



Comparison Of The Effectiveness And Safety Of Anemia Epoetin Alfa With Epoetin Beta Inhemodialysis Routine Patients At Haji Rsu Surabaya

Gunawan Widodo^{1*}, Anita Purnamayanti², Hesti Trisnianti, Burhan²

¹Rsu Haji Surabaya jl Manyar Kertoadi
²Faculty of Pharmacy, University of Surabaya
jl. Tenggilis Mejoyo Blok AM No.12

*Email: gunwidodo@gmail.com

Received: August 12th2021. Revised : Sep 2th2021. Published: Dec 21th2021

DOI : 10.22219/sm.Vol17.SMUMM2.18228

ABSTRACT

Chronic Kidney Disease (CKD) is a disorder of the structure / function of kidney > 3 months marked by pathology and renal damage marker and impairment Glomerular filtration rate (GFR). Erythropoietin is a growth factor hematopoietic that plays a role in the formation of red blood cells. Research conducted by Henry et al, on the pharmacokinetics of epoetin alfa showed the results that epoetin alfa has the effectiveness of increasing Hb concentration within 2-6 weeks with a half-life of 4-5 hours. Epoetin therapy was given with indications of Hb < 10 g/dL, no absolute iron deficiency anemia Transferrin Saturation > 20%, Serum Ferritin and no severe infection. At RSU HAJI, the insurance company bears the cost of administering epoetin alfa at a dose of 3000 IU and epoetin beta at a dose of 2000 IU to anemic patients undergoing HD, with several written conditions, namely the administration of epoetin alfa/beta given twice a week, Hb < 10 g/dL, TSAT > 20%, FS > 200 ng/L, and no severe infection. The research subjects were divided into 2 groups, namely a group of patients receiving treatment for epoetin alpha 3000 IU/2x a week and a group of patients receiving epoetin beta anemia therapy 2000 IU/2x a week, with the direction of data collection being a combination of retrospective methods. Based on the results of research that has been conducted on the comparison of the effectiveness and safety of anemia therapy with epoetin alfa and epoetin beta in routine hemodialysis patients at RSU HAJI Surabaya.

Keywords : Hemodialysis, Anemia, Epoetin, Effectiveness, Safety.

Copyright © 2021, Gunawan W et al
This is an open access article under the CC-BY-SA license

INTRODUCTION

Chronic Kidney Disease (CKD) is a disorder of the structure / function of kidney > 3 months marked by pathology and renal damage marker and impairment *Glomerular filtration rate* (GFR) < 60 ml / min / 1.73 m². Management of CKD can be given conservative therapy such as diet, drinking restrictions, and drugs (Angela Yee-Moon Wang, 2019). Giving drugs to patients with CKD can no longer provide help. Therefore, patients with CKD require renal function replacement therapy to prolong and maintain the patient's quality of life · such as kidney transplantation or

dialysis(Hiddo J.L. Heerspink , 2021).Limited donors and cost factors cause most patients in Indonesia to use dialysis as the main renal replacement therapy, one of which is HD. (Zaki Morad, MBBS, 2015)

CKD patients undergoing HD generally experience complications in the form of anemia. Anemia in CKD is closely related to decreased production of erythropoietin produced by the kidneys. This is because the kidneys are the main source of erythropoietin (Haine et al., 2021). The kidneys produce 90% of the total erythropoietin. Erythropoietin is a growth factor *hematopoietic* that plays a role in the formation of red blood cells (Nasr, 2020). Erythropoietin increases the production of reticulocytes and the initial release of reticulocytes from the bone marrow, which then lose their ribosomes and become erythrocytes(Elisa Piva MD, 2015). Anemia in CKD may result in an increase in the progression of chronic kidney damage, development of anemia in CKD condition and can cause a decrease in the delivery and use of oxygen, which can cause an increase in *cardiac output*(Jay B. Wish, 2021).As a result of these cumulative effects are *left ventricular hypertrophy* (LVH), *arterial hypertrophy*, *arteriosclerosis*, cardiac dilatation, arrhythmias and heart failure. So it can be said that this will increase the risk of cardiovascular and death in CKD patients. (Coyne et al., 2021)

