

## CHAPTER 1

### INTRODUCTION

#### 1.1 Research Background

The global prevalence of chronic kidney disease is >10% of the general population worldwide, with approximately 843.6 million people affected. According to the 2018 Indonesia Basic Health Research data, 0.38% of the Indonesian population (252,124,458 people) had chronic kidney disease (CKD). This was equivalent to 9.1% to 13.4% of the total population, or approximately 700,000 to 1 million people. In 2018, 19.33% of chronic kidney disease patients were undergoing hemodialysis. According to the 2018 Riskesdas data, in Central Java, the prevalence of chronic kidney disease reached 0.42%, with 96,794 cases undergoing hemodialysis.<sup>1</sup>

The number of patient visits to the hemodialysis installation at RSUD Ir. Soekarno increased from year to year. In 2018, there were 12,045 hemodialysis patient visits, based on the data obtained. The number of hemodialysis installation visits increased to 15,219 in 2019, and further increased by 4.86% to 15,959 visits in 2020.<sup>2</sup>

Chronic kidney disease is characterized by decreased kidney function, which impairs the body's ability to maintain fluid and electrolyte balance and excrete metabolic waste products. This condition is influenced by reduced erythropoietin production in the kidneys, impaired nutrient metabolism, and chronic inflammation, which are commonly observed in patients with chronic kidney disease.<sup>3</sup>

Low hemoglobin levels in chronic kidney disease patients can affect their quality of life, causing fatigue, cognitive impairment, and increased risk

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<sup>1</sup> Tim Riskesdas, Laporan Nasional Riskesdas 2018, Lembaga Penerbit Badan Penelitian Dan Pengembangan Kesehatan, 2019.

<sup>2</sup> LKIP. Laporan Kinerja Instansi Pemerintah Tahun 2020 RSUD Kabupaten Sukoharjo. 2020;(2504):1–9.

<sup>3</sup> S R Vaidya and N R Aeddula, 'Chronic Renal Failure.', *StatPearls. Treasure Island (FL): StatPearls Publishing*, 223 (2022)

of cardiovascular disease. One of the therapies for chronic renal failure that can contribute to a reduction in hemoglobin levels is hemodialysis <sup>4</sup>.

Hemodialysis therapy was performed routinely according to a schedule determined by healthcare professionals at the hospital, patients typically underwent therapy 1-3 times a week, which aimed to maximize the replacement of kidney function in filtering fluids and substances not needed by the body for further excretion through urine.<sup>5</sup> Hemodialysis takes a long time, which can lead to the development of various complications that may result in a decrease in hemoglobin levels (anemia).<sup>6</sup> These side effects of hemodialysis affect the patient's food intake. Nutrient deficiencies such as protein, folic acid and iron affect erythropoiesis.<sup>7</sup> Based on the research of Farah Al Mahdiyyah Hendaridi (2024) there is a significant relationship between protein intake in patients with chronic kidney disease undergoing HD therapy in the hemodialysis unit of UPTD RSUD dr. Soekardjo, Tasikmalaya City in 2023.<sup>8</sup>

Hemodialysis patients require adequate protein to replace the protein lost during the dialysis process. Protein intake plays an important role in the nutritional intake of patients with chronic kidney disease. Protein in the human body plays a key role in hematopoiesis, which is the formation of erythrocytes containing hemoglobin.<sup>9</sup> Anemia is one of the complications that often occurs in patients with chronic kidney disease. The Indonesian Nephrology Association (Pernefri) reported in 2018 that 87,000 patients with chronic

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<sup>4 4</sup> Relina R, 'Mengenal Lebih Dekat Terapi Cuci Darah / Hemodialisa (HD)', *RSUD Kota Mataram*, 2023.

<sup>5</sup> Wella Susantri, Bayhakki Bayhakki, and Rismadefi Woferst, 'Hubungan Kepatuhan Menjalani Terapi Hemodialisis Dengan Kualitas Hidup Pasien Penyakit Ginjal Kronik Di Masa Pandemi Covid-19', *Holistic Nursing and Health Science*, 5.2 (2022), 216–25.

<sup>6</sup> Utami Sasmita Lestari Muhammad Awaludin Nur Anindhita Kurniawaty Wijaya, Muhamad Nurmansyah, 'Fatigue Dan Depresi Terbukti Menurunkan Kualitas Tidur Pasien Gagal Ginjal Kronik Yang Menjalani Hemodialisis', *Jurnal Penelitian Kesehatan Suara Forikes*, 14.4 (2023), 769–74.

