that fluid intake can affect their blood pressure. On the other hand, approximately one-third of the patients unconcerned that excess fluid intake can cause shortness of breath or difficulties in breathing. Earlier study showed that less than 10% of the respondents presented with complications when non-adhered to fluid intake (North et al., 2019). More studies are needed to delineate the recommended amount of fluid, as this is often one of the biggest challenges for dialysis patients, especially for patients living in tropical countries.

On the other hand, the mean score for patients' perception on fluid restriction was 18.4 ± 3.9 , ranged from 8 to 27. A majority of the patients perceived their fluid restriction as average with only less than one-third of the patients perceived they had good fluid restriction. Findings from previous studies showed that hemodialysis patients who failed to restrict fluid intake tend to have lack of knowledge and perceptions about the fluid intake requirement during dialysis which then result in major complications that will negatively affect the health status of the patients (North et al., 2019; Elamin et al., 2012).

Table 4.4.1: Patients perceptions of fluid restriction among HD patients

Subscales	n (%)	Mean $\pm$ SD	Range
Knowledge about fluid restriction		3.75 $\pm$ 1.1	1 - 6
Poor	13 (14.1)		
Average	54 (58.7)		
Good	25 (27.2)		
Perceptions about fluid restriction		18.4 $\pm$ 3.9	8 - 27
Poor	3 (3.2)		
Average	60 (65.3)		
Good	29 (31.5)		
Total score		22.2 $\pm$ 4.3	

As shown in Table 4.4.2, a majority of the patients were aware on the importance to limit their fluid intake to keep their body healthy and to make them more comfortable. On the other hand, most of the patients acknowledged importance of fluid restriction upon the advice from medical professionals. Approximately one-third of the patients acknowledged the importance of fluid restriction after hospitalization due to excessive fluid intake, which makes them more careful on their fluid intake.

On the other hand, there were few patients (7.6%) felt fluid restrictions were not important for them as 6.5% of them claimed that they do not face any complications when they drank more water. This finding was concurred with earlier study which showed that less than 10% of the respondents presented with complications when not adhered to fluid intake (North et al., 2019). More studies are needed to delineate the recommended amount of fluid, as this is often one of the biggest challenges for dialysis patients, especially for patients living in tropical countries. It is noteworthy that 7.6% of the patients reported that they do not know how to control their fluid intake. Furthermore, 6.5% stated that they do not think controlling fluid intake is important for them and 5.4% of patients reported that they

just cannot resist the urge to drink.

Table 4.4.2: Patients Perceptions of Fluid Restriction

Questions	n (%)
Perceived fluid restriction is important	85 (92.4)
Why do you think it is important for you to limit your fluid intake	
a) Because I fully understand that my kidney condition requires limiting fluid intake	85 (92.4)
b) Because limiting fluid intake is important to keep my body healthy	83 (90.2)
c) Because a medical professional (my doctor, nurse, dietitian, or other medical staff) told me to do so	83 (90.2)
d) Because I was hospitalized after I drank lots of fluid	32 (34.8)
e) Because limiting fluid intake will make me feel more comfortable before, during and after dialysis sessions	76 (82.6)
Perceived fluid restriction is not important	7 (7.6)
Why do you think it is not important for you to limit your fluid intake?	
a) Because I don't have any complications even if I drink more water.	6 (6.5)
b) Because I don't know how to control / limit my fluid intake	7 (7.6)
c) Because I do not think controlling fluid intake is important to me	6 (6.5)
d) Because I just cannot resist drinking	5 (5.4)

4.5 Fluid adherence

Based on the findings, mean interdialytic weight gain (IDWG) among patients was 2.8 ± 1.3 , ranged from 0.02% to 5.98%. As shown in Figure 4.1, majority of the respondents (81.5%) maintained good interdialytic weight gain percentage which is below 4% of dry weight, as recommended by Clinical Practice Guideline of Ministry of Health Malaysia (Hooi et al., 2017), while close to 20% of the patients failed to achieve the recommended IDWG. Accomplishment of IDWG less than 4% resulting in decreased risk of hospitalizations due to fluid overload (Chan et al., 2019). The percentage of poor fluid adherence was relatively lower compared to other studies (Naalweh et al., 2017; Smith et al., 2011). A similar scenario was obtained when the findings were compared with previous local study in which they reported 87% of the patients had IDWG of more than 4% of dry weight, therefore indicated overall poor fluid adherence (Chan et al., 2012). The overall higher adherence on fluid may be attributed to overall good control of fluid and sodium intake of the patients.

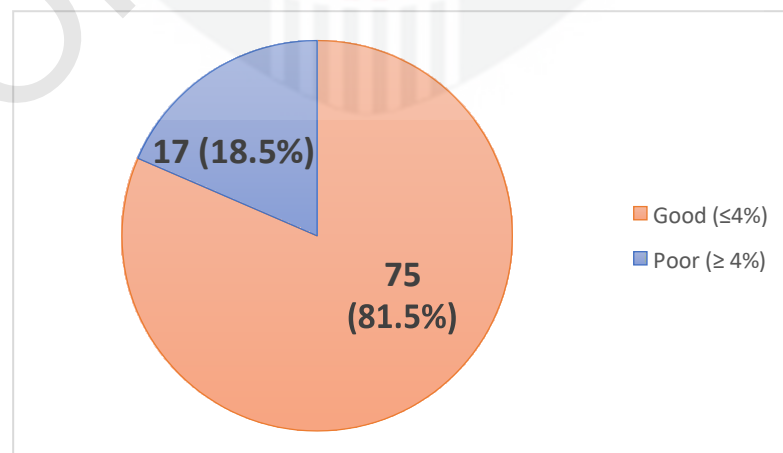


Figure 4.1 Fluid adherence among patients

4.6 Hypothesis Testing

1.6.1 Socio-demographic Background and Fluid Adherence

As shown in Table 4.5, there were no significant associations and correlation between age, hemodialysis duration, sex with fluid adherence among patients undergoing hemodialysis. There was no significant correlation between age with fluid adherence in current study ($r=-0.176$, $p=.092$). Furthermore, this study found that there was no statistical difference between young patients (aged below than 60 years old) and elderly (aged 60 years old and above) ($t =1.735$, $p=0.086$) on IDWG. This result could be explained by the imbalance age of patients who participated in this study where the total patients below 60 years old were two times higher than patients aged above 60 years old. However, this finding was not supported by previous research where fluid adherence was more common in older patients (Kugler et al., 2005; Takaki et al., 2003; Vlamincx et al., 2001). This could be due to young patients tend to be more metabolically active which then result to higher food and fluid intake that would lead to higher interdialytic weight gain (Ferraz et al., 2014).