First-line therapy for CKD anemia is to replace the deficient erythropoietin with *erythropoiesis-stimulating agents* (ESAs), more commonly known as epoetin(Sandra Ribeiro, Luís Belo, Flávio Reis, 2016). The history of using epoetin therapy in CKD anemia is that since 1989 in America, epoetin alfa is the standard therapy for anemia with CKD undergoing HD, because it can reduce morbidity and mortality(Qiyan Zheng, Huisheng Yang, Luying Sun, 2020). Research conducted by Henry *et al*, on the pharmacokinetics of epoetin alfa showed the results that epoetin alfa has the effectiveness of increasing Hb concentration within 2-6 weeks with a half-life of 4-5 hours.(M.Basora, 2015)

Based on PERNEFRI, corrective phase ESA therapy is started with 2000-5000 IU twice weekly or 80-120 units/kgBW/week subcutaneously with monitoring of Hb levels every 4 weeks(Sydney C.W.Tang, 2017). Meanwhile, the maintenance phase of ESA therapy (done when the Hb target has been reached) starts with a dose of 2000-5000 IU/week subcutaneously with monitoring of Hb levels every 4 weeks. Epoetin therapy was given with indications of Hb < 10 g/dL, no absolute iron deficiency anemia (Transferrin Saturation (TSAT) > 20%, Serum Ferritin (FS) > 100) and no severe infection. The expected therapeutic response target is an Hb increase of 0.5–1.5 g/dL in 4 weeks, with a target of achieving Hb of 10-12 g/dL in 4 weeks.The response to an increase in Hb with epoetin administration can be reduced under certain conditions(Jain, 2021). It can be affected by iron deficiency, acute infection, *inadequate dialysis*, malnutrition, folate deficiency, hyperparathyroidism, and the patient's own disease condition (Ines Silva, 2021).

Epoetin alpha and epoetin beta both have 165 amino acids, but they differ in terms of glycosylation patterns. Unit oligosaccharides of erythropoietin has a function that varies in

modulating the biological activity. The oligosaccharide portion of the epoetin beta structure is larger and more acidic than the epoetin alpha (Thompson A.M,2020). In addition, when compared with epoetin alfa, epoetin beta has an isoform with a higher bioactivity ratio *in vivo: in vitro* (Ali Reza Khoshbin, 2015). Based on a study conducted by Halstenson *et al*, regarding the pharmacokinetic and pharmacodynamic differences between epoetin alpha and epoetin beta, the results showed that the steady state (7.7%), the volume of distribution of the β -phase (16.9%), and the elimination half-life (20%) of epoetin beta by intravenous administration was greater ($p < 0.05$) than epoetin alfa (Dennis Stalker PhD, 2016). Comparison of these pharmacokinetic properties may affect the difference in drug side effects (ESO) of each epoetin. Reports of ESO from epoetin alfa were nausea 58%, fever 51%, *injection site reaction* 29%, vomiting 29%, hypertension 24%, pruritis 22%, insomnia 21%, dizziness 21%, headache 19%, cough 18%, edema 17%, redness 16%, *dyspnea* 14%, and *deep vein thrombosis* 11% and *pure red cell aplasia* rare (PRCA) (Alwhaibi,2021). Reports on ESO from epoetin beta were hypertension 23.4%, *GI tract* 23%, pruritis 22%, dizziness 21%, insomnia 21%, headache 19%, cough 18%, *dyspnea* 14%, *upper respiratory tract infection* 12.7%, *menstrual disorders* 9.1%, *lower respiratory tract infection* 8.6%, thrombosis 8.2%, joint disorders 7%, hyperkalemia 7%, *overhydration* 7%, infection 5.7%, *injection site reaction* 5.7%, and rare PRCA (Bejar Rafael, 2014).

