

**Risk Factors and Drug Therapy Monitoring in CKD Patients
(Chronic Kidney Disease)****Roslina Patandung¹, Riski Ishariyanto², Debi Mariska Sune³**

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roslianapatandung94@gmail.com¹, riskiishariyanto@gmail.com², debby.sune@gmail.com³**Keywords**Chronic Kidney Disease,
Drug-Related Problems,
Medication Therapy
Management, Risk
Factors, Patient
Education**Abstract**

Chronic Kidney Disease (CKD) is a global health problem that affects millions of people, characterized by a progressive decline in kidney function. This study aims to determine Drug Related Problems (DRPs) in the treatment management of CKD (Chronic Kidney Disease) patients. This study used the literature review method. The research results from the collected literature will be summarized and presented in the form of descriptive analysis. Researchers will conduct literature searches through online sites such as Google Scholar, PubMed, ResearchGate, Elsevier, and NCBI. The keywords used are "CKD risk factors" and "drug therapy for CKD patients". The results of the search for relevant literature will be collected and selected according to the inclusion criteria. The research results from the collected literature will be presented in the form of a descriptive table. The table will include information such as author, year of publication, article title, and summary of the study results. The prevalence of drug-related problems (DRP) in CKD patients ranges from 12% to 87%. Commonly found problems include ineffective treatment, inappropriate drug selection, and drug dosing issues. Regular drug monitoring and dose adjustment are essential to reduce adverse drug reactions and improve patient outcomes. Effective drug therapy management and patient education are essential to improve the quality of care and life of CKD patients. In conclusion, this study emphasizes the importance of identifying and addressing drug-related problems (DRPs) to improve treatment effectiveness in CKD patients. Close drug monitoring and comprehensive patient education are key components in the optimal management of CKD.

Corresponding Author : Roslana Patandung
E-mail: roslianapatandung94@gmail.com**INTRODUCTION**

Chronic kidney disease (CKD) is a global health problem that affects millions of people worldwide. CKD is characterized by a progressive decline in kidney function over months to years (Rosdewi et al. 2023). Kidney function disorders are characterized by a decrease in glomerular filtration rate (GFR) of less than 60 mL/min/1.73m² (0.58 mL/s/m²). The main risk factors for CKD include diabetes mellitus, hypertension, and obesity, family history of kidney disease, smoking, and use of nephrotoxic drugs (which damage the kidneys).

CKD can cause various serious complications such as chronic kidney failure, cardiovascular disease (such as hypertension and coronary heart disease), electrolyte disorders (such as hyperkalemia) and disorders of the body's acid-base balance (metabolic acidosis) (Rahman, 2020). Management of CKD includes control of modifiable risk factors (such as blood sugar control in diabetes sufferers, blood pressure control in hypertension sufferers), monitoring and adjusting medication doses, as well as patient education about the importance of a healthy lifestyle and adherence to treatment (Munir et al. 2022).

Decreased kidney function not only causes disturbances in electrolyte and fluid balance, but also causes changes in physiology and metabolites that can change the pharmacokinetics and pharmacology of drugs (Hasballah, 2022) . Pharmacokinetic processes such as drug distribution and elimination may be altered due to renal failure (Wanadiatri, 2019) . Both therapeutic and toxic responses may be altered due to changes in drug sensitivity at the receptor site (Naidoo and Meyers 2015). Because of this, administering drugs that are contraindicated to patients with reduced kidney function should be avoided so as not to worsen kidney function.

Patients with chronic renal failure are often given drugs that can be harmful to the kidneys and are often used in combination. Treatment complications in patients with chronic kidney disease can increase the risk of Drug Related Problems (DRP) (Kardela et al. 2022) . Drug Related Problems (DRP) is a drug-related condition that can significantly affect desired clinical health outcomes (Al-Worafi 2020).

The prevalence of DRP in CKD is reported to be between 12 and 87 %. The most common DRPs include ineffective treatment, inappropriate drug choice and dosing problems (Suhadi et al. 2020) . Drug Therapy Monitoring (PTO) is a process that includes activities to ensure safe, effective and rational pharmacotherapy for patients with the aim of increasing the effectiveness of treatment, detecting the presence of DRP and minimizing unwanted drug reactions (ROTD).

