An-Najah National University
Faculty of Graduate Studies

THE ASSOCIATION OF DIETARY BEHAVIORS WITH MENTAL HEALTH AND CLINICAL ASPECTS AMONG PATIENTS DURING HEMODIALYSIS AT AN-NAJAH NATIONAL UNIVERSITY HOSPITAL

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Dedication

في البداية، أهدي هذا العمل لمن علّمني الإيمان بنفســـي، ولمن دفعني منذ البداية دون كلل أو ملل إلى والديَّ العزيزين وعائلتي. كما أهدي هذه الدراســـة لكل المشـــاركين بدافع المحبة والدعم، وإلى أصـــدقائي الأعزاء.

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فإنَّ الوفاء يقتضـي أن يرد الفضل لأهله، لذلك أتقدم بجزيل الشكر والعرفان إلى من كان له الفضل بعد الله في إخراج هذا البحث العلمي، الدكتورة منال بدرساوي، كما أود أن أعبر لها عن امتنانتي لصحبتها في هذا الطريق الطويل بكل محبة وصبر.

كما أود أن أشـكر كل من سـهل مهمتي، من مسـتشـفى النجاح الجامعي، والطاقم الطبي في قسـم الغسـيل الكلوي.

وأخيراً وليس آخراً، أتقدم بالشكر لمن ألهمني الوقوف في أصـعب الأيام، إلى أمي وأبي، ومنقذتي الصـغيرة أختي الغالية.

إلى من سمع شكواي الدائمة وحوّلها إلى ضحكات صادقة، صديقاتي العزيزات، شكراً لكم.

Declaration

I, the undersigned, declare that I submitted the thesis entitled:

THE ASSOCIATION OF DIETARY BEHAVIORS WITH MENTAL HEALTH AND CLINICAL ASPECTS AMONG PATIENTS DURING HEMODIALYSIS AT AN-NAJAH NATIONAL UNIVERSITY HOSPITAL

I declare that the work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

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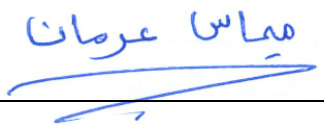
Signature: 

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THE ASSOCIATION OF DIETARY BEHAVIORS WITH MENTAL HEALTH AND CLINICAL ASPECTS AMONG PATIENTS DURING HEMODIALYSIS AT AN-NAJAH NATIONAL UNIVERSITY HOSPITAL

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Abstract

Background: Intradialytic hypotension (IDH) is a frequent consequence of (HD) that has been associated with elevated symptom burden, increased access failure, cardiovascular events, and increased mortality). Eating during dialysis (EDD) treatment has traditionally been associated with an increased risk of IHD, but new research suggests a shift in clinical practice, with more clinicians believing that intradialysis meals and supplements may be a way to increase caloric intake and improve nutritional status (NS) in HD patients The main objective is to study the association between eating practice and nutrition status (NS), clinical outcome (CO): IHD, adequate dialysis (AD) and mental health (MH) in adults with HD at An-Najah National University Hospital.

Methods: This study used an observational and cross-sectional design. Data collection started in July 2024 and finished in October 2024. The study included 155 adult hemodialysis patients from An-Najah University Hospital. Data were collected by face-to-face interviews, which included: first, socio-demographic data; second, medical history; third, dialysis-related information; fourth, nutritional status using ABCD, which includes body measurements, body mass index, biochemical tests, and clinical nutrition (MIS and dietary record for dialysis and non-dialysis days, which helps to know the number of food groups and food types, as well as the amount of energy and protein consumed during the day); fifth, dietary intake practices; and finally, mental health utilizing the GHQ-12 questionnaire.

The patient was observed for three sessions, including data collected on food intake (yes or no), symptom presence (yes or no), and minimum mean arterial pressure (MAP).

In addition, policies and recommendations for the specialist, staff, and hospital were recorded.

Results: The study included 155 HD patients, of whom 66.5% were male and 79.4% EDD. The face-to-face interviews data showed that there was no association between EDD and NS or MH status. The observational data showed there was no association between EDD and symptoms, or a decrease in blood pressure, and AD.

Conclusions: In conclusion, based on face-to-face interviews, there was no association between dialysis patients' eating habits and the NS or MH. Observational data additionally showed that there was no association between EDD with AD and symptoms or a decrease in blood pressure during the dialysis.

Keywords: Intradialytic eating; adequate dialysis; nutritional status; mental health

Chapter One

Introduction

1.1 Background

Chronic kidney disease (CKD) is defined as the presence of kidney damage or an estimated glomerular filtration rate (eGFR) of less than 60 ml/min per 1.73 square meters that lasts for at least three months (Vaidya , Aeddula, & Doerr, 2021). CKD has become one of the most significant causes of mortality and suffering in the twenty-first century, affecting approximately 843.6 million people worldwide in 2017 (Kovesdy, 2022). A study of 11 Middle Eastern nations indicated that the frequency of CKD ranged from 5.2% to 10.6% (Amouzegar, et al., 2021). The total prevalence of CKD in Jordan was 6.8%, 5.7% in Saudi Arabia (Alsuwaida, et al., 2010), and 14.9% in Iran (Hosseinpanah, Kasraei, Nassiri, & Azizi, 2009). In 2016, the total number of Hemodialysis (HD) patients in Palestine was 1119, which increased to 1216 in 2017 (Marzouq, Samoudi, Samara, Zyoud, & Al-Jabi, 2021). End-stage renal disease (ESRD) is defined as an estimated glomerular filtration rate (eGFR) of 15 ml/min/1.73 m^2 (Bello, et al., 2022). By 2040, ESRD is projected to be the fifth most common cause of mortality in the world, with one of the biggest expected rises of any significant cause of death (Kalantar-Zadeh, Jafar, Nitsch, Neuen, & Perkovic, 2021). Review of previous publications in the Middle East from January 1990 to January 2015, reported the prevalence of ESRD or renal replacement therapy at a prevalence rate of360 per million population (PMP), which, in comparison to other areas, is not a large prevalence, but is considered significant. The incidence rate in the Middle East is significantly greater than what was measured (Malekmakan, Tadayon, Roozbeh, & Sayadi, 2018). Furthermore, in Palestine, the prevalence of ESRD in 2013 was 240.3 PMP (Hamdan, et al., 2020).

Hemodialysis (HD) has shown to be a successful treatment for this illness (Kitamura & Fujii, 2004). HD is a therapeutic procedure that uses extracorporeal circulation of a patient's blood to address the uremic syndrome's azotemia, fluid, electrolyte, and acid-base abnormalities. HD is mostly used to treat acute and chronic renal failure that has not responded to standard medical therapy. Georg Haas (1886-1971) was a forgotten pioneer who made substantial contributions to the development of the HD concept. He was the first to execute clinically effective HD, however, beche faced huge practical hurdles due to low level of bioengineering. This interrupted the acceptance of the treatment, which

was clinically effective despite insufficient dialytic efficacy (Wizemann & Ritz, 1998). Therefore, by the end of 1928, Haas stopped working (Murea, Geary, Davis, & Moossavi, 2019). Willem Kolff created and introduced a more efficient dialysis machine in 1943, thereby ending the field of blood purification. By this stage, medical vascular access insertion had switched from surgical cut-down to venipuncture with metal trocars. Dialysis delivery and patient survival were not feasible beyond a few months due to the eventual failure to gain entrance into the vascular area (Kolff, 1965). In 1948, Nils Alwall developed the bypass by connecting venous and arterial glass cannulae with rubber tubing to establish a continuous shunt and maintain access patency between dialyses. However, Alwall's strategy to create an arteriovenous shunt provided a foundation for subsequent techniques for long-term vascular access (Murea, Geary, Davis, & Moossavi, 2019). According to the Palestinian Ministry of Health's 2017 annual health report, the number of HD patients got from 1014 in 2015 to 1119 in 2016 (Atieh, Shamasneh, Hamadah, & Gharaibeh, 2020), and then to 1216 in 2017 (Marzouq, Samoudi, Samara, Zyoud, & Al-Jabi, 2021).

Patients who get regular hemodialysis face a number of difficulties, both during, and after the hemodialysis session, as well as long-term consequences (Hafi, et al., 2021). Some of the most frequent intradialytic consequences of HD include hypotension, vomiting, epigastric discomfort, hypoglycemia, chest pain, tachycardia, muscle cramps, cardiac arrest, shivering, hotness, epistasis, melena, hallucination, restlessness leg, allergic reaction, and jaw lock (Prabhakar, Singh, Singh, Rathore, & Choudhary, 2015).

Intradialytic hypotension (IDH) is a frequent consequence of (HD) that has been associated with elevated symptom burden, increased access failure, cardiovascular events, and increased mortality (Kuipers, et al., 2019). IHD is defined as a drop in systolic blood pressure of at least 20 mmHg, or a drop in mean blood pressure of at least 10 mmHg, accompanied by unpleasant intradialytic symptoms or requiring nursing interventions (Fotiadou, Georgianos, Chourdakis, Zebekakis, & Liakopoulos, 2020). It is related to a greater risk of access failure, cardiovascular events, and mortality (Caplin, Kumar, & Davenport, 2011). The actual prevalence of dialysis hypotension is unknown due to the high average age of dialysis patients, as well as persons with comorbidities such as diabetes and heart failure (Kuipers, et al., 2019). According to a recent meta-analysis, the prevalence of complex hemodialysis sessions by IDH was estimated to be

11.6% using the nadir 90 measure, and 10.1% using the IDH definition of a >20 mmHg decrease in systolic blood pressure in association with clinical events and treatments (Sars, van der Sande, & Kooman, 2020).

Eating during dialysis (EDD) treatment has traditionally been associated with an increased risk of IHD, but new research suggests a shift in clinical practice, with more clinicians believing that intradialysis meals and supplements may be a way to increase caloric intake and improve nutritional status (NS) in HD patients (Fotiadou, Georgianos, Chourdakis, Zebekakis, & Liakopoulos, 2020). Although North America, particularly the United States, had more restrictive dietary guidelines in dialysis units than European and Asian nations, the statistical significance disappeared quickly, and it was not allowed to eat meals in 28.6% and 22.6% of dialysis units, respectively, in 2011 and 2014 (Benner, et al., 2016). Food consumption, during treatment, has been shown to improve NS (Pupim, Majchrzak, Flakoll, & Ikizler, 2006), QOL (Scott, et al., 2009), and is associated with significant mortality reductions (Weiner, Kapoian, & Johnson, 2015), but it remains a controversial topic due to postprandial hemodynamics and other symptoms (Kistler, et al., 2014). In a cross-sectional study, doctors were asked about their experiences with six common reasons for food restriction during therapy. On a 4-point scale, doctors responded "rarely" or "never" to the following questions: choking 98%, low Kt/V 98%, infection management concerns 96%, spills or pests 83%, gastrointestinal issues 71%, and low blood pressure 62%.

Kt/Vurea (urea clearance multiplied by dialysis duration and adjusted for urea distribution volume) was initially presented as a dialysis adequacy criterion during a period of high mortality on dialysis in the United States (Vanholder, Glorieux, & Eloot, 2015). Blake showed in 1992 that mortality increased with Kt/V less than 1.5, and subsequent studies in Canada and the United States published in 1996 assessed 680 patients and indicated that the Kt/V goal for optimal dialysis should be 1.2 (Lo, et al., 2003).

1.2 Problem statement

EDD treatment has traditionally been associated with an increased risk of IDH, however, current data suggests a shift in clinical practice, with more physicians noticing that intradialytic meals and supplements may be a method to enhance caloric intake and improve NS in HD patients.

Allowing dialysis patients to EDD is a sensitive subject, which explains the variance in EDD practices and rules from one country to another. There are three main causes for the variances in viewpoints. First, intervention studies show that eating, while undergoing analysis, causes a clinically significant decline in post dialysis systemic tamponade pressure, resulting in hypotension and an increased risk of death. Second, clinical studies have shown that eating, while on dialysis, lowers the efficiency of the treatment. Third, randomized controlled trials suggest that EDD, has a beneficial effect, however, they do not adequately balance the potential benefit with the implications of circulatory instability in the analysis and dialysis efficiency (Agarwal & Georgianos, 2018). A randomized study with 32 chronic HD patients looked at the effect of oral nutritional supplements as well as bioelectrical carriers on the status of nutrition, water, and QOL in HD patients, and found that the rate of malnutrition decreased by 13%, compared to those in the control group who relied on a personal diet, and the increase in QOL was significantly higher in the oral nutritional supplement group (Nieves-Anaya, et al., 2023).

In a study to investigate the effect of nutrition, the effect of EDD on the intradialytic blood pressure profile was studied on 26 patients receiving HD three times per week. According to the findings, there was an association between EDD and larger intradialytic blood pressure fluctuation and lower dialysis sufficiency (Fotiadou, Georgianos, Chourdakis, Zebekakis, & Liakopoulos, 2020).

The influence of eating time on patient problems was studied in 2016, with 48 patients participating, and a decrease in systolic and diastolic blood pressure was noted both times, whether it was an hour or two after the start of dialysis (Borrelli, et al., 2020).

A 2020 study included 12 patients at three different times: before and after a meal on a non-dialysis day, before and after a meal during routine dialysis therapy, and before and after eating two meals during HD. After eating that day, there was no decrease in blood pressure. However, on typical HD days, taking the meal orally resulted in a 22% drop in systolic blood pressure and a 19% decrease in diastolic blood pressure (Svinth-Johansen, Reinhard, & Ivarsen, 2020).

Furthermore, a previous study in Palestine examined the potential relationship with increasing the need for future research to find probable variables related with malnutrition, as well as the necessity to search in more Palestinian hospitals (Badrasawi,

et al., 2021). Our study examines the association between IDH and EDD, as well as the influence on NS and QOL in HD patients at An-Najah National University Hospital.

1.3 Importance of the study

This research would be one of the few in Palestine to focus on nutrition issues among dialysis patients. A study was conducted in Palestine in 2021, involving 153 patients, to assess the prevalence of malnutrition and discover potential factors associated with malnutrition. It was discovered that the risk of malnutrition is linked to multiple factors, including complications during dialysis sessions such as headache, nausea, and hypotension (Badrasawi, et al., 2021). Furthermore, in 2021, a study was conducted to assess the quality of life and ensure the factors that may affect it, including the NS of Palestinian diabetics receiving HD treatment. It was discovered that malnutrition was associated with a decrease in the quality of life among diabetics getting HD (Iqbal, Iqbal, Iqbal, & Ashraf, 2021).

This study will highlight the existence of the problem among Palestinian dialysis patients, as well as the absence of research in Palestine on the relationship between EDD, a dialysis session and IDH. Therefore, this study may be utilized as an example for other researchers to perform more qualitative studies and research additional aspects of dialysis, such as the amount of Ultrafiltration volume during a dialysis session, in future intervention studies.

1.4 Objective

1.4.1 Main Objective

The main objective is to study the association between eating practice and nutrition status (NS), clinical outcome (CO): IHD, adequate dialysis (AD), biochemical imbalance (BCI), and mental health (MH) in adults with HD at An-Najah National University Hospital.

1.4.2 Specific objective

1. To determine if there was an association between EDD and malnutrition among Palestinian HD patients at An-Najah National University Hospital.
2. To determining the association between EDD on MH among Palestinian HD patients at An-Najah National University Hospital.
3. Hospital policy and staff perception about EDD.

1.4.3 Research question

1. Is there an association between EDD and NS among Palestinian HD patients at An-Najah National University Hospital?
2. Is there an association between EDD and MH among Palestinian HD patients at An-Najah National University Hospital?
3. Are there any hospital policies and staff perception about EDD?

1.5 Literature review

1.5.1 Definition

Chronic kidney disease (CKD) is defined as the presence of kidney damage or an estimated glomerular filtration rate (eGFR) of less than 60 ml/min per 1.73 square meters that lasts for at least three months (Vaidya , Aeddula, & Doerr, 2021). CKD development from the early stage to end-stage renal disease (ESRD) is defined as an estimated glomerular filtration rate (eGFR) of 15 ml/min/1.73 m² (Bello, et al., 2022). As a result, the stages of chronic kidney disease are classified into six separate categories: First stage GFR of 90 ml/min per 1.73 m^2 or higher, second stage GFR of 60 to 89 ml/min per 1.73 m^2, third stage GFR of 45 to 59 ml/min per 1.73 m2, third stage b: GFR of 30 to 44 ml/min per 1.73 m^2, fourth stage GFR of 15 to 29 ml/min per 1.73 m^2, fifth stage GFR of less than 15 m^2 (Gaitonde, Cook, & Rivera, 2017). Individual CKD stages had a prevalence of 3.5% (stage 1), 3.9% (stage 2), 7.6% (stage 3), 0.4% (stage 4), and 0.1% (stage 5) (Kovesdy, 2022).

1.5.2 Prevalence

CKD has become one of the most significant causes of mortality and suffering in the twenty-first century, affecting approximately 843.6 million people worldwide in 2017 (Kovesdy, 2022). Since the worldwide death rate from CKD increased by 41.5% between 1990 and 2017 (GBD, 2020), a comprehensive search of the literature published between 1990 and 2017 was conducted in 2020 to evaluate the burden of CKD. According to estimations (Bello, et al., 2017), CKD affected one in every seven to ten people worldwide. In a survey of 11 Middle Eastern nations, the prevalence of CKD ranged from 5.2% to 10.6% (Amouzegar, et al., 2021). The overall prevalence of CKD was 6.8% in Jordan, 5.7% in Saudi Arabia (Alsuwaida, et al., 2010), and 14.9% in Iran (Hosseinpanah,

Kasraei, Nassiri, & Azizi, 2009). In 2016, there were 1119 hemodialysis (HD) patients in the West Bank of Palestine. In 2017, the number of patients climbed to 1216 (Marzouq, Samoudi, Samara, Zyoud, & Al-Jabi, 2021).

By 2040, ESRD is anticipated to be the fifth leading cause of mortality in the world, with one of the biggest expected rises of any significant cause of death (Kalantar-Zadeh, Jafar, Nitsch, Neuen, & Perkovic, 2021). In a review of articles published in the Middle East from January 1990 to January 2015, the prevalence rate of ESRD or renal replacement therapy was 360 pmp, which, in comparison to other areas, is not a large prevalence; nevertheless, it is considered that the Middle East has a significantly higher prevalence rate (Malekmakan, Tadayon, Roozbeh, & Sayadi, 2018). Furthermore, in Palestine, the prevalence of ESRD was 240.3 PMP (Hamdan, et al., 2020).

1.5.3 Risk factors

There are many causes of CKD worldwide, but the most common primary diseases that poison CKD and ESRD are diabetes of the first and second types, with diabetes of the first type accounting for 3.9% and diabetes of the second type accounting for 30%-50%. This is followed by high blood pressure accounting for 27%, primary glomerulonephritis accounting for 8.2%, chronic tubulointerstitial nephritis accounting for 3.6%, hereditary or cystic diseases accounting for 3.1%, secondary glomerulonephritis or vasculitis 2.1%, and plasma cell dyscrasias or neoplasm 2.1% (Webster, Nagler, Morton, & Masson, 2017). Due to a rapid increase in the two leading causes of ESRD, diabetes and high blood pressure, ESRD has become a global problem (Perico & Remuzzi, 2012).

Diabetes's microvascular complications cause kidney damage, known as diabetic nephropathy (DN). It is one of the most common consequences among individuals with type 2 diabetes (Long & Dagogo-Jack, 2011). Approximately ten years after the diagnosis of type 2 diabetes, it is possible to develop persistent albuminuria, which was measured at least twice every 6 months, and is also accompanied by a decrease in the GFR, which is often associated with high blood pressure, which can cause CKD (Thipsawat, 2021). Standard treatment for ND patients is to control the level of glucose and blood pressure. This treatment can reduce the progression of the disease but to stop or reverse it (Samsu, Gunawan, Wulandari, & Wibowo, 2021).

