The Relationship between Blood Flow Velocity (QB) and Achievement of URR Values in Hemodialysis Patients: Literature Review

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Abstract: This literature study examines the relationship between blood flow velocity (Qb) and the achievement of Urea Reduction Ratio (URR) values in chronic kidney disease (CKD) patients undergoing hemodialysis. The main objective of this review is to identify and analyze findings from various studies related to this topic. The research method used is a systematic literature review, with article searches through the ResearchGate, Proquest, and Google Scholar databases using specific keywords. Of the 310 initial articles, 10 articles that met the inclusion and exclusion criteria were further analyzed. The results of the analysis of the 10 articles showed a variety of findings regarding the relationship between Qb and URR. Three studies showed a significant relationship between increasing Qb with increasing URR and hemodialysis effectiveness. Meanwhile, two other studies found no significant relationship between Qb and hemodialysis adequacy, emphasizing the role of other factors such as vascular access patency, body weight, and dialysis characteristics. Other studies also highlighted the influence of dialysis filter type and hemodialysis time on adequacy. The conclusion of this literature review is that there is an indication of a positive relationship between blood flow velocity and achievement of hemodialysis adequacy as measured by URR in CKD patients. However, this relationship is influenced by various other factors. The implication of this review is the need for holistic consideration of patient and technical factors in determining Qb settings to achieve optimal dialysis adequacy. Further research is needed to identify more specific and personalized guidelines in Qb settings to improve hemodialysis outcomes in CKD patients.

Keywords: Quick of Blood (QB); Urea Reduction Ratio (URR); Chronic Kidney Disease (CKD); Hemodialisis

1. Introduction

Chronic kidney disease (CKD) is an irreversible kidney dysfunction in which the kidneys' ability to maintain metabolism, fluid balance, and electrolytes fails, resulting in uremia (Nurbadriyah W. D., 2021). Chronic kidney disease (CKD) is defined as a decline in kidney function characterized by a glomerular filtration rate (GFR) <60 ml/min/1.73 that occurs for more than 3 months or the presence of markers of kidney damage that can be seen through albuminuria, abnormalities in urine sediment, abnormal electrolytes, histological or imaging-detected kidney abnormalities, and a history of kidney transplantation.(Mahesvara, 2020).

According to the World Health Organization (WHO) in (Efendi, 2021), around 500 million people in the world suffer from chronic kidney disease (CKD), and around 1.5 million of them undergo hemodialysis therapy. In the Southeast Asia region, between 2014 and 2016, around 250,217 people were recorded as suffering from chronic kidney disease (CKD). In

Indonesia, the Indonesian Association of Kidney and Hypertension Specialists (Pernefri) reported around 200,000 new cases of end-stage kidney disease each year. Based on data from the Indonesian Nephrology Association (Penefri in Rustandi et al., 2018), around 12.5 million people in Indonesia or 25 million people experience impaired kidney function, with around 150,000 people suffering from kidney failure, most of which are caused by hypertension. According to the Indonesian Ministry of Health (2018), in 2018 the prevalence of GGK in Indonesia reached 19.3%, with 66,433 new patients recorded from a population of 251 million, while the number of active patients reached 132,142 people from a total of 499 million Indonesians. In South Sulawesi, the prevalence of new GGK patients was recorded at 1,317 people (Pernefri, 2018).

Hemodialysis is a process of using a machine to filter the blood and remove metabolic waste products, such as urea, creatinine, and electrolytes, that cannot be removed by damaged or failing kidneys, thereby maintaining the body's electrolyte, acid-base and fluid balance. (Daugirdas, Handbook of Dialysis. (Edisi 5), 2020)Hemodialysis is a therapy method that uses a dialysis machine to clean the blood of harmful substances, such as urea, creatinine, and electrolytes, that cannot be removed by damaged or failing kidneys, thereby maintaining electrolyte and acid-base balance and reducing symptoms associated with kidney failure. (Sudoyo, 2020)

Ultrafiltration is the process of transferring fluid from the blood compartment to the dialysate compartment through a semi-permeable membrane due to differences in hydrostatic pressure. The hydrostatic pressure of the blood compartment is positive while the dialysate compartment is negative. When fluid is transferred in the ultrafiltration process, the solution or molecules dissolved in the fluid also move into the dialysate fluid. This process is called convection. This fluid transfer process can remove toxins and excess fluid from the patient's body. (Daugirdas, Handbook of Dialysis. (Edisi 5), 2020)

For patients with kidney failure, hemodialysis is given as a kidney function replacement therapy, which functions to remove metabolic waste and remove toxins such as urea from the body. Increased urea (Sari, 2020)levels can cause complications of uremia toxicity. As stated in the National Guidelines for Health Services in the field of kidney replacement therapy in Indonesia, hemodialysis adequacy is assessed using the Kt/V or URR calculation. "The standard for hemodialysis adequacy in Indonesia is 2 times a week with a Kt/V target of 1.8 and a URR of 80 percent." (IRR, 2018)