The Pharmaceutical Care Network Europe (PCNE) classifies DRP as adverse reactions, dosage problems, drug selection problems, drug interactions, drug use problems, problems with the duration of therapy, problems with the choice of drug form as well as problems with patient compliance with taking medication (Adiana & Maulina, 2022) . DRP can occur due to the use of quite a lot of drugs in one therapy or can be called polypharmacy. Polypharmacy in chronic diseases is difficult to avoid because the therapy is complex.

This study aimed to determine Drug Related Problems (DRPs) in the medication management of CKD (Chronic Kidney Disease) patients.

RESEARCH METHODS

The research method used is the literature review method. The research was conducted by reviewing the literature to obtain references that are in accordance with the research topic. This method is used to conduct a critical review, ideas, findings, and knowledge to draw theoretical conclusions that will be used as a reference in further research. This literature review method will be summarized in a descriptive analysis according to the needs of the researcher based on the findings in each literature obtained. The results of the research are organized in such a way and presented to the reader in an easy-to-understand form.

This research uses a literature search strategy through online media which includes, dancing on Google scholar, PubMed, Research gate, Elsevier, NCBI. The following is the address of the search site that will be used by researchers in conducting literature studies:

Name Site	Address site
Google Scholar	https://scholar.google.co.id/
PubMed	https://pubmed.ncbi.nlm.nih.gov
ResearchGate	https://www.researchgate.net
Elsevier	https://www.elsevier.com
NCBI	https://www.ncbi.nlm.nih.gov

The keywords that will be used as search alternatives are keywords that are adjusted to the research title, namely CKD risk factors and drug therapy for CKD patients.

The research data that has been collected will be curated or collected according to the research method and will be summarized in the form of a narrative based on the group of research results. After the process of research duration and grouping of studies according to the inclusion criteria and methods used. Researchers will summarize and collect study description data in tabular form.

The study description table will describe an unbiased summary of research results which includes the name of the researcher, year of publication, and journal of publication, title of the research article, and a summary of the study results. The results of the summary in tabular form will later be reviewed more clearly the research methods, research process, and research results obtained from the full text research articles.

RESULTS AND DISCUSSION

Article Selection Results

This research uses the PICOS framework method to search for articles by selecting and collecting articles based on five components of suitability to the research topic. These components are as follows:

1. Population, namely the population or subjects targeted are sufferers of CKD (chronic kidney disease) (Febriyantara et al. 2016) .
2. Intervention is an intervention in the form of monitoring drug therapy
3. Comparative is a comparison which in this case compares with other interventions in the form of risk factors for CKD patients
4. Outcomes are the results obtained from interventions in the form of monitoring therapy to avoid DRP and the occurrence of unwanted drug reactions (ROTD) so as to improve the quality of service and quality of life of patients (Aprianti et al. 2023).
5. Study Design is a research method and design that focuses on intervention research design.

Research articles curated and collected by researchers from various sources using keywords in searches for each site. After the article search was carried out, articles were collected to be studied and analyzed using the PICOS framework method and presented in the form of a descriptive review of literature analysis.

Article Description

A total of 5 articles collected from several journal search sites were then reviewed and analyzed. The research articles collected range from 2019 to the most recent year 2023. The research articles collected are then summarized in the following table.

