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THE FACTORS THAT INFLUENCE THE ELECTROLYTE FLUID IMBALANCE TO THE PATIENT WITH CHRONIC KIDNEY DISEASE WHO UNDER GO HEMODIALYSIS TREATMENT IN THE NEPHROLOGY UNIT IN HNGV DILI, 2023.

Acácio Guterres Pereira, Carlos Boavida Tilman, Eduardo C. Gaio, Amado da Costa, Sónia C, Jesus P. Luan, Natália de Jesus da Silva.

*Correspondence: Acácio Guterres Pereira

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Abstract

Introduction: *First basic human needs are the physiological needs, which are seen as the most basic needs for the survival of the human being. One of these physiological needs is the need for fluids and electrolytes that are the second fluid after oxygen. Chronic kidney disease in the world is currently increasing and becoming a worldwide health problem with increased incidence, prevalence and morbidity and mortality rates. According to TheWorld Health Organization (The MS, 2022) chronic kidney disease contributes to the burden of disease in the world with a mortality rate of 850,000 each year. The disease is the 12th cause of death and the 17th the cause of disability in the around world and just including Timor-Leste.*

Objective: *To identify and know the factors that influence the electrolyte fluid imbalance to patients with chronic kidney disease who undergo hemodialysis.*

Methodology: *Utilize meal quantitative descriptive, the research was conducted on the day, May 13 to 27 July, 2023 in Hospital Nacional Guido Valadares in the Nephrology Unit and the sample composed of 98 people who do the hemodialysis treatment. We use to collect with the questio nary, documentation and observation. Use descriptive analysis in the Statistical Package for the Social Sciences (SPSS) in the system computer analysis.*

Result: *Most respondents aged 39-54 are 51 frequencies and 52% and the minority age aged 23-38 is 21 frequencies and 21% of the survey result. It means that most patients aged 39-54 suffer chronic kidney disease and electrolyte fluid imbalance.*

Conclusion*: Patients with chronic kidney disease most there is electrolyte fluid imbalance that influenced by factors such as age, room temperature, stress, diet and pain among these factors, the factor*

that most give influence are the factor room temperature with 73.1% and stress with 72.6%. in the research results cited by (Pereira A.G & Tilman CB., 2023).

Keyword: Factors, Electrolyte Fluid, Chronic Kidney Disease, Hemodialysis Treatment and HNGV Dili Nephrology Unit.

INTRODUCTION

The first basic human needs are the physiological needs, which are seen as the most basic needs for the survival of the human being. One of these physiological needs is the need for fluids and electrolytes that are the second fluid after oxygen. Fluids and electrolytes are components of the body that play a role in maintaining body functions and homeostatic processes. Our body is made up of about 60% water that spreads in and out of cells. However, the amount of water depends on age, sex, and fat content (Tarwoto and Wartonah, 2011). To maintain the electrolyte hydra balance, the body must have adequate amount, water output and distribution of fluids and electrolytes, as well as regulation of these components, so that the body is able to maintain its health and survival (Ernawati, 2012). The imbalance will speed up metabolic processes, slow down, inhibit the use of food essences properly, affect oxygen levels in the body, or cause our bodies to store well-organized toxic waste in better conditions (Benita W. Vaughan, 2011; cited by Pereira A.G & Tilman CB., 2023).

Fluid hypo volume/dehydration and electrolyte balance disturbances may occur in patients with hypothalamic disorders, thyroid gland disorders, diarrhea, and vomiting. Chronic kidney disease or chronic kidney failure is a progressive and irreversible change in kidney function. In Renal Failure hemodialysis is more time-consuming, with a higher proportion of patients on hemodialysis in the age group of 45 to 64 years, that is, 27.31% - 29.46% (PERNEFRI, 2015). Chronic kidney disease in the world is currently increasing and becoming a worldwide health problem with increased incidence, prevalence and morbidity and mortality rates, the global prevalence has been increasing every year. According to the World Health Organization (WHO, 2021; cited by Pereira A. G & Tilman CB., 2023) chronic kidney disease contributes to the burden of disease in the world with a mortality rate of 850,000 each year. The disease is the 12th cause of death and the 17th the cause of disability in the world (Pongsibidang 2016, cited by Jayanti, 2020, P.28). According to the results of the Global Burden of Diseases survey in 2010, chronic kidney disease was the 27th leading cause of death in the world in 2007 and then increased to 18th^{in} *2010*. More than 2 million people in the world receive hemodialysis or kidney transplant treatment and only about 10% that we actually experience treatment (Simatupang 2019, cited by Jayanti, 2020, P.28).