Blood flow rate (Quick of Blood / Qb) is the amount of blood that can be flowed in a unit of time minutes (mL / min). The more blood that can be flowed to the dialyzer per minute, the more toxic substances and excess fluids can be removed from the patient's body. Control in hemodialysis patients according to patient needs can be assessed from the adequacy of hemodialysis achieved by hemodialysis patients (Sudoyo, 2020). Blood flow rate (Qb) in hemodialysis is the volume of blood flowing through the dialysis machine per unit of

time, usually measured in mL / min or L / hour. This parameter is important to ensure the effectiveness of the hemodialysis process. (Daugirdas, Hemodialysis Adequacy: A Practical Approach, 2010)

The Qb setting given to the patient is adjusted to the patency of the vascular access, the size of the lumen of the catheter/needle used and taking into account patient comfort. Patient comfort is related to intradialysis complications experienced by the patient such as hypotension, cramps, nausea-vomiting or dizziness. The Qb value usually given to HD patients ranges from a speed of 200 - 300 mL/minute. Based on experience in the room, the range of this Qb value is determined after the patient has gone through the process of 6 HD since the patient underwent HD for the first time, the initial speed given was Qb <200 mL/minute. Furthermore, a speed of between 200 - 300 mL/minute is given until a Qb value is obtained that is close to stable according to the patient's condition. The next HD schedule, Qb settings start in the first minute by giving a Qb of 150 mL/minute. The next fifth minute, Qb is increased according to the usual speed given, which is between 200 - 300 mL/minute. (Pernefri, 2015)

Hemodialysis adequacy can be assessed quantitatively by calculating the Urea Reduction Ratio (URR) or using the Kt/V formula. URR is the reduction of urea in HD patients from predialysis to post dialysis. Kt/V is the ratio of urea clearance and time during HD to the volume of urea distributed in the patient's body. K is the dialyzer urea clearance mL/min), t indicates the duration of HD (minutes) and V is the volume of urea distribution in body fluids (mL) (Kallenbach, Gutch, Stoner, & Corca, 2005). The Pernefri Dialysis Consensus (2003) stated that the ideal Kt/V target is 1.2 (URR 65%) for HD 3X per week for 4 hours per HD and 1.8 for HD 2X per week for 4-5 hours per HD. Charra (2000) stated that there is a positive relationship between adequate dialysis adequacy and the achievement of dialysis goals.

The value of URR is highly dependent on the flow of dialysate fluid, Quick of Blood (QB), type and material of dialyzer, dialyzer reuse and dialyzer surface area. Zyga and Sarafis (2009) also stated that the urea clearance value or RRU value is influenced by blood flow rate , dialysate flow rate, dialyzer membrane permeability and recirculation. Hemodialysis can achieve maximum results if all hemodialysis adequacy parameters can be achieved. One of the parameters of hemodialysis adequacy is the urea reduction ratio (RRU). The recommended RRU by (DOQI, 2006)is at least 65%

During the intra HD process, nurses monitor and regulate Qb with the aim of achieving efficiency during the HD process. Nurses collaborate with the team of doctors and laboratory assistants to determine the achievement of HD adequacy as a form of evaluation of the achievement of the HD dose that has been given. Collaboration with the team of doctors is related to the achievement of HD adequacy and determination of the patient's dose for the next HD, while collaboration with laboratory assistants is related to laboratory examinations

for pre and post HD urea. Several researchers have previously conducted research on the relationship between blood flow velocity and the achievement of URR values in chronic kidney disease (CKD) patients undergoing hemodialysis, therefore researchers want to summarize the literature that aims to identify all relationships related to chronic kidney disease (CKD) patients undergoing hemodialysis. Based on background behind the, so researcher interested to do summary literature regarding the relationship between blood flow velocity and the achievement of patient URR values chronic kidney disease (CKD) undergoing hemodialysis

2. Proposed Method

Searching for articles or journals using predetermined keywords serves to specify the search, making it easier to determine the articles or literature you want to use. The keywords used in compiling the literature review will be described in the following table:

Table 1 Literature review keywords

Chronic Kidney Failure	AND	QB	AND	URR	Connection
OR		OR		OR	OR
CKD		Blood Flow Velocity		*Urea Reduction Ratio*	*Correlation*
OR				OR	
chronic kidney disease				RRU	

Source: Data processed by the author, 2024

2.1 Search Database

Literature review is a comprehensive summary of several research studies that have been determined with a certain theme. The literature search was conducted in December 2024. The data used in compiling this literature review is secondary data, namely data obtained from the results of research that has been conducted by previous researchers. The sources of secondary data obtained are in the form of reputable national and international journal articles with a predetermined theme. The search for articles in this literature review uses several databases with high to low quality criteria, namely ResearchGate , Proquest , and Google Scholar.