Similarly, there was no significant correlation between hemodialysis duration and fluid adherence among hemodialysis patients ($r=0.028$, $p=0.794$). Current result was parallel with previous study that showed no significant relationship between total hemodialysis time spent and fluid adherence of patients (Huda et al., 2019). However, these findings were contradicted with other study that reported patients with longer hemodialysis duration had better fluid adherence due to more knowledge gained within the period of time they receive the treatments (Mundakir et al., 2019). Moreover, previous studies also suggested that longer hemodialysis duration causes the patients to understand their body and able to adapt with the possible complication

by discussing with other patients and the healthcare staff (Chan et al., 2012; McDonald, Garg, & Haynes, 2002; Ozen et al., 2019). More studies are needed to delineate the possible association between dialysis vintage and fluid adherence.

In addition, there was no significant difference between sex with fluid adherence among patients undergoing hemodialysis ($X^2 = 3.536$, $p=.060$). In contrast, Acar & Güneş (2018) found that female patients displayed better fluid adherence compared to male. On the other hand, earlier study reported female patients normally have more knowledge and skills on preparing and cooking food that were appropriate for hemodialysis patients, thus resulting in better adherence to diet and fluid restriction if compared to male patients (Burner et al., 2013). How sex may influence fluid adherence is an interesting topic which signifies more studies on this aspect.

There was significant association between ethnicity and fluid adherence among hemodialysis patients ($X^2 = 223.871$, $p < 0.001$). However, the finding also reported that there was no significant difference of interdialytic weight gain among Malay, Chinese and Indian ($F(2) = 0.275$, $p=0.760$). Moreover, there was significant association between educational level and fluid adherence among patients undergoing hemodialysis ($X^2(4) = 224.061$, $p < 0.001$). Furthermore, as shown in Table 4.5, there was no statistically significant difference of interdialytic weight gain among patients with educational level; primary, secondary and tertiary ($F(2) = 1.124$, $p=0.330$). Current result was not in line with the previous study which reported that patients with higher educational level showed better adherence towards fluid restriction (Bossola et al., 2018). The higher the educational level, the better the patients would behave and response towards the treatment restrictions of diet and fluid, hence resulting in controlled interdialytic weight gain (Mundakir et al., 2019).

As shown in Table 4.5, there was a significant association between marital status and patients fluid adherence. This finding was parallel with previous findings that reported marital status was correlated significantly with patients' fluid adherence (Ibrahim, Hossam, and Belal, 2015; Safdar, Baakza, and Kumar, 2014). Married patients have somebody that involve in taking care of them, who were likely to notice any health changes and aid in treatment-seeking behavior, hence increasing the patients' adherence towards the treatment, diet and fluid restrictions which could hinder certain complications that causes to hospitalization (Plantinga et al., 2004).

Table 4.5 Association and correlation between socio-demographic with IDWG percentage

Variables	IDWG	
	<i>r/ χ^2/ F value</i>	<i>p-value</i>
Age	-0.176****	0.092
Sex	3.536**	0.600
Male		
Female		
Ethnicity	223.871*	< 0.001
Malay	0.275***	0.760
Chinese		
Indian		
Educational Level	224.061*	< 0.001
No Formal	1.124***	0.330
Primary		
Secondary		
Tertiary		
Marital Status	224.680*	< 0.001
Single		
Married		
Divorce		
Duration of dialysis	0.028****	0.794

*significant at $p < 0.05$

*Fisher's Exact test

** Chi-square test

*** Anova test

**** Pearson correlation test

1.6.2 Sodium intakes and Fluid Adherence

As shown in Table 4.6, a significant correlation was found between sodium intake and fluid adherence among hemodialysis patients ($r = 0.302$, $p = 0.003$). This result was supported by other finding that showed hemodialysis patients who have uncontrolled intake of sodium will face difficulty to restrict fluid intake that will result in fluid overload (Correa et al., 2017). Therefore, patients undergoing hemodialysis are strongly advised to constantly limit salt and fluid intake to improve thirst control, encourage lower fluid intake and IDWG to minimize body water retention (Ferraz et al., 2014).

Table 4.6 Correlation of intakes of fluid and sodium with fluid adherence

Variables	IDWG	
	<i>r</i> -value	<i>p</i> -value
Sodium intake	0.302	0.003*

*significant at $p < 0.05$

1.6.3 Perceived Social Support and Fluid Adherence

As shown in Table 4.7, there was a negative correlation between overall social support and IDWG among patients undergoing hemodialysis ($r = -0.023$, $p = .033$). In other words, patients with higher overall perceived social support had better fluid adherence. The finding was supported by other researches that showed higher perceived social support level was associated with higher level of adherence towards fluid restrictions due to the presence of help from patients' family, friends and significant others with the management of the treatment (Ahrari, Moshki, & Bahrami 2014; Kara et al., 2007). Moreover, Plantinga et al. (2004) also reported patients with better perceived social support would be more adhered to diet and fluid restriction.

It is interesting to note that there was no significant correlation between IDWG with perceived support from family or significant others. This could be attributed to the homogeneity of the data whereby a majority of the patients reported high social support on these two sub-scales. On the other hand, higher friends' support was associated with lower IDWG ($r = -0.211$, $p = .043$), hence better fluid adherence. Active support from close friends may minimize stress and anxiety of the patients towards the diseases, and also motivate them to maintain good adherence to hemodialysis regime (Ahrari et al., 2014). This finding is worth noted in light of only a small proportion of the patients perceived good support from their friends.