1.5.4 Management

When CKD progresses to the end stage, kidney replacement treatment is administered: kidney transplantation or dialysis (Bello, et al., 2019). Hemodialysis (HD) is considered a successful treatment for this disease (Kitamura & Fujii, 2004). HD is a therapeutic procedure that uses extracorporeal circulation of a patient's blood to address the uremic syndrome's azotemia, fluid, electrolyte, and acid-base abnormalities. HD is mostly used to treat acute and chronic renal failure that has not responded to standard medical therapy. Georg Haas (1886-1971) was a forgotten pioneer who made substantial contributions to the development of the concept of HD. He was the first person to execute clinically effective HD; however, due to the low level of bioengineering, he faced enormous practical challenges. This prevented wider adoption of the treatment, which was clinically effective despite insufficient dialytic efficacy (Wizemann & Ritz, 1998). By the end of 1928, Haas stopped working (Murea, Geary, Davis, & Moossavi, 2019). In 1943, Willem Kolff created and introduced a more efficient dialysis machine, thereby ending the field of blood purification. By this stage, medical vascular access insertion had switched from surgical cut-down to venipuncture with metal trocars. Dialysis delivery and patient survival were not possible beyond a few months due to the inability to gain entrance into the vascular area (Kolff, 1965). In 1948, Nils Alwall devised the bypass by connecting venous and arterial glass cannulae with rubber tubing to create a continuous shunt and maintain access patency between dialyses. However, Alwall's strategy to create an arteriovenous shunt provided a foundation for subsequent techniques for long-term vascular access (Murea, Geary, Davis, & Moossavi, 2019).

HD is the most common kidney replacement therapy in the world, accounting for approximately 69% of total kidney replacement therapy and 89% of total dialysis (Bello, et al., 2022). The number of HD patients grew from 1014 in 2015 to 1119 in 2016 (Atieh, Shamasneh, Hamadah, & Gharaibeh, 2020), and it kept on increasing to 1216 in 2017 (Marzouq, Samoudi, Samara, Zyoud, & Al-Jabi, 2021).

It's remarkable how rarely life-threatening complications arise during HD. Cardiac arrest, for example, occurs seven times out of every 100,000 sessions (Saha & Allon, 2017). In 2015, a study of 2325 people with CKD was released to investigate the difficulties with the analysis. During the trial, 12,785 sessions were carried out. The most common issue discovered in the analysis was hypotension, which was detected in 1296 sessions. This

was followed by nausea and vomiting in 1125, temperature and chills in 8181, headache in 665, cramps in 85, and low blood sugar in 77 sessions (Prabhakar, Singh, Singh, Rathore, & Choudhary, 2015). cCKD is associated with mineral bone disorder (MBD) and osteoporosis (Hsu, Chen, & Chen, 2020). Although CKD-MBD often begins early in the course of the CKD, it becomes clear with secondary hyperparathyroidism, hyperphosphatemia, and hypocalcemia only when GFR occurs below 45-50 mL/min/1.73 m^2 (Hu, et al., 2022). The Longitudinal Aging Study Amsterdam (LASA) study indicated that early impaired renal function (eGFR < 60 mL/min/1.73 m^2) was associated with increased acute fracture risk but not with higher incidence of vertebral fractures or falls (Chen, Lips, Vervloet, van Schoor, & de Jongh, 2018).

According to research, people receiving HD have a progressive reduction in nutritional parameters (Suryantoro, et al., 2021). Malnutrition in ESRD patients is considered one of the most significant indicators of mortality and morbidity (Graterol Torres, et al., 2022). Nutritional counseling and following dietary guidelines assist in enhancing the NS of HD patients, allowing for higher consumption of foods high in protein while keeping within the recommended sodium, phosphorus, and potassium limits (Chan , 2021). A planned method of frequent feedback during follow-up, patient education, and nutritional interventions when needed is required for effective nutritional interventions in kidney failure (Kolak, et al., 2022). Many of these dietary recommendations for dialysis patients are very challenging (Table 1).

Table 1

Dietary recommendations and restriction in dialysis patients and their implications

	Recommended range	Evidence	Observations
Dietary protein recommendations	1.2–1.4 g/kg/day	Epidemiologic studies show greatest survival with 1.2–1.4 g/kg/day.	Most dialysis patients eat <1.0 g/kg/day.
Dietary phosphorus restrictions	<800 mg/day	Mostly based on epidemiologic association between serum phosphorus and mortality.	Adhering to low phosphorus diet may result in inadequate protein intake.
Dietary potassium (K) restrictions	<3 g/day	Very recent data suggest an association between higher K load and death.	Most K rich foods are heart-healthy.
Dietary salt and fluid restrictions	<2.5 g/day	Salt data are mostly opinion based.There is more recent data on adverse outcomes from fluid retention.	Less fluid intake may be difficult to adhere to if patients are to eat larger amounts of protein and calorie.
Dietary carbohydrate restrictions	Mostly for diabetic dialysis patients	Higher A1c >9% may be associated with higher death risk.	May aggravate burnt-out diabetes leading to poor outcomes, especially if A1c<6%.
Dietary calcium restrictions	<1200 mg/day	Data are mostly based on association between serum calcium and mortality.	Hypocalcemia may be aggravated, especially with calcimimetics.

Dietary Protein Recommendations

The International Society of Renal Nutrition and Metabolism first mentioned protein-energy wasting (PEW) in 2007 (Obi, Qader, Kovesdy, & Kalantar-Zadeh, 2015). PEW is a condition of nutritional and metabolic derangements in patients with CKD and ESRD defined by simultaneous loss of systemic body protein and energy storage, based on the established definition (Hanna, Ghobry, Wassef, Rhee, & Kalantar-Zadeh, 2020). Albumin is one of the indicators that may be used to detect PEM in chronic hemodialysis patients (Suryantoro, et al., 2021). The results showed that hypoalbuminemia is an independent risk factor for the development of CKD, independent of whether the patients had diabetes, validating the importance of albumin levels in the blood for the development of CKD (Zhang, et al., 2022). In a review of 90 studies from 34 countries, involving 16,434 dialysis patients, the prevalence of PEW ranged from 28% to 54% (Carrero, et al., 2018). In 2021, a cross-sectional study in Palestine reported that the prevalence of malnutrition risk was as high as 45.4% (Badrasawi, et al., 2021). Dialysis reduces the symptoms of uremic and metabolic disorders without requiring a low-protein diet, but it must be confirmed that protein-energy waste is not increased more (Ko, Obi, Tortorici, & Kalantar-Zadeh, 2017). As a result, the standard recommendation for individuals with ESRD is 1.2 grams/kg/day and 30–35 kcal/kg/day to avoid PEW (Hanna, Ghobry, Wassef, Rhee, & Kalantar-Zadeh, 2020).

Dietary Phosphorus Restrictions

In individuals with ESRD, high phosphorus levels increase the risk of cardiovascular disease and mortality (Obi, Qader, Kovesdy, & Kalantar-Zadeh, 2015). Additionally, from causing skeletal damage, it also increases renal failure and increases the risk of bone pain, fractures, and death (Ruospo, et al., 2018). In the majority of patients, regular dialysis and diet alone are insufficient to lower phosphorus levels to normal levels. As a result, additional pharmacological therapy is required, including phosphate binders, active/analog vitamin D, and calcimimetics (Rastogi, Bhatt, Rossetti, & Beto, 2021). In a study involving 181 HD patients, their starting phosphate levels were above 5 mg/dL. Adherence to therapy with phosphorus binder was 39.2% in HD patients with poor phosphorus level control (Dolores Arenas, et al., 2013). To avoid elevated levels, the daily phosphorus requirement should be limited to not higher than 800-1000 mg/day (Saglimbene, et al., 2021). Soft drink consumption and processed meals are two of the

factors that lead to increased dietary phosphorus intake (Ye, Yang, Bi, Huang, & Liu, 2021).

Dietary Potassium Restrictions

A decreased renal function increases the risk of having abnormal potassium metabolism (Yamada & Inaba, 2021); low potassium levels are linked to muscular weakness and hypertension, whereas high potassium levels can cause cardiac arrhythmia and mortality (Cupisti, et al., 2018). Dietary potassium consumption and blood potassium levels are both of great medicinal importance (Kim & Jung, 2020). Hyperkalemia is more common in patients with CKD (Thomsen, et al., 2018) and is usually defined as a serum level of potassium more than 5.0 mmol/L (Adelborg, et al., 2019). Hyperkalemia tends to occur in a variety of conditions, including an increase in potassium-rich diets (Watanabe, 2020). As a result, HD patients must limit their potassium intake to 2-3 g/day (Noori, et al., 2010).

Dietary Salt and Fluid Restriction

High intake of salt is associated with fluid overload in ESRD patients, leading to higher blood pressure levels (Borrelli, et al., 2020). High blood pressure is common in individuals with ESRD, increasing at a prevalence of 50-80%, increasing the risk of cardiovascular disease, which is the main cause of mortality and hospitalization in patients on chronic HD (Merchant, et al., 2015). As a result, restricting sodium intake is the main goal of treating these individuals, since it has been estimated that a salt consumption of less than 6 g/day results in the patient gaining no more than 0.8 kg/day in interdialytic weight (Borrelli, et al., 2020). Dialysis patients consume salt to add flavor to their meals, which increases the sodium concentration, causing severe thirst via the thirst center in the brain, and this thirst lasts until the sodium concentration returns to normal (Nagasawa, 2021). Doctors have an important challenge in managing salt and fluids for dialysis patients since the definition of dry weight is utilized, which is re-evaluated by doctors over time based on the patient's conditions and changes (Canaud, Chazot, Koomans, & Collins, 2019). A clinical trial with 192 patients was published in 2018 to investigate an educational and motivational intervention for HD patients to reduce fluid consumption between HD sessions. The results showed that an educational and

motivational intervention is beneficial in reducing the pattern of weight increase during interdialysis periods (Oller, et al., 2018).

Dietary Glycemic Restrictions

In Palestine, approximately 34.6% of type 2 diabetes patients have nephropathy, which is associated with the risk of developing ESRD and a need for dialysis. Its prevalence rate in Palestine is 240.3 per million people (Nazzal, et al., 2021). In dialysis patients, the association between blood glucose and HbA1c levels differs from that observed in people with normal renal function (Hoshino, et al., 2013). Dialysis patients with diabetes may experience the phenomenon known as the diabetes burnout phenomenon, in which it becomes possible to reduce oral hypoglycemic agents and, in some cases, stop because of hypoglycemia risk (Park, Lertdumrongluk, Molnar, Kovesdy, & Kalantar-Zadeh, 2012). According to recent research, the recommended HbA1c levels for dialysis patients are 7-9%, and a decrease in HbA1c level of less than 6% is associated with malnutrition or other metabolic disorders (Kalantar-Zadeh, et al., 2015).

Diet is an essential component of CKD treatment. Nutritional interventions can reduce the progress of CKD in the early stages, and in later stages, they may delay the need for kidney replacement therapy, as the diet for those with kidney disease is one of the most restricted in comparison to other chronic illnesses (Kistler, et al., 2021). Also, dietary requirements for dialysis patients are very restricting, as finding anything appropriate to consume creates a major challenge for dialysis patients (Kalantar-Zadeh, et al., 2015). A low-potassium diet, for example, contradicts current guidelines for a heart-healthy diet (Khoueiry, et al., 2011). There is also an unusually high prevalence of antioxidant deficiency, which can be caused by an inadequate supply of natural sources such as fresh fruits and vegetables (Kalantar-Zadeh & Kopple, 2003); thus continuing to these limits may frustrate the patient and lead to suboptimal adherence (Kalantar-Zadeh, et al., 2015).

1.5.5 Eating food during dialysis

Eating food during dialysis (EDD) treatment has traditionally been associated with an increased risk of IHD, a frequent consequence of (HD) that has been associated with elevated symptom burden, increased access failure, cardiovascular events, and increased mortality (Kuipers, et al., 2019). IHD is defined as a drop in systolic blood pressure of at least 20 mmHg, or a drop in mean blood pressure of at least 10 mmHg, accompanied by

unpleasant intradialytic symptoms or requiring nursing interventions (Fotiadou, Georgianos, Chourdakis, Zebekakis, & Liakopoulos, 2020). It is related to a greater risk of access failure, cardiovascular events, and mortality (Caplin, Kumar, & Davenport, 2011). The actual prevalence of dialysis hypotension is unknown due to the high average age of dialysis patients, as well as persons with comorbidities such as diabetes and heart failure (Kuipers, et al., 2019). According to a recent meta-analysis, the prevalence of complex hemodialysis sessions by IDH was estimated to be 11.6% using the nadir 90 measure and 10.1% using the IDH definition of a >20 mmHg decrease in systolic blood pressure in association with clinical events and treatments (Sars, van der Sande, & Kooman, 2020).

An online survey was sent to nephrologists and dialysis centers in the United States, asking why patients do not eat during dialysis treatment. Concerns included low blood pressure after eating, the risk of choking on food, infection control and hygiene issues, including fear of fecal-oral transmission of such diseases as Hepatitis A, employee distraction in addition to being an excessive burden, diabetes, and phosphorus level control. Table 2 defines some of the advantages and disadvantages of providing meals during dialysis (Kalantar-Zadeh & Ikizler, 2013).

Table 2

The advantages and disadvantages of assessing food intake and providing meals in dialysis treatment centers

Advantages	Disadvantages
Impact on NS and CO -Meals during HD occur always in many developed nations, including Europe and South East Asia -High survival rates in most nations where meals are provided during HD. -No significant negative impacts were identified in nations that provided meals during HD.	Low blood pressure and irregular circulation with meal consumption -Despite improved dialysis treatments and procedures, splanchnic circulation expansion may decrease blood pressure during and after eating. - Hypotensive episodes can delay dialysis treatment time and reduce fluid removal efficiency.
Reduces/corrects catabolism during and after dialysis. -HD Treatment has catabolic consequences, which can be prevented by eating during HD. -Muscle wasting may be reduced. - Effectively improves the frequency of regular meal consumption	Risk of aspiration and other respiratory problems. -individuals with a history of neurologic diseases, swallowing challenges, or other medical conditions are at a higher risk of swallowing. - Aspiration can occur even in a sitting position for individuals who cannot feed themselves at home.
Improved management of dietary phosphorus, potassium, salt, and fluid -Meals and supplements produced in-center may better satisfy the particular requirements of CKD patients. -In-center meals may enhance compliance with limited salt and fluid consumption. - Consumption of phosphorus binder can be monitored. - Patient education can be improved by interacting with an a dietitian and a nephrologist together while eating.	Infectious control and hygiene issues - Fecal-oral transmission of infection including hepatitis A is possible. - Food crumbs could result to an infestation. - Ingestion of rotting food may result in food poisoning. - Meal tray delivery and storage may present more hygiene concerns
Improved adherence to HD treatment - Improves the chance of attending HD treatment. -May reduce the chance of HD treatment shortening by hungry patients. - Improves communication among patients, dietitians, and clinic staff.	The burden on dialysis workers and logistics difficulties. -Overworked dialysis personnel are facing increased responsibilities. -Nutrition may not be viewed a necessary aspect of patient treatment in dialysis clinics.
Increased patient satisfaction and quality of life. -In-center meals may make patients more satisfied with the dialysis treatment lifestyle. -Improved quality of life with in-center meals may increase survival.	Only a small amount of the essential meals are given. -Tri-weekly meals account for a quarter of all meals. -Intradialytic feeding may not effectively reduce or reverse the catabolic effects of HD.
Significantly low a meal costs on HD -The costs for serving meals in the center are just a small portion of the costly drugs used in ESRD. -Dialysis organizations can change this through effective and inexpensive techniques.	Additional costs for dialysis treatment -The cost of meals during dialysis may be small, but not significant. -Financial institutions could put food costs above other essential therapy components and drugs when utilizing services.

Abbreviations: CKD, chronic kidney disease; PEW, protein-energy wasting.

Many studies have researched oral intake during dialysis and the potential for life-threatening problems related to the treatment. The first study studied the effect of eating meals during dialysis on blood pressure, and it included 9 patients at the ESRD who didn't have diabetes. The results showed the significance of avoiding meals during dialysis in patients with IDH (Sherman, Torres, & Cody, 1988). In a randomized trial on 13 patients in ESRD, the aim of which was to test the hypothesis of the negative effect of food intake on the hemodynamic response, a standard meal of no more than 400 calories was given, and each patient was studied during two dialysis sessions performed at a rate of identical ultrafiltration, where the effect of sudden hypotension from the snack was more evident, and the results confirmed that fasting during dialysis may help prevent hypotension (Zoccali, Mallamaci, Ciccarelli, & Maggiore, 1989).

A quasi-experimental study including 48 dialysis patients investigated the effect of eating food during dialysis on the risk of low blood pressure, nausea, and vomiting problems. The results confirmed that eating food had no effect on nausea and vomiting, but it caused a decrease in diastolic and systolic pressure, and the effect of lowering pressure was observed for an hour or hour and a half after the meal, so it is recommended to eat in the first hours of dialysis (Borrelli, et al., 2020). Another study with 20 dialysis patients observed that eating food during HD reduced monitoring relative blood volume but was not associated with vomiting or nausea (Sivalingam, Banerjee, Nevett, & Farrington, 2008).

In an observational study that aimed at studying the possibility of negative effects during HD treatment as a sign of calories and fluid intake, the study included 23 patients receiving HD in the second shift on Tuesdays, Thursdays, and Saturdays, and the results confirmed that food and fluid intake may lead to risk of low blood pressure, but not cramps, nausea, and vomiting (Strong, et al., 2001). Another retrospective, cross-sectional chart review study including 126 participants observed no association between food intake and low blood pressure (Benaroia & Iliescu, 2008).

But new research suggests a shift in clinical practice, with more clinicians believing that intradialysis meals and supplements may be a way to increase caloric intake and improve nutritional status (NS) in HD patients (Fotiadou, Georgianos, Chourdakis, Zebekakis, & Liakopoulos, 2020). Although North America, especially the United States, possessed

more restrictive dietary guidelines in dialysis units than European and Asian nations, the statistical significance disappeared quickly, and there was meal restriction in 28.6% and 22.6% of dialysis units, respectively, in 2011 and 2014 (Benner, et al., 2016). EDD has been found to improve NS (Pupim, Majchrzak, Flakoll, & Ikizler, 2006), QOL (Scott, et al., 2009), and is associated with significant mortality reductions (Weiner, Kapoian, & Johnson, 2015); however, it remains a contentious subject due to postprandial hemodynamics and other symptoms (Kistler, et al., 2014).

1.5.6 Dialysis adequacy

Adequate dialysis cannot be easily determined (Levin, 1994). For many years, the phrase adequacy of dialysis has been used to refer to the determination of small solute clearance using urea and creatinine (Rees, 2019). It developed in the 1980s after it had been determined how much the amount of urea in the blood has an impact on survival, and the definitions of urea clearance and Kt/Vurea were defined (Perl, et al., 2017). The redistribution of blood volume between the systemic circulation and the gastrointestinal tract after eating can impact the adequacy of administered hemodialysis (Fotiadou, Georgianos, Chourdakis, Zebekakis, & Liakopoulos, 2020).

Table 3

Interventional studies evaluating of eating during dialysis on dialysis adequacy

Patient characteristics	Year	*n*	Intervention	Change in *Kt/V*	References
Stable dialysis patients	2001	14	N/A	Decrease	San Juan Miguelsanz & Pilar, 2001
Stable dialysis patients	2004	420	Oral food intake two hours before dialysis versus a three-hour fast before dialysis	No change	Singri & Johnstone, 2004
Stable nondiabetic dialysis patients without evidence of autonomic neuropathy	2010	25	N/A	Decrease	Kara & Acikel, 2010
Stable dialysis patients without overt cardiovascular disease	2014	40	Service of a typical a meal Two hours after starting dialysis.	No change	Müller-Deile & Lichtinghagen, 2014

Note: N/A, not available.

The first research examined the association between dietary intake during HD and Kt/V. The study included 14 patients, where the amount of HD was assessed during the second week, with or without EDD. There was no change in the average urea concentration and intradialysis gain with food intake, but there was a significant change in Kt/V levels (San Juan, Miguelsanz, Pilar, Santo, & Pablos, 2001). In a quasi-experimental study including 25 patients, they were given a standard meal after the first hour of treatment. After one week, the same group had HD without any food intake. It is thought that EDD causes a decrease in Kt/V levels (Kara & Açikel, 2010).