2.2 Search Strategy

The search for articles or literature in this study uses the Boolean System (AND and OR) which is used to specify articles or literature, making it easier to determine the articles or literature to be used. Here are some keywords and Boolean systems used as follows

Table 2. Literature Review Keywords

Chronic Kidney Failure	AND	QB	AND	URR	Connection
OR		OR		OR	OR
CKD		Blood Flow Velocity		*Urea Reduction Ratio*	*Correlation*
OR				OR	
chronic kidney disease				RRU	

Source: Data processed by the author, 2024

2.3 Inclusion and Exclusion Criteria

The strategy used to search for articles using the PICOS framework (Chris Schardt, 2007)consists of:

a. Population/problem, namely the population or problem that will be analyzed according to the theme that has been determined in the literature review.

b. ntervention is an action to manage individual or community cases and an explanation of the management of the study according to the theme that has been determined in the literature review.

c. Comparison is an intervention or other management used as a comparison, if there is none, a control group can be used in the selected study.

d. Outcome is the result or output obtained from previous studies that are in accordance with the theme that has been determined in the literature review.

e. Study design is a research design used in compiling literature reviews.

Table 3. Inclusion and Exclusion Criteria with PICOS Format

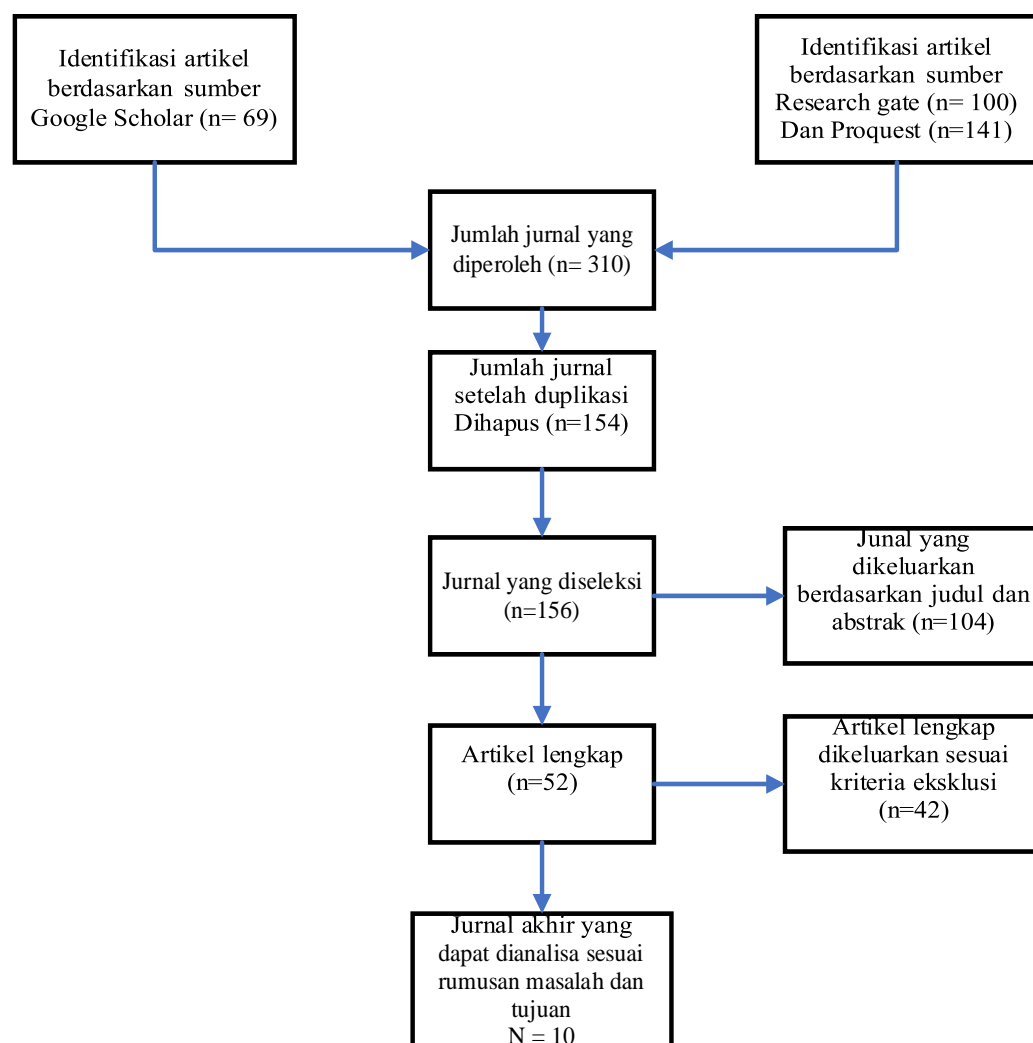| Criteria	Inclusion	Exclusion
Population/Problem	National and international journals related to the research topic, namely: The relationship between blood flow velocity and the achievement of URR	International journals related to research topics, namely: The relationship between blood flow velocity and the achievement of URR values in *chronic kidney disease*