Table 4.7 Correlation of social support with IDWG among patients

Variables	IDWG	
	<i>r-value</i>	<i>p-value</i>
Overall Social support	-0.223	0.033*
Family support	-0.182	0.083
Friends support	-0.211	0.043*
Significant other supports	-0.195	0.062

*significant at $p < 0.05$

1.6.4 Patients' Perceptions on Fluid Restrictions and Fluid Adherence

As shown in Table 4.8, there was no significant correlation between patients' knowledge of fluid restriction and fluid adherence among hemodialysis patients. However, this finding was not in agreement with other study that reported patients' knowledge generally tend to be main facilitator to have great level of fluid adherence (Chironda & Bhengu, 2016). This is because patients undergoing hemodialysis should have adequate knowledge about controlling fluid intake so that fluid restriction can be achieved (Jia et al. 2016; Chen et al., 2017). The finding discrepancy could be attributed to the different instrument was used to reflect knowledge of fluid restriction in these studies.

In addition, this study found that perceptions about fluid restriction was significantly negatively correlated with the fluid adherence among hemodialysis patients ($r = -0.270$, $p = .009$). This result was parallel with earlier study that emphasized on the understanding of the perceptions of fluid restriction suggesting that controlling fluid intake is very important (Naalweh et al., 2017). Furthermore, earlier study also revealed that negative perceptions of fluid restrictions was correlated with low levels of fluid adherence among patients undergoing hemodialysis (Kim and Evangelista, 2010). However, other study reported contradict

finding that showed positive perceptions do not influence the level of diet and fluid adherence (Acar & Güneş, 2018). The authors proposed that adherence towards fluid restriction may be indicated by the educational level and duration of disease of the patients themselves despite the positive perceptions showed by the patients (Acar & Güneş, 2018). More studies are needed to delineate the correlation.

Table 4.8 Correlation of patients' perceptions on fluid restrictions with fluid adherence

Variables	IDWG	
	<i>r</i> -value	<i>p</i> -value
Patients' Perceptions of Fluid Restriction		
Knowledge about fluid restriction	-0.086	0.414
Perceptions about fluid restriction	-0.270	0.009*

*significant at $p < 0.05$

CHAPTER 5

CONCLUSION & RECOMMENDATION

5.1 Conclusion

In general, there was good adherence level on fluid restriction among the HD patients, which may be attributed to the optimal control of fluid and sodium intakes of the patients. Hence, it is imperative to emphasize the restriction of sodium and fluid intake for the optimal control of fluid adherence among HD patients. It is noteworthy that patients' knowledge on fluid restriction was unsatisfactory, with less than one-third of them had good knowledge on fluid restriction. The present study found significant relationships between ethnicity, educational level, marital status, social support, intakes of fluid and sodium, and fluid adherence among hemodialysis patients. In addition, perceptions on fluid restriction was significantly correlated with fluid adherence suggesting that counselling and educating hemodialysis patients about their treatment modalities is essential for enhancing health outcomes. The understanding of the perceptions of fluid restriction suggesting that controlling fluid intake is very important. Further research regarding factors associated with fluid adherence among HD patients is recommended. Adequate social support from friends is crucial for the optimal control of fluid adherence. The patients obtained moderate social support with perceived social support from friends was significantly lower than the other two subscales, hence perceived social support should be further enhanced so that fluid adherence can be improved.

5.2 Strength and Limitations

The study had recruited adequate number of subjects which gave good study power, together with a high response rate at 97%. There were however several study limitations that should be considered so that more detailed and precise finding can be obtained. Firstly, the 2-days dietary intake (on dialysis day and non-dialysis day) may be under or over report by the patients due to misunderstanding on household measurements between patients and researcher when describing the intake of food during interview session, therefore may result in inaccurate patients' intakes of fluid and sodium. Last but not least, this study was a cross-sectional study which cannot determine the causal relationship between the variables as well as the direction of the relationship. For instance, the direction of the relationship of perceptions on fluid restriction and fluid adherence could not be determined, as this whether poor perceptions on fluid restriction causing low levels of fluid adherence or otherwise.

5.3 Recommendation

There are some recommendations that could be suggested to improve the findings of this study. Firstly, a more objective measure for fluid adherence for example multi- frequency bioelectric impedance (BIA) should be used to provide more accurate and reliable data on fluid adherence. On the other hand, the use of multiple days of dietary record or the use of validated food frequency questionnaire to ascertain the dietary pattern should be used in the future studies. Longitudinal studies with larger samples from different cultural groups is recommended as it can provide causal relationship between the associated factors with fluid adherence among hemodialysis patients in Selangor.

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APPENDIX III: Subject Information Sheet and Consent Form (English version)

 	JAWATANKUASA ETIKA UNIVERSITI UNTUK PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM) UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG, SELANGOR, MALAYSIA
FORM 2.4: RESPONDENT'S INFORMATION SHEET AND INFORMED CONSENT FORM	
Please read the following information carefully and do not hesitate to discuss any questions you may have with the researcher.	
1. STUDY TITLE : Factors associated with fluid adherence among patients undergoing hemodialysis in selected dialysis centres in Selangor.	
2. INTRODUCTION: There is continuous raise in the number of patients suffering from chronic kidney disease which require hemodialysis treatment. Despite life-saving, patients undergoing for HD are require to adhere strictly on several restriction including fluid, diet, medication and dialysis. Among all, poor adherence to fluid and diet restrictions are commonly reported, and had been documented as the main difficulties faces by patients on dialysis. Fluid adherence can be influenced by various factors which includes sociodemographic, social support, perception on fluid management, fluid and sodium intake. Most of the available studies were conducted among Caucasian population with data are scarce among Malaysian. Therefore, this study is conducted to study the factors associated with fluid adherence among hemodialysis patients. It is hope that the findings of this study can be used for the formation of appropriate intervention to improve fluid adherence among hemodialysis patients in Malaysia.	
3. WHAT WILL YOU HAVE TO DO? The respondents who meet the criteria of the study will be given this information sheet and informed consent. If you agree to participate in this study, you will be interviewed and you are also required to answer the questionnaire provided. You will be interviewed related to your history of medical reord and also required to answer all the questions related to your socio-demographic background, dietary intakes, social support and perceptions on fluid restriction in the questionnaire provided. Some measurements such as height, weight and some biochemical parameters will be obtained from the current medical record. The whole duration for this interview is estimated around 30-45 minutes.	
4. WHO SHOULD NOT PARTICIPATE IN THE STUDY? Your participation is not suitable if you have: i) physical disabilities such as limb amputation and metallic devices. ii) hearing difficulties or uncommunicative iii) recent hospitalization for the past 3 months prior to data collection. iv) Hepatitis B and/or hepatitis C.	
JKEUPM/FORM 2.4 VERSION: 17 JULY 2017	
Page 1	

5. WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?

You will be informed about your fluid adherence rate and figure out about your dietary intakes particularly on fluid and sodium intakes that can be used to develop better interventions in the future to improve quality of life.

You will not be paid for your participation. However a small gift will be given as a token of appreciation

(b) TO THE INVESTIGATOR?

The purpose of this study is to determine the factors associated with fluid adherence among hemodialysis patients. The findings from this study can be used by other health professionals in order to plan appropriate intervention to improve fluid adherence rate among hemodialysis patients in the future.

6. WHAT ARE THE POSSIBLE RISKS?

There will be no possible risks poses in this study. This is a questionnaire-based study which you are only required to answer the questionnaire, as well as some anthropometry measurement that is absolutely non-invasive to hemodialysis patients.

7. WILL THE INFORMATION THAT YOU PROVIDE AND YOUR IDENTITY REMAIN CONFIDENTIAL?

All of your information obtained in this study will be kept and handled in a confidential manner and the study results will not revealed your identity.

8. WHO SHOULD YOU CONTACT IF YOU HAVE ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?

Ethics Committee for Research Involving Human Subject UPM (JKEUPM) Review Panel has approved the study, and may be reached through the following address for information regarding rights of study participants, including grievances and complaints.

Ethics Committee for Research Involving Human Subject UPM (JKEUPM)
Research Management Centre
Office of The Deputy Vice Chancellor (Research & Innovation)
University Putra Malaysia
43400 UPM Serdang, Selangor

Should you have any additional questions, you can contact the study researcher, Nur Imanina Izzaty bt Hussin at telephone number 011-10765461 or email at nurimaninaizzaty@gmail.com. You may also contact the supervisor of this study, Assoc. Prof. Dr. Chan Yoke Mun at 03-97692433 or email at cym@upm.edu.my.

Thank You for Your Cooperation

Please initial here if you have read and understood the contents of this page _____

9. CONSENT

I Identity Card No.
address.....

.....hereby voluntarily agree to take part in the research stated
above *(clinical /drug trial/video recording/ focus group/interview-based/ questionnaire-based).

I have been informed about the nature of the research in terms of methodology, possible adverse
effects and complications (as written in the Respondent's Information Sheet). I understand that I have
the right to withdraw from this research at any time without giving any reason whatsoever. I also
understand that this study is confidential and all information provided with regard to my identity will
remain private and confidential.

I* wish / do not wish to know the results related to my participation in the research

I agree/do not agree that the images/photos/video recordings/voice recordings related to me be used in
any form of publication or presentation (if applicable)

* delete where necessary

Signature
(Respondent)

Signature
(Witness)

Date :

Name :

I/C No. :

I confirm that I have explained to the respondent the nature and purpose of the above-mentioned
research.

Date

Signature
(Researcher)

APPENDIX IV: Subject Information Sheet and Consent Form (Malay version)

		JAWATANKUASA ETIKA UNIVERSITI UNTUK PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM) UNIVERSITI PUTRA MALAYSIA, 43400 UPM SERDANG, SELANGOR, MALAYSIA
BORANG 2.4: PENERANGAN DAN PERSETUJUAN RESPONDEN		
Sila baca maklumat berikut dengan teliti. Sekiranya anda mempunyai sebarang pertanyaan, sila kemukakan kepada penyelidik.		
1.TAJUK KAJIAN: Faktor-faktor yang berkaitan dengan pematuhan cecair di kalangan pesakit yang menjalani hemodialisis di pusat dialisis yang dipilih di Selangor.		
2. PENGENALAN:		
Terdapat peningkatan berterusan dalam jumlah pesakit yang menderita penyakit ginjal kronik yang memerlukan rawatan hemodialisis. Walaupun dengan rawatan hemodialisis dapat menyelamatkan nyawa, pesakit yang menjalani HD perlu mematuhi beberapa sekatan termasuk pengawalan cecair, diet, ubat dan dialisis. Di antara semua itu, kepatuhan terhadap pengawalan cecair dan diet biasanya dilaporkan, dan telah didokumentasikan sebagai kesukaran utama yang dihadapi oleh pesakit semasa menjalani dialisis. Pematuhan cecair dipengaruhi oleh pelbagai faktor yang merangkumi sosiodemografi, sokongan sosial, persepsi terhadap pengawalan cecair, pengambilan cecair dan natrium. Sebilangan besar kajian yang telah dilakukan adalah dalam kalangan penduduk Kaukasia dan data yang sedikit sahaja didapati dalam kalangan rakyat Malaysia. Oleh itu, kajian ini dilakukan untuk mengkaji faktor-faktor yang berkaitan dengan kepatuhan cecair di kalangan pesakit hemodialisis. Diharapkan penemuan kajian ini dapat digunakan untuk pembentukan intervensi yang sesuai untuk meningkatkan kepatuhan cecair di kalangan pesakit hemodialisis di Malaysia.		
3. APAKAH YANG PERLU ANDA LAKUKAN?		
Responden yang memenuhi kriteria kajian akan diberikan maklumat ini dan borang persetujuan. Jika anda bersetuju untuk mengambil bahagian dalam kajian ini, anda akan diwawancara dan anda juga perlu menjawab borang soal selidik yang disediakan. Anda akan ditemu bual berkaitan dengan sejarah perubatan anda dan juga perlu menjawab semua soalan yang berkaitan dengan latar belakang sosio-demografi, pengambilan makanan, sokongan sosial dan persepsi mengenai pengawalan cecair dalam soal selidik yang disediakan. Beberapa pengukuran seperti ketinggian, berat dan beberapa parameter biokimia akan diperolehi dari rekod perubatan semasa. Tempoh keseluruhan untuk temu duga ini dianggarkan sekitar 30-45 minit.		
4. SIAPA YANG TIDAK BOLEH MENYERTA KAJIAN INI?		
Penyertaan anda tidak sesuai jika anda mempunyai/mengalami: i) Ketidakupayaan fizikal seperti amputasi anggota badan atau mempunyai alat berasaskan logam. ii) Kesukaran pendengaran atau tidak boleh berkomunikasi. iii) Kemasukan ke hospital dalam masa 3 bulan sebelum pengumpulan data dijalankan. iv) Hepatitis B dan/atau hepatitis C.		
JKEUPM/FORM 2.4 VERSION: 17 JULY 2017		Page 1