Another study, which included 42 patients, investigated the effect of eating food before HD on the adequacy of dialysis. The patients ate food two hours before HD instead of fasting for at least three hours before HD, and the results confirmed that eating food before HD does not affect the adequacy of dialysis (San Juan, Miguelsanz, Pilar, Santo, & Pablos, 2001). In 2014 study of 40 patients showed that dialysis adequacy was constant (Müller-Deile, Lichtinghagen, Haller, & Schmitt, 2017).

1.5.7 Nutritional status and Malnutrition

Eating during dialysis might relate to protein waste and NS, providing the case for allowing HD patients to eat all during the session (Agarwal & Georgianos, 2018). A study of 110 patients obtaining HD three times per week explored the theory that delivering high-protein meals during HD with a strong phosphorus binder enhances serum albumin without increasing blood phosphorus levels. The results revealed that in HD patients with low levels of blood albumin, high-protein meals during treatment resulted in a rise in serum protein while maintaining phosphorus levels (Rhee, et al., 2017).

In a cross-sectional research study of 1,901 dialysis patients, eating habits were studied on both dialysis and non-dialysis treatment days. On dialysis days, participants consumed fewer calories and protein than on non-dialysis days; thus they should be recommended to Those receiving dialysis should consume enough quantities of calories and protein daily, especially during dialysis days, with appropriate management required in patients who report a decreased appetite (Burrowes, et al., 2003).

Hemodialysis patients have had several dietary issues, including loss of appetite, ongoing illnesses, and infections. Furthermore, the HD treatment may result in a catabolic status,

which can be reduced by taking oral nutritional supplements, thus decreasing PEW (Weiner, Kapoian, & Johnson, 2015).

In 2012, a retrospective matched-cohort research study was done to investigate the extent to which oral nutritional supplements during HD may increase survival for HD patients with albumin deficiency since oral nutritional supplements were administered during the HD. For HD patients for one year or until the albumin level is ≥4.0 g/dl. The results showed a lower mortality rate in individuals with an albumin level of less than 3.5 g/dl (Lacson, Jr, Zebrowski, Wingard, & Hakim, 2012). A pre-test post-test quasi-experimental study was done to study the impact of oral nutritional supplements during HD on the QOL of HD patients diagnosed with PEW. The test was tested on 109 elderly individuals before and after 3 months of oral nutritional supplements during HD. The results show that 3 months of oral nutritional supplements during HD improves physical and mental QOL as well as NS in older patients with PEW (Ayala, Marchant, Hertz, & Castillo, 2022). On the other hand, a systematic review of the effects of oral nutritional supplements on HD patients, which included randomized controlled trials, identified insufficient evidence that they may improve NS by increasing albumin levels and BMI for HD patients (Liu, Ma, Wang, & He, 2018).

Chapter Two
Methodology

2.1 Study design

This study utilized observational and cross-sectional design. The data collection will start in July 2024 and end in October 2024. The collected data will include socio-demographic data, medical history, HD-related data, eating practices during HD sessions, and mental health.

2.2 Study population

All adult hemodialysis patients in Palestine at An-Najah National University Hospital.

2.2.1 Inclusion criteria

All adult patients having regular hemodialysis treatment at An-Najah National Hospital will be included.

2.2.2 Exclusion criteria

Patients on enteral nutrition, cancer patients, individuals with mental illnesses, and individuals with communication problems will be excluded.

2.3 Sampling frame

The study will include all hemodialysis patients at An-Najah National University Hospital, which has the largest dialysis center in Palestine, as well as other sociodemographic variables.

2.4 Data collection and Study variables

The participants were given information about the study's design, goals, and types of data that would be collected, with a focus on voluntary participation and confidentiality of the information collected, as well as acceptance of their signature on a consent form. The information was collected after confirming the acceptance of the approval provided to An-Najah National University Hospital. Data was collected from hemodialysis patients at An-Najah Hospital utilizing a structured face-to-face interviews with six components.

The first section: socio-demographic:

Include elements such as gender, age, marital status (single, married, divorced), place of residence (city, village, or camp), degree of education (uneducated, up to secondary school, university, higher education studies), and employment status (employed or unemployed) to consider.

The second section: patient's medical history:

It includes the disease's comorbidities, how long it has been since diagnosis, and whether or not drugs.

The third section: related to dialysis data:

including how long has the patient used hemodialysis? Does the patient have any symptoms during hemodialysis? How long is the hemodialysis session?

The fourth section: assessed nutritional status:

Using ABCD Nieman & Lee (2017), which includes anthropometric measurements (height, weight, BMI), height and weight were taken from computerized patient files. BMI classifications include underweight (<18.5 kg/m2), normal weight (18.5-24.9 kg/m2), overweight (25.0-29.9 kg/m2), obese class I (30.0-34.9 kg/m2), obese class II (35.0-39.9 kg/m2), and obese class III (≥40 kg/m2) (Almas, et al., 2022), biochemical tests (phosphorus (3.5–5.5 mg/dL) (Sato, et al., 2018), potassium (3.5–5.0 mEq/L) (Yamada & Inaba, 2021), albumin (3.5-5.0 g/dl) (Thongprayoon, et al., 2020), calcium (8.8 - 10.7 mg/Dl) (Shrimanker & Bhattarai, 2023), sodium (135 to 145 mEq/L) (Al Mawed, et al., 2018), BUN (30 - 90 mg/dL), Creatinine(5-14 mg/dl) (Narasimhan, Goodman, & Patel, 2001), clinical nutrition (screening for malnutrition using MIS), and dietary record (during dialysis and non-dialysis days), which includes the dietary diversity, number of food groups (starches, meat, milk and its derivatives, fats, fruits, vegetables), and food items eaten by the patient. The fifth section : Dietary intake practices

Including eating during HD: yes or no, time of eating during the session, and type of food), and the last section examined mental health, as shown in the appendix A.

The section six:

Each patient was observed for three sessions, including data collected about food intake during the session (yes or no), having symptoms (yes or no), and the minimum mean arterial pressure (MAP) measurement.

In addition, policies and recommendations for the specialist, staff, and hospital were recorded.

2.5 Tools

The Malnutrition-Inflammation Score (MIS) questionnaire is an assessment tool that includes the original SGA components as well as three new evaluation criteria (body mass index (BMI), serum albumin, and total iron-binding capacity (TIBC) test). Each MIS component has four severity levels that vary from zero (normal) to three (very severe). The total of all ten MIS components varies from zero to 30, indicating increasing severity. The patients will be classified as mild, moderate, or severe wasting (Hasheminejad, Namdari, Mahmoodi, Bahrampour, & Azmandian, 2016). The cutoff point was 7; any score >7 was considered malnutrition and any score ≤7 was considered well-nourished (Xavier, de Góes, Borges, Caramori, & Vogt, 2022).

Individual Dietary Diversity Score (IDDS) It is validated to different age and gender groups and is used to evaluate macronutrient and micronutrient adequacy in the diet, and it shows high reliability (Cronbach's Alpha = 0.76) (Hussien, et al., 2021). The IDDS includes a total of 16 components, divided into three categories: lowest nutritional diversity (less than 3), medium nutritional diversity (4-5), and high nutritional diversity (more than 6), it is shown in appendix B (FAO, 2006).

The General Health Questionnaire (GHQ-12) is a twelve-item questionnaire used to test for non-specific mental illness. It has been thoroughly verified and has proved to be reliable (Hankins, 2008). The Arabic version of the GHQ-12 was found to be reliable, with a Cronbach alpha of 0.86. The best balance of sensitivity and specificity was found at the GHQ-12 cut-off point of 15/16: sensitivity was 0.88 and specificity was 0.84 (Daradkeh, Ghubash, & El-Rufaie, 2001).

The IDH will be measured using the pressure device attached to the HD machine from Fresenius Medical Care, version 5008S, while the average value deviation of blood

pressure measurement is 5 mmHg, the standard deviation is 8 mmHg, based on the related booklet from the manufacturer.

Finally, the efficiency of HD will be calculated using the following equation based on Kt/V:

$$Kt/V = -In(R-0.008T) + (4-3.5R) \times (\Delta BW/BW) \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where R = blood urea nitrogen (BUN) after dialysis/BUN before dialysis, T = dialysis time (h), ΔBW = change in body weight from before to after dialysis (kg), and BW = dry body weight (kg) (Dai, et al., 2020).

2.6 Ethics consideration

An-Najah National University provided an IRB and approval for a research project at An-Najah National University Hospital, as well as consent from study participants to collect the sample.

2.7 Statistical Analysis

The researcher used the Statistical Package of Social Science (SPSS version 25) program for data entry and analysis. Frequency tables that show baseline characteristics by number (n) and percentage (%) in categorical data. After testing normality by normality criteria in numerical data, normally distributed quantitative data were described by mean ± standard deviation (SD). The chi-square test was used to evaluate associations between variables such as IDH and EDD.

Chapter Three

Results

3.1 Patient characteristics

The mean age is 58.15 (SD=13.4) years, 66.5% were males, 83.2% married, 47.1% residing in the village, 71.6% living with their spouse, 34.2% finished middle school, and 76.8% were unemployed (Table 4).

Table 4

Patients' sociodemographic are presented as n (%).

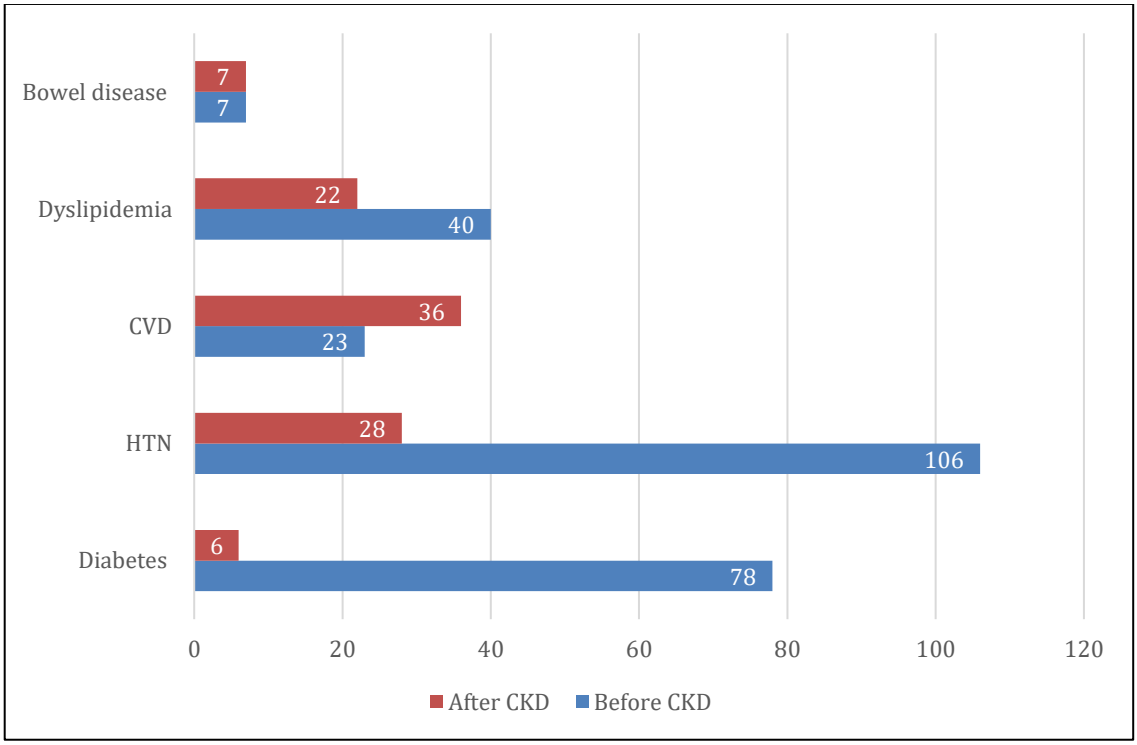
Characteristics (n=155)		N	%
Gender	Male	103	66.5
	Female	52	33.5
Marital status	Married	129	83.2
	Single	16	10.3
	Others	10	6.5
Lining area	City	65	41.9
	Village	73	47.1
	Camp	17	11
Living status	With spouse	111	71.6
	With family	33	21.3
	Alone	11	7.1
Education level	No formal education	11	7.1
	Primary school	34	21.9
	Middle school	53	34.2
	High school	34	21.9
	Degree /postgrad	23	14.8
Monthly income	< 1500 NIS	92	59.4
	1500-3000 NIS	37	23.9
	3000-5000 NIS	12	7.7
	above 5000 NIS	14	9
Working status	Full time	15	9.7
	Part time	5	3.2
	Not working	119	76.8
	Retired	16	10.3

3.2 Medical history

The most common morbidity among participants was hypertension, which affected 85.8% of them (Figure 1).

Figure 1

Chronic Diseases Among Hd Patient Presented As N



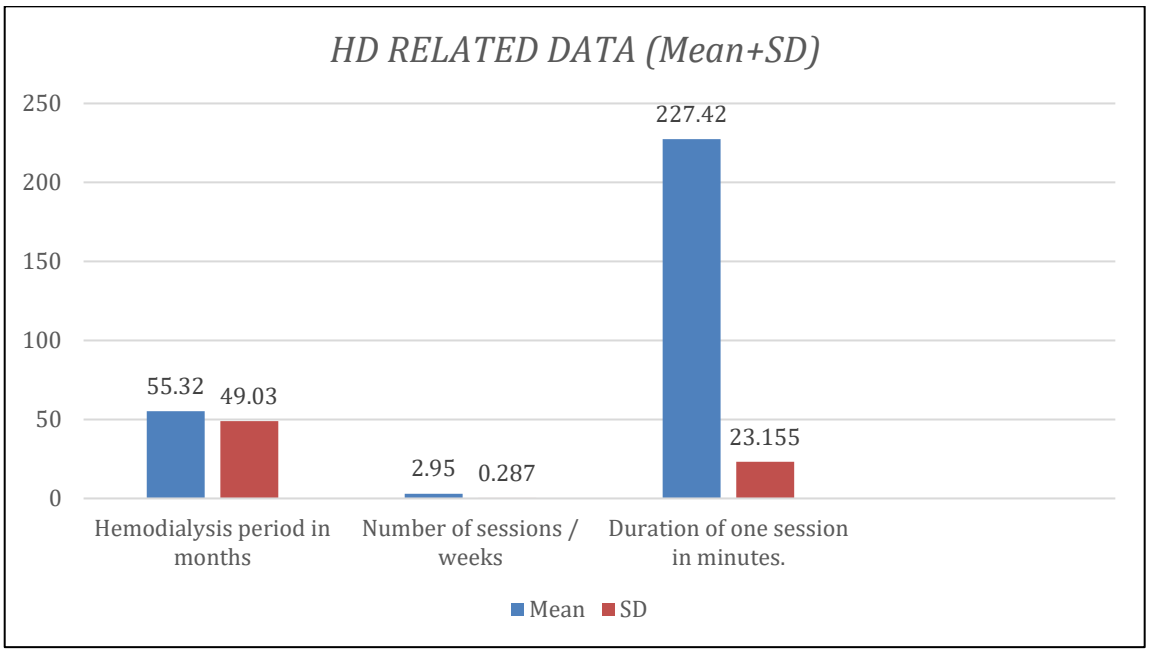
CKD: chronic kidney disease, HTN: Hypertension, CVD: Cardiovascular disease.

3.3 Hemodialysis related data

46.5% of patients receive twice-weekly nutritional advice, and 84.5% adhere to the nutritional instructions provided. The mean duration of dialysis in months is 55.32 (SD = 49.03), the mean number of dialysis sessions per week is 2.97 (SD =.287), and each session lasts 227.42 minutes (SD =23.155) (Figure 2).

Figure 2

Hd Related Data



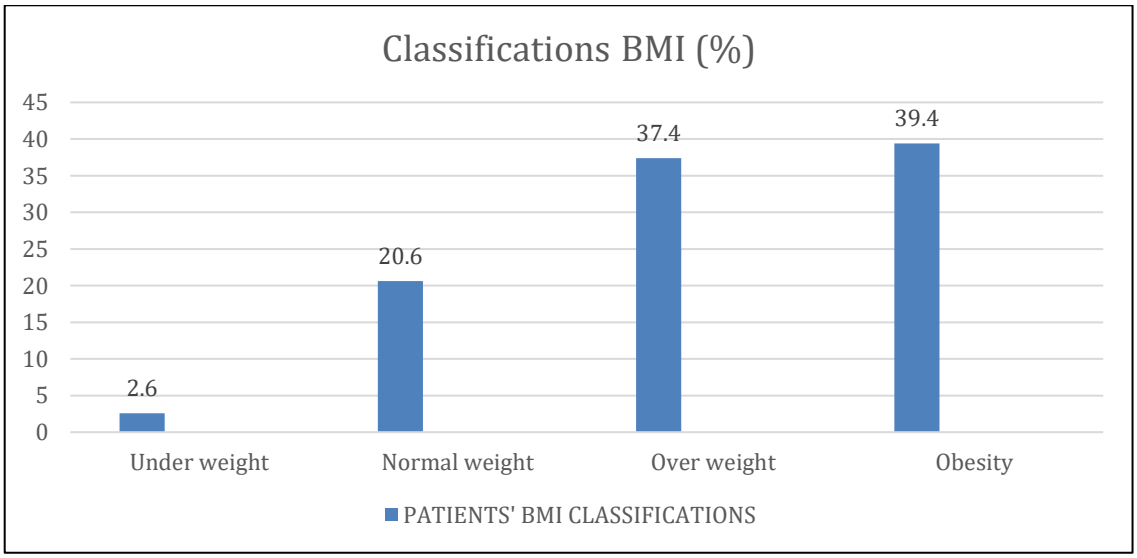
3.4 Nutrition status assessment

3.4.1 Anthropometric and clinical data

Using dry weight, the patients' BMIs was 39.4% obese, 37.4% overweight, 20.6% normal weight, and 2.6% underweight (Figure 3). The mean weight was 81.26 (standard deviation = 21.26).

Figure 3

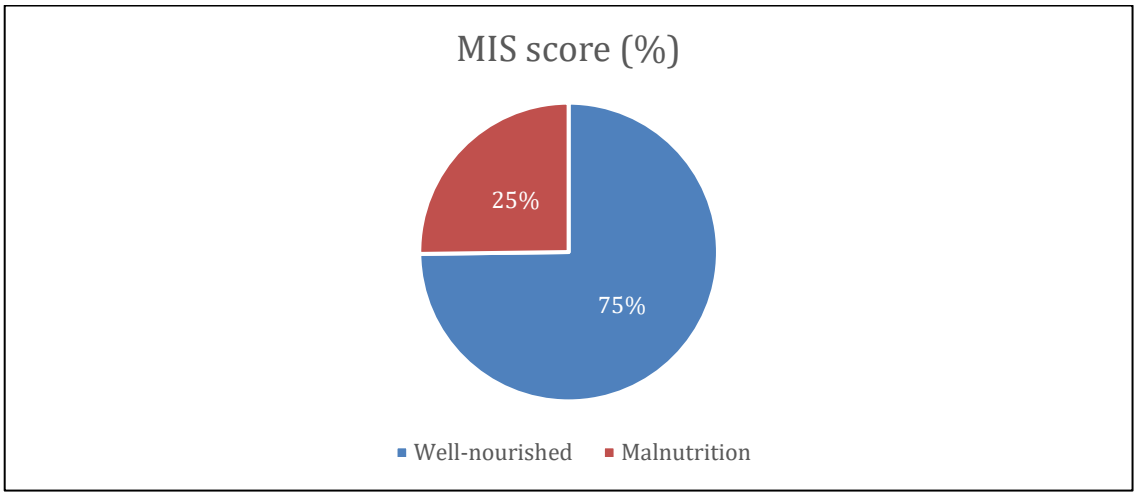
Patients' BMIs classifications



The results showed that 74.8% of patients were well-nourished **(Figure 4).**

Figure 4

MIS Score (%)

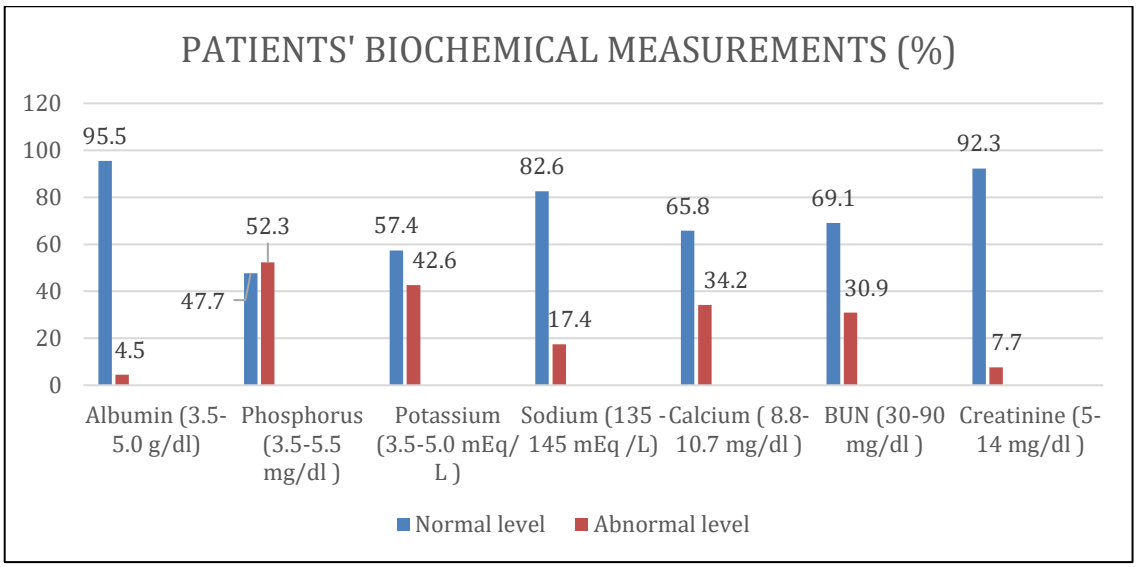


3.4.2 Biochemical Measurements

The patients' biochemical measurements reported 95.5% normal albumin levels, 47.7% normal phosphorus levels, 57.3% normal potassium levels, 65.8% normal calcium levels, 69.1% normal BUN levels, and 92.3% normal creatinine levels (Figurer 5).