	values in *chronic kidney disease* (CKD) patients undergoing hemodialysis.	(CKD) patients undergoing hemodialysis.
Intervention	No intervention	No intervention
Comparison	there is a comparison factor	There are no comparison factors
Outcome	There is a relationship between blood flow velocity and the achievement of URR values in *chronic kidney disease* (CKD) patients undergoing hemodialysis.	There is no relationship between blood flow velocity and the achievement of URR values in *chronic kidney disease* (CKD) patients undergoing hemodialysis.
Design study	cross sectional, correlation analysis, regression analysis, quantitative and qualitative studies	Systematic/literature review
Publication Year	Articles or journals published from 2019 to 2024	Articles or journals that published before 2019
Language	Indonesian and English	Besides Indonesian and English

Source: Data processed by the author, 2024

2.4 Literature Selection Process

2.4.1 Literature search results

The results of the literature search through publications in three databases, namely Research Gate, Proquest and Google Scholar using keywords that have been adjusted, then the researcher got 310 articles that match the keywords. The search results that have been obtained are then checked for duplication, it was found that there were 154 similar articles so they were removed and 156 articles remained. The researcher then conducted screening based on the title and abstract (n = 104) and full text (n = 52) which were adjusted to the theme of the literature review. Assessment carried out. Based on the eligibility of the inclusion and exclusion criteria, 10 articles were obtained that could be used in the literature review.

Table 4. Review flowchart

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┌─────────────────────────┐                          ┌─────────────────────────┐
│ Identifikasi artikel    │                          │ Identifikasi artikel    │
│ berdasarkan sumber      │                          │ berdasarkan sumber      │
│ Google Scholar (n= 69)  │                          │ Research gate (n= 100)  │
│                         │                          │ Dan Proquest (n=141)    │
└─────────────────────────┘                          └─────────────────────────┘
                │                                                  │
                └──────────────┐          ┌──────────────────────┘
                               ▼          ▼
                        ┌─────────────────────────┐
                        │ Jumlah jurnal yang      │
                        │ diperoleh (n= 310)      │
                        └─────────────────────────┘
                                    │
                                    ▼
                        ┌─────────────────────────┐
                        │ Jumlah jurnal           │
                        │ setelah duplikasi       │
                        │ Dihapus (n=154)         │
                        └─────────────────────────┘
                                    │
                                    ▼
                        ┌─────────────────────────┐        ┌─────────────────────────┐
                        │ Jurnal yang diseleksi   │───────▶│ Junal yang              │
                        │ (n=156)                 │        │ dikeluarkan             │
                        │                         │        │ berdasarkan judul dan   │
                        │                         │        │ abstrak (n=104)         │
                        └─────────────────────────┘        └─────────────────────────┘
                                    │
                                    ▼
                        ┌─────────────────────────┐        ┌─────────────────────────┐
                        │ Artikel lengkap         │───────▶│ Artikel lengkap         │
                        │ (n=52)                  │        │ dikeluarkan sesuai      │
                        │                         │        │ kriteria eksklusi       │
                        │                         │        │ (n=42)                  │
                        └─────────────────────────┘        └─────────────────────────┘
                                    │
                                    ▼
                        ┌─────────────────────────┐
                        │ Jurnal akhir yang       │
                        │ dapat dianalisa sesuai  │
                        │ rumusan masalah dan     │
                        │ tujuan                  │
                        │ N = 10                  │
                        └─────────────────────────┘
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Source: Data processed by the author, 2024

3. Results and Discussion

Based on the results of the journal article search, 10 journals were obtained with the keyword "The relationship between blood flow velocity (QB) and Urea Reduction Ratio (URR) in hemodialysis patients" which have been adjusted to the inclusion criteria that have been set. Overall, each study discusses blood flow velocity (QB) and Urea Reduction Ratio (URR) in hemodialysis patients. The results of the study show similarities in the 10 journals, including the title and objectives of the researcher, the research methods used and the results of the study. Researchers (Silaen, 2019)with the title The effect of determining Quick of Blood (QB) on the success of Urea Reduction Ratio (URR) with the duration of hemodialysis at Murni Teguh Memorial Hospital. Researchers (Fardiansyah, 2024)with the title The relationship between blood flow velocity (QB) and adequacy in patients undergoing hemodialysis therapy. Researchers (Hasan, 2021)with the title The effect of increasing Quick

of Blood (QB) on urea reduction ratio (URR) in clients who are conducting hemodialysis in dustira hospital cimahi.