Mortality from chronic kidney disease in Timor-Leste in the 2020 school year reached 192 people or 2.72% mortality. The mortality rate of chronic kidney disease in Timor-Leste ranks 71.0 in the world. In the year 2023 the mortality rate in Timor-Leste increasing 610 people who died, and occupies 8^{the} place among all diseases that exists in Timor-Leste. (WHO, 2020; MdS, 2021;). Data from patients at the Nephrology Unit Hospital Nacional Guido Valadares in 2021-2022 with a total of 98

people, males with 48 people and females with 50 people who undergo hemodialysis treatment cited by (Pereira A. G & Tilman CB., 2023).

Objectives:

General Objective

To identify and know the factors that influence the electrolyte fluid imbalance to the patient with chronic kidney disease who do the hemodialysis treatment in the nephrology unit in HNGV Dili.

Specific Objectives:

- To identify and know the age of patients undergoing hemodialysis.
- To identify and know the stressed of patients undergoing hemodialysis.
- To identify and know about the diets they have consumed in daily life
- To identify and know about the ambient temperature that causes sweating and thirst.
- To identify and know about the pain that patient feels during hemodialysis treatment.

THEORETICAL FRAMEWORK

Chronic kidney disease is a progressive and irreversible disorder of kidney function in which the body's ability to maintain a metabolism and water and electrolyte balance, resulting in uremia (Subsuma & Nurarif, 2015). Chronic kidney disease is a clinical condition characterized by an irreversible decline in renal function, to the point that it requires permanent renal replacement therapy, in the form of dialysis therapy or through kidney transplantation. According to The Kidney *Disease Outcomes Quality Initiative (KDOQI) and National Kidney Foundation (2015),* there are two main causes of chronic kidney disease, namely hypertension and diabetes. Diabetes occurs when blood sugar is too high, causing damage to many organs in the body, including the kidneys and heart, as well as blood vessels, nerves, and eyes. Hypertension occurs when blood pressure rises so that the walls of blood vessels also increase. If left unchecked, it will cause high blood pressure and become the leading cause of heart attack, stroke, and chronic kidney disease. The classification of chronic renal failure has 5 stages. Based on the presence of kidney damage and Glomerular Filtration Rate (GFR).

Table 1. Stages of Chronic Renal Failure

Face of Renal Failure		
Stage	Description	Glomerular filtration rate (GFR)* (ml/min/1.73m2)
1	Kidney damage (e.g., protein in urine) with normal GFR	90 or more of above
2	Kidney damage with mild decrease in GFR	60 – 89
3rd	Moderate decline in GFR	45-59
3b	Moderate decline in GFR	30-44
4	Severe fall	15-29
5	Renal failure	Menus of 15

The pathophysiology of chronic renal failure depends on the underlying disease, but in its development the process of occurrence is almost the same. Starting with the presence of toxins, infections and obstructions in the urinary tract that cause urinary retention. From these causes, the Glomerular Filtration Rate (GFR) in all nephrons is below normal. Things that are obtained from decreased GFR include: impaired protein secretion, na retention, and decreased erythropoiesis secretion. This causes urea syndrome to increase stomach acid and itching. The increase in stomach acid causes nausea, stomach irritation and bleeding can also occur if

the irritation is not treated. The process of Na retention causes the extracellular fluid to increase and edema to occur. Edema can increase cardiac load, resulting in left ventricular hypertrophy. The process of hypertrophy is followed by a decrease in renal blood flow, then increased retention of Na and H2O occurs. This causes excess fluid volume in patients with chronic renal failure. The decrease in Hb causes the supply of O2 m drops of Hb and patients may present with impaired tissue perfusion or weakness (Windarti, 2017; cited by Pereira AG & Tilman CB., 2023).