<sup>7</sup> Zakiyah Aenurochmah, Oktariani Pramiastuti, and Osie Listina, 'Hubungan Pengetahuan Dan Pola Makan Terhadap Pengobatan Eritropoietin Pada Pasien Hemodialisis', *Pharmacy Medical Journal*, 5.2 (2022), 29–37.

<sup>8</sup> farah Al Mahdiyyah Hendaridi, 'Hubungan Asupan Protein, Asam Folat Dan Zat Besi Dengan Kadar Hemoglobin Posthemodialisis Pada Pasien Penyakit Ginjal Kronis', *Repositori Universitas Siliwangi*, 5.1 (2023), 1–23.

<sup>9</sup> Dina Permatasari and Elida Soviana, 'Hubungan Asupan Protein Terhadap Kejadian Anemia Pada Remaja Putri', *Indonesian Journal of Nutrition Science and Food*, 8.2 (2022), 8–13.

kidney disease, or 78%, had hemoglobin (Hb) levels below 10 g/dL. Hemoglobin functions as a carrier of oxygen and carbon dioxide which are transported by protein.<sup>10</sup> Protein and copper intake can influence hemoglobin levels in the body.

Consuming sufficient copper played a role in preventing anemia by stimulating Hb synthesis, iron absorption, and releasing iron stores from ferritin in the liver.<sup>11</sup> Copper and iron metabolism work together, so if the body lacks copper, it will cause disturbances in the iron metabolism process and trigger anemia.<sup>12</sup> A deficiency results in a decrease in peroxidase activity, which inhibits red blood cell synthesis and leads to anemia.<sup>13</sup> Anemia can affect sleep quality, and conversely, poor sleep quality can also contribute to anemia.

Poor sleep quality in chronic renal failure patients undergoing hemodialysis can impact daily activities and affect the body physiologically, psychologically, socially, and spiritually. It can also decrease alertness and concentration, exacerbating the condition of the disease.<sup>14</sup> Anemia can lead to sleep deprivation due to a decrease in the number of red blood cells that carry oxygen to body tissues, reducing the oxygen needed by the tissues. Therefore, the patient experiences fatigue, tiredness, and a lack of energy.<sup>15</sup> According to research conducted by Damayanti & Anita (2021), all respondents had an HD duration of at least 3 months (100%), and these respondents experienced sleep disturbances.<sup>16</sup>

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<sup>10</sup> Yulianah Sulaiman and others, *Dasar-Dasar Ilmu Gizi* (Yayasan Penerbit Muhammad Zaini, 2022).

<sup>11</sup> D Sarbini, S Zulaikah, and F Isnaeni, *Gizi Geriatri (1st Edition)* (Muhammadiyah University Press, 2020).

<sup>12</sup> Gita Ransun Natalia, Maureen I Punuh, and Grace D Kandou, 'Gambaran Kecukupan Mineral Mikro Pada Mahasiswa Semester 2 Fakultas Kesehatan Masyarakat Universitas Sam Ratulangi Manado Selama Masa Pandemi Covid-19', *Jurnal KESMAS*, 10.1 (2021), 50–58.

<sup>13</sup> Magdalena Araya, Manuel Olivares, and Fernando Pizarro, 'Copper in Human Health', *International Journal of Environment and Health*, 1.4 (2007), 608–20.

<sup>14</sup> Ismi Nurhayati and others, 'Gambaran Kualitas Tidur Pada Pasien Gagal Ginjal Kronik Yang Menjalani Terapi Hemodialisa: Literature Review', *Jurnal Keperawatan Indonesia Florence Nightingale*, 1.1 (2022), 38–51.

<sup>15</sup> Dadi Santoso and others, 'Faktor-Faktor Yang Berhubungan Dengan Fatigue Pada Pasien Gagal Ginjal Kronik Yang Menjalani Hemodialisa Di Rsud Dr. Soedirman Kebumen', *Jurnal Ilmiah Kesehatan Keperawatan*, 18.1 (2022), 60.

<sup>16</sup> Maylina Damayanti, 'Fatigue Dan Kualitas Tidur Pada Pasien Hemodialisa : Literature Review Dan Kualitas Tidur Pada Pasien Hemodialisa', *Fatigue Dan Kualitas Tidur Pada Pasien Hemodialisa : Literature Review Dan Kualitas Tidur Pada Pasien Hemodialisa*, 2021.