Researchers (Hanivah, 2019)with the title Quick of Blood and ultrafiltration on urea values in hemodialysis patients. Researchers (Kaban, 2024)with the title Relationship between Quick of Blood (Qb) and hemodialysis adequacy in patients undergoing hemodialysis therapy in the HD room. Researchers with the title Effectiveness of (Haksara, 2021)Quick of Blood (QB) regulation on plasma urea reduction ratio in CKD patients undergoing hemodialysis at RST DR. Soejono Magelang. Researchers (Noee, 2020)with the title Relationship between the filter type and blood flow rate and dialysis adequacy in hemodialysis patients . Researchers (Abdulla, 2020)with the title The effect of blood flow rates on dialysis adequacy and complication in both low and high flux membrane. Researchers(Nurbadriyah W. D., 2023) with the title Correlation between the Quick of Blood and quality of life of chronic kidney disease patient in dialysis therapy in the hemodialysis unit at wava husada hospital. Researchers (Natassya, 2023)with the title Relationship between Quick of Blood (QB) with hemodialysis adequacy in hemodialysis patients at PKU Muhammadiyah Hospital Yogyakarta.

Table 5. Previous research

No	Writer	Year	Vol. No	Title	Method (design, population, variables)	Research result
1	**English: Harsudianto Silaen, Yusrial Tarihoran**	**2019**	**Vol 5. No 2**	**The effect of determining *Quick of Blood* (QB) on the success of Ureum Reduction Ratio (URR) with the duration of Hemodialysis at Murni Teguh Memorial Hospital**	**This type of research is quantitative research with the Quasi Experimental Study method with a total sampling of 160 hemodialysis patients.**	**that the average URR value before hemodialysis was 204.41 and after hemodialysis was 44.51 with a percentage of 78.01% indicating a very significant difference. Based on the results of this study, it shows the average duration of hemodialysis with a time accuracy of 4.391 hours with a Qb speed of 254.63 mL/minute.**
2	**M. Ari Fardiansyah, Oktoruddin Harun, Pandith Aribowo, Suci Rahmadani**	**2024**	**Vol 10, No 1**	**The relationship between blood flow velocity (QB) and adequacy in patients undergoing**	**The research design used cross-sectional with 62 respondents.**	**The average Qb value was 234.9 mL /minute with a standard deviation/SD of 25.834. The average hemodialysis**

				hemodialysis therapy		adequacy value was 1.810 with an SD of 0.3212 . The results of statistical tests showed no significant relationship between Qb and hemodialysis adequacy (p *value* = 0.933). Conclusion: Vascular access patency, body weight, intradialysis complications, and catheter lumen size can be used as guidelines in setting Qb. Nurses need to pay attention to these Qb setting guidelines to achieve optimal hemodialysis adequacy.
3	smafiaty, R. Acep Hasan, and Eka Winarsih	2021	Vol. 4, No. 1	The effect of increasing *Quick of Blood* (QB) on ureum reduction ratio (URR) in clients who are conducting hemodialysis in Dustira Hospital Cimahi	The research design used in this study was quasi-experimental. The population in this study was 170 patients undergoing hemodialysis.	The results showed that post-hemodialysis urea with QB 200ml/minute decreased by 64%, while QB 250ml/minute decreased urea by 71%. Statistical tests showed that there was a significant difference in urea values before and after hemodialysis with an increase in QB (p = 0.001)
4	Ita Ulva Hanivah, Santi Herlina	2019	Vol. 9 No. 1	*Quick of Blood* and ultrafiltration on urea values in hemodialysis patients	This research uses a descriptive analytical research method with a design retrospective, namely using medical record data for data	The results of the relationship between UF and post HD urea values had a moderate and negative relationship (r = 0.335), and the second measurement

					from the past 6 months during hemodialysis.	was a P value of 0.005 (α 0.05), it is recommended that quickblood and ultrafiltration administration can provide optimal effects on urea values.
5	Karmila Br Kaban, Eva Kristin Marbun, Rizki Syadiyah Nasution, Febri Nanda Aulia, Ria Juwinta Harefa, Karmelinda	2024	Vol 4	The relationship between *Quick of Blood* (Qb) and hemodialysis adequacy in patients undergoing hemodialysis therapy in the HD room	The method used in this study is quantitative using a cross-sectional design. The type of sample used is used by researchers, namely saturated samples where the total population used as a sample is 100 people.	There is a relationship between blood flow velocity and urea reduction ratio in patients receiving hemodialysis therapy.
6	Endro Haksaraa, Ainnur Rahmanti	2021	Vol 6, No 1	Effectiveness of *Quick of Blood* (QB) regulation on plasma urea reduction ratio in CKD patients undergoing hemodialysis at RST DR. Soejono Magelang	Analytical survey research with cross sectional research design	There is a significant difference in value between QB 150 ml/minute with 175 ml/minute and 200 ml/minute. There is an effect of QB settings on RRU values. QB settings are effective on RRU values
7	Mohsen Nezami Ghale Noee, Jalil Hasani, Saeed Erfanpoor, Hedayat Jafari	2020	Vol 7, No 2	Relationship between the filter type and blood flow rate and dialysis adequacy in hemodialysis patients	This correlational study was conducted in 2016 at the teaching hospital of Mazandaran University of Medical Sciences.	Of the total 185 patients, 101 were male and 84 were female, with a mean age of 57.2 ± 0.7 years. Dialysis adequacy in high-flux and low-flux filters was 79% and 1.5 % based on KT/V index and 70.6% and 0% based on URR index, respectively . A statistically significant relationship was