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANDA SEBAGAI PESERTA?

Anda akan dimaklumkan mengenai kadar pematuhan cecair dan mengetahui tentang pengambilan makanan anda terutamanya mengenai pengambilan cecair dan natrium yang boleh digunakan untuk intervensi yang lebih baik pada masa akan datang untuk meningkatkan kualiti hidup.

b) KEPADA PENYELIDIK?

Tujuan kajian ini adalah untuk mengkaji faktor-faktor yang berkaitan dengan kepatuhan cecair di kalangan pesakit hemodialisis. Penemuan dari kajian ini boleh digunakan oleh ahli profesional kesihatan lain untuk merancang intervensi yang sesuai untuk meningkatkan kadar kepatuhan cecair di kalangan pesakit hemodialisis pada masa akan datang.

6. ADAKAH IA BERISIKO?

Tidak akan ada kemungkinan risiko dalam kajian ini. Ini adalah kajian berasaskan soal selidik yang anda hanya perlu menjawab soal selidik, serta beberapa ukuran antropometri yang tidak memudaratkan pesakit hemodialisis.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?

Semua maklumat anda yang diperolehi dalam kajian ini akan disimpan dan dikendalikan secara rahsia dan keputusan kajian tidak akan mendedahkan identiti anda.

8. SIAPA YANG SAYA PERLU HUBUNGI SEKIRANYA SAYA MEMPUNYAI SOALAN TAMBAHAN SEMASA MENGIKUTI PENYELIDIKAN INI?

Panel Kajian Jawatankuasa Etika Penyelidikan yang Melibatkan Subjek Manusia UPM (JKEUPM) telah meluluskan kajian ini, dan dapat dihubungi melalui alamat berikut untuk mendapatkan maklumat mengenai hak peserta kajian, termasuk rungutan dan aduan.

Jawatankuasa Etika Penyelidikan Melibatkan Subjek Manusia UPM (JKEUPM)
Pusat Pengurusan Penyelidikan
Pejabat Timbalan Naib Canselor (Penyelidikan & Inovasi)
Universiti Putra Malaysia
43400 UPM Serdang, Selangor

Jika anda mempunyai sebarang soalan mengenai kajian ini, anda boleh menghubungi penyelidik kajian, Nur Imanina Izzaty bt Hussin di nombor telefon 011-10765461 atau e-mel di nurimaninaizzaty@gmail.com. Anda juga boleh menghubungi penyelia kajian ini, Prof. Prof. Dr. Chan Yoke Mun di 03-97692433 atau e-mel di cym@upm.edu.my.

Terima Kasih atas Kerjasama Anda

Sila tandatangan di sini sekiranya anda telah membaca dan memahami kandungan halaman ini _____

9. PERSETUJUAN

Saya..... No Kad Pengenalan.
beralamat.....

.....dengan ini bersetuju untuk mengambil bahagian secara sukarela dalam penyelidikan yang tersebut di atas *(kajian klinikal/percubaan ubat-ubatan/rakaman video/kumpulan sasaran/temuduga/ soal selidik).

Saya telah diberi penjelasan secara menyeluruh mengenai penyelidikan ini dari segi metodologi, risiko dan komplikasi (seperti tertulis pada Helaian Penerangan Responden). Saya memahami bahawa saya berhak menarik diri dari penyelidikan ini pada bila-bila masa tanpa memberi sebarang alasan. Saya juga memahami bahawa sebarang maklumat yang berkaitan identiti saya akan dirahsiakan.

Saya* berminat / tidak berminat untuk mengetahui keputusan kajian yang melibatkan saya.

I setuju/tidak bersetuju untuk imej/gambar/rakaman video/ rakaman suara digunakan dalam apa jua bentuk penerbitan atau pembentangan. (sekiranya berkaitan).

*potong yang tidak berkenaan

Tandatangan
(Responden)

Tandatangan
(Saksi)

Tarikh :

Nama :

No. K/P:

Saya mengesahkan bahawa saya telah menerangkan kepada responden ini sifat dan tujuan penyelidikan yang tersebut di atas.

Tarikh

Tandatangan
(Penyelidik)

APPENDIX V: Approval for JKEUPM Ethical Application

Ref. no: UPM/TNCPI/RMC/JKEUPM/1.4.18.2 (JKEUPM)

Date: 4 August 2020

Dear Prof./Dr./Mr./Ms.,

APPLICATION FOR JKEUPM ETHICAL CLEARANCE: APPROVED

With reference to the above, I am pleased to inform you that your application for ethical clearance for the research project entitled 'Factors Associated with Fluid Adherence Among Hemodialysis Patients in Selected Dialysis Centre in Selangor' has been approved.

Please note that the official letter of approval will be issued as soon as possible. However, the ethical clearance is considered effective from the date of this email, and you may now proceed with your research.