Fluids are included in the basic physiological needs of the human being because they have a large proportion in the body. Almost 90% of total body weight is in the form of liquid. Water in the body is stored in two main compartments, FIC and FEC. Intracellular fluid (FIC) is a fluid found in the cells of the body and serves as a medium where the chemical activity of cells occurs. This fluid represents about 70% of the total body water (TBW of total body water) of adults, FIC represents about 40% of body weight or 2/3 TBW. Extracellular fluid (ECF) is a fluid that is outside the cells and makes up 30% of the TWB or about 20% of the body weight. LEC consists of intravascular fluid, interstitial fluid, and transecular fluid. Intravascular fluid or plasma represents 5% of total body weight, while interstitial fluid represents 10% -15% of total body weight. In body fluids there are electrolytes, these electrolytes are composed of electrolyte ions that can conduct electric current. Positively charged ions are called cations, for example, sodium (Na+), potassium (K+), calcium (Ca2+), and magnesium (Mg2+). Negatively charged ions are called anions, for example, chloride (Cl-), sulfate (SO4 2-), phosphate (PO4 3-) and bicarbonate (HCO-3). To maintain chemical balance, electrolyte balance, and normal pH, the body performs a two-vein exchange mechanism between FIC and FEC. Cations and anions play a role in this exchange. (Lyndon Saputras 2013, cited by Utami, 2017).

Body fluids consist of two main compartments separated by a semipermeable membrane. The two compartments are intracellular and extracellular. About 65% of body fluids are in cells or intracellularly. The remaining 35% of body fluids are outside the cells or extracellular. The extracellular compartment is further divided into three (3) subdivisions; Interstitial: fluid between cells and around blood vessels (25%); Intravascular: fluid in the blood vessels; also called blood plasma (8%). Transsecular: tears, as well as spinal, synovial, peritoneal, pericardial and pleural fluids (25%). Electrolytes are electrically charged minerals that are found inside and outside the body's cells. These minerals are included in liquids and food and excreted mainly by the kidneys. Electrolytes are also excreted by the liver, skin, and lungs in smaller amounts, and carefully implication in the future cited by (Pereira A.G & Tilman CB., 2023).

Hemodialysis is a therapy whose function is to replace the work of the kidneys in removing certain toxins from the human bloodstream, such as water, sodium, potassium, hydrogen, urea, creatinine, uric acid and metabolic wastes. Through a semipermeable membrane as a separator of fluid and blood, the dialysate occurs in an artificial kidney where the processes of diffusion, osmosis and ultrafiltration occur. Larasati (2018) in (Sumah, 2020). Meanwhile, according to Simbolong (2019), hemodialysis is one of the renal function replacement therapies using a special tool that aims to remove uremic toxins and regulate electrolyte fluids in the

body. Hemodialysis is indicated for patients who acutely require short-term hemodialysis therapy (a few days or weeks) or patients with chronic or end -stage renal failure who require long-term or permanent therapy. In general, hemodialysis is indicated in patients with renal insufficiency with glomerular filtration rate lower than 15 ml/min, failure of conservative therapy, hyperkalemia, creatinine greater than 65 mEq/L, urea level greater than 200 mg/dl, prolonged anuria more than 5 times and fluid overload that is important in the human body (Miftah, 2016; cited by Pereira A.G & Tilman CB., 2023).

Electrolyte levels in the body are regulated through absorption and excretion to maintain the levels necessary for optimal functioning of the body. In the case of calcium, parathyroid hormone and casitonin are secreted to stimulate the storage or excretion of calcium from the bones to regulate blood levels. Other electrolytes are absorbed from food in small or large amounts or stored or secreted by the kidneys or stomach in small or large amounts as needed to reduce or increase electrolyte levels to the levels necessary for optimal body functioning. For feedback mechanisms to be effective, the organs or systems responsible for absorption and excretion (gastrointestinal) or reabsorption and excretion (renal) must be functioning properly. Maintaining the balance of fluids, electrolytes and acid-base affects metabolic processes in the body. The imbalance will speed up the process, slow down, inhibit the use of food essences properly, affect oxygen levels in the body or cause our bodies to store toxic waste (Benita 2013, cited by Utami, 2017).

Age

The age of a person affects the function of the organ. The ability of organs (e.g., heart, kidneys, lungs) to efficiently manage fluid, electrolyte, and acid-base balance is also affected. Since age is a factor of uncontrollable influence, it becomes even more important to administer the previously mentioned controlled factors to very young and very old individuals.

Room temperature

Excessive heat causes sweating, a person can lose Chlorinated Natrum (NaCl) through sweat up to 15 -30 grams/day.

Diet

When the body lacks nutrients, the body will break down energy reserves, this process will cause fluid to pass from the interstitial to the intracellular.

Stressed.

Stress can cause an increase in cellular metabolism, blood concentration and muscle glycolysis, this mechanism can cause sodium and water retention. This process can lead to sodium and water retention.