						found between filter type and blood flow rate with KT/V and URR criteria (P < 0.001).
8	JE Abdulla JK Shakor, AF Shallal	2020	Vol 14	The effect of blood flow rates on dialysis adequacy and complications in both low and high flux membranes	The research method used in this study was a quasi-experimental design. Researchers selected 96 hemodialysis sessions from different patients.	Similarly, high URR was seen at blood flow rate of 300ml/min on high flux dialysis membrane, which was 64.57 ± 6.82. The statistical difference was highly significant (p value=0.000).
9	Wiwit Dwi Nurbadriyah, Nursalam Nursalam, Ika Yuni Widyawati, Hardiyanto, Ardhiles Wahyu Kurniawan, Devi Santi Fatmawati	2023	Vol 3, No 2	Correlation between the *Quick of Blood* and quality of life of chronic kidney disease patients in dialysis therapy in the hemodialysis unit at wava husada hospital	This study uses a quantitative approach with a correlational method. The population in this study were patients with chronic kidney disease (CKD) undergoing hemodialysis at Wava Husada Hospital, Kepanjen, Malang, totaling 122 patients.	Data analysis using Pearson test. The results of the analysis showed a p value of 0.037, so there is a significant correlation between Quick of Blood (QB) and the quality of life of hemodialysis patients. Most respondents were found to have a moderate quality of life.
10	Fannya Natassya, Prof. Dr. apt. Dr. apt. Fita Rahmawati, Sp.FRS.	2023		The relationship between *Quick of Blood* (QB) and hemodialysis adequacy in hemodialysis patients at PKU Muhammadiyah Hospital, Yogyakarta	This study is a non-experimental study with a cross-sectional approach and prospective data collection at the hemodialysis unit of PKU Muhammadiyah Hospital Yogyakarta in March 2023.	There is a Relationship The results of the study showed that out of 74 respondents, there were 75.7% of respondents with *Quick of Blood* 200 mL/minute and 24.3% of respondents with *Quick of Blood* <200 p=0.02)

Source: Data processed by the author, 2024

Analysis of the relationship between blood flow velocity (QB) and URR values in hemodialysis patients Based on 10 articles that have discussed the relationship between blood flow velocity (QB) and URR values in hemodialysis patients ((Silaen, 2019) (Nurbadriyah W. D., 2023) (Noee, 2020) (Natassya, 2023) (Kaban, 2024) (Hasan, 2021) (Fardiansyah, 2024) (Hanivah, 2019) (Haksara, 2021) (Abdulla, 2020), Of the 10 journals, there are 3 journals that discuss the determination of Quick of Blood (QB) on the success of Urea Reduction Ratio (URR) in hemodialysis patients. In the study (Silaen, 2019)of the Effect of Determining Quick of Blood (QB) on the Success of Urea Reduction Ratio (URR) with the Duration of Hemodialysis at Murni Teguh Memorial Hospital, the author used a quantitative method with the Quasi Experimental Study method with a total sampling of 160 hemodialysis patients and there was a significant relationship between the determination of Quick of Blood (Qb) on the Success of Urea Reduction Ratio (URR) with the Duration of Hemodialysis at Murni Teguh Memorial Hospital.

In research(Hasan, 2021) The effect of increasing Quick of Blood (QB) on urea reduction ratio (URR) in clients that are conducting hemodialysis in dustira hospital cimahi, the author used a quasi-experimental study method by taking a sample of 170 patients undergoing hemodialysis and there was a relationship with an increase in blood flow velocity during hemodialysis which had a significant effect on decreasing urea levels. In the study of the Effectiveness of (Haksara, 2021)Quick of Blood (QB) regulation on the plasma urea reduction ratio in CKD patients undergoing hemodialysis at RST DR. Soejono Magelang, the author used a cross-sectional research method by taking a sample of 45 patients undergoing hemodialysis and there was a relationship with an increase in blood flow velocity to the URR value. Where the higher the blood flow velocity, the decrease in URR is very effective and significant.

The similarities of the three of the 10 journals show that there are similarities in the samples used in the study, namely CKD patients undergoing Hemodialysis. In a study (Silaen, 2019)entitled The Effect of Determining Quick of Blood (QB) on the Success of Ureum Reduction Ratio (URR) with the Duration of Hemodialysis at Murni Teguh Memorial Hospital, it is said that the URR value is highly dependent on the flow of dialysate fluid, Quick Blood (QB), type and material of the dialyzer, reuse of the dialyzer and surface area of the dialyzer. This study is in line with (Zyga, 2009)also stating that the urea clearance value or URR value is influenced by blood flow velocity, dialysate flow velocity, dialyzer membrane permability and recirculation. Hemodialysis can achieve maximum results if all hemodialysis adequacy parameters can be achieved and one of the adequacy parameters of hemodialysis is the urea reduction ratio (URR).