At RSU HAJI, the insurance company (BPJS) bears the cost of administering epoetin alfa at a dose of 3000 IU and epoetin beta at a dose of 2000 IU to anemic patients undergoing HD, with several written conditions, namely the administration of epoetin alfa/beta given twice a week, $Hb < 10$ g/dL, $TSAT > 20\%$, $FS > 200$ ng/L, and no severe infection. If there is an iron deficiency $FS < 200$ ng/L and $TSAT < 20\%$, this must be overcome first by giving iron preparations (P.Fenau, 2017). Based on research conducted by Loughnan A *et al*, the results showed that epoetin beta and epoetin alfa were equally effective in increasing Hb and Hct levels, but epoetin beta was effective at a smaller dose than epoetin alfa ($p < 0.001$) (Robert Provenzano MD, 2016). In addition, research evidence or current therapeutic guidelines only say that the clinical effect of epoetin therapy is the same, but there is no difference in terms of target time, safety and the length of time the therapeutic effect can last after administration of epoetin alpha and epoetin beta (Steven Fishbane, 2019). So that these reasons are considered for conducting a study "Comparison of the Effectiveness and Safety of Epoetin Alpha Anemia Therapy with Epoetin Beta in Routine Hemodialysis Patients at RSU HAJI Surabaya", with a design *quasi experimental*.

METHODS

This research was conducted with a design *quasi experimental*, with the method of *Non-equivalent Control Group Design*. The research subjects were divided into 2 groups, namely a group of patients receiving treatment for epoetin alpha 3000 IU/2x a week and a group of patients receiving epoetin beta anemia therapy 2000 IU/2x a week, with the direction of data collection being a combination of retrospective methods (as initial data / *baseline*). and prospective. Retrospective or

prospective data retrieval was carried out at the HD Installation section of the HAJI RSU Surabaya during the study period, namely 3 months from March 22 to June 22 2016, with a total of 50 patients who completed the final stage (25 patients in each group).

The independent variables were Hb levels <10 g/dl, Hct levels <30%, epoetinalfa therapy and epoetin beta therapy which included dose, frequency of administration, route of administration, and duration of administration. The dependent variable is the effectiveness and safety of epoetinalfa and epoetin beta anemia therapy. The effectiveness is the target Hb level (10-12 g/dL), the target Hct level (> 30%), and the time to target Hb *target and time in target*. Safety is the side effects of drugs due to anemia therapy of epoetinalfa or epoetin beta. Controlled variables were TSAT and serum ferritin levels, malnutrition/liver cirrhosis, blood loss, dialysis adequacy, cancer, folic acid administration, dialysate flow rate (Qd), blood flow velocity (Qb), type *dialyzer*, dialysate type, dialysate temperature, and speed of ultrafiltration. Confounding variables are drug factors such as Azathioprine, mycophenolatemofetil (MMF), ACE inhibitors, Statins, Angiotensin II *receptor blockers* (ARB); Patient factors which include age and gender; and the underlying disease of CKD (Tang,2018).

Tabel 1. Variables

| Independent Variables | Operational Definition |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dosage Administration of epoetinalfa&epoetin beta | Dosage of epoetinalfa and epoetin beta during the research process, in this case 2000 IU for epoetin beta per administration and 3000 IU for epoetinalfa per administration |
| Frequency of epoetinalfa&epoetin beta administration | Frequency of administration of epoetinalfa and epoetin beta to patients during the research process, in this case 2x a week |
| Route of administration of epoetinalfa&epoetin beta | The route of administration of epoetinalfa and epoetin beta during the research process, namely subcutaneously |
| Hemoglobin (Hb) | Levels Hb levels for the first time before being given epoetinalfa/beta, namely Hb levels <10g/dL |
| Hematocrit levels (Hct) | Hct levels for the first time before being given epoetinalfa/ beta i.e. Hct levels <30% |
| Duration of administration of epoetinalfa and beta | Time interval from the first administration of epoetinalfa/beta to the end of the prospective study period |
| Variable Dependent | Operational Definition |
| Effectiveness | Is an anemia condition that is resolved by looking at the difference between the initial Hb level or Hct level (since the patient first received epoetin alpha or beta therapy) with |