Journal 1	
Journal Title	Therapy Monitoring of Patients Suffering from CKD and Hypertension at One of the Hospitals in Bandung
Writer	Elsa D. Cristin, Hasna S. Zahra, Gofarana Wilar, Anggi Setiadi
Year	2022
Journals, Volumes & Numbers	Pharmaca Vol. 20, No. 2
Journal link	https://journal.unpad.ac.id/farmaka/article/viewFile/39722/pdf
Introduction	The prevalence of DRP in CKD is reported to be between 12 and 87 %. The most common DRPs include ineffective treatment, inappropriate drug choice and dosing problems. Drug Therapy Monitoring (PTO) is a process that includes activities to ensure safe, effective and rational pharmacotherapy for patients with the aim of increasing the effectiveness of treatment, detecting the presence of DRP and minimizing adverse drug reactions (ROTD).
Research purposes	Considering the high risk of possible Drug Related Problems (DRP) in patients with CKD, Drug Therapy Monitoring (PTO) is carried out at hospitals in Bandung to determine the presence of DRP or adverse drug reactions (ROTD) in patients.
Research methods	The research is descriptive in nature and was carried out retroactively on data from inpatients who received drug therapy monitoring by pharmacists at Hospital assessment sheet using the inpatient activity interview method. Analyzed descriptively with a pharmacist.
Results	Drug therapy monitoring (PTO) was carried out on a patient named Mrs. LBZ by a pharmacist at the hospital with complaints of feeling weak and tight since the last week and getting worse since the last two days. Patients

Conclusion	complain of pain in the pit of the stomach as well as nausea and vomiting after eating. The patient also experienced bleeding from the birth canal for the past week. Doctors diagnosed chronic kidney failure with hemodialysis and pulmonary edema. The action taken on the patient was hemodialysis because the patient was experiencing stage V chronic kidney failure. The patient's hypertension condition was treated by administering amlodipine and a diuretic drug, namely furosemide, to treat edema. Based on Drug Therapy Monitoring carried out in patients with chronic renal failure with metabolic acidosis and additional diagnosis of anemia, it was successful and no side effects and reactions to drug therapy were reported. The hemodialysis procedure was successful and the patient's symptoms of shortness of breath were reduced. The patient's laboratory data also showed significant improvement
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Journal 2

Journal Title	Evaluation of Drug Use in Chronic Kidney Failure Patients Undergoing Hemodialysis at Toto Kabila Hospital for the 2017-2018 Period
Writer	Teti Sutriyati Tuloli, Madania, Moh Adam Mustapa, Evania P. Tuli
Year	2019
Journals, Volumes & Numbers	Harapan Bersama Tegal Polytechnic Journal Vol.8, No.2
Journal link	https://repository.ung.ac.id/get/karyailmiah/3901/Evaluation-cepatan-obat-pada-patient-gagal-ginjal-kronik-yang-menjalani-hemodialysis-di-rsud-toto-kabila-period-2017-2018.pdf
Introduction	Chronic kidney disease (CKD) is a global public health problem with increasing prevalence and incidence of kidney failure, poor prognosis and high costs. The prevalence of CKD increases with the increasing number of elderly people and the incidence of diabetes mellitus and hypertension. The province with the highest prevalence is Central Sulawesi at 0.5%, followed by Aceh, Gorontalo and North Sulawesi at 0.4% each. Chronic kidney disease is usually accompanied by various complications. Some potential complications in patients with chronic kidney disease include hyperkalemia, heart disease, hypertension, anemia, and bone disease. To overcome the problems above, there are several treatments to deal with CKD cases, namely hemodialysis, peritoneal dialysis and kidney transplantation. From the medical record data of chronic kidney failure patients undergoing hemodialysis at Toto Kabila Regional Hospital for the use of medication in the form of antihypertensive drugs, antibiotics, analgesics-antipyretics, antiemetics, antihistamines, anti-ulcers, anti-anemia, anti-gout, vitamins, anti-anginal, anti-diabetic, anti-tussive, anti-anxiety, anti-tuberculosis, NSAIDs and others. Therefore, researchers want to evaluate the use of drugs with the aim of seeing which drugs have a good therapeutic effect in accordance with treatment guidelines for chronic kidney failure patients undergoing hemodialysis therapy based on four criteria, namely the right patient, the right drug, the right indication and the right dose.
Research purposes	To evaluate the use of drugs in CKD patients on hemodialysis based on four aspects, namely the right patient, the right drug, the right indication and the right dose according to standard therapy.
Research methods	The research method used was descriptive using a <i>cross sectional design</i> with retrospective data collection. The research data source is secondary data obtained from medical records and registration books for chronic kidney failure patients undergoing hemodialysis at Toto Kabila Regional Hospital for the period January 2017 to October 2018. Sampling was carried out using a <i>purposive sampling method</i> from medical record data that met the inclusion criteria, namely patients more than 18 years old, diagnosed with chronic kidney failure and undergoing hemodialysis therapy, outpatient, receiving drug therapy, patient data is complete and readable. Exclusion criteria were missing medical record data and patients who received compounded drugs. Analyzed univariately where the data obtained presented and reported in the form of