Of the 10 journals, 5 of them discuss blood flow velocity (QB) with adequacy in hemodialysis patients undergoing hemodialysis. In the study (Fardiansyah, 2024)of the relationship between blood flow velocity (QB) and adequacy in patients undergoing

hemodialysis therapy, the author used a cross-sectional research method with a sample size of 62 patients undergoing hemodialysis and the results of statistical tests showed no significant relationship between Qb and hemodialysis adequacy (p value = 0.933), however, vascular access patency, body weight, intradialysis complications, and catheter lumen size can be used as guidelines in setting Qb to achieve optimal hemodialysis adequacy.

In the study of (Kaban, 2024)the Relationship between Quick of Blood (Qb) and hemodialysis adequacy in patients undergoing hemodialysis therapy in the HD room, the author used a quantitative research method with a cross-sectional design with a sample size of 100 patients undergoing hemodialysis and the results of statistical tests showed a relationship between blood flow velocity and urea reduction ratio for patients receiving hemodialysis therapy. Based on the researcher's assumption, the relationship between Quick of Blood and hemodialysis adequacy is caused by an increase in the Quick of Blood value which can be useful in increasing the urea reduction ratio value so that the patient's hemodialysis adequacy can be achieved. However, not only the Quick of Blood value is a factor , nurses must also pay attention to the length of hemodialysis time, the quality of the dialysis machine, and the speed of dialysis. Plus cooperation between nurses and patients so that therapy discipline can be ideal and dialysis adequacy is achieved. In the study(Abdulla, 2020) The effect of blood flow rates on dialysis adequacy and complication in both low and high flux membranes, the author used a quasi-experimental research method with a sample size of 96 patients undergoing hemodialysis, and the results of statistical tests showed a significant relationship between blood flow rates and hemodialysis adequacy by increasing dialysis efficiency, using high flux membranes and achieving high URR values.

In the study of (Natassya, 2023)the Relationship between Quick of Blood (QB) and hemodialysis adequacy in hemodialysis patients at PKU Muhammadiyah Hospital Yogyakarta, the author used a cross-sectional research method with a sample size of 75 patients undergoing hemodialysis and the results of statistical tests showed that there was a Relationship between Quick of Blood (QB) and hemodialysis adequacy by considering QB > 200 ml/minute can increase the efficiency of reducing urea levels. In the study(Nurbadriyah W. D., 2023) Correlation between the Quick of Blood and quality of life of chronic kidney disease patients in dialysis therapy in the hemodialysis unit at wava husada hospital, the author uses a quantitative approach research method with a correlational method with a sample of 112 patients undergoing hemodialysis, and the results of statistical tests Data analysis using the Pearson test showed a p value of 0.037, which indicates a significant correlation between blood flow velocity (QB) and the quality of life of hemodialysis patients. Most respondents have a moderate quality of life.

The similarities of the five of the 10 journals show that there are similarities in the samples used in the study, namely CKD patients undergoing Hemodialysis. In the study of (Kaban, 2024)the Relationship between Quick of Blood (Qb) and hemodialysis adequacy in

patients undergoing hemodialysis therapy in the HD room, it says that hemodialysis adequacy is the adequacy of the dialysis dose achieved during the hemodialysis process. Hemodialysis adequacy is achieved when the client feels healthy, comfortable and can survive despite suffering from end-stage kidney disease. The success of hemodialysis adequacy is influenced by technical aspects such as vascular access, duration of hemodialysis, quick blood and quick dialysate rotation, length of hemodialysis therapy, achievement of URR values and use of dialyzer machines.

This study is supported by the results of researchers (Karyadi, 2022)who stated that there is a significant relationship between Quick of Blood and hemodialysis adequacy so that the optimal adequacy level is achieved, then the quality of the hemodialysis process will increase significantly. Based on the researcher's assumption, (Kaban, 2024)the relationship between Quick of Blood and hemodialysis adequacy is caused by an increase in the Quick of Blood value which can be useful in increasing the urea reduction ratio value so that the adequacy of patient hemodialysis can be achieved. However, not only the Quick of Blood value is a factor, nurses must also pay attention to the length of hemodialysis time, the quality of the dialysis machine, and the speed of dialysis. It can be concluded from 10 journals that there are similarities in the keywords blood flow velocity (QB), Ureum Reduction Ratio (URR) and Hemodialysis, The type of research approach uses a correlation design with a cross-sectional approach, quasi-experimental and the samples used are Chronic Kidney Disease patients undergoing Hemodialysis. The results of the study are that there is a relationship between blood flow velocity (QB) and the Ureum Reduction Ratio (URR) value, namely blood flow velocity (QB), dialysate flow velocity (QD), dialyzer membrane permeability, recirculation, hemodialysis duration. While the differences from 10 journals are several differences, namely in the number of samples used and differences in several respondent variables in each journal.