Figure 5

Patients' Biochemical Measurements



3.4.3 Diet related data

Intradialytic eating

According to the results, 79.4% of patients EDD, while 52.3% render their meals at home, which mainly consist of traditional sandwiches with labneh, hummus, and thyme. 54.8% eat full meals, 85.8% eat while sitting, and 48.4% eat in the middle of a dialysis session (Table 5).

In addition, 71% of patients EDD because they feel better, 9.67% do not EDD because they do not feel hungry, and 25.8% of patients have a headache during the dialysis session (Table 5).

Table 5

Intradialytic Eating Data are Presented by N (%).

Intradialytic eating data (n=155)		N	%
Eating during dialysis	Always	123	79.4
	Sometimes	17	11
	Never	15	9.7
Food source	The home	81	52.3
	Supermarket or cafeteria	59	38.1
Meal type	Full meal	85	54.8
	Snack	55	35.3
Meal positioning	Sleeping position	7	4.5
	Sitting position	133	85.8
Meal timing	The beginning of session	63	40.6
	The middle of session	75	48.4
	End of the session	2	1.3
Reasons to EDD	Hunger	95	61.3
	Feeling better	110	71
	Food is suitable for my health condition	95	61.3
	Depression	4	2.6
Reasons for not EDD	Not feeling hungry	15	9.67
	Loss of appetite	1	.6
	Depression and Boring	1	0.6
	Change in taste or no taste	1	0.6
Symptoms reported by patients during dialysis	Nausea	24	15.5
	Vomiting	10	6.5
	Headache	40	25.8
	Stomach pain	14	9
	Shortness of breath	24	15.5
	Heartburn	8	5.2

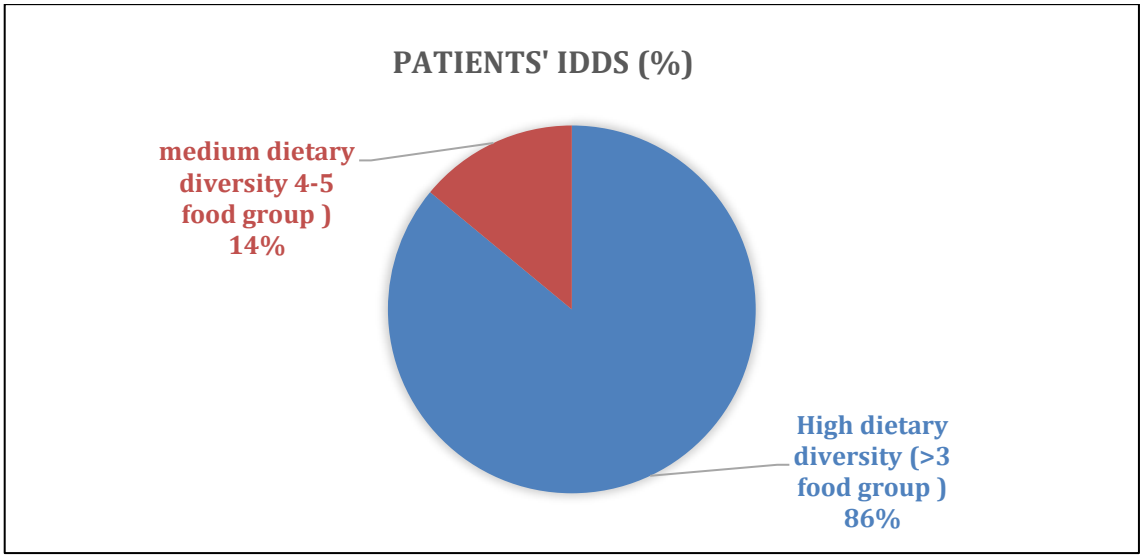
EDD: eating during dialysis.

Dietary Diversity

Patients consume a mean of 4.9 (SD=0.68) food group and 7.6 (SD=2.2) food types per day, with 86% having high diet diversity (Figure 6).

Figure 6

Patients' IDDS (%)

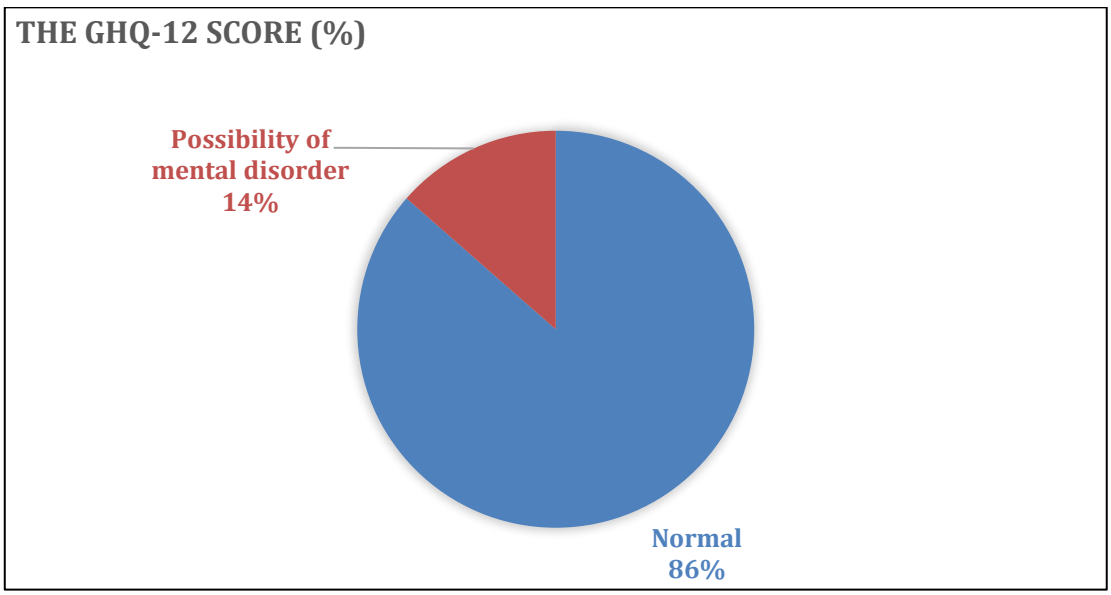


3.5 Mental Health

Results showed that 86.5% had good mental health (Figure 7).

Figure 7

The Ghq-12 Score is Presented (%)



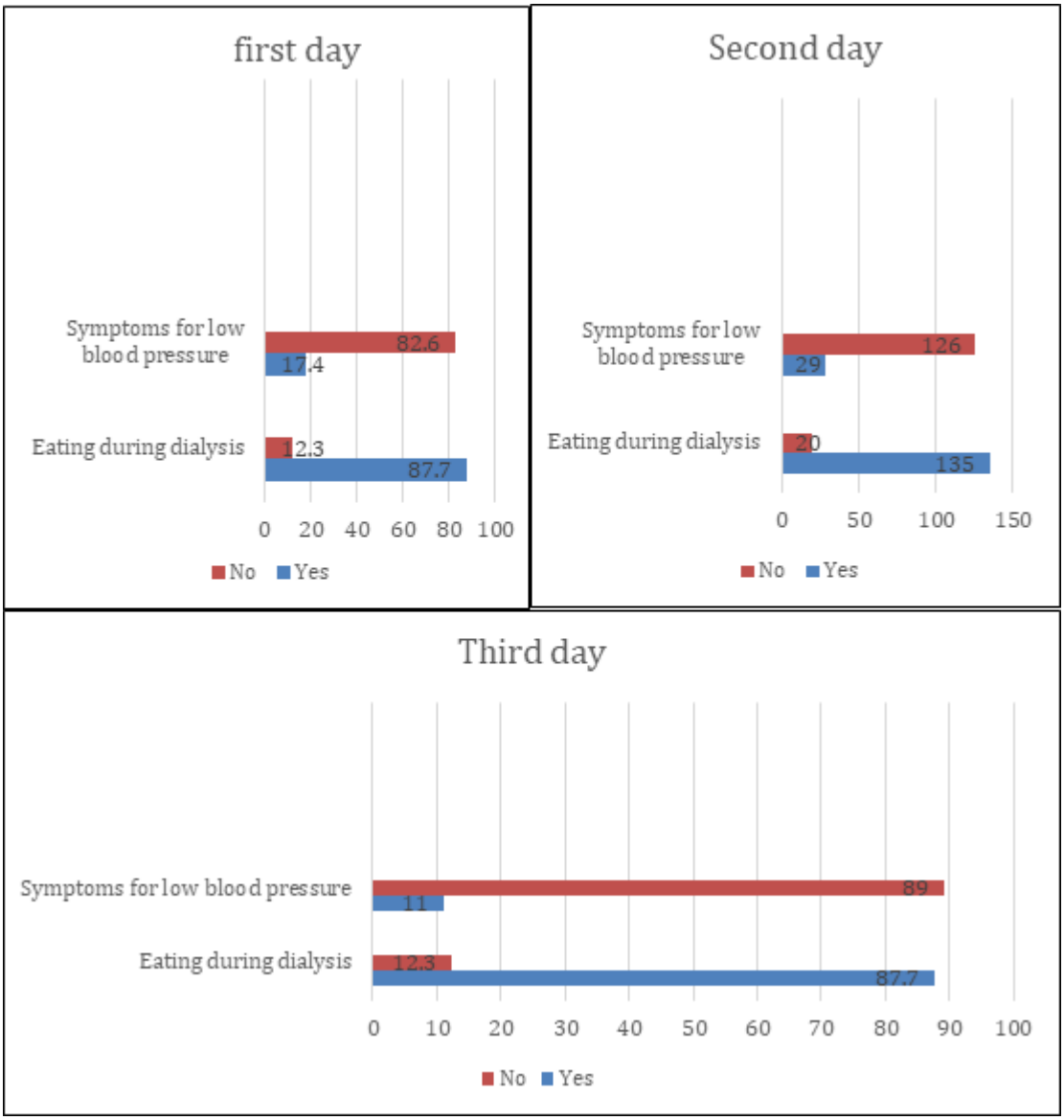
3.6 Observational data

3.6.1 Eating during dialysis

It found that on the first day, 87.7% of the participating patients ate food during dialysis, and 82.6% of them did not notice any symptoms of low blood pressure; on the second day, 87.1% of the patients ate food during dialysis, and 81.3% did not notice any symptoms of low blood pressure during the dialysis session; and on the third day, 87.7% of the patients ate food during dialysis, and 89% did not notice symptoms of low blood pressure during the dialysis session (Figure 8).

Figure 8

Observational data is presented by (%).

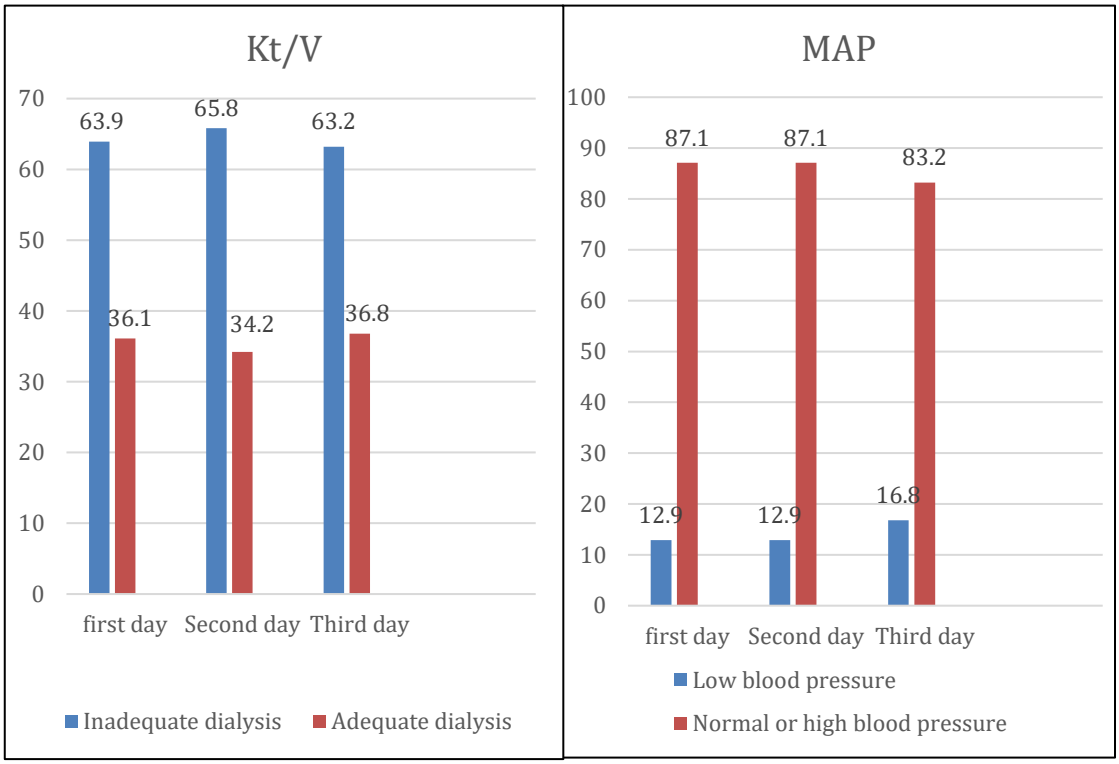


3.6.2 Clinical Outcome

On the first day, 63.9% of patients had inadequate dialysis, whereas 87.1% had normal blood pressure measurements. On the second day, 65.8% of patients had inadequate dialysis, whereas 87.1% had normal blood pressure measurements. On the third day, 63.2% of patients had inadequate dialysis, but 83.2% had normal blood pressure levels (Figure 9).

Figure 9

Clinical Outcome is Presented by (%)



MAP : minimum mean arterial pressure.

3.7 policies and recommendations

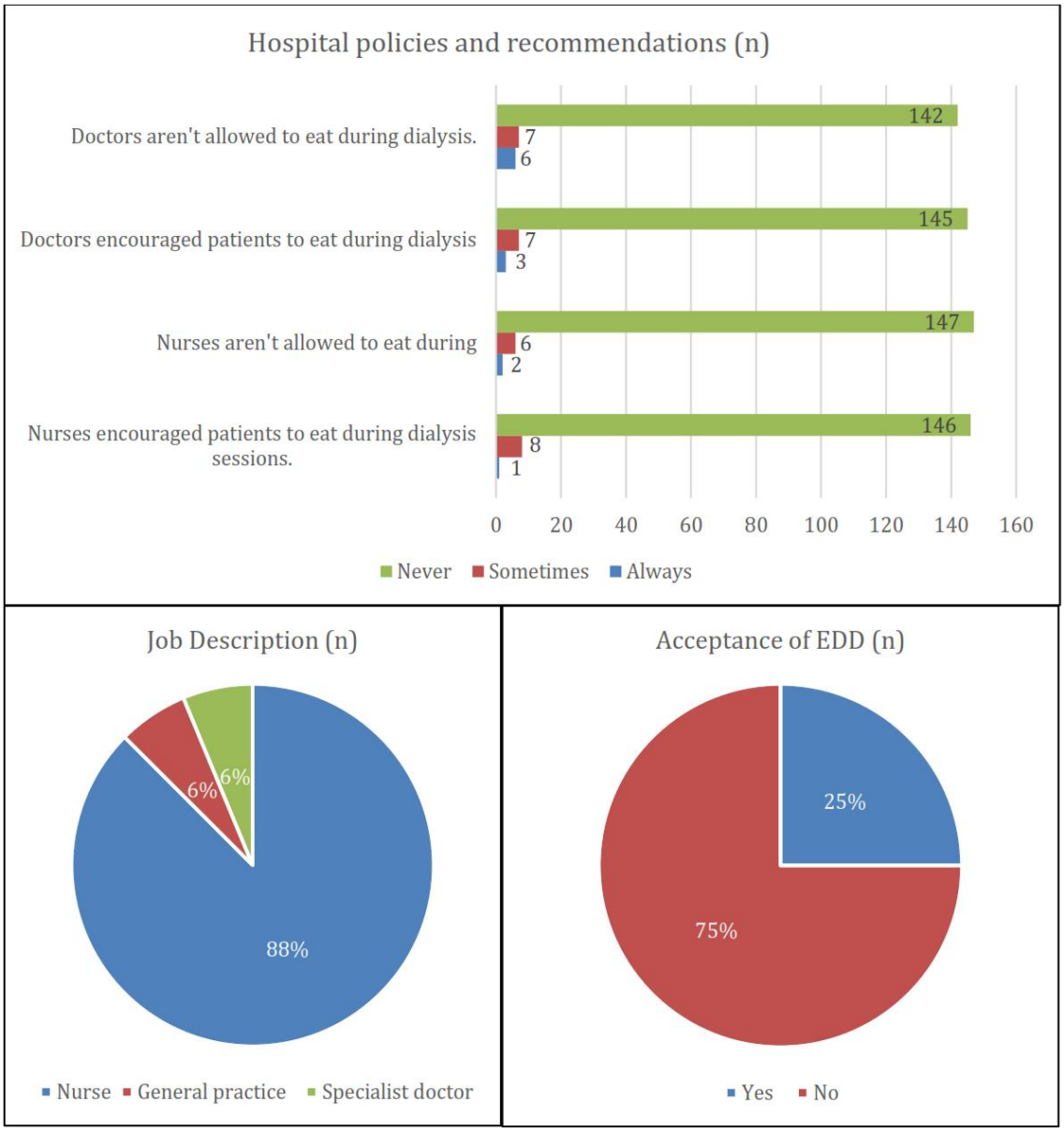
The results showed that food was not provided to patients during dialysis sessions, and that 94.2% of patients were not encouraged by nurses to EDD, 94.8% were not encouraged to EDD by doctors, 93.2% were not told to EDD by nurses, and 91.6% were not prevented from EDD by doctors (Figure 10).

Also, 75% of the staff in the kidney dialysis department disagree with to patients EDD, with nurses accounting for 87.5% of the staff (Figure 10).

There was no hospital policy that prevented or encouraged patients to eat during dialysis.

Figure 10

Hospital Policies and Staff Recommendations



3.8 Intradialytic eating and adequate dialysis

There was no significant association seen between EDD, MAP and adequate dialysis over three days (Table 6).