Results	percentages containing tables, figures and narratives. The population of chronic kidney failure patients undergoing hemodialysis at Toto Kabila Regional Hospital during the period January 2017 – October 2018 was 103 patients with a total sample of 43 who met the inclusion criteria. In this study, the value of drug use based on the patient's accuracy was 100% because all the drugs prescribed were in accordance with the patient's pathological and physiological conditions and did not cause contraindications for the patient. Appropriate medication was 86.05% and inappropriate medication was 13.95%. Inappropriate drugs include amlodipine, captopril and valsartan, diclofenac sodium, and ondansetron. The value of correct indication was 83.72% and incorrect indication was 16.28%. Of the prescriptions given to patients, there were 7 cases of inaccurate indications, namely untreated hypertension and urticaria, untreated itching, untreated swollen feet, two cases of untreated fever, untreated cough, untreated abdominal pain and untreated low back pain. Dosage accuracy in prescriptions for CKD patients was 53.49%, while dose accuracy in prescriptions was 46.51% for drugs with incorrect doses, including calfera, folic acid and ketosteril.
Conclusion	Based on the results of research conducted regarding the evaluation of drug use in chronic kidney failure patients undergoing hemodialysis at Toto Kabila Regional Hospital for the period January 2017 – October 2018, which was reviewed from several aspects as follows: 1. Based on the exact aspect of the patient, a value of 100% was obtained. 2. Based on the aspect of appropriate medication, the value for appropriate medication was 86.05% and inappropriate medication was 13.95%. 3. Based on the exact indication aspect, the value for correct indication was 83.72% and incorrect indication was 16.28%. 4. Based on the exact dose aspect, the correct dose value was 51.16% and the incorrect dose value was 48.84%.

Journal 3

Journal Title	Risk Factors for Chronic Kidney Disease Sufferers in the Medical and Surgical Emergency Room at Dr. Soedono Madiun
Writer	Salsabila Qothrunnada, Dewi Rachmawati, Mujito
Year	2023
Journals, Volumes & Numbers	<i>Journal of Borneo Holistic Health</i> Vol.6, No.2
Journal link	http://jurnal.borneo.ac.id/index.php/borticalth/article/download/4303/2579
Introduction	In 2017, the global prevalence of <i>chronic kidney disease</i> (CKD) was 9.1% or around 700 cases. Kovesdy (2022) stated that CKD is the number 110 cause of death in the world and in Indonesia it ranks number 10 of the top 50 causes of death with a percentage of 2.54%. The prevalence of kidney failure in Indonesia in men is higher (0.3%) compared to women (0.2%). Many factors cause kidney failure rates, such as factors that can be changed and cannot be changed. Factors that can be changed include diabetes mellitus, hypertension, obesity, and smoking. Factors that cannot be changed include family history of disease, gender, ethnicity, age etc. CKD ranks 6th out of the 10 most common cases of disease in the Medical and Surgical Emergency Room at RSUD dr. Soedono Madiun with a total of 977 patients
Research purposes	To determine the risk factors for <i>Chronic Kidney Disease</i> in patients treated in the medical and surgical emergency room at RSUD Dr. Soedono Madiun
Research methods	The design of this study was quantitative descriptive, with a population of all CKD patients treated in the Medical and Surgical Emergency Room at RSUD dr. Soedono Madiun from February to March 2023 a total of 30 respondents. The samples in this study were CKD patients or their families who were treated in a room with inclusion criteria (kidney damage lasting 3 months or more, glomerular filtration rate (GFR) < 60 ml/minute/ 1.73 m ² , patients with decreased urine output, shortness of breath breathing, nausea, weakness, pain and edema) and with exclusion criteria (patients with no kidney damage