Kindly remind the ethical approval is required in the case of amendments/ changes to the study documents/ study sites/ study team.

Researchers should also complete a Study Final Report upon study completion. The form can be obtained from the Ethics Committee for Research Involving Human Subjects (JKEUPM) website (<http://www.tncpi.upm.edu.my/faildokumen>).

If you have any enquiries, please contact Ms. Nurulhasanah Ishak (03-97691605) or Ms. Nor Ellia Abd Ajis (03-97691244).

Note: Please use this reference number for any transaction:- JKEUPM-2020-160

Thank you.

Yours faithfully,

Prof. Dr. Zamberi Sekawi
Chair
Ethics Committee for Research Involving Human Subjects
Universiti Putra Malaysia

APPENDIX VI: Questionnaire

JKEUPM Ref No: JKEUPM-2019-021



FACULTY OF MEDICINE AND HEALTH SCIENCES

DEPARTMENT OF NUTRITION AND DIETETICS

Questionnaire Form

Research Title:

**Fluid adherence and its associated factors Among Hemodialysis Patients in
Selected Dialysis Centres**

*Pematuhan cecair dan faktor-berkaitan dalam kalangan pesakit hemodialisis di
pusat dialisis tertentu.*

Researcher's Name : Nur Imanina Izzaty bt Hussin

Matric Number : 194393

Supervisor's Name : Associate Professor Dr. Chan Yoke Mun

Date:

Confidential and for research purpose only
Sulit dan untuk kegunaan kajian sahaja

Instruction:

This study is conducted for academic purpose. All information will be kept private and confidential. Thank you for your cooperation in answering this questionnaire.

Arahan: Kajian ini dijalankan untuk kegunaan akademik sahaja. Semua maklumat dalam kajian ini akan disimpan secara sulit. Terima kasih kerana menjawab borang ini.

SECTION A

1. Age / Umur : _____ years old / tahun
2. Date of Birth / Tarikh lahir: _____ (dd/mm/yyyy)
3. Sex / Jantina:
 - () Male / Lelaki
 - () Female / Perempuan
4. Ethnicity / Bangsa:
 - () Malay / Melayu
 - () Chinese / Cina
 - () Indian / India
 - () Others, please specify / Lain-lain, sila nyatakan: _____
5. Marital Status / Status Perkahwinan:
 - () Single / Bujang
 - () Married / Berkahwin
 - () Divorce / Berceraai
6. Educational Level / Latar belakang pendidikan:
 - () No formal education / Tiada Pendidikan Formal
 - () Primary Education / Sekolah Rendah
 - () Secondary Education / Sekolah Menengah
 - () Tertiary (Diploma/ Degree/ Master/ PhD) / Pendidikan IPTA, Diploma ke atas
 - () others, please specify / Lain-lain, sila nyatakan _____
7. Currently working / Adakah andabekerja?
 - () Yes / Ya
 - () No / Tidak

8. Occupation / *Pekerjaan*: _____ (Part Time / *Sambilan*) (Full Time / *Sepenuh masa*)
9. Monthly personal income / *Pendapatan bulanan peribadi* : RM _____
10. Monthly household income / *Pendapatan bulanan isi rumah*: RM _____
11. How long had you been on hemodialysis / *Berapa lamakah anda telah menerima rawatan hemodialysis?*
_____ month(s)/year(s) / *bulan/tahun*
12. Were you on other modality treatments before? (Peritoneal Hemodialysis, kidney transplant) / *Adakah anda pernah menerima rawatan modaliti yang lain? (Dialisi peritoneum, pemindahan buah pinggang)*
() Yes / *Ya*
Reason for changing the modality treatment / *Alasan pertukaran jenis rawatan?*

() No / *Tidak*
13. Have you met dietitian before / *Adakah anda pernah jumpa dengan dietitian?*
() Yes / *Ya*
What is the advice given / *Apakah nasihat yang diberi?* _____
() No / *Tidak*

SECTION B

Instruction: Please read each of the following statement and circle the number which indicates how much the statement applied to you. There are no right or wrong answers.

Arahan: Sila baca semua soalan dengan teliti dan bulatkan jawapan yang paling sesuai dengan anda. Tiada jawapan yang betul atau salah.

SOCIAL SUPPORT (Multidimensional Scale of Perceived Social Support (MSPSS)) / Sokongan Sosial

We are interested in knowing how you feel on the social support you received. I will read to you several statements, kindly let us know how you feel about each statement by indicating either you **Very Strongly Disagree**, **Strongly Disagree**, **Mildly Disagree**, **Neutral**, **Mildly Agree**, **Strongly Agree** or **Very Strongly Agree**.

*Kami berminat untuk mengetahui bagaimana perasaan anda terhadap sokongan sosial yang anda terima. Kami akan memberikan beberapa kenyataan, sila beritahu kami bagaimana perasaan anda tentang setiap pernyataan dengan menunjukkan sama ada anda **Sangat Tidak Bersetuju**, **Tidak Bersetuju**, **Agak Tidak Bersetuju**, **Neutral**, **Agak Bersetuju**, **Bersetuju**, **Sangat Bersetuju**.*

	Very Strongly Disagree/ Sangat Tidak Bersetuju	Strongly Disagree/ Tidak Bersetuju	Mildly Disagree/ Agak Tidak Bersetuju	Neutral/ Neutral	Mildly Agree/ Agak Bersetuju	Strongly Agree/ Bersetuju	Very Strongly Agree/ Sangat Bersetuju
1. There is a special person who is around when I am in need. <i>Ada orang istimewa yang ada ketika saya memerlukan.</i>	1	2	3	4	5	6	7
2. There is a special person with whom I can share joys and sorrows. <i>Ada orang istimewa dengan siapa saya boleh berkongsi kegembiraan dan kesedihan.</i>	1	2	3	4	5	6	7
3. My family really tries to help me. <i>Keluarga saya benar-benar cuba membantu saya.</i>	1	2	3	4	5	6	7