Table 6

Association between EDD and adequate dialysis is presented as n (%)

Association between EDD, MAP and adequate dialysis (n=155)				Kt/V		P-value
				Adequate dialysis	Inadequate dialysis	
EDD	First day	Yes	N	85	51	0.247
			%within EDD	62.5	37.5	
		No	N	14	5	
			%within EDD	73.7	26.3	
	Second day	Yes	N	88	47	0.440
			%within EDD	65.2	34.8	
		No	N	14	6	
			%within EDD	70	30	
	Third day	Yes	N	85	51	0.409
			%within EDD	62.5	37.5	
		No	N	13	6	
			%within EDD	68.4	31.6	
MAP	First day	Low blood pressure	N	8	12	0.439
			%within MAP	14.4	12.1	
		Normal or high blood pressure	N	48	87	
			%within MAP	85.7	87.9`	
	Second day	Low blood pressure	N	7	13	0.560
			%within MAP	13.2	12.7	
		Normal or high blood pressure	N	46	89	
			%within MAP	86.8	87.3	
	Third day	Low blood pressure	N	9	17	0.494
			%within MAP	15.8	17.3	
		Normal or high blood pressure	N	48	81	
			%within MAP	84.2	82.7	
			%within MAP	84.6	15.4	
		Normal or high blood pressure	N	114	15	
			%within MAP	88.4	11.6	

Over three days, there was no association between the development of symptoms or a decrease in blood pressure with eating during dialysis (Table 7).

Table 7

Association between EDD, MAP, and feeling symptoms during dialysis is presented as N. (%)

Association with EDD (n=155)				EDD		p-value
				Yes	No	
MAP	First day	Low blood pressure	N	16	4	0.213
			%within MAP	80	20	
		Normal or high blood pressure	N	120	15	
			%within MAP	88.9	11.1	
	Second day	Low blood pressure	N	16	4	0.244
			%within MAP	80	20	
		Normal or high blood pressure	N	119	16	
			%within MAP	88.1	11.9	
	Third day	Low blood pressure	N	22	4	0.398
			%within MAP	84.6	15.4	
		Normal or high blood pressure	N	114	15	
			%within MAP	88.4	11.6	
feeling symptoms during dialysis	First day	YES	N	21	6	0.084
			%within symptoms during HD	77.8	22.2	
		NO	N	115	13	
			%within symptoms during HD	89.8	10.2	
	Second day	Yes	N	22	7	0.051
			%within symptoms during HD	75.9	24.1	
		No	N	113	13	
			%within symptoms during HD	89.7	10.3	
	Third day	Low blood pressure	N	14	3	0.212
			%within symptoms during HD	82.4	17.6	
		Normal or high blood pressure	N	122	16	
			%within symptoms during HD	88.4	11.6	

During three days, there was a significant association between UF volume and adequate dialysis, but no significant association was observed between UF volume and MAP (Table 8).

Table 8

The significance of UF Volume on Adequate dialysis and blood pressure reduction is presented as n (mean +SD)

Variables			Adequate dialysis	Inadequate dialysis	p-value
UF – volume	First day	N	56	99	0.047
		Mean +SD	2510.7+965.7	2883.03+1335.7	
	Second day	N	53	102	0.012
		Mean +SD	2475.47+1074.5	3235.2+2017.38	
	Third day	N	57	98	0.016
		Mean +SD	2429.8+1154.6	2940.8+1323.2	
			Low blood pressure	Normal or high blood pressure	p-value
	First day	N	20	135	0.081
		Mean +SD	3195+1122.2	2682.3+1229.6	
	Second day	N	20	135	0.750
		Mean +SD	3095+875.6	2957.7+1885.3	
	Third day	N	26	129	0.698
		Mean +SD	2842.3+1262.1	2734.8+1292.5	

3.9 Patient habits during dialysis

There was no significant association between patients' habits during dialysis and their gender, living area and HD related data. There was significant association between patients' habits during dialysis and their marital and living status (Table 9). There was no significant association between patients' habits during dialysis and their nutrition status, diet related data and mental health (Table 10).

Table 9

Association between patient social-demographic, HD related data and eating habits during HD presented as n(%)

Patients' habits during dialysis (n=155)			Eating habits during hemodialysis			p-value
			Always	Sometimes	Never	
Social-demographic	Gender	Male	80	13	10	0.097
		%Within gender	77.7	12.6	9.7	
		Female	43	4	5	
		%Within gender	82.7	7.7	9.6	
	Marital status	Married	105	14	10	0.043
		%Within marital status	81.4	10.9	7.8	
		Single	10	2	4	
		%Within marital status	62.5	12.5	25	
		Others	8	1	10	
		%Within marital status	80	10	10	
	Living area	City	53	6	6	0.076
		&Within living area	81.5	9.2	9.2	
		Village	56	8	9	
		%Within living area	76.7	11	12.3	
		Camp	14	3	0	
		%Within living area	82.4	17.6	0	
	Living status	With spouse	92	11	8	0.033
		%Within living status	82.9	9.9	7.2	
		With family	22	5	6	
		%Within living status	66.7	15.2	18.2	
		Alone	9	1	1	
		%Within living status	81.8	9.1	9.1	
HD related data	Follow the nutritional guidance provided.	Yes	103	15	13	0.132
		%Within follow the nutritional guidance provided	78.6	11.5	9.9	
		No	20	2	2	
		%Within follow the nutritional guidance provided	83.3		8.3	
	HD period in months	N	123	17	15	0.290
		Mean +SD	56.2+ 49.12	39.5+ 18.8	65.8+ 67.68	
	Number of HD sessions / week	N	123	17	15	0.080
		Mean +SD	2.97+ 0.284	3+0.00	2.8+ 0.414	
	Duration of one HD session in minutes	N	123	17	15	0.317
		Mean +SD	228.78+ 24.1	224.12+ 18.72	220+ 18.51	

Table 10

Association nutrition status, mental health and eating habits during HD presented as n(%)

patients' habits during dialysis (n=155)			Eating habits during hemodialysis			p-value
			Always	Sometimes	Never	
Nutrition status	BMI	Under-weight	2	2	0	0.100
		%Within BMI	50	50	0	
		Normal weight	27	3	2	
		%Within BMI	84.4	9.4	6.3	
		Over weight &obese	94	12	13	
		%Within BMI	79	10.1	10.9	
	MIS	Well-nourished	93	14	9	0.720
		%Within MIS	80.2	12.1	7.8	
		Malnutrition	30	3	6	
		%Within MIS	76.9	7.7	15.4	
Diet related data	Dietary Diversity (IDDS)	Medium dietary diversity	8	3	2	0.059
		%Within IDDS	61.5	23.1	15.4	
		High dietary diversity	64	11	5	
		% Within IDDS	80	13.8	6.3	
Mental health	Normal	N	108	13	13	0.112
		%Within GHQ-12	80.6	9.7	9.7	
	Possibility of mental disorder	N	15	4	2	
		%Within GHQ-12	71.4	19	9.5	

Chapter Four
Discussion and Conclusion

4.1 Discussion

The average dialysis duration was 55.32 months, with a 227.42-minute session mean. 39.4% of patients were obese, with a mean of 81.26 kg. The face-to-face interviews data showed that 123 patients ate during each dialysis session, with 17 patients eating sometimes during the session. Traditional sandwiches were the most common, with 48.4% of attendees eating in the midst of the session. 71% of patients ate to make them feel better.

According to the observations, on the first day, 136 patients ate food during dialysis, 135 patients had normal blood pressure readings, 128 patients had no symptoms of low blood pressure, and 99 patients had low dialysis adequacy. On the second day, 135 patients ate food during dialysis, 135 patients had normal blood pressure readings throughout the dialysis session, 126 patients had no symptoms, and 102 patients got dialysis with dialysis adequacy. Finally, on the third day, 136 patients ate during dialysis, 129 had normal blood pressure readings, 138 did not have any symptoms, and 98 had low dialysis adequacy.

4.1.1 Association between dialysis adequate and eating during dialysis

The observation results show that there is no association between EDD and dialysis adequacy. This is consistent with a 2004 study that investigated into how eating before dialysis affects URR and Kt/V levels. This study included 420 dialysis patients. The patients ate one-third of a daily diet 2 hours before dialysis, instead of fasting for at least three hours. The results showed that eating before dialysis had no significance for URR or Kt/V (Singri, et al., 2004).

There is a study that contradicts a study in 2001. In a prospective study of 14 patients, dialysis adequacy was studied before and after meals, and there was a substantial shift in Kt/V with eating habits. In 2010, a study was also conducted to see if EDD influenced the urea reduction rate (URR) and Kt/V. In the first stage, patients were given a regular meal following the first hour of dialysis. After one week, the same group completed dialysis without eating. The study showed that eating during the analysis decreases the Kt/V and URR (Kara & Açikel, 2010).

The differences between previous studies might be attributed to differences in the number of participants and the timing of meals, whereas our study was different because it checked dialysis adequacy and eating habits during three dialysis sessions.

Adequate dialysis cannot be easily determined (Levin, 1994). The redistribution of blood volume between the systemic circulation and the gastrointestinal tract after eating can impact the adequacy of administered HD (Fotiadou, Georgianos, Chourdakis, Zebekakis, & Liakopoulos, 2020). However, according to the results, there was no association between EDD and AD.

4.1.2 Intradialytic hypotension

According to the observation results, there is no association between eating during dialysis and low blood pressure or the appearance of symptoms. This is consistent with a previous study, which in 2008, a cross-sectional study of 126 patients was published, with the objective of studying the association between EDD and IDH across three dialysis sessions. The results showed no association between eating food orally and a decrease in diastolic, systolic, or mean blood pressure. Therefore, patients have no need to avoid EDD (Benaroia & Iliescu, 2008). A cross-sectional study published in 2024 that included 260 dialysis patients found no association between eating practices during dialysis and symptoms that appeared during the analysis or low blood pressure during the analysis (Hamdan, et al., 2024). Although utilizing a different definition of low blood pressure, the results were still consistent.

A research study published in 2019 aimed to show that protein-rich meals during dialysis are not associated with low blood pressure. Over a period of 25 consecutive dialysis sessions, 9 patients were given a meal that included 30 grams of protein, which included one-third of the daily sodium, potassium, phosphorus, and fluid requirements for dialysis patients. It was also in addition to 25 sessions before the intervention started. The study found that providing protein-rich meals did not enhance the symptoms of low blood pressure (Choi, et al., 2019).

In addition, some studies found no consent; for example, in a quasi-experimental study including 48 patients, the research was conducted in two sessions. The patients had fasted before dialysis. The patients ate one hour after the first dialysis session began. In the

second session, the patient stated that he ate two hours after the start of the dialysis session, consuming 350 calories each meal. Blood pressure was taken before dialysis, and the degree of nausea and vomiting was recorded half an hour before dialysis ended. The data revealed that consuming meals resulted in lower systolic and diastolic blood pressure in both sessions.(Bourzou & Mahdipour, 2016).Another study with 20 dialysis patients observed that eating food during HD reduced monitoring relative blood volume but was not associated with vomiting or nausea (Sivalingam, Banerjee, Nevett, & Farrington, 2008). Another research, published in 2022 and including 26 patients, revealed that EDD is related to an increased risk of systolic pressure fluctuation through the dialysis session and a significant decrease in dialysis efficiency (Fotiadou, et al., 2022). The difference in results can be due to the number of participants, which may impact the accuracy of the study results.

In addition, 105 patients participated in research published in 2022 that investigated the impacts of eating during hemodialysis and low blood pressure during hemodialysis. The research was undertaken in two stages. The first stage was for 4-8 weeks with a meal during hemodialysis, followed by 4 weeks without one. The findings showed that fasting during hemodialysis may be responsible for a significant decrease in the incidence of low blood pressure and cramping (Jelicic , 2021). The duration of all stages may have affected the study's results, as the first stage was longer than the second.

In a systematic review of five studies with 13,189 individuals, it was shown that the percent of dialysis sessions complicated by IDH was 10.1% and 11.6%. Diabetes, interdialytic weight gain, female gender, and lower body weight were shown to be the most significant risk factors for IDH in the studies (Kuipers, et al., 2019). Although the results were consistent, the observational results showed no association between UF volume and IDH.

4.1.3 Nutrition status and eating during dialysis

The results showed that just 2.6% of patients had a low BMI, 25.2% were malnourished according to the MIS questionnaire, and 4.5% had low blood albumin levels. This contrasted with the common poor nutritional status and PEW among HD patients (Kalantar-Zadeh & Fouque, 2017). This difference could be caused by the fact that HD patients in this study received dietary intervention on a monthly basis that was appropriate

to their medical condition based on blood tests. Dialysis alone without attractive nutritional intervention usually fails to reduce malnutrition (Piccoli, et al., 2020).

Face-to-face interviews showed that 52.8% of dialysis patients prepare their meals at home, and 60.7% eat full meals, most of which are traditional sandwiches such as hummus, labneh, and cheese sandwiches. In a study suited to investigate the food patterns of Malaysian hemodialysis patients and their association with nutritional status, the results showed that a home-based diet is associated with better in HD patients (Sualeheen, et al., 2020). As a result, the better nutritional status seen in this study could be related to the type of home-based meal eaten by patients during HD.

There was no association between eating habits during dialysis and nutritional status. This is inconsistent with the study done on 110 patients who administered HD three times per week, which evaluated the notion that giving high-protein meals during HD with a strong phosphorus binder increases serum albumin without increasing blood phosphorus levels (Rhee, et al., 2017). And this contradicts a cross-sectional study of hemodialysis patients in Palestine, which found that dietary practices during dialysis were not associated with dialysis symptoms, ischemia, or malnutrition (Hamdan, et al., 2024).

The findings showed that in HD patients with low levels of blood albumin, high-protein meals during therapy resulted in an increase in serum protein while maintaining phosphorus levels (Rhee, et al., 2017). On the other hand, a systematic review of the effects of oral nutritional supplements on HD patients, which included randomized controlled trials, identified insufficient evidence that they may improve NS by increasing albumin levels and BMI for HD patients (Liu, Ma, Wang, & He, 2018).The difference could be caused by the fact that earlier studies defined the type of meals or nutritional supplements provided during dialysis, which may have had positive effects on nutritional status.

According to the dietary records of 90 patients, patients consume a mean of 4.9 and 7.6 food types/day, with 86% having high diet diversity.

This inconsistent with malnutrition is common among dialysis patients (Zha & Qian, 2017). A cross-sectional study has been carried out to find out the prevalence of malnutrition among dialysis patients at Hebron Governmental Hospital in the West Bank,

Palestine. Dialysis patients show a high prevalence of malnutrition (Badrasawi, et al., 2021).

According to a cross-sectional study conducted between June 2009 and October 2010 on 63 hemodialysis patients, the quality of the food was investigated, and the problems that contributed to low diet quality have been identified. The results revealed that the main cause of low intake of important nutrients is an insufficient intake of calories (Kim, Lim, & Choue, 2015). As a result, the good nutritional status of a good number of research participants may have had a positive impact on dietary diversity, as seen by the study results.

4.1.4 Mental health and eating during dialysis

Results showed that 86.5% had good mental health. A study of 398 kidney dialysis patients found an association between a poor appetite, insomnia, and depression (Yildiz, Heybeli, Smith, Soysal, & Kazancioglu, 2023). A prospective cohort and cross-sectional study of 632 dialysis patients showed an association between MIS ≥6 with higher death rates and symptoms of depression (Lopes, et al., 2017). According to the MIS questionnaire, most of the patients were well-nourished, which may have impacted the majority of the patients in the study to have good mental health.

According to face-to-face interviews, there was no association between food intake during dialysis and mental health. A pre-test-post-test quasi-experimental study was done to test the impact of oral nutritional supplements during HD on the quality of life of HD patients diagnosed with PEW. The test was done on 109 elderly individuals before and after three months of using oral nutritional supplements during HD. Results indicate that 3 months of oral nutritional supplements during HD improves physical and QOL, as well as NS in older patients with PEW (Ayala, Marchant, Hertz, & Castillo, 2022). In a study published in 2021, a cross-sectional study was published to evaluate eating patterns, socio-demographic, laboratory, and clinical parameters, and symptoms of depression. The results showed an association between eating dinner and morning dialysis sessions, high blood pressure, increased protein, and an increase in the mental component summary score (Afsar, Elsurer, & Kanbay, 2012). Another research study examined 70 dialysis patients, divided into two groups of 35 each. The findings revealed that dialysis patients have a significantly decreased standard of life, but to a lesser extent than those who

received dietary education (Aghakhani, Samadzadeh, Mafi, & Rahbar, 2012). As thus, nutritional education about diet could help the mental health of HD patients.

4.1.5 Policies and Recommendations

Although 75% of dialysis staff disagreed that patients should have EDD, and there was no clear policy preventing or allowing EDD, 71% of patients reported eating during dialysis because it helped them feel better. As a result, establishing policies that allow high-protein meals during dialysis may help patients improve their albumin levels and feel better.

Doctors limit eating during dialysis for a variety of causes, including low blood pressure, choking, and gastrointestinal symptoms (Kistler, et al., 2014). In North America, especially the United States, had more restrictive dietary guidelines in dialysis units than European and Asian countries, the statistical significance diminished quickly, with meal restriction in 28.6% and 22.6% of dialysis units, respectively, in 2011 and 2014 (Benner, et al., 2016).

However, the rising focus on nutritional status and the objective of increasing patients' food intake on dialysis days were among the most important explanations for the change in clinical practice (Benner, et al., 2016). Protein and energy loss, in addition to low blood albumin levels, are risk factors for mortality in patients with CKD (Kalantar-Zadeh & Ikizler, 2013). In addition, nutritional practices at dialysis centers differed in many different ways, including meal timing (during, before, and after dialysis) and meal type (food, supplements, or drinks) (Fitschen, et al., 2015).

4.2 Conclusion

In conclusion, based on face-to-face interviews, there was no association between dialysis patients' eating habits and the NS or MH. Observational data additionally showed that there was no association between EDD with AD and symptoms or a decrease in blood pressure during the dialysis.

The dietary record showed that HD patients consume less than the recommended protein and energy requirements on both dialysis and non-dialysis days.

This study showed that there were no policies established controlling EDD. Hospitals should create policies that limit the type and amount of food that can be EDD, which could help patients achieve their protein requirements.

4.3 Strengths and limitations

4.3.1 Some of the study's strengths

- The observational data were collected during three sessions, validating the accuracy of the data collected.
- The study included 155 dialysis patients, which is a large sample when compared to previous research and helps generalize the findings of the research.
- A dietary record was collected from the patients, including the amounts and types of food during a dialysis day and a non-dialysis day. This helps to know the amount of protein and calorie intake of the patients, as well as the number of food groups consumed during the day.

4.3.2 Some of the study's limitations

- The GHQ-12 results are based on patients, which will be more accurate if they are based on observation.
- Only 90 patients participated to complete the dietary record.

List of Abbreviations

Abbreviation	Meaning
IDH	Intradialytic hypotension
HD	Hemodialysis
EDD	Eating during dialysis
NS	Nutritional status
CO	Clinical outcome
AD	Adequate dialysis
MH	Mental health
CKD	Chronic kidney disease
Egfr	Glomerular filtration rate
ESRD	End-stage renal disease
PEW	Protein-energy wasting
BP	Blood Pressure
QOL	Quality of life
BMI	Body mass index
BP	Blood pressure
MAP	Mean arterial pressure
MIS	Malnutrition-Inflammation Score questionnaire
TIBC	Total iron-binding capacity
IDDS	Individual Dietary Diversity Score
GHQ-12	The General Health Questionnaire
BUN	Blood urea nitrogen
HTN	Hypertension
CVD	Cardiovascular disease

References

Adelborg, K., Nicolaisen, S. K., Hasvold, P., Palaka, E., Pedersen, L., & Thomsen, R. W. (2019). Predictors for repeated hyperkalemia and potassium trajectories in high-risk patients - A population-based cohort study. ,. *PloS one, 14*(6), e0218739.

Afsar, B., Elsurer, R., & Kanbay, M. (2012). The relationship between breakfast, lunch and dinner eating pattern and hemodialysis sessions, quality of life, depression and appetite in hemodialysis patients. *International urology and nephrology, 44*(5), 150.

Agarwal, R., & Georgianos, P. (2018, Jun 1). Feeding during dialysis-risks and uncertainties. *Nephrol Dial Transplant, 33*(6), 917-933.