	> 3 months and GFR > 60 ml/minute/ 1.73 m ²). The sample in this study was 28 people. The sampling technique used was <i>purposive sampling</i> with data collection instruments in the form of interview sheets, observations and documentation studies.
Results	Based on the research carried out, it was interpreted that the highest age of people suffering from chronic kidney disease was 15-54 years old with 18 (60%) respondents, the most common symptom was shortness of breath with 24 (80%) respondents followed by edema and nausea. 10 (33%) respondents each. The most modifiable risk factor for chronic kidney disease is hypertension with 25 (83%) respondents and the least is smoking with 3 (10%) respondents. Meanwhile, the risk factor that cannot be changed most is age with a total of 9 (30%) respondents and the least is family history with a total of 1 (3%) respondents. Risk factors for chronic kidney disease aged 15-54 years in the Medical and Surgical Emergency Room at RSUD dr. In Soedono Madiun, hypertension was the highest number of 6 (21%) respondents, and those aged >54 years were most likely to have diabetes mellitus, hypertension, numbering 2 (6%) respondents.
Conclusion	CKD sufferers have modifiable risk factors such as hypertension, obesity and smoking. And risk factors that cannot be changed such as age, certain diseases and family history. Ages 15-54 years, the highest risk factor for CKD is hypertension, 6 (21%) respondents, this is due to unhealthy lifestyle patterns and lifestyles, and the highest risk factors for ages > 54 years are diabetes mellitus, hypertension, and also age 2 (6%).) respondents because many elderly people experience complications from previously suffered illnesses.

Journal 4

Journal Title	Description of Medication Use for Chronic Kidney Disease Patients in the Inpatient Installation of PKU Muhammadiyah Gamping Hospital
Writer	Yulia Indah Widiyanti, Supadmi Woro
Year	2021
Journals, Volumes & Numbers	Farmagazine Journal Vol. 8, No. 2
Journal link	https://media.neliti.com/media/publications/455553-none-c299d99c.pdf
Introduction	Decreased kidney function not only causes disturbances in electrolyte and fluid balance, but also causes changes in physiology and metabolites that can change the pharmacokinetics and pharmacology of drugs. Pharmacokinetic processes such as drug distribution (and elimination) can be altered by renal failure. Both therapeutic and toxic responses can be altered due to changes in drug sensitivity at the receptor site. Because of this, administration of contraindicated drugs to patients with reduced renal function should be avoided. worsening kidney function
Research purposes	To find out the characteristics of Chronic Kidney Disease (CKD) patients, drug classes, types of drugs and drugs that are contraindicated in CKD patients at the PKU Muhammadiyah Gamping Hospital Inpatient installation
Research methods	The research carried out was observational research where the results were displayed descriptively with retrospective data collection. The data source in this research is medical records to determine the patient's condition and medication use in chronic kidney disease patients at PKU Muhammadiyah Gamping Hospital for the period January to December 2019. The sampling technique used in this research is <i>non-probability sampling with a purposive sampling</i> method.
Results	In the use of drugs given to 41 patients diagnosed with chronic kidney disease at PKU Muhammadiyah Gamping Hospital, there were a total of 11 groups of therapy, 66 types of drugs with a total of 305 drug administrations. The highest number of medications used by chronic kidney disease patients during treatment was 6 – 10 medications (39.02%).

Tabel 4. Jumlah Penggunaan Obat Penyakit Ginjal Kronik di RS PKU Muhammadiyah Gamping

Golongan obat	Jenis obat	Kontraindikasi	
		IONI	DIH
NSAID	Ketorolac	✓	✓
	Asam mefenamat	✓	✓
Diuretik kalium	hemat Spironolactone	✓	✓
Khelator senyawa kompleks	Sukraifat	✓	-
Analgesik opioid	Tramadol	✓	-

Conclusion

NSAIDs can cause sodium and water retention, worsen kidney function, increase the risk of gastrointestinal bleeding. Administration of potassium-sparing diuretic drugs is contraindicated because of the high risk of hyperkalemia. Spironolactone is not recommended in patients with CKD stages 4-5 because of the high risk of causing hyperkalemia and its efficacy in this group of patients is unknown.