4. I get the emotional help and support I need from my family. <i>Saya mendapat bantuan emosi dan sokongan yang saya perlukan dari keluarga saya.</i>	1	2	3	4	5	6	7
5. I have a special person who is a real source of comfort to me. <i>Saya mempunyai orang istimewa yang merupakan sumber keselesaan yang sebenar kepada saya.</i>	1	2	3	4	5	6	7
6. My friends really try to help me. <i>Rakan-rakan saya benar-benar cuba membantu saya.</i>	1	2	3	4	5	6	7
7. I can count on my friends when things go wrong. <i>Saya boleh bergantung kepada rakan saya apabila keadaan menjadi salah.</i>	1	2	3	4	5	6	7
8. I can talk about my problems with my family. <i>Saya boleh bercakap tentang masalah saya dengan keluarga saya.</i>	1	2	3	4	5	6	7
9. I have friends with whom I can share my joys and sorrows. <i>Saya mempunyai kawan dengan siapa saya boleh berkongsi kegembiraan dan kesedihan saya.</i>	1	2	3	4	5	6	7
10. There is special person in my life who cares about my feelings. <i>Ada orang istimewa dalam hidup saya yang peduli terhadap perasaan saya.</i>	1	2	3	4	5	6	7
11. My family is willing to help me make decisions. <i>Keluarga saya bersedia membantu saya membuat keputusan.</i>	1	2	3	4	5	6	7

12. I can talk about my problems with my friends. <i>Saya boleh bercakap tentang masalah saya dengan kawan saya.</i>	1	2	3	4	5	6	7
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**PATIENTS' PERCEPTIONS ON FLUID RESTRICTIONS/ PERSEPSI PESAKIT TENTANG
PENGAWALAN CECAIR**

No	Statements	Yes	No	Don't know or Not applicable
		1	2	3
1	Do you think it is important for you to control / limit your fluid intake?/ <i>Adakah anda fikir adalah penting untuk anda mengawal / mengehadkan pengambilan air anda?</i>	1	2	3
	If your answer is Yes, why do you think it is important for you to limit your fluid intake?/ <i>Sekiranya jawapan anda Ya, mengapa anda fikir adalah penting bagi anda untuk mengehadkan pengambilan cecair anda?</i>			
	a) Because I fully understand that my kidney condition requires limiting fluid intake/Kerana saya memahami sepenuhnya bahawa keadaan buah pinggang saya memerlukan mengehadkan pengambilan cecair.	1	2	3
	b) Because limiting fluid intake is important to keep my body healthy/Kerana mengehadkan pengambilan cecair adalah penting untuk menjaga kesihatan badan saya.	1	2	3
	c) Because a medical professional (my doctor, nurse, dietitian, or other medical staff) told me to do so/Kerana seorang profesional perubatan (dokter, jururawat, pegawai dietetik, atau kakitangan perubatan lain) memberitahu saya untuk berbuat demikian.	1	2	3
	d) Because I was hospitalized after I drank lots of fluid/ Kerana saya dimasukkan ke hospital selepas saya minum	1	2	3

	<i>banyak cecair.</i>			
	e) Because limiting fluid intake will make me feel more comfortable before, during and after dialysis sessions/ <i>Oleh kerana mengehadkan pengambilan cecair akan membuatkan saya berasa lebih selesa sebelum, semasa dan selepas sesi dialisis</i>	1	2	3
	f) Others/ <i>Lain-lain, _____</i>			
	If your answer is <i>No</i> , why do you think it is not important for you to limit your fluid intake?/ <i>Jika jawapan anda Tidak, kenapa anda merasakan tidak penting untuk mengehadkan pengambilan cecair anda?</i>			
	a) Because I don't have any complications even if I drink more water/ <i>Kerana saya tidak mempunyai komplikasi walaupun saya minum lebih banyak air</i>	1	2	3
	b) Because I don't know how to control / limit my fluid intake/ <i>Kerana saya tidak tahu bagaimana untuk mengawal / mengehadkan pengambilan cecair saya</i>	1	2	3
	c) Because I do not think controlling fluid intake is important to me/ <i>Kerana saya tidak fikir mengawal pengambilan cecair adalah penting kepada saya</i>	1	2	3
	d) Because I just cannot resist drinking/ <i>Kerana saya tidak dapat menahan rasa hendak minum</i>	1	2	3
	e) Others/ <i>Lain-lain, _____</i>			
2	In your opinion, do you think you have good adherence on fluid intake?/ <i>Pada pendapat anda, adakah anda fikir anda mempunyai pematuhan yang baik terhadap pengambilan cecair?</i>	1	2	3
3	Taking fluid more than the recommendation can cause swelling in the body (eg: face or legs)/ <i>Mengambil cecair lebih daripada syor boleh menyebabkan bengkak di dalam badan (misalnya: muka atau kaki).</i>	1	2	3
4	How much fluid I take does not have any effect on my blood pressure. / <i>Berapa banyak cecair yang saya ambil tidak mempunyai kesan ke atas tekanan darah saya.</i>	1	2	3
5	Excess fluid intake will make me difficult to breath or cause shortness of breath./ <i>Pengambilan cecair yang berlebihan akan membuatkan saya sukar bernafas atau menyebabkan sesak nafas.</i>	1	2	3
6	Consuming the following foods may increase my desire for fluid./ <i>Mengambil makanan berikut boleh meningkatkan keinginan saya</i>			