Aghakhani, N., Samadzadeh, S., Mafi, T. M., & Rahbar, N. (2012). The impact of education on nutrition on the quality of life in patients on hemodialysis: A comparative study from teaching hospitals. *Saudi Journal of Kidney Diseases and Transplantation, 23*(1), 26-30.

Al Mawed, S., Pankratz, V. Z., Chong, K., Sandoval, M., Roumelioti, M. E., & Unruh, M. (2018). Low serum sodium levels at hospital admission: Outcomes among 2.3 million hospitalized patients. *PloS one, 13*(3), e0194379.

Almas, T., Muhammad, F., Siddiqui, L., Shafi, B., Gul, R., Altaf, R., . . . Fatima, K. (2022). Safety and efficacy of direct oral anticoagulants in comparison with warfarin across different BMI ranges: A systematic review and meta-analysis. *Annals of medicine and surgery , 2012*(77), 103610.

Alsuwaida, A. O., Farag, Y. M., Al SayyarI, A. A., Mousa, D., Alhejaili, F., Al-Harbi, A., . . . Singh, A. K. (2010). Epidemiology of chronic kidney disease in the Kingdom of Saudi Arabia (SEEK-Saudi investigators) - a pilot study. *Saudi journal of kidney diseases and transplantation: an official publication of the Saudi Center for Organ Transplantation, Saudi Arabia, 21*(6), 1066–1072.

Amouzegar, A., Abu-Alfa, A. K., Alrukhaimi, M. N., Bello, A. K., Ghnaimat, M. A., Johnson, D. W., & Board, I. (2021). International Society of Nephrology Global Kidney Health Atlas: structures, organization, and services for the management of kidney failure in the Middle East. *Kidney International Supplement, 2*, e47-e56.

Atieh, A. S., Shamasneh, A. O., Hamadah, A., & Gharaibeh, K. A. (2020). Predialysis nephrology care amongst Palestinian hemodialysis patients and its impact on initial vascular access type. *Renal failure, 42*(1), 200-206.

Ayala, M., Marchant, M., Hertz, C., & Castillo, G. (2022). Intradialytic nutrition and quality of life in Chilean older patients in hemodialysis with protein-energy wasting. *International urology and nephrology, 54*(8), 1947-1955.

Badrasawi, M., Zidan, S., Sharif, I., Qaisiyha, J., Ewaida, S., Jaradat, T., & Samamra, Y. (2021). Prevalence and correlates of malnutrition among hemodialysis patients at hebron governmental hospital, Palestine: cross-sectional study. *BMC nephrology, 22*(1), 214.

Bello, A. K., Levin, A., Lunney, M., Osman, M. A., Ye, F., Ashuntantang, G. E., & Johnson, D. W. (2019). Status of care for end stage kidney disease in countries and regions worldwide: international cross sectional survey. *BMJ*, 367.

Bello, A. K., Levin, A., Tonelli, M., Okpechi, I. G., Feehally, J., Harris, D., . . . Johnson, D. W. (2017). Assessment of Global Kidney Health Care Status. *JAMA, 317*(18), 1864–1881.

Bello, A. K., Okpechi, I. G., Osman, M. A., Cho, Y., Htay, H., Jha, V., . . . Johnson, D. W. (2022). Epidemiology of haemodialysis outcomes. *Nature reviews. Nephrology, 18*(6), 378–395.

Benaroia, M., & Iliescu, E. A. (2008). Oral intake during hemodialysis: is there an association with intradialytic hypotension?. Hemodialysis international. *International Symposium on Home Hemodialysis, 12*(1), 62-65.

Benner, D., Burgess, M., Stasios, M., Brosch, B., Wilund, K., Shen, S., & Kistler, B. (2016). In-Center Nutrition Practices of Clinics within a Large Hemodialysis Provider in the United States. *Clinical journal of the American Society of Nephrology : CJASN, 11*(5), 770-775.

Borrelli, S., Provenzano, M., Gagliardi, I., Michael, A., Liberti, M. E., De Nicola, L., . . . Andreucci, M. (2020). Sodium Intake and Chronic Kidney Disease. *International journal of molecular sciences, 21*(13), 4744.

Burrowes, J. D., Larive, B., Cockram, D. B., Dwyer, J., Kusek, J. W., McLeroy, S., & Hemodialysis (HEMO) Study Group. (2003). Effects of dietary intake, appetite, and eating habits on dialysis and non-dialysis treatment days in hemodialysis patients: cross-sectional results from the HEMO study. *Journal of Renal Nutrition, 13*(3), 191-198.

Canaud, B., Chazot, C., Koomans, J., & Collins, A. (2019). Fluid and hemodynamic management in hemodialysis patients: challenges and opportunities. *Jornal brasileiro de nefrologia, 41*(4), 550-559.

Caplin, B., Kumar, S., & Davenport, A. (2011). Patients' perspective of haemodialysis-associated symptoms. *Nephrology Dialysis Transplantation, 26*(8), 2656-2663.

Carrero, J. J., Thomas, F., Nagy, K., Arogundade, F., Avesani, C. M., Chan, M., . . . Kovesdy, C. P. (2018). Global Prevalence of Protein-Energy Wasting in Kidney Disease: A Meta-analysis of Contemporary Observational Studies From the International Society of Renal Nutrition and Metabolism. *Journal of renal nutrition : the official journal of the Council on Renal Nutrition of the National Kidney Foundation, 28*(6), 380-392.

Chan , W. (2021). Chronic Kidney Disease and Nutrition Support. *Nutrition in clinical practice: official publication of the American Society for Parenteral and Enteral Nutrition, 36*(2), 312-330.

Chen, H., Lips, P., Vervloet, M. G., van Schoor, N. M., & de Jongh, R. T. (2018). Association of renal function with bone mineral density and fracture risk in the

Longitudinal Aging Study Amsterdam. *Osteoporosis international: a journal established as result of cooperation between the European Foundation for Osteoporosis and the National Osteoporosis Foundation of the USA, 29*(9), 2129-2138.

Choi, M. S., Kistler, B., Wiese, G. N., Stremke, E. R., Wright, A. J., Moorthi, R. N., . . . Hill Gallant, K. M. (2019). Pilot Study of the Effects of High-Protein Meals During Hemodialysis on Intradialytic Hypotension in Patients Undergoing Maintenance Hemodialysis. *Journal of renal nutrition: the official journal of the Council on Renal Nutrition of the National Kidney Foundation, 29*(2), 102-111.

Cupisti, A., Brunori, G., Di Iorio, B. R., D'Alessandro, C., Pasticci, F., Cosola, C., . . . Gesualdo, L. (2018). Nutritional treatment of advanced CKD: twenty consensus statements. *Journal of nephrology, 31*(4), 457-473.

Dai, L., Lu, C., Liu, J., Li, S., Jin, H., Chen, F., & Miao, C. (2020). Impact of twice-or three-times-weekly maintenance hemodialysis on patient outcomes: a multicenter randomized trial. *Medicine, 99*(20).

Daradkeh, T. K., Ghubash, R., & El-Rufaie, O. E. (2001). Reliability, validity, and factor structure of the Arabic version of the 12-item General Health Questionnaire. *Psychological reports, 89*(1), 85-94.

Dolores Arenas, M., Pérez-García, R., Bennouna, M., Blanco, A., Mauricio, O., Prados, M. D., . . . Estudio, C. (2013). Improvement of therapeutic compliance in haemodialysis patients with poor phosphorus control and adherence to treatment with binders: COMQUELFOS study. *Nefrologia : publicacion oficial de la Sociedad Espanola Nefrologia, 33*(2), 196-203.

FAO. (2006). *Baseline Survey Report Protecting and Improving Household Food Security and Nutrition in HIV/AIDS Affected Areas in Manica and Sofala Province.* Maputo, Mozambique.

Fitschen, P. J., Kistler, B. M., Wu, P. T., Jeong, J. H., Chung, H. R., Aviram, M., & Wilund, K. R. (2015). Effects of pomegranate extract supplementation on cardiovascular risk factors and physical function in hemodialysis patients. *Journal of medicinal food, 18*(9), 941-949.

Fotiadou, E., Georgianos, P. I., Chourdakis, M., Zebekakis, P. E., & Liakopoulos, V. (2020). Eating during the Hemodialysis Session: A Practice Improving Nutritional Status or a Risk Factor for Intradialytic Hypotension and Reduced Dialysis Adequacy? *Nutrients, 12*(6), 1703.

Fotiadou, E., Georgianos, P. I., Vaios, V., Sgouropoulou, V., Divanis, D., Karligkiotis, A., & Liakopoulos, V. (2022). Feeding during dialysis increases intradialytic blood pressure variability and reduces dialysis adequacy. *Nutrients, 14*(7), 1357.

Gaitonde, D. Y., Cook, D. L., & Rivera, I. M. (2017). Chronic Kidney Disease: Detection and Evaluation. *American family physician, 96*(12), 776-783.

Graterol Torres, F., Molina, M., Soler-Majoral, J., Romero-González, G., Rodríguez Chitiva, N., Troya-Saborido, M., . . . Bover, J. (2022). Evolving Concepts on Inflammatory Biomarkers and Malnutrition in Chronic Kidney Disease. *Nutrients, 14*(20), 4297.

Hafi, E. A., Soradi, R. Y., Diab, S., Samara, A. M., Shakhshir, M., Alqub, M., & Zyoud, S. (2021). Nutritional status and quality of life in diabetic patients on hemodialysis: a cross-sectional study from Palestine. *Journal of Health, Population and Nutrition, 40*, 1-11.

Hamdan, M., Al-Amouri, F., Ali Aljondi, A., Dweik, E., Al-Joubeh, T., Al Jondi, T., & Badrasawi, M. (2024). Intradialytic eating practices and health outcomes among hemodialysis patients, cross-sectional study. *Clinical nutrition ESPEN, 63*, 768-775.

Hamdan, Z., Nazzal, Z., Khader, S., Zawyani, H., Abdallah, M., & Sawalmeh, O. (2020). Bone mineral density in Palestinian patients with end-stage renal disease and the related clinical and biochemical factors: cross-sectional study. *PLoS One, 15*(11), e0241201.

Hankins, M. (2008). The reliability of the twelve-item general health questionnaire (GHQ-12) under realistic assumptions. *BMC public health, 8*(1), 1-7.

Hanna, R. M., Ghobry, L., Wassef, O., Rhee, C. M., & Kalantar-Zadeh, K. (2020). A Practical Approach to Nutrition, Protein-Energy Wasting, Sarcopenia, and Cachexia in Patients with Chronic Kidney Disease. *Blood purification, 49*(1-2), 202-211.

Hasheminejad, N., Namdari, M., Mahmoodi, M. R., Bahrampour, A., & Azmandian, J. (2016). Association of handgrip strength with malnutrition-inflammation score as an assessment of nutritional status in hemodialysis patients. *Iranian journal of kidney diseases, 10*(1), 30.

Hoshino, J., Mehrotra, R., Rhee, C. M., Yamagata, K., Ubara, Y., Takaichi, K., . . . Kalantar-Zadeh, K. (2013). Using hemoglobin A1c to derive mean blood glucose in peritoneal dialysis patients. *American journal of nephrology, 37*(5), 413-420.

Hosseinpanah, F., Kasraei, F., Nassiri, A. A., & Azizi, F. (2009). High prevalence of chronic kidney disease in Iran: a large population-based study. *BMC public Health, 9*(1), 1-8.

Hsu, C. Y., Chen, L. R., & Chen, K. H. (2020). Osteoporosis in Patients with Chronic Kidney Diseases: A Systemic Review. *International journal of molecular sciences, 21*(18), 6846.

Hu, L., Napoletano, A., Provenzano, M., Garofalo, C., Bini, C., Comai, G., & La Manna, G. (2022). Mineral Bone Disorders in Kidney Disease Patients: The Ever-Current Topic. *International journal of molecular sciences, 23*(20), 12223.

Hussien, F. M., Mebratu, W., Ahmed, A. Y., Mekonnen, T. C., Hassen, A. M., Asfaw, Z. A., . . . Abate, K. H. (2021). Performance of individual dietary diversity score to identify malnutrition among patients living with HIV in Ethiopia. *Scientific reports, 11*(1), 18681.

Iqbal, M. S., Iqbal, Q., Iqbal, S., & Ashraf, S. (2021). Hemodialysis as long term treatment: Patients satisfaction and its impact on quality of life. *Pakistan journal of medical sciences, 2*, 398–402.

Jelicic , I. (2021, March 10). Relationship of a food intake during hemodialysis and symptomatic intradialytic hypotension. , 10.1. Advance online publication. 2021 Mar 10. *Hemodialysis international. International Symposium on Home Hemodialysis*. doi:doi: 10.1111/hdi.12923

Kalantar-Zadeh, K., & Fouque, D. (2017). Nutritional Management of Chronic Kidney Disease. *The New England journal of medicine, 377*(18), 1765–1776.

Kalantar-Zadeh, K., & Ikizler, T. A. (2013). Let them eat during dialysis: an overlooked opportunity to improve outcomes in maintenance hemodialysis patients. *Journal of renal nutrition : the official journal of the Council on Renal Nutrition of the National Kidney Foundation, 23*(3), 157-163.

Kalantar-Zadeh, k., & Kopple, J. D. (2003). Trace elements and vitamins in maintenance dialysis patients. *Advances in renal replacement therapy, 10*(3), 170-182.

Kalantar-Zadeh, K., Jafar, T. H., Nitsch, D., Neuen, B. L., & Perkovic, V. (2021). Chronic kidney disease. *The lancet, 398*(10302), 786-802.

Kalantar-Zadeh, K., Tortorici, A. R., Chen, J. L., Kamgar, M., Lau, W. L., Moradi, H., . . . Kovesdy, C. (2015). Dietary restrictions in dialysis patients: is there anything left to eat? *Seminars in dialysis, 28*(2), 159-168.

Kara, B., & Açikel, C. H. (2010). The effect of intradialytic food intake on the urea reduction ratio and single-pool Kt/V values in patients followed-up at a hemodialysis center. *Turkish Journal of Medical Sciences, 40*(1), 91-97.

Khoueiry, G., Waked, A., Goldman, M., El-Charabaty, E., Dunne, E., Smith, M., . . . El-Sayegh, S. (2011). Dietary intake in hemodialysis patients does not reflect a heart healthy diet. *Journal of renal nutrition : the official journal of the Council on Renal Nutrition of the National Kidney Foundation, 21*(6), 438-447.

Kim, H., Lim, H., & Choue, R. (2015). A Better Diet Quality is Attributable to Adequate Energy Intake in Hemodialysis Patients. *Clinical nutrition research, 4*(1), 46-55.

Kim, S. M., & Jung, J. Y. (2020). Nutritional management in patients with chronic kidney disease. *The Korean journal of internal medicine, 35*(6), 1279–1290.

Kistler, B. M., Moore, L. W., Benner, D., Biruete, A., Boaz, M., Brunori, G., . . . Kalantar-Zadeh, K. (2021). The International Society of Renal Nutrition and Metabolism Commentary on the National Kidney Foundation and Academy of Nutrition and Dietetics KDOQI Clinical Practice Guideline for Nutrition in Chronic Kidney Disease. *Journal of renal nutrition : the official journal of the Council on Renal Nutrition of the National Kidney Foundation, 31*(2), 116-120. el.

Kistler, B., Benner, D., Burgess, M., Stasios, M., Kalantar-Zadeh, K., & Wilund, K. R. (2014). To eat or not to eat-international experiences with eating during hemodialysis

treatment. *Journal of renal nutrition : the official journal of the Council on Renal Nutrition of the National Kidney Foundation, 24*(6), 349–352.

Kitamura, H., & Fujii, M. (2004). Nihon rinsho. *Japanese journal of clinical medicine, 62*(Suppl 6), 54-57.

Ko, G. J., Obi, Y., Tortorici, A. R., & Kalantar-Zadeh, K. (2017). Dietary protein intake and chronic kidney disease. *Current opinion in clinical nutrition and metabolic care, 20*(1), 77-85.

Kolak, E., Radić, J., Vučković, M., Bučan Nenadić, D., Begović, M., & Radić, M. (2022). Nutritional and Hydration Status and Adherence to Dietary Recommendations in Dalmatian Dialysis Patients. *Nutrients, 14*(17), 3553.

Kolff, W. J. (1965). First clinical experience with the artificial kidney. *Annals of internal medicine, 62*, 608-619.

Kovesdy, C. P. (2022). Epidemiology of chronic kidney disease: an update 2022. *Kidney international supplements, 12*(1), 7-11.

Kuipers, J., Verboom, L. M., Ipema, K., Paans, W., Krijnen, W. P., Gaillard, C., . . . Franssen, C. (2019). The Prevalence of Intradialytic Hypotension in Patients on Conventional Hemodialysis: A Systematic Review with Meta-Analysis. *American journal of nephrology, 49*(6), 497-506.

Lacson, E., Jr, W., Zebrowski, B., Wingard, R., & Hakim, R. M. (2012). Outcomes associated with intradialytic oral nutritional supplements in patients undergoing maintenance hemodialysis: a quality improvement report. *American journal of kidney diseases : the official journal of the National Kidney Foundation, 24*(2), 591-600.

Levin, N. W. (1994). Adequacy of dialysis. *American journal of kidney diseases: the official journal of the National Kidney Foundation, 24*(2), 308-315.

Liu, P. J., Ma, F., Wang, Q. Y., & He, S. L. (2018). The effects of oral nutritional supplements in patients with maintenance dialysis therapy: A systematic review and meta-analysis of randomized clinical trials. *PloS one, 13*(9), e0203706.

Lo, W. K., Ho, Y. W., Li, C. S., Wong, K. S., Chan, T. M., Yu, A. W., & Cheng, I. (2003). Effect of Kt/V on survival and clinical outcome in CAPD patients in a randomized prospective study. *Kidney international, 64*(2), 649-656.

Long, A. N., & Dagogo-Jack, S. (2011). Comorbidities of diabetes and hypertension: mechanisms and approach to target organ protection. *Journal of clinical hypertension (Greenwich, Conn.), 13*(4), 244-251.

Lopes, M. B., Silva, L. F., Lopes, G. B., Penalva, M. A., Matos, C. M., Robinson, B. M., & Lopes, A. A. (2017). Additional Contribution of the Malnutrition-Inflammation Score to Predict Mortality and Patient-Reported Outcomes as Compared With Its Components in a Cohort of African Descent Hemodialysis Patients. . *Journal of renal*

nutrition : the official journal of the Council on Renal Nutrition of the National Kidney Foundation.

Malekmakan, L., Tadayon, T., Roozbeh, J., & Sayadi, M. (2018). End-stage renal disease in the Middle East: a systematic review and meta-analysis. *Iranian journal of kidney diseases, 12*(4), 195.

Marzouq, M. K., Samoudi, A. F., Samara, A., Zyoud, S., & Al-Jabi, S. W. (2021). Exploring factors associated with pain in hemodialysis patients: a multicenter cross-sectional study from Palestine. *BMC nephrology, 22*, 1-12.

Merchant, A., Wald, R., Goldstein, M. B., Yuen, D., Kirpalani, A., Dacouris, N., . . . Yan, A. T. (2015). Relationship between different blood pressure measurements and left ventricular mass by cardiac magnetic resonance imaging in end-stage renal disease. *Journal of the American Society of Hypertension: JASH, 9*(4), 275-284.

Müller-Deile, J., Lichtinghagen, R., Haller, H., & Schmitt, R. (2017). Online Kt/V monitoring in haemodialysis by UV absorbance: variations during intra-dialytic meals. *Blood purification, 37*(2), 113-118.

Murea, M., Geary, L., Davis, R. P., & Moossavi, S. (2019). Vascular access for hemodialysis: A perpetual challenge. *Seminars in dialysis, 32*(6), 527-534.

Nagasawa, Y. (2021). Positive and Negative Aspects of Sodium Intake in Dialysis and Non-Dialysis CKD Patients. *Nutrients, 13*(1), 951. Retrieved from https://doi.org/10.3390/nu13030951

Narasimhan, L. R., Goodman, W., & Patel, C. K. (2001). Correlation of breath ammonia with blood urea nitrogen and creatinine during hemodialysis. *Proceedings of the National Academy of Sciences of the United States of America, 98*(8), 4617–4621.