The highest percentage of drug use in patients with chronic kidney disease at PKU Muhammadiyah Hospital for the period January-December 2019 was 39.02% with 6-10 drugs, cardiovascular and hematopoietic system groups 32.67% with 100 types of drugs, types of drugs namely furosemide 11.14% with 34 administrations. The use of drugs that are contraindicated in patients with chronic kidney disease based on the IONI 2014 and DIH 2012 literature are ketorolac, mefenamic acid and spironolactone.

Journal 5

Journal Title	Monitoring Drug Therapy in Patients with CKD (<i>Chronic Kidney Disease</i>), Anemia, Hypertension at "X" Hospital
Writer	Kadek Ayu Yessy Ermawardani, Dini Permatasari
Year	2021
Journals, Volumes & Numbers	<i>Social Clinical Pharmacy Indonesia Journal</i> Vol. 6, no. 1
Journal link	https://journal.uta45jakarta.ac.id/index.php/SCPIJ/article/download/4601/1836
Research purposes	To find out drug related problems (DRP's) in the treatment management of patients with CKD (Chronic Kidney Disease) , Anemia and Hypertension at Hospital
Research methods	Therapeutic monitoring was carried out on patients Mr. A, 54 years old, weighing 56 kg and 167 cm tall, came to the Internal Medicine Polyclinic at the Hospital on March 15 2021 with complaints of feeling weak. Doctors recommend that MRS patients with a diagnosis of CKD on HD + Anemia and Hypertension. The patient has a history of chronic kidney disease and currently the patient regularly undergoes hemodialysis twice a week.
Results	In the treatment received by patients at the hospital, <i>Drug Related Problems</i> (DRP) or drug-related problems were found. The problem related to the drug found was a moderate interaction between the drug Amlodipine and CaCO ₃ , because carbonate can reduce the effect of Amlodipine. It is recommended that calcium carbonate and Amlodipine be taken at intervals when calcium carbonate is taken in the morning and evening, while amlodipine is taken at night. ACEI or ARB therapy is recommended as first line therapy for blood pressure treatment in CKD + Hypertension patients. The recommended medication is Ramipril 2.5mg once a day, 1 tablet at night. Doctors administer CaCO ₃ twice a day 500mg used to treat hyperphosphatemia in patients with renal insufficiency. As well as the administration of folic acid 1 mg once a day by a doctor is necessary for nucleoprotein synthesis and maintenance of erythropoiesis. However, folic acid administration was inadequate because the patient's hemoglobin target had not been achieved. So it is recommended to use Erythropoietin once a week as a Ferro Sulphate tablet 1x1 or as additional therapy.
Conclusion	Mr A was diagnosed with CKD, anemia and hypertension. It was found that the DRP of inadequate use of folic acid medication was recommended to add Ferrous Sulphate tablet therapy 1x1 or Erythropoietin 1x a week. Amlodipine

5 mg therapy is not appropriate, it is recommended that first line therapy use ACEI class drugs such as Ramipril 2.5 mg 1x1 at night. There is a moderate interaction with the drug calcium carbonate which can reduce the effects of Amlodipine. It is recommended that calcium carbonate be taken in the morning and evening. Amlodipine is recommended to be taken at night

Discussion

Drug therapy monitoring (PTO) was performed on a patient named Mrs. LBZ by a pharmacist at the patient's home with complaints of weakness and tightness since the last week and felt heavy since the last two days. The patient complained of pain in the solar plexus and nausea and vomiting after eating. The patient also had bleeding from the birth canal since the last week. The doctor diagnosed the patient with chronic renal failure with hemodialysis and pulmonary oedema. The action taken on the patient was hemodialysis because the patient already had stage V chronic renal failure (Vadakedath and Kandi 2017). Hypertensive conditions in patients are treated with amlodipine group drugs and diuretic group drugs, namely furosemide to treat oedema.