	untuk cecair.			
	a) Spicy foods/ Makanan Pedas	1	2	3
	b) Salty foods eg salted vegetables, potato chips, pickles/ Makanan masin seperti sayur-sayuran masin, kerepek kentang, jeruk	1	2	3
	c) Dry food items eg fried fish, biscuits/ Makanan kering seperti ikan goreng, biskut	1	2	3
	d) Sugary drinks eg carbonated beverages, syrups/ Minuman berkarbonat seperti minuman berkarbonat, syrup	1	2	3
7	Which of the following foods are considering as fluids / Antara makanan berikut yang manakah akan mengandungi cecair?			
	a) Rice/Nasi	1	2	3
	b) Porridge/Bubur	1	2	3
	c) Pudding/Puding	1	2	3
	d) Biscuits/Biskut	1	2	3
	e) Yogurt/Yogurt	1	2	3
	f) Soups/Sup	1	2	3
	g) Fruit juices/Jus buah	1	2	3
	h) Vegetables (eg: Cabbage, kangkung, potato, pumpkin, yams, carrots)/ Sayur-sayuran (contohnya: Kubis, kangkung, kentang, labu, keladi, lobak merah)	1	2	3
	i) Ice cream/Ais-krim	1	2	3
	j) Fruits (eg guava, apple, oranges)/Buah-buahan (contohnya: jambu, epal, oren)	1	2	3
	k) Fruits (eg watermelon)/Buah tembikai			
	l) Tea, coffee, malted drinks (eg Milo)/Teh, kopi, minuman malt			
8	Which of the following foods contain high sodium/salt?/ Makanan manakah mengandungi garam yang tinggi?			
	a) Sauces (eg: soy sauce, oyster sauce, fish sauce)/ Sos seperti kicap, sos tiram, sos ikan	1	2	3
	b) Chips (potatoes, yam, tapioca)/ Kerepek seperti kentang, keladi, ubi kayu.	1	2	3
	c) Canned food (eg: canned vegetable, canned meats/poultry). /Makanan bertin seperti sayuran/ayam dan daging dalam tin	1	2	3
	d) Egg whites/Telur putih	1	2	3
	e) Baked foods (biscuits, cakes, pizza)/makanan dibakar seperti biskut, kek, pizza	1	2	3
	f) White rice/ Nasi Putih	1	2	3
	g) Lemon/Lemon	1	2	3

	h) Sport drinks/Minuman sukan	1	2	3
	i) Sausages, bacon, patties/ sosej, bacon, patty	1	2	3
	j) Pickles/ Jeruk	1	2	3
9	When you feel thirsty, what will you do?/Apabila anda merasa dahaga, apa yang akan anda lakukan?			
	a) Take Lemon wedges/Ambil lemon	1	2	3
	b) Take hard sour candies/Ambil gula-gula masam yang keras	1	2	3
	c) spray with breath mints/semburkan dengan semburan nafas	1	2	3
	d) use chewing gums/menggunakan gula-gula getah	1	2	3
	e) sucking on ice cubes/menghisap ketulan ais	1	2	3
	f) Drink warm water/minum air suam	1	2	3
	g) Drink cold water/minum air sejuk	1	2	3
	h) Gauge my mouth with water or mouthwash/Kumur mulut dengan air atau pengkumur mulut	1	2	3
	i) I do nothing/Saya tidak membuat apa-apa.	1	2	3
10	I always keep track of how much I drink in a day./Saya sentiasa mengira berapa banyak saya minum dalam sehari.	1	2	3
11	Do you use measuring container to quantify how much fluid you take in a day ?/Adakah anda menggunakan bekas untuk mengukur berapa banyak cecair yang anda ambil dalam sehari?	1	2	3
12	Are you taking the following on daily basis? If Yes, how much do you take?/Adakah anda mengambil yang berikut setiap hari? Jika ya, berapa yang anda ambil?			
	a) Plain water (warm or cold)/Air kosong (suam/sejuk) _____ cups / mugs / bottles / ml			
	b) Coffee or tea/Kopi atau teh _____ cups / mugs / ml			
	c) Soups/Sup _____ bowls / ml			
13	If you have any urine output, can you take more fluid intake?/Sekiranya anda mempunyai sebarang pengeluaran air kencing, anda boleh mengambil lebih banyak pengambilan cecair?	1	2	3
14	A good IDWG goal is to gain not more than 4% between dialysis treatments/Matlamat IDWG yang baik adalah untuk mendapatkan tidak lebih daripada 4% antara rawatan dialisis.	1	2	3

15	I keep away from activities that cause me to drink too much fluid/ <i>Saya menjauhkan diri dari aktiviti yang menyebabkan saya minum terlalu banyak cecair.</i>	1	2	3
16	Do you weigh yourself at home? / <i>Adakah anda menimbang sendiri di rumah</i>	1	2	3

SECTION C

DIETARY INTAKE /PEMAKANAN SEHARIAN

Information on dietary intake is collected for non-dialysis day and dialysis day.

Infomasi tentang pemakanan diambil untuk hari menjalani dialisis dan hari tidak menjalani dialisis.

Researchers will ask the subject on 24-hour food recall for non-dialysis day and researcher will telephone interview subject to obtain the food recall for dialysis day. *Pengkaji akan tanya subjek tentang pemakanan untuk hari tidak menjalani dialisis dan pengkaji akan menelefon subjek untuk mengambil pemakanan untuk hari menjalani dialisis.*

Meal	Meal time	Food/drink items	Amount	Method of food preparation



SECTION D

ANTHROPOMETRY AND BIOCHEMICAL PARAMETERS / INTERDIALYTIC WEIGHT GAIN**MEASUREMENTS****PARAMETER ANTHROPOMETRI DAN BIOKIMIA / PENGUKURAN KEUNTUNGAN BERAT INTERDIALITIK**

	Anthropometry and biochemical parameters	First reading	Second reading	Third reading	Average reading
1.	Body weight / <i>Berat badan</i>				
2.	Height / <i>Tinggi</i>				
3.	BMI				
4.	Fat mass (kg) / <i>Berat lemak (kg)</i>				
5.	Body fat percentage / <i>Peratus lemak badan</i>				
6.	Lean body mass (kg) / <i>Berat bukan lemak (kg)</i>				
7.	Percentage of body water / <i>Peratusan komposisi air dalam badan (%)</i>				
8.	Waist circumference / <i>Lilitan pinggang</i>				
9.	Handgrip strength / <i>Kuasa gengaman</i>				
10.	Serum albumin / <i>Serum albumin</i>				
11.	Serum phosphorus / <i>Serum fosfat</i>				
12.	Serum creatinine / <i>Serum creatinine</i>				
13.	Serum potassium / <i>Serum potasium</i>				