Nazzal, Z. A., Hamdan, Z., Natour, N., Barbar, M., Rimawi, R., & Salaymeh, E. (2021). Prevalence of Vitamin D Deficiency among Hemodialysis Patients in Palestine: A Cross-Sectional Study. *International journal of nephrology*, 6684276.

Nieman, D. C., & Lee, R. (2019). *2019). Nutritional assessment (pp. 224-8)*. United States of America: McGraw-Hill Education.

Nieves-Anaya, I., Várgas, M. B., García, O. P., Biruete, A., Kistler, B., & Atilano-Carsi, X. (2023). Effect of oral nutritional supplementation combined with impedance vectors for dry weight adjustment on the nutritional status, hydration status and quality of life in patients on chronic hemodialysis: A pilot study. *Clinical nutrition ESPEN, 54*, 23-33.

Noori, N., Kalantar-Zadeh, K., Kovesdy, C. P., Murali, S. B., Bross, R., Nissenson, A. R., & Kopple, J. D. (2010). Dietary potassium intake and mortality in long-term hemodialysis patients. *American journal of kidney diseases: the official journal of the National Kidney Foundation, 56*(2), 338-347.

Obi, Y., Qader, H., Kovesdy, C. P., & Kalantar-Zadeh, K. (2015). Latest consensus and update on protein-energy wasting in chronic kidney disease. *Current opinion in clinical nutrition and metabolic care, 18*(3), 254-262.

Oller, G., Oliveira, M. P., Cesarino, C. B., Teixeira, C., Costa, J., & Kusumota, L. (2018). Clinical trial for the control of water intake of patients undergoing hemodialysis treatment. *Revista latino-americana de enfermagem, 26*, e3091.

Park, J., Lertdumrongluk, P., Molnar, M. Z., Kovesdy, C. P., & Kalantar-Zadeh, K. (2012). Glycemic control in diabetic dialysis patients and the burnt-out diabetes phenomenon. *Current diabetes reports, 12*(4), 432-439.

Perico, N., & Remuzzi, G. (2012). Chronic kidney disease: a research and public health priority. *Nephrology Dialysis Transplantation, 27*((suppl_3)), iii19-iii26.

Perl, J., Dember, L. M., Bargman, J. M., Browne, T., Charytan, D. M., Flythe, J. E., . . . American Society of Nephrology Dialy. (2017). The Use of a Multidimensional Measure of Dialysis Adequacy-Moving beyond Small Solute Kinetics. *Clinical journal of the American Society of Nephrology : CJASN, 12*(5), 839-847.

Piccoli, G. B., Lippi, F., Fois, A., Gendrot, L., Nielsen, L., Vigreux, J., . . . Cupisti, A. (2020). Intradialytic Nutrition and Hemodialysis Prescriptions: A Personalized Stepwise Approach. *Nutrients, 12*(3), 785.

Prabhakar, Singh, R. G., Singh, S., Rathore, S. S., & Choudhary, A. T. (2015, Jan). Spectrum of intradialytic complications during hemodialysis and its management: a single-center experience. *Saudi J Kidney Dis Transpl, 26*(1), 168-172. doi:doi: 10.4103/1319-2442.148771

Pupim, L. B., Majchrzak, K. M., Flakoll, P. J., & Ikizler, T. A. (2006). Intradialytic oral nutrition improves protein homeostasis in chronic hemodialysis patients with deranged nutritional status. *Journal of the American Society of Nephrology, 17*(11), 3149-3157.

Rastogi, A., Bhatt, I., Rossetti, S., & Beto, J. (2021). Management of Hyperphosphatemia in End-Stage Renal Disease: A New Paradigm. *Journal of renal nutrition : the official journal of the Council on Renal Nutrition of the National Kidney Foundation, 31*(1), 21-34.

Rees, L. (2019, Jan). Assessment of dialysis adequacy: beyond urea kinetic measurements. *Pediatr Nephrol, 34*(1), 61-69.

Rhee, C. M., You, A. S., Koontz Parsons, T., Tortorici, A. R., Bross, R., St-Jules, D. E., . . . Kalantar-Zadeh, K. (2017). Effect of high-protein meals during hemodialysis combined with lanthanum carbonate in hypoalbuminemic dialysis patients: findings from the FrEDI randomized controlled trial. *Nephrology, dialysis, transplantation: official publication of the European Dialysis and Transplant Association - European Renal Association, 32*(7), 1233-1243.

Ruospo, M., Palmer, S. C., Natale, P., Craig, J. C., Vecchio, M., Elder, G. J., & Strippoli, G. F. (2018). Phosphate binders for preventing and treating chronic kidney disease-

mineral and bone disorder (CKD-MBD). *The Cochrane database of systematic reviews, 8*(8), CD006023.

Saglimbene, V. M., Su, G., Wong, G., Natale, P., Ruospo, M., Palmer, S. C., . . . Strippoli, G. (2021). Dietary intake in adults on hemodialysis compared with guideline recommendations. *Journal of nephrology, 34*(6), 1999-2007.

Saha, M., & Allon, M. (2017). Diagnosis, Treatment, and Prevention of Hemodialysis Emergencies. *Clinical journal of the American Society of Nephrology: CJASN, 12*(2), 357-369.

Samsu, N., Gunawan, A., Wulandari, W., & Wibowo, B. P. (2021). *Efficacy and Safety of ElbasvirGrazoprevir Fix-Combination Therapy In Chronic Hepatitis C Virus-Infected Patients with End-Stage Renal Disease Undergoing Hemodialysis.*

San Juan, Miguelsanz, M., Pilar, S. M., Santo, d., & Pablos, M. R. (2001). Reduction of Kt/V by food intake during haemodialysis. *EDTNA/ERCA journal (English ed.), 27*(3), 150-152.

Sars, B., van der Sande, F. M., & Kooman, J. P. (2020). Intradialytic hypotension: mechanisms and outcome. *Blood purification, 49*(1-2), 158-167.

Sato, T., Aoki, J., Kozuma, K., Maruyama, Y., Nasu, K., Otsuka, M., . . . Ikari, Y. (2018). Impact of Serum Phosphorus Levels on Outcomes After Implantation of Drug-Eluting Stents in Patients on Hemodialysis. *Circulation journal: official journal of the Japanese Circulation Society, 82*(2), 388-395.

Scott, M. K., Shah, N. A., Vilay, A. M., Thomas III, J., Kraus, M. A., & Mueller, B. A. (2009). Effects of peridialytic oral supplements on nutritional status and quality of life in chronic hemodialysis patients. *Journal of Renal Nutrition, 19*(2), 145-152.

Sherman, R. A., Torres, F., & Cody, R. P. (1988). Postprandial blood pressure changes during hemodialysis. *American journal of kidney diseases : the official journal of the National Kidney Foundation, 12*(1), 37-39.

Shrimanker, I., & Bhattarai, S. (2023). *Electrolytes.* In StatPearls. StatPearls Publishing.

Singri, N., Johnstone, D., Paparello, J., Khosla, N., Ahya, S. N., Ghossein, C., & Levin, M. L. (2004). Effect of predialysis eating on measurement of urea reduction ratio and Kt/V. *Advances in chronic kidney disease, 11*(4), 398-403.

Sivalingam, M., Banerjee, A., Nevett, G., & Farrington, K. (2008). Haemodynamic effects of food intake during haemodialysis. *Blood purification, 26*(2), 157-162.

Strong, J., Burgett, M., Buss, M. L., Carver, M., Kwankin, S., & Walker, D. (2001). Effects of calorie and fluid intake on adverse events during hemodialysis. *Journal of renal nutrition: the official journal of the Council on Renal Nutrition of the National Kidney Foundation, 11*(2), 97-100.

Sualeheen, A., Khor, B. H., Balasubramanian, G. V., Sahathevan, S., Ali, M., Marayanan, S. S., & Morad, Z. (2020). Habitual dietary patterns of patients on hemodialysis indicate nutritional risk. *Journal of Renal Nutrition, 30*(4), 322-332.

Suryantoro, S. D., Ardhany, A. R., Basoeki, W., Thaha, M., Mardiana, N., Tjempakasari, A., . . . Widiyastuti, K. N. (2021). Dietary management of haemodialysis patients with chronic kidney disease and malnourishment. *Asia Pacific journal of clinical nutrition, 30*(4), 579-587.

Svinth-Johansen, C., Reinhard, M., & Ivarsen, P. (2020). Hemodynamic response to glucose-insulin infusion and meals during hemodialysis. *Kidney and Blood Pressure Research, 45*(2), 249-262.

Thipsawat, S. (2021). Early detection of diabetic nephropathy in patient with type 2 diabetes mellitus: A review of the literature. *Diabetes & vascular disease research, 18*(6), 14791641211058856.

Thomsen, R. W., Nicolaisen, S. K., Hasvold, P., Sanchez, R. J., Pedersen, L., Adelborg, K., . . . Sørensen, H. T. (2018). Elevated potassium levels in patients with chronic kidney disease: occurrence, risk factors and clinical outcomes-a Danish population-based cohort study. *Nephrology, dialysis, transplantation : official publication of the European Dialysis and Transplant Association - European Renal Association, 33*(9), 1610-1620.

Thongprayoon, C., Cheungpasitporn, W., Chewcharat, A., Mao, M. A., Thirunavukkarasu, S., & Kashani, K. B. (2020). Impacts of admission serum albumin levels on short-term and long-term mortality in hospitalized patients. *QJM: monthly journal of the Association of Physicians, 113*(6), 393-398.

Vaidya , S. R., Aeddula, N. R., & Doerr, C. (2021). *Chronic renal failure (nursing).*

Vanholder, R., Glorieux, G., & Eloot, S. (2015). Once upon a time in dialysis: the last days of Kt/V? *Kidney international, 88*(3), 460-465.

Watanabe, R. (2020). Hyperkalemia in chronic kidney disease. *Revista da Associacao Medica Brasileira (1992), 66Suppl 1*(Suppl 1), s31–s36.

Webster, A. C., Nagler, E. V., Morton, R. L., & Masson, P. (2017). Chronic Kidney Disease. *Lancet (London, England), 389*(10075), 1238–1252.

Weiner, D. E., Kapoian, T., & Johnson, D. S. (2015). Nutrition, vitamin D, and health outcomes in hemodialysis: time for a feeding frenzy? *Current opinion in nephrology and hypertension, 24*(6), 546-556.

Wizemann, V., & Ritz, E. (1998). Georg Haas: A forgotten pioneer of haemodialysis. *Nephrology, 4*(4), 229-234.

Xavier, J. S., de Góes, C. R., Borges, M., Caramori, J., & Vogt, B. P. (2022). Handgrip strength thresholds are associated with malnutrition inflammation score (MIS) in maintenance hemodialysis patients. *Journal of Renal Nutrition, 32*(6), 739-743.

Yamada, S., & Inaba, M. (2021). Potassium Metabolism and Management in Patients with CKD. *Nutrients, 13*(6), 1751.

Ye, G., Yang, W., Bi, Z., Huang, L., & Liu, F. (2021). Effects of a high-phosphorus diet on the gut microbiota in CKD rats. *Renal failure, 43*(1), 1577–1587.

Yildiz, S., Heybeli, C., Smith, L., Soysal, P., & Kazancioglu, R. (2023). The prevalence and clinical significance of loss of appetite in older patients with chronic kidney disease. *International Urology and Nephrology, 55*(9), 2295-2302.

Zha, Y., & Qian, Q. (2017). Protein Nutrition and Malnutrition in CKD and ESRD. *Nutrients, 9*(3), 208.

Zhang, X., Fang, Y., Zou, Z., Hong, P., Zhuo, Y., Xu, Y., & Wan, J. (2022). Risk Factors for Progression of CKD with and without Diabetes. *Journal of diabetes research, 2022*, 9613062.

Zoccali, C., Mallamaci, F., Ciccarelli, M., & Maggiore, Q. (1989). Postprandial alterations in arterial pressure control during hemodialysis in uremic patients. *Clinical nephrology, 31*(6), 323-326.

Appendices

Appendix A

Questionnaire

نموذج طلب موافقة على المشاركة في بحث علمي

بموجب هذا النموذج، يُطلب منك المشاركة في دراسة بحثية لرسالة ماجستير حول العلاقة بين تناول الطعام أثناء غسيل الكلى وانخفاض ضغط الدم داخل الكلى لدى مرضى غسيل الكلى في جامعة النجاح الوطنية

يجُرى هذا البحث بغية الإجابة على أسئلة مهمة، الأمر الذي قد يساعد على تغيير أو تحسين حياة مرضى الكلى الذين يخضعون لغسيل الدم.

لن تكون عرضة لأي أخطار خلال مشاركتك في هذه الدراسة عدا احتمالية الشعور بالإحراج تجاه بعض المعلومات دقيقة. لا يتطلب منك إلا أن تقوم بالإجابة على هذا الإستبيان.

يجوز لك عدم المشاركة في الدراسة ،كما يجوز لك الانسحاب من الدراسة في أي وقت كان ،ولن تطبق عليك أي عقوبة أو تخسر أي مزايا إذا رفضت المشاركة أو إذا قررت التوقف.

نؤكد لك بأن كافة المعلومات التي سيتم جمعها هي لأغراض البحث العلمي فقط وسيتم الحفاظ على السرية التامة وعدم استخدام هذه المعلومات لأغراض أخرى.

قبل موافقتك على المشاركة بالدراسة ،سيقوم الباحث بتلخيص المعلومات المهمة التي ستسمح لك باتخاذ قرار المشاركة أوعدمه.

في حال كان لديك أي أسئلة حول الدراسة يمكنك الاتصال في أي وقت ب:

رقم الهاتف:0594460026

موافقة المشارك:

لقد تم قراءة المعلومات المدرجة أعلاه بتمعن

وأوافق على المشاركة بهذه الدراسة البحثية ☐

اسم المشارك بالأحرف الكبيرة الواضحة:_____

رقم الهاتف:_____

توقيع المشارك: _____

التاريخ:_____

فريق البحث:

.الطالبة ميماس نعيم عرمان

الدكتورة منال بدرساوي

Part 1 : Sociodemographic Information

الجزء الأول: المعلومات الشخصية

1. Age/					
تاريخ الميلاد	_____				
2. Gender/					
الجنس	(1) Male/ ذكر		(2) Female/ أنثى		
3. Marital status/					
الحالة الاجتماعية	(1) Married/ متزوج		(2) Single/ أعزب	(3) Other/ غير ذلك	
4. Living area/					
منطقة السكن	(1) City/ مدينة		(2) Village/ قرية	(3) Camp/ مخيم	
5. Living status/ حالة المعيشة	(1) With spouse/ مع الزو ج		(2) With family/ مع العائلة		
	(3) Alone/ وحيدا		(4) Other/ غير ذلك		
6. Family member number/ عدد أفراد الأسرة					
7. Educational level/ المستوى التعليمي					
8. Years of study/ عدد سنوات الدراسة					
9. Working status/ حالة العمل	(1) Full time/ دوام كامل		(2) Part time/ دوام جزئي		
	(3) Not working/ لا يعمل		(4) Retired/ متقاع د		
10. Current work/ العمل الحالي					
11. Previous work/ العمل السابق					
12. Monthly income/ الدخل الشهري	(1) <1500 NIS		(2) 1500-3000 NIS		
	(3) 3000-5000 NIS		(4) Above 5000 NIS		

Part 2: Medical history

الجزء الثاني:التاريخ الطبي

اسم المرض/ المشكلة الصحية	نعم اعاني Yes	لا اعاني No	هل تأخذ ادوية ؟ Did you take any medication?
1- سكري /Diabetes			1. نعم / yes 2. لا /No
متى تم التشخيص ؟ / When did the diagnosis?	قبل / بعد الفشل الكلوي Before/after CKD		
2- ارتفاع ضغط الدم / Hypertension			1. نعم / yes 2. لا /No
متى تم التشخيص ؟ / When did the diagnosis?	قبل / بعد الفشل الكلوي Before/after CKD		
3- امراض القلب والشرايين / Cardiovascular disease			1. نعم / yes 2. لا /No
متى تم التشخيص ؟ / When did the diagnosis?	قبل / بعد الفشل الكلوي Before/after CKD		
4-اضطرابات بدهون الدم /lipid profile			1. نعم / yes 2. لا /No
متى تم التشخيص ؟ / When did the diagnosis?	قبل / بعد الفشل الكلوي Before/after CKD		
5- متلازمة أو اللتهاب القولون العصبي / IBD or IBS			1. نعم / yes 2. لا /No
متى تم التشخيص ؟ / When did the diagnosis?	قبل / بعد الفشل الكلوي Before/after CKD		
9- أخرى/ Others؟.....			

Part 3: hemodialysis related data

الجزء الثالث: معلومات متعلقة بالغسيل الكلوي

1. كم شهر / سنة بدأت غسيل الكلى؟	
2. كم مرة تقوم بغسيل الكلى في الأسبوع؟	
3. كم هي مدة الغسيل خلال الجلسة؟	
4. هل تتبع نظام تغذوي موجه لك من قبل اخصائي تغذية ؟	1. نعم 2. لا
5. إذا كانت الإجابة نعم؟ كم مرة تقابل اختصاصي التغذية؟	

Part 4: Assessment Nutritional

الجزء الرابع: تقييم الحالة التغذوية

1. Anthropometric Measurements/ **قياسات الجسم**	
1. Weight (kg) الوزن	
2. Height (cm) الطول	
3. Mid upper arm (cm) محيط منتصف الذراع	
1. Biochemical Measurements/ **الفحوصات المخبرية** (from the patients file)	
1. Albumin	
2. Creatinine	
3. Trans Ferrin	
4. BUN	
5. Calcium	
6. Sodium	
7. potassium	
8. Phosphorous	
9. Kt/V	

3. Clinical Assessment/

التقييم السريري

malnutrition -inflammatory score (MIS)

A) **Patient's related medical history** :					
1.changes in end dialysis dry weight (overall in past 3-6 months) : التغير في الوزن ما بعد جلسة الغسل (في اخر 3 الى 6 أشهر):					
2. Dietary intake: الاستهلاك اليومي للطعام :	good appetite and no deterioration of the dietary intake pattern شهية جيدة, عدم وجود اختلال في النظام الغذائي		Somewhat sub-optimal solid diet intake تناول كميات أقل من الطعام	moderate overall decrease to full liquid diet تغير بسيط الى نظام غذائي يحتوي سوائل	hypo-caloric liquid to starvation سائل منخفض السعرات الحرارية (لا يغطي الاحتياجات اليومية)
4. Gastro- intestinal symptoms : أعراض الجهاز العضمي					
4.Functional capacity (nutritional related functional impairment) : القدرة الوظيفية (الضعف الوظيفي المرتبط بالتغذية)	Normal طبيعي	Occasionally difficulty with baseline ambulatory or feeling tired frequently صعوبة بالحركة, والشعور بالتعب المتكرر	Difficulty with otherwise independent activity (e.g going to the bathroom) صعوبة بالقيام بأي نشاط مستقل	Bed/ chair -ridden, or little to no physical activity البقاء على السرير- الكرسي, أو ممارسة القليل من النشاط البدني أو عدم وجودة ابدا	
5. Co-morbidity including number of years on dialysis : الأمراض المصاحبة للفشل الكلوي, بالاضافة لعدد سنوات الغسيل الكلوي					
B) Physical exam :					
6.Decrease fat stores or loss of subcutaneous fat (below	Normal		Mild	Moderate	Severe

eyes, triceps, biceps, chest) : فقدان مخزون الدهون, أو فقدان الدهون المخزنة تحت الجلد				
7. Signs of muscle wasting (temple, clavicle, scapula, ribs, quadriceps, knee, interosseous) : علامات على وجود خسارة بالعضلات	Normal	Mild	Moderate	Severe
C) Body mass index				
8. Body mass index (BMI = wt(kg)/ht*2 (m))				
D) Laboratory parameters :				
9. Serum albumin :				
10. Serum TIBC (total iron binding capacity) :				

4. Diet Assessment/ **تقييم النظام الغذائي**

24-Hours Diet Record

Please, could you mention your dietary habits precisely for three past days since the moment you wake up until the moment you went to sleep.
نرجو منك استرجاع عاداتك الغذائية بدقة من ثلاث أيام ماضية منذ لحظة استيقاظك حتى لحظة نومك.