4. Discussion

In this chapter , the results of the study will be presented after data analysis has been carried out first, the results of the study are presented to determine the relationship between blood flow velocity (Qb) and URR values in hemodialysis patients . Hemodialysis adequacy is the adequacy of the dialysis dose achieved during the hemodialysis process. Hemodialysis adequacy is achieved when the client feels healthy, comfortable and can survive despite suffering from end-stage kidney disease. The success of hemodialysis adequacy is influenced by technical aspects such as vascular access, duration of hemodialysis, quick blood and quick dialysate rotation , length of hemodialysis therapy, achievement of URR values and use of dialyzer machines. This study is supported by the results of researchers (Karyadi, 2022)who stated that there is a significant relationship between Quick of Blood and hemodialysis adequacy so that an optimal level of adequacy is achieved, then the quality of the hemodialysis

process will increase significantly. Based on the researcher's assumption, (Kaban, 2024)the relationship between Quick of Blood and hemodialysis adequacy is caused by an increase in the Quick of Blood value which can be useful in increasing the urea reduction ratio value so that the patient's hemodialysis adequacy can be achieved. However, it is not only the Quick of Blood value that is a factor, nurses must also pay attention to the length of hemodialysis time, the quality of the dialysis machine, and the speed of dialysis.

Urea clearance value or URR value is influenced by blood flow rate, dialysate flow rate, dialyzer membrane permeability and recirculation. Hemodialysis can achieve maximum results if all hemodialysis adequacy parameters can be achieved and one of the hemodialysis adequacy parameters is the urea reduction ratio (URR). Hemodialysis adequacy can be quantitatively measured by examining the Urea Reduction Ratio (URR) which measures the percentage of urea cleared in a single hemodialysis procedure. Hemodialysis can achieve maximum results if all hemodialysis adequacy parameters can be achieved. One of the hemodialysis adequacy parameters is the urea reduction ratio (RRU) which is recommended by (Pernefri, 2015)is at least 65% and where the higher the blood flow rate, the more effective and significant the decrease in URR is. Higher Qb increases hydrostatic pressure, facilitating urea elimination, higher Qb increases renal perfusion, improving renal function. Higher Qb reduces vascular resistance, improving blood flow. optimal range of QB:

a. Qb ≥ 300 mL/min: optimal urea removal efficiency.
b. Qb 200-300 mL/min: urea removal efficiency is sufficient.
c. Qb < 200 mL/min: low urea removal efficiency

The results of this research review conclude that the relationship between blood flow velocity (QB) and URR values in hemodialysis patients can improve the quality and adequacy of hemodialysis in hemodialysis patients, where the higher the blood flow velocity, the more effective and significant the decrease in URR. Higher Qb increases hydrostatic pressure, facilitates urea removal, higher Qb increases renal perfusion, improves renal function. Higher Qb reduces vascular resistance, improves blood flow. However, to improve the success of hemodialysis adequacy is influenced by technical aspects such as vascular access, duration of hemodialysis, quick blood and quick dialysate rotation , length of hemodialysis therapy, achievement of URR value and use of dialyzer machine.

5. Conclusions

Hemodialysis adequacy is the adequacy of the dialysis dose achieved during the hemodialysis process. Hemodialysis adequacy is achieved when the client feels healthy, comfortable and can survive despite suffering from end-stage kidney disease. The success of hemodialysis adequacy is influenced by technical aspects such as vascular access, duration of hemodialysis, quick blood and quick dialysate rotation , length of hemodialysis therapy, achievement of URR value and use of dialyzer machine. Hemodialysis adequacy can be

assessed quantitatively by calculating the Urea Reduction Ratio (URR) or using the Kt/V formula. URR is the reduction of urea in HD patients from predialysis to post-dialysis.

Based on the results of the analysis and summary of the discussion of literature reviews from 10 previous research journals, it was found that the relationship between blood flow velocity (QB) and URR values in hemodialysis patients can improve the quality and adequacy of hemodialysis in hemodialysis patients, where the higher the blood flow velocity, the decrease in URR is very effective and significant. Higher Qb increases hydrostatic pressure, facilitating urea elimination, higher Qb increases renal perfusion, improving renal function. Higher Qb reduces vascular resistance, improving blood flow.

Based on the research results (Fardiansyah, 2024), there is no significant relationship between blood flow rate and URR, but it can be influenced by technical aspects such as vascular access, duration of hemodialysis, quick blood and quick dialysate rotation , length of hemodialysis therapy, achievement of URR value and use of dialyzer machine.

6. Suggestion

The researcher's suggestion to health workers on duty in the Hemodialysis room is to provide education about hemodialysis that is easy to understand so that they can deal with possible side effects and can improve hemodialysis adequacy. The results of this literature study are expected to be basic data for further research, and further research is needed on the speed of blood flow to urr and other hemodialysis adequacy.

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