In the Qur'an Surah al-Mai'dah verse 88, it is explained that humans are commanded (obliged) to consume halal and toyyib (good) food. The obligation to consume halal food aims to bring benefits, goodness, and welfare (falah) to humans. From this goal, the values that align with maqasid al-Sharia can be found. Ignoring the wisdom and goodness of consuming halal food threatens the existence of religion and makes it susceptible to various external and internal diseases.<sup>17</sup> Thayyib (good) food in Islam not only fulfills the halal aspect, but also provides health benefits. Thayyib (good) food in Islam is closely related to physical and spiritual health. Islam not only regulates food in terms of its halalness but also in terms of cleanliness, benefits, and nutritional balance. The Qur'an and Hadith provided guidelines for consuming food that not only fulfilled the body's needs but also brought people closer to Allah SWT.<sup>18</sup>

## **1.2 Research Problems**

Is there a association protein intake, copper intake, and sleep quality with hemoglobin levels in hemodialysis patients with chronic kidney disease at Ir. Soekarno Hospital, Sukoharjo Regency?

## **1.3 Research Objectives**

### **1. General Purpose**

Analyzed the the Association protein intake, copper intake, and sleep quality with hemoglobin levels in hemodialysis patients with chronic kidney disease at Ir. Soekarno Hospital, Sukoharjo Regency.

### **2. Specific Objectives**

- a. Analyzed the characteristics of respondents in hemodialysis chronic kidney disease patients at Ir. Soekarno Hospital, Sukoharjo Regency.
- b. Analyzed association protein intake with hemoglobin levels in chronic kidney disease hemodialysa patients at Ir. Soekarno Hospital, Sukoharjo Regency

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<sup>17</sup> Muhamad Takhim Mashudi, 'Hifdzun Nasl', 12.1 (2018), 19–36.

<sup>18</sup> Nurkhayati Rojabiah, (2023). Korelasi makanan halal dan thoyib terhadap Kesehatan dalam perspektif Al-qur'an. *International journal Mathla'ul Anwar of halal issues*. (Vol 3 (1))

- c. Analyzed the association copper intake with hemoglobin levels in chronic kidney disease hemodialysis patients at Ir. Soekarno Hospital, Sukoharjo Regency
- d. Analyzed the association sleep quality with hemoglobin levels in chronic kidney disease hemodialysis patients at Ir. Soekarno Hospital, Sukoharjo Regency.

#### 1.4 Research Benefits

##### 1. Theoretical Benefits

The theoretical benefit was that it was expected to become an additional reference and information regarding the relationship between protein intake, copper, and sleep quality with hemoglobin levels in patients with chronic kidney disease.

##### 2. Practical Benefits

The practical benefits were expected to serve as evaluation material. The study aimed to provide materials or education to raise awareness. The focus was on the importance of maintaining nutritious food intake and good nutritional knowledge among patients.

#### 1.5 Authenticity Research

Research on the relationship between protein intake, copper and sleep quality with hemoglobin levels in hemodialysis renal failure patients at the RSUD as shown in table 1 below.

**Table 1. Authenticity Research**

Research Title	Research Methods	Variabel	Results	Research Differences
The relationship between protein, vitamin c and iron intake with hemoglobin levels in patients with chronic renal failure undergoing hemodialysis at the Regional	Cross Sectional	<b>Dependen</b> Intake of protein, vitamin c and iron <b>Independen:</b> Effects of pre-hemodialysis hemoglobin levels on chronic renal failure patients in Harapan and Doa City Hospital Bengkulu in 2020, using 24-	The study found that there was a significant relationship between vitamin C intake ( $p = 0.001$ ), there was a significant relationship between iron intake ( $p = 0.002$ ), there was no significant relationship between protein intake ( $p = 0, 013$ ) at Harapan and Doa Hospital, Bengkulu City in 2020.	<b>Dependen:</b> Analyzing the relationship between protein intake, copper and sleep quality <b>Independen:</b> Hemoglobin levels in hemodialysis patients with chronic renal failure by using SQ-FFQ on food intake and