Pain

Surgical conditions, tissue trauma, kidney and heart disorders, hormonal disorders will disrupt the fluid balance in the human body (Utami *et al*, 2017: cited by Pereira A.G & Tilman CB., 2023).

RESEARCH METHODOLOGY.

It uses descriptive quantitative method, research was conducted on the day, May 3 to July 27, 2023 in Hospital Nacional Guido Valadares in the Nephrology Unit and the sample composed of 98 people who undergo hemodialysis treatment. We use to collect with the questionnaire, documentation and observation. Use descriptive analysis in the *Statis-*

tical Package for the Social Sciences, according to the systems computer process.

RESULT AND DISCUSSION

Table 2. Frequency Distribution of respondents based on Age.

Ages	Frequency (n)	(%)
23-38	21	21
39-54	51	52
55-78	26	27
Total	98	100

Sources: Result of research at the Nephrology Unit in HNGV, Dili 2023

It is based on the survey result shows that majority of respondents aged 39-54 is 51 frequencies and 52%, respondents 55-78 is 26 frequencies and 27% and the minority age with 23-38 is 21 frequencies and 21% of the survey result. It means that most patients aged 39-54 suffer chronic kidney disease and electrolyte fluid imbalance.

Table 3. Percentage of factors associated with the study.

Associated factors	% Yes	% No	% Total
Room temperature	73.1	26.9	100
Diet	66.8	33.2	100
Stress	72.6	27.4	100
Pain	68.6	31.4	100

Sources: Result of research at the Nephrology Unit in HNGV, Dili 2023

The maintenance of fluid balance, electrolytes affect metabolic processes in the body. The imbalance will speed up the process, slow down, inhibit the use of food essences properly, affect oxygen levels in the body or cause our bodies to store toxic waste**.**

Therefore, the result of the ambient temperature factor survey shows that, majority of respondents chose "Yes" with 73.1% and those who chose "No" with 26.9%. the stress factor most respondents chose "Yes" with 72.6% and those who chose "No" with 27.4%. the pain factor: most respondents chose "Yes" with 68.6% and those who chose "No" with 31.4% and the diet factor, majority of respondents chose "Yes" with 66.8% and those who chose "No" with 33.2%. It means that these factors give influence the electrolyte fluid imbalance to patients with chronic kidney disease and in this research identifies the major factors that give more influence to the electrolyte fluid imbalance to patients who do the hemodialysis treatment in the Nephrology Unit in HNGV are: the ambient temperature with 73.1 % and stress with 72.6%, according to the study cited by (Pereira A. G & Tilman CB., 2023).

CONCLUSION

It is based on the results of research on the factors that influence the electrolyte fluid imbalance to the patient with chronic kidney disease who do hemodialysis treatment in the Nephrology Unit in HNGV, Dili 2023, wanted to conclude that these five (5) factors give much influence to the electrolyte fluid imbalance to patients with chronic kidney disease with their percentage is based on each indicator as:

- **Age:** Based on the survey result shows that majority of respondents aged 39-54 is 51 frequencies and 52% and minority age with 23-38 is 21 frequencies and 21%.

- **Room temperature:** Based on the result of the research, most patients in the Nephrology Unit chose "Yes" with 358 frequencies and 73.1%

and those who chose "No" with 132 frequencies and 26.9%. It means that this factor give influence to the net electrolyte imbalance.

- **Stress:** Based on the survey result shows that the majority respondents chose "Yes" with 498 frequencies and 72.6% and those who chose "No" with the total 188 frequencies and 27.4%. It means that the "stress" factor give influence to the electrolyte fluid imbalance to patients with chronic kidney disease in the study.

- **Diet:** Based on the survey result shows that the majority respondents chose "Yes" with 524 frequencies and 66.8% and those who chose "No" with the total 260 frequencies and 26.9%. It means that the factor "diet" give influence to the electrolyte fluid imbalance to patients with chronic kidney disease according to the result of investigation.

- **Pain:** It is based on diagram 4.2.5. on the fifth indicator "pain" shows that the majority respondents chose "Yes" with 336 frequencies and 68.6% and those who chose "No" with the total 154 frequencies and 31.4%. It means that the factor "pain" influences the electrolyte fluid imbalance to patients with chronic kidney disease in the study conducted in Dili Timor-Leste cited by (Pereira A.G. & Tilman CB., 2023).

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