Dialysis day	
Time	Food / drink item

Non-dialysis day

Time	Food / drink item

Part 5: eating practice during hemodialysis

الجزء الخامس: ممارسات الاكل خلال عملية الغسيل

1. الأنظمة والقوانين	1. هل تقدم المشفى لك وجبات خلال جلسة الغسيل	1. دائما 2. أحيانا 3. أبدا
	2. هل يوجد توصيات من قبل الأطباء تحث على الاكل خلال الجلسة	1. دائما 2. أحيانا 3. أبدا
	3. هل يوجد توصيات من قبل الممرضين تحث على الاكل خلال الجلسة	1. دائما 2. أحيانا 3. أبدا
	4. هل قام الأطباء بمنعك من الاكل خلال جلسة الغسيل	1. دائما 2. أحيانا 3. أبدا
	5. هل قام الممرضين بمنعك من الاكل خلال جلسة الغسيل	1. دائما 2. أحيانا 3. أبدا
2.عادات الاكل خلال جلسة الغسيل	1. هل تأكل في كل الجلسات	1. دائما 2. أحيانا 3. أبدا
	***اذا كانت الإجابة ابدا انتقل الى سؤال رقم 9 في نفس القسم**	
	أسباب تناول الطعام خلال الجلسة	
	2. اتناول الطعام لأنني اشعر بالجوع	1. دائما 2. أحيانا 3. أبدا
	3. اتناول الطعام لأنني اشعر بالنشاط والتحسن	1. دائما 2. أحيانا 3. أبدا
	4. اتناول الطعام لأنني اشعر بان الطعام المقدم يلاءم حالتي المرضية ويحسنها	1. دائما 2. أحيانا 3. أبدا
	5. اتناول الطعام لأنني اشعر بالاكتئاب	1. دائما 2. أحيانا 3. أبدا

6. اتناول الطعام لأنني اشعر بالملل ولإضاعة الوقت	1. دائما 2. أحيانا 3. أبدا
7. أسباب أخرى تجعلك تتناول الطعام خلال جلسة	1. دائما 2. أحيانا 3. أبدا
أسباب عدم تناول الطعام خلال الجلسة	
8. لا اتناول الطعام لأنني لا اشعر بالجوع	1. دائما 2. أحيانا 3. أبدا
9. لا اتناول الطعام لأنني افقد الشهية	1. دائما 2. أحيانا 3. أبدا
10. لا اتناول الطعام لأنني لا أحب الأصناف المقدمة	1. دائما 2. أحيانا 3. أبدا
11. لا اتناول الطعام لأنني اشعر بالملل والاكتئاب	1. دائما 2. أحيانا 3. أبدا
12. لا اتناول الطعام لأنني لا اشعر بالطعم او اشعر بان مذاق الطعام قد اختلف	1. دائما 2. أحيانا 3. أبدا
13. لا اتناول الطعام لأنني اشعر بأعراض مزعجة	1. دائما 2. أحيانا 3. أبدا
14. أسباب أخرى تمنعك من تناول الطعام خلال جلسة الغسيل	

3) **اعراض تشعر بها خلال جلسة الغسيل**	نعم/لا
1. هل تشعر بالغثيان خلال جلسة الغسيل	نعم/لا
هل تتعرض للقيء خلال جلسة الغسيل	نعم/لا
هل تشعر بوجع بالرأس خلال جلسة الغسيل	نعم/لا
هل تشعر بمغص في البطن خلال جلسة الغسيل	نعم/لا
هل تشعر بضيق في التنفس	نعم/لا
هل تشعر بحرقة في المعدة	نعم/لا
اعراض أخرى تعاني منها خلال جلسة الغسيل	

3.اختيارات الطعام	1. عادة ما هو مصدر الطعام الذي تتناوله اثناء جلسة الغسيل؟	1. الوجبات المقدمة من المشفى 2. اصطحب معي وجبات بيتية من المنزل 3. أقوم بشراء الأطعمة من المحلات المجاورة
	2. عادة ما هي الأطعمة التي تتناولها خلال جلسة الغسيل؟	1. وجبة خفيفة 2. وجبة كاملة 3. عصائر فقط 4. فواكة فقط 5. تسالي
	3. اذكر أصناف من الأطعمة التي تتناولها خلال جلسة الغسيل بشكل اعتيادي؟	وضعية النوم وضعية الجلوس
4. الوضعية والتوقيت	1. ما هي الوضعية التي تكون عليها خلال الاكل خلال جلسة الغسيل	
	2. وقت تناول الطعام خلال الجلسة	1. بداية الجلس 2. وسط الجلسة 3. نهاية الجلسة

Part6 : Mental Health

الجزء الخامس: الصحة النفسية

استبانة الصحة النفسية يرجى الإجابة على الأسئلة التالية حسب ما كنت تشعر به خلال الثلاث شهور الماضية				
Question Item	0	1	2	3
هل تشعر بالقدرة على التركيز؟	أحسن من المعتاد	نفس المعتاد	أقل من المعتاد	اقل من المعتاد بكثير
هل فقدت النوم من القلق؟	على الاطلاق	ليس أكثر من معتاد	بل أكثر من معتاد	أكثر من المعتاد بكثير
هل شعرت أنك تلعب دوراً مفيداً في الأشياء؟	أكثر من المعتاد	نفس المعتاد	أقل من المعتاد	اقل من المعتاد بكثير
هل شعرت أنك قادر على اتخاذ القرارات؟	أكثر من المعتاد	نفس المعتاد	أقل من المعتاد	اقل من المعتاد بكثير
أنك تحت الضغط هل شعرت باستمرار؟	على الاطلاق	ليس أكثر من معتاد	بل أكثر من معتاد	أكثر من المعتاد بكثير
هل شعرت أنه لا يمكنك التغلب على الصعوبات؟	على الاطلاق	ليس أكثر من معتاد	بل أكثر من معتاد	أكثر من المعتاد بكثير
هل شعرت أنك قادر على الاستمتاع بالأنشطة اليومية؟	أكثر من المعتاد	نفس المعتاد	أقل من المعتاد	اقل من المعتاد بكثير
هل شعرت أنك قادر على مواجهة المشاكل؟	أكثر من المعتاد	نفس المعتاد	أقل من المعتاد	اقل من المعتاد بكثير
هل شعرت بالحزن والإحباط؟	على الاطلاق	ليس أكثر من معتاد	بل أكثر من معتاد	أكثر من المعتاد بكثير
هل فقدت الثقة في نفسك؟	على الاطلاق	ليس أكثر من معتاد	بل أكثر من معتاد	أكثر من المعتاد بكثير
هل كنت تفكر في نفسك كأنك شخص لا قيمة له؟	على الاطلاق	ليس أكثر من معتاد	بل أكثر من معتاد	أكثر من المعتاد بكثير
هل شعرت بسعادة نوعا ما؟	أكثر من المعتاد	تقريباً نفس المعتاد	أقل من المعتاد	اقل من المعتاد بكثير

Appendix B

Individual Dietary Diversity Questionnaire

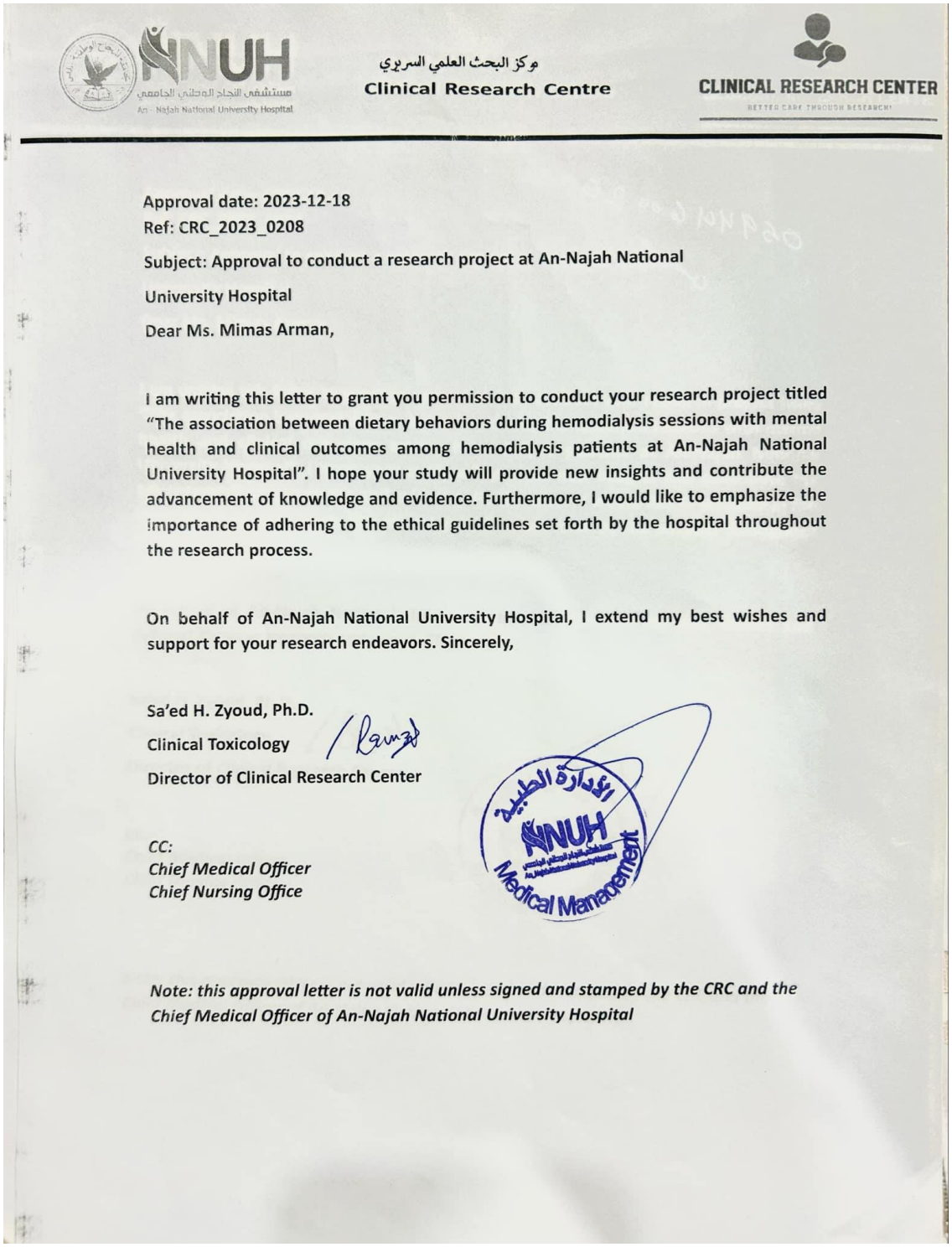
INDIVIDUAL DIETARY DIVERSITY QUESTIONNAIRE [1, 2]

Please describe the foods (meals and snacks) that you ate yesterday during the day and night, whether at home or outside the home. Start with the first food eaten in the morning,

Question number	Food group	Examples	YES=1 NO=0
1	CEREALS	bread, noodles, biscuits, cookies or any other foods made from millet, sorghum, maize, rice, wheat + *insert local foods eg ugali, nshima, porridge or pastes or other locally available grains*	
2	VITAMIN A RICH VEGETABLES AND TUBERS	pumpkin, carrots, squash, or sweet potatoes that are yellow or orange inside + *other locally available vitamin-A rich vegetables*	
3	WHITE TUBERS AND ROOTS	White potatoes, white yams, cassava, or foods made from roots.	
4	DARK GREEN LEAFY VEGETABLES	Sweet pepper, dark green/leafy vegetables, including wild ones + *locally available vitamin-A rich leaves such as cassava leaves etc.*	
5	OTHER VEGETABLES	other vegetables, including wild vegetables	
6	VITAMIN A RICH FRUITS	Ripe mangoes, papayas + *other locally available vitamin A-rich fruits*	
7	OTHER FRUITS	other fruits, including wild fruits	
8	ORGAN MEAT (IRON-RICH)	liver, kidney, heart or other organ meats or blood-based foods	
9	FLESH MEATS	Beef, pork, lamb, goat, rabbit, wild game, chicken, duck, or other birds	
10	EGGS		
11	FISH	fresh or dried fish or shellfish	
12	LEGUMES, NUTS AND SEEDS	Beans, peas, lentils, nuts, seeds or foods made from these	
13	MILK AND MILK PRODUCTS	milk, cheese, yogurt or other milk products	
14	OILS AND FATS	Oil, fats or butter added to food or used for cooking	
15	SWEETS	Sugar, honey, sweetened soda or sugary foods such as chocolates, sweets or candies	
16	COFFEE/TEA	tea (black, green, herbal) or coffee	
			YES=1 NO=0
B.	Did you eat anything (meal or snack) outside of the home yesterday?		

Appendix C

Approval To Conduct A Research Project At An- Najah National University Hospital



مستشفى النجاح الوطني الجامعي
An - Najah National University Hospital

مركز البحث العلمي السريري
Clinical Research Centre

CLINICAL RESEARCH CENTER
BETTER CARE THROUGH RESEARCH!

Approval date: 2023-12-18
Ref: CRC_2023_0208

Subject: Approval to conduct a research project at An-Najah National University Hospital

Dear Ms. Mimas Arman,

I am writing this letter to grant you permission to conduct your research project titled "The association between dietary behaviors during hemodialysis sessions with mental health and clinical outcomes among hemodialysis patients at An-Najah National University Hospital". I hope your study will provide new insights and contribute the advancement of knowledge and evidence. Furthermore, I would like to emphasize the importance of adhering to the ethical guidelines set forth by the hospital throughout the research process.

On behalf of An-Najah National University Hospital, I extend my best wishes and support for your research endeavors. Sincerely,

Sa'ed H. Zyoud, Ph.D.
Clinical Toxicology
Director of Clinical Research Center

الإدارة الطبية
NNUH
Medical Management

CC:
Chief Medical Officer
Chief Nursing Office

Note: this approval letter is not valid unless signed and stamped by the CRC and the Chief Medical Officer of An-Najah National University Hospital

Appendix D

IRB Approval Letter

An-Najah National University
Faculty of Medicine & Health Sciences
Institutional Review Board

جامعة النجاح الوطنية
كلية الطب وعلوم الصحة
لجنة اخلاقيات البحث العلمي

Ref: Mas. Nov. 2023/40

IRB Approval Letter

Title of Research:

The association between dietary behaviors during hemodialysis sessions with mental health and clinical outcomes among hemodialysis patients at An-Najah National University Hospital

Submitted by:
Mimas Arman

Supervisor:
Manal Bedrasawi

Approved:
26th Nov. 2023

Your Study Title" **The association between dietary behaviors during hemodialysis sessions with mental health and clinical outcomes among hemodialysis patients at An-Najah National University Hospital.**".reviewed by An-Najah National University IRB committee and was approved on 26th Nov. 2023

Hasan Fitian, MD

IRB Committee Chairman

IRB Institutional Review Board

Nablus - P.O Box :7 or 707 | Tel (970) (09) 2342902/4/7/8/14 | Faximile (970) (09) 2342910| E-mail : IRB@najah.edu

جـامعـــة النجاح الوطنية
كليـــة الدراســـات العليـــا

العلاقة بين ممارسات تناول الطعام مع الصحة النفسية والحالة السريرية لدى المرضى أثناء غسيل الكلى الدموي في مستشفى جامعة النجاح الوطنية

إعداد
ميماس نعيم أحمد عرمان

إشراف
د. منال بدرساوي

قدمت هذه الأطروحة استكمالا لمتطلبات الحصول على درجه الماجستير في الصحة العامة، من كلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس– فلسطين.
2025

العلاقة بين ممارسات تناول الطعام مع الصحة النفسية والحالة السريرية لدى المرضى أثناء غسيل الكلى الدموي في مستشفى جامعة النجاح الوطنية

إعداد

ميماس نعيم أحمد عرمان

إشراف

د. منال بدرساوي

الملخص

الخلفية: يعتبر انخفاض ضغط الدم أثناء الغسيل الكلوي من المضاعفات الشائعة لغسيل الكلى الدموي، ويرتبط بزيادة شدة الاعراض وزيادة حدوث فشل الوصول وزيادة انتشار اي حوادث قد تسبب ضررا لعضلة القلب وارتفاع معدل الوفيات. ارتبط تناول الطعام خلال غسيل الكلى الدموي تقليديا لزيادة خطر الاصابة بانخفاض ضغط الدم اثناء الغسيل الكلوي الدموي، ولكن تشير الابحاث السريرية الجديدية في تغير في الممارسات الطبية، حيث يعتقد الاطباء أن الوجبات والمكملات الغذائية اثناء غسيل الكلى الدموي، والتي قد تكون وسيلة لزيادة تناول السعرات الحرارية وتحسين الحالة التغذوية لدى مرضى غسيل الكلى الدموي.

الهدف: هو دراسة العلاقة بين ممارسات تناول الطعام خلال الغسيل الكلى الدموي والحالى التغذوية والنتائج السريرية، بما فيها: انخفاض ضغط الدم اثناء غسيل الكلى الدموي، وكفاءة الغسيل الكلوي، والصحة العقلية لدى مرضى غسيل الكلى البالغين في مستشفى النجاح الوطني الجامعي.

المنهجية: في هذه الدراسة تم استخدام تصميم رصدي و مقطعي. بدأ جمع البيانات في يوليو 2024 وانتهى في أكتوبر 2024. شملت الدراسة 155 مريضاً بالغاً من مرضى غسيل الكلى الدموي في مستشفى النجاح الوطني الجامعي. تم جمع البيانات باستخدام تقرير ذاتي، تضمن الاقسام التالية: اولاً: البيانات الاجتماعية والديموغرافية، ثانياً: التاريخ الطبي، ثالثاً: المعلومات المتعلقة بالغسيل الكلوي، رابعاً: التقييم التغذوي الذي يشمل قياسات الوزن والطول، ومؤشر كتلة الجسم، وتحاليل الدم الحيوية، والتغذية السريرية (استبيات درجة سوء التغذية والالتهاب، السجل الغذائي ليوم مع غسيل الكلى ويوم بدون غسيل الكلى، والذي يساعد في معرفة عدد المجموعات الغذائية واصناف الطعام، وكمية السعرات الحرارية والبروتين الذي يتم استهلاكه

خلال اليوم)، خامسا: ممارسات تناول الطعام خلال غسيل الكلى الدموي، واخيرا: الصحة العقلية باستخدام استبيان الصحة العامة.

كما انه تمت مراقبة المرضى على مدار ثلاث جلسات, لجمع بيانات تتعلق بتناول الطعام (نعم أو لا)، ووجود أعراض لنزول الضغط (نعم أو لا)، أقل قراءة لضغط الدم الشرياني المتوسط.

كما أنه تم البحث في توصيات الطاقم الطبي، ووجود سياسات بخصوص ممارسات تناول الطعام خلال غسيل الدم الكلوي في المستشفى.

النتيجة: شملت الدراسة 155 مريض غسل كلوي، كان 66.5% منهم من الذكور، و 79.4 % منهم يتناول الطعام خلال غسيل الكلى الدموي. اكدت نتائج التقرير الذاتي عدم وجود ارتباط بين تناول الطعام خلال غسيل الكلى مع الحالة التغذوية والصحة العقلية، كما اظهرت البيانات الرصدية عدم وجود ارتباط بين تناول الطعام خلال الغسيل الكلوي مع ظهور أعراض او انخفاض ضغط الدم وكفاءة الغسيل.

الاستنتاج: في الختام، بناءً على التقرير الذاتي لم يكن هنالك ارتباط بين عادات تناول الطعام خلال الغسيل لدى مرضى غسيل الكلى الدموي مع الحالة التغذوية او الصحة العقلية. وبينت البيانات الرصدية أيضاً عدم وجود ارتباط بين تناول الطعام خلال غسيل الكلى الدموي مع كفاءة الغسيل الكلوي وظهور أعراض نزول الضغط او انخفاض الضغط الدم أثناء غسيل الكلى.

الكلمات المفتاحية: تناول الطعام خلال غسيل الكلى الدموي؛ كفاءة الغسيل الكلوي؛ الحالة التغذوية؛ الصحة العقلية.