Research Title	Research Methods	Variabel	Results	Research Differences
General Hospital. Hopes and Prayers for Bengkulu City in 2020. <sup>19</sup>		hour food recall Semi-quantitative FFQ form on patient food intake		medical records to determine the patient's Hb.
The relationship between sleep quality and hemoglobin levels in patients with chronic renal failure in the hemodialysis unit of Yukum Medical Center Hospital. <sup>20</sup>	Cross Sectional	<b>Dependen:</b> Sleep Quality <b>Independen:</b> Where Haemoglobin	The study obtained a p-value of 0.034, which was less than the significance level of 0.05. This indicated a statistically significant relationship between sleep quality and hemoglobin levels in patients with chronic renal failure undergoing hemodialysis	<b>Dependen:</b> Hemoglobin levels in patients with chronic renal failure obtained from patient medical records <b>Independen:</b> Effects of sleep quality on hemodialysis patients with chronic renal failure using questionnaires.
The relationship between sleep quality and quality of life of chronic renal failure patients undergoing hemodialysis at RSUD Wates	Cross sectional	<b>Dependen</b> sleep quality <b>Independen</b> quality of life in chronic renal failure patients undergoing hemodialysis	Sleep quality was generally poor (5.95) and quality of life was generally good (63.5). There was an association with a p value of 0.021. Conclusion: There is a relationship between sleep quality and quality of life in chronic renal failure patients undergoing hemodialysis at the Hemodialysis Unit of RSUD Wates.	<b>Dependen</b> Hemoglobin levels in patients with chronic renal failure obtained from patient medical records <b>Independen</b> Effects of sleep quality on hemodialysis patients with chronic renal failure using questionnaires.
Relationship between protein, vitamin c, and iron intake with prehemodialysis is hemoglobin	Cross sectional	<b>Dependen:</b> Intake of Protein, Vitamin C, iron <b>Independen:</b> prehemodialysis hemoglobin levels in patients	The results showed that there was a significant relationship between vitamin C intake (p=0.001), there was a significant relationship between iron intake (p=0.002), there was a significant relationship	<b>Dependen:</b> Analyzing the relationship between protein intake, copper and sleep quality <b>Independen:</b>

<sup>19</sup> Andreas, 'Hubungan Asupan Protein, Vitamin C Dan Zat Besi Dengan Kadar Hemoglobin Pada Pasien Gagal Ginjal Kronik Yang Menjalani Hemodialisa Di RSUD Harapan Dan Doa Kota Bengkulu Tahun 2020.' (Poltekkes Kemenkes Bengkulu, 2020).

<sup>20</sup> Aqua Oktaviana, 'Hubungan Kualitas Tidur Dengan Kadar Hemoglobin Pada Pasien Gagal Ginjal Kronik Di Unit Hemodialisis RS Yukum Medical Centre', 2021.

Research Title	Research Methods	Variabel	Results	Research Differences
levels in chronic renal failure patients. <sup>21</sup>		with chronic renal failure	between protein intake (p=0, 013) at Harapan and Doa Hospital Bengkulu City in 2020.	Hemoglobin levels in hemodialysis patients with chronic renal failure using SQ-FFQ on food intake and medical records to determine patient Hb
The Relationship of Protein Intake with Urem, Creatinine, and Blood Hemoglobin Levels in Patients with Chronic Kidney Failure Outpatient Hemodialysis at Tugurejo Hospital Semarang. <sup>22</sup>	Cross sectional	<b>Dependen:</b> Protein Intake with Urem, Creatinine Levels <b>Independen:</b> Blood Hemoglobin Levels in Patients with Chronic Renal Failure	The results of data analysis showed a p value of 0.024 <0.05 so it can be concluded that there is a positive relationship between protein intake and Hb levels in Chronic Kidney Failure Patients with Outpatient Hemodialysis at Tugurejo Semarang Hospital..	<b>Dependen:</b> Analyzing the relationship between protein intake, copper and sleep quality <b>Independen:</b> Hemoglobin levels in hemodialysis patients with chronic renal failure using SQ-FFQ on food intake and medical records to determine patient Hb

<sup>21</sup> Andreyas and Deri Andika Putra, 'Hubungan Asupan Protein, Vitamin C, Dan Zat Besi Dengan Kadar Hemoglobin Prahemodialisa Pada Pasien Gagal Ginjal Kronis', *ARGIPA (Arsip Gizi Dan Pangan)*, 6.1 (2021), 33–42.

<sup>22</sup> Nura Ma 'shumah, Sufiati Bintanah, and Erma Handarsari, 'Hubungan Asupan Protein Dengan Kadar Urem, Kreatinin, Dan Kadar Hemoglobin Darah Pada Penderita Gagal Ginjal Kronik Hemodialisa Rawat Jalan Di RS Tugurejo, Semarang', *Jurnal Gizi Universitas Muhammadiyah Semarang*, 3.1 (2014), 22–32.