The population of renal failure patients undergoing chronic hemodialysis at Toto Kabila Hospital during the period January 2017 - October 2018 was 103 patients with a total sample size of 43 people who fit the inclusion criteria. In this study, the accuracy of drug use based on appropriate patients reached 100% because all drugs prescribed were in accordance with the patient's pathology and physiology and did not cause contraindications for patients. Drug accuracy was 86.05% and inappropriate drugs amounted to 13.95%. The inappropriate drugs were amlodipine, captopril and valsartan, diclofenac sodium, and ondansetron (Curriuan 2021). Prescriptions with the right indication amounted to 83.72% and those with inappropriate indications amounted to 16.28%. Of the prescriptions in patients, there were 7 cases of inaccurate indications, namely hypertension and hives that were not treated, itching that was not treated, stiff legs that were not treated, fever that was not treated, cough that was not treated, abdominal pain that was not treated and low back pain that was not treated. dose accuracy in the prescription of CKD patients was 53.49% while for dose accuracy in the prescription was 46.51% with drugs that were not in the right dose including calfera, folic acid and ketosteril.

Based on the research conducted, it is interpreted that the age most affected by chronic kidney disease is at the age of 15-54 years as many as 18 (60%) respondents, the symptoms that appear most are shortness of breath as many as 24 (80%) respondents followed by oedema and nausea each 10 (33%) respondents. The risk factor for chronic kidney disease that is most likely to be changed is hypertension with 25 (83%) respondents and the least is smoking with 3 (10%) respondents. While the most risk factor that cannot be changed is age with 9 (30%) respondents and the least is family history with 1 (3%) respondent. The risk factor for chronic kidney disease aged 15-54 years in the Emergency and Surgical Hospitalization Room of RSUD dr. Soedono Madiun is hypertension with a total of 6 (21%) respondents, and age > 54 years the most is diabetes mellitus, hypertension with a total of 2 (6%) respondents.

In the use of drugs given to 41 patients with a diagnosis of chronic kidney disease at PKU Muhammadiyah Kapur Hospital, there were a total of 11 therapeutic groups, 66 types of drugs with a total of 305 drugs. The highest amount of drug use received by chronic kidney disease patients during treatment was 6 - 10 drugs (39.02%).

Tabel 4. Jumlah Penggunaan Obat Penyakit Ginjal Kronik di RS PKU Muhammadiyah Gamping

Golongan obat	Jenis obat	Kontraindikasi	
		IONI	DIH
NSAID	Ketorolac	✓	✓
	Asam mefenamat	✓	✓
	Spironolactone	✓	✓
Diuretik kalium	hemat		
Khelator senyawa kompleks	dan Sukralfat	✓	-
Analgesik opioid	Tramadol	✓	-

Chronic kidney disease (CKD) or chronic renal failure is a disease that damages the kidneys and lasts for three months or more, during which the kidneys become abnormal and lose their function (Yang et al. 2014). Patients with CKD have modifiable risk factors such as hypertension, obesity and smoking. And irreversible risk factors such as age, certain diseases and family history. At the age of 15-54 years, the highest risk factor for CKD is hypertension, due to unhealthy lifestyle and lifestyle, and the highest risk factors at the age of >54 years are diabetes mellitus, hypertension, and also age.

Therapy for CKD patients usually uses more than 5 drugs, this is because the majority of CKD patients also suffer from other comorbidities. Therefore, therapy monitoring must be carried out to avoid the occurrence of DRPs and the occurrence of unwanted drug reactions (ROTD) so as to improve the quality of service and quality of life of patients.

CONCLUSION

Chronic kidney disease (CKD) or chronic renal failure is a disease that damages the kidneys and lasts for three months or more, during which the kidneys become abnormal and lose their function. Patients with CKD have modifiable risk factors such as hypertension, obesity and smoking. And irreversible risk factors such as age, certain diseases and family history. At the age of 15-54 years, the highest risk factor for CKD is hypertension, due to unhealthy lifestyle and lifestyle, and the highest risk factors at the age of >54 years are diabetes mellitus, hypertension, and also age. Therapy for CKD patients usually uses more than 5 drugs, this is because the majority of CKD patients also suffer from other comorbidities. Therefore, therapy monitoring must be carried out to avoid the occurrence of DRPs and the occurrence of unwanted drug reactions (ROTD) so as to improve the quality of service and quality of life of patients..

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