| | <p>the final Hb level or Hct level (when the prospective study ends).</p> <p>In this case, the target Hb level is 10-12 g/dl and the target Hct level is >30%.</p> <p><i>Time to target</i> is the time span since anemia therapy is given until the minimum Hb target has been determined (Hb 10 g/dL).</p> <p><i>Time in targets</i> the time span required by anemia therapy to produce Hb levels that can stay within the target range (Hb 10 – 12 g/dL).</p> <p><i>Time Below target</i> is the time span required for anemia therapy to produce Hb levels that fall back below the target after previously reaching the target (Hb<10 g/dL).</p> <p><i>Time Over Target</i> is the time span required for anemia therapy to reach Hb levels above the target (Hb> 12 g/dL).</p> |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety | There are no drug side effects in the study subjects due to efforts to overcome anemia with epoetinalfa or epoetin beta |
| Controlled Variables | Operational Definition |
| Transferrin Saturation Levels (TSAT) | TSAT levels before the first time the patient received epoetin alpha or beta therapy, namely >20% |
| Serum levels ferritin | Serum ferritin levels before the first time the patient received epoetin alpha or beta therapy were > 200 ng/ml |
| Folic acid | Folic acid was always given before administration of epoetin alpha or beta therapy. |
| Malnutrition/liver cirrhosis | The condition declared as malnutrition/liver cirrhosis in this study is that in addition to the doctor's diagnosis (from medical record data), albumin levels show <3 g/dl. |
| Blood loss | The condition of sudden blood loss during the research process, namely Hb level <7 g/dl |
| Cancer | Patients diagnosed with cancer by a doctor based on medical record data |
| Adequate dialysis | frequency and duration of HD received by an HD patient. In this case, dialysis adequacy will be calculated (URR value indicator >65%, Kt/V >1.8) |
| Blood flow rate (Qb) | Blood flow rate (Qb) in patients with HD ranges from 200-270 ml/min. Qb used in this study tailored to the clinical conditions of patient |

| | |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| rate flow of dialysate (Qd) | flow rate of dialysate (Qd) in patients on HD were used in this study range from 500 ml / min |
| type of dialyzer | type of dialyzer used for hemodialysis in this study is a Hollow fiber dialyzer high flux / FB-130 |
| Type of dialysate The | type of dialysate used in HD during the study is bicarbonate. |
| Dialysate The dialysate | temperaturetemperature used when HD patients are adjusted to the patient's temperature conditions, namely 36-37 °C |
| Ultrafiltration | Speed Ultrafiltration speed used when HD patients, in this case adjusted to the patient's clinical condition, which ranges from 1-10 L/hour |
| Variable Confounding | Operational Definition |
| Patient The patient's | ageage since the first time receiving epoetin alpha/beta therapy until the end of the prospective study period and patient age data based on the date of birth on the patient's ID card or this data can be obtained from the medical record. |
| Patient | gender The gender of patients with chronic kidney disease who underwent hemodialysis at the HAJI Surabaya general hospital were female and male. |
| Factors drugs other used by patients with | medications that can affect changes in hemoglobin in therapy epoetinalfa and epoetin beta, ie azathioprine, mycophenolatemofetil (MMF), ACE inhibitors, Statins, Angiotensin II receptor blockers (ARBs). |
| Diseases that underlie the occurrence of CKD | The underlying diseases in chronic kidney disease are grouped into two, namely diabetes mellitus and non-diabetes (hypertension and <i>polycystic kidney disease</i>). |

The target population in this study were patients with chronic kidney disease who received anemia therapy with Epoetinalfa or Epoetin beta and underwent routine hemodialysis twice a week at RSU HAJI Surabaya. While the affordable population in this study were patients with chronic kidney disease who received anemia therapy with Epoetinalfa or Epoetin beta and underwent routine hemodialysis twice a week at RSU HAJI Surabaya, according to the research criteria.

3 Inclusion Criteria for this study. First, Patients with chronic kidney anemia (Hb<10 g / dL), Hct<30% who underwent routine hemodialysis 2x a week for 4-5 hours with a stable condition at the Hemodialysis Installation of RSU HAJI Surabaya during the study period. Second,

Patients received anemia therapy with epoetinalfa 3000 IU/2x a week or epoetin beta 2000 IU/2x a week, with adequate iron status (serum ferritin >200 ng/ml and transferrin saturation >20%) third, Patients >18 years old and stating their willingness to be involved in the study, evidenced by signing the *Statement of Consent Form*.

Exclusion criteria were: patients with a doctor's diagnosis of cancer and malnutrition or liver cirrhosis Dropout 2 criteria Patients died, resigned or transferred to another hospital or did not come back to the HD Installation of HAJI RSU, before completing all stages of the study and Acute conditions requiring medical intervention /psychiatric threatening condition

Calculation of sample size

$$n = \frac{\{Z_{1-\alpha/2}\sqrt{2P(1-P)} + Z_{1-\beta}\sqrt{[P_1(1-P_1) + P_2(1-P_2)]}\}^2}{(P_1 - P_2)^2}$$

Description :

n : number of samples

$Z_{1-\alpha/2}$: degree of significance

P : population proportion

The value used is $P_1 = 0.34$; $P_2 = 0.66$; $\alpha = 0.05$; and $\beta = 0.10$, so the number of samples in this study are:

$$n = \frac{\{1.960\sqrt{2(0.80)(0.20)} + 1.282\sqrt{[0.34(0.66) + 0.66(0.34)]}\}^2}{(0.34-0.66)^2}$$

n = 19,53 atau 20 sampel

The sampling technique used was the method, *total sampling* namely the sample was taken from the entire target population during the data collection period. In this study, the sample was divided into two groups determined by the clinical responsible physician at the HD Installation of the HAJI RSU.

Interventions in this study will be divided into 2 groups, namely: epoetinalfa 3000 IU anemia therapy group twice a week and 2000 IU epoetin beta anemia therapy group 2x a week, group selection is determined by the clinical doctor in charge of the hemodialysis installation at RSU HAJI; and during the intervention monitoring the effectiveness and safety of therapy (Carrillo,2016).

Collection data collection data collection including Hb, Hct, BUN, Cr, Ferritin, TSAT and side effects were recorded before and during subjects receiving epoetin therapy, until shortly before the prospective study phase was carried out. Samples that match the research criteria will be given an explanation of the research procedure along with the benefits and risks, then their willingness to fill out asked. *Statement of Consent Form*

Data collection including Hb, Hct and side effects were recorded and followed continuously during and during subjects receiving epoetin therapy, until the end of the study data recording period.

In this study, data analysis was carried out in inferential and descriptive statistics. Inferential statistical analysis used is *paired t test* (if data is normally distributed) or *Wilcoxon* (if data is not normally distributed), *t test* unpaired (if data is normally distributed) or *Mann Whitney* (if data is not normally distributed), *chi square* and ANCOVA (Ji Lanpeng, Liu Peng, Robert Stephan, 2019).

RESULTS AND DISCUSSION

The total patients who completed to the end of the study were 50 patients (25 patients in each group). There was no between the two groups significant difference from the mean *baseline* (hemoglobin/hematocrit/systolic BP/BP diastolic) (Appendix 1). This means that the initial state of anemia in the two anemia treatment groups (group I and group II) is *comparable* so that the two anemia treatment groups can be compared.

Group I compared to group II: group I (treated with epoetin alpha anemia 3000 IU/2x a week) was significantly more effective than group II (treated with epoetin beta anemia 2000 IU/2x a week). In group I it was shown by an increase in the Hb value of 7.9 g/dl \pm 0.71 (Hb before epoetin alpha therapy) to 10.2 g/dl \pm 1.49 (Hb after epoetin alpha therapy) while in group II it was shown with an increase in Hb value of 7.7 g/dl \pm 0.62 (Hb before epoetin beta therapy) to 8.9 g/dl \pm 1.66 (Hb after epoetin beta therapy) (Appendix 2). Regarding the comparison of *time to target* and *time in target* in groups I and II, they cannot be compared because in group I the target was achieved while in group II it was not achieved (Appendix 3 and 4). Then regarding the achievement of the Hb target or the length of Hb in the target range, it cannot be determined because the patient's Hb measurement is only done once a month, so it is not certain when the Hb will reach the target or how long the Hb level will continue in the target range.

Group I compared to group II: based on the occurrence and non-occurrence of ESO, it was found that there was no significant difference in the incidence of side effects between group I (the epoetin alpha group) and group II (group giving epoetin beta) (Appendix 5). However, based on the occurrence of the resulting ESO, it was found that there was a significant difference in the incidence of side effects that occur/arise between group I (group epoetin alpha) and group II (epoetin beta administration group) (Appendix 5). As indicated by the percentage of ESO >10% in group I, there were 4 types of ESO, namely dizziness 28% (6 patients), cough 18.4% (7 patients), itching 14.9% (2 patients), and fever 14.9% (5 patients) compared to group II there were 3 types of ESO namely dizziness 25.9% (3 patients), digestive tract disorders 15.5% (5 patients), and itching 13.8% (2 patients) (Appendix 6).

One of the side effects of giving *erythropoietin* as a therapy for anemia is hypertension. Observation of blood pressure for ESO hypertension can only be done when the patient returns home, so it is necessary for the patient to have a BP measuring device at home. However, patients who have a blood pressure measuring device at home are very limited (only 10 patients from each anemia therapy group), so in this study to ensure the occurrence of side effects of hypertension from epoetin alpha/beta, statistical tests were carried out on systolic or diastolic blood pressure data. . Then, after performing statistical tests on the comparison of systolic and diastolic blood pressure to the two groups, namely the comparison of intradialytic and interdialytic BP in each group, the comparison of retrospective and prospective BP in each group, as well as the comparison of retrospective BP between groups I and II was not found. there is a difference that shows the presence of ESO therapy of anemia against hypertension (Appendix 7). There was a significant difference, only showing an increase in blood pressure due to hemodialysis complications.

CONCLUSION

Based on the results of research that has been conducted on the comparison of the effectiveness and safety of anemia therapy with epoetinalfa and epoetin beta in routine hemodialysis patients at RSU HAJI Surabaya, the conclusions a. There was a significant difference in the increase in the initial hemoglobin with the final hemoglobin in each anemia treatment group ($p < 0.05$) and There was a significant difference in the difference in Hb levels between the epoetinalfa group and the beta epoetin group, that is, epoetinalfa was better than epoetin beta ($p < 0.05$).

The period of *time to target* and *time in target* for each anemia therapy group cannot be determined because the patient's Hb measurement is only done once a month, so it is not certain when the Hb will reach the target or how long the Hb level will remain within the target range. Comparison of *time to target* and *time in target* between the two anemia therapy groups could not be determined because epoetinalfa reached the Hb target while epoetin beta did not reach the target. There was no significant difference in the incidence of side effects between the two anemia therapy groups ($p > 0.05$).

REFERENCES

Angela Yee-Moon Wang, Tadao Akizawa, Sunita Bavanandan, Takayuki Hamano, Adrian Liew, Kuo-Cheng Lu, Dusit Lumlertgul, Kook-Hwan Oh, Ming-Hui Zhao, Samuel Ka-Shun Fung, Yoshitsugu Obi, Keiichi Sumida, Lina Hui Lin Choong, Bak Leong Goh, Chuan-Ming Hao, You, Y. T. and M. F. (2019). 2017 Kidney Disease: Improving Global Outcomes (KDIGO) Chronic Kidney Disease–Mineral and Bone Disorder (CKD-MBD)

- Guideline Update Implementation: Asia Summit Conference Report. *Kidney* <https://doi.org/10.1016/j.ekir.2019.09.007>
- Ali Reza Khoshbin, Fahimeh Mohamadabadi , Fatemeh Vafacian , Adel Babania , Saeideh Akbarian , Reza Khandozi ,Mohamad Ali Sadrebazaz , Ehsan Hatami , Hamid Reza Joshaghani. The effect of radiotherapy and chemotherapy on osmotic fragility of red blood cells and plasma levels of malondialdehyde in patients with breast cancer. *Reports of Practical Oncology & Radiotherapy*. <http://dx.doi.org/10.1016/j.rpor.2014.11.002>
- A.M. Thompson, K. Farmer, E.K. Rowe, S.P. Hayley (2020), Erythropoietin modulates striatal antioxidant signalling to reduce neurodegeneration in a toxicant model of Parkinson's disease, *Molecular and Cellular Neuroscience*, doi: <https://doi.org/10.1016/j.mcn.2020.103554>
- Abdulrahman Alwhaibi, Sary Alsanea, Ziyad Alrabiah, Fars K. Alanazi, Badraddin M. Al-Hadiya, Hisham S. Abou-Auda (2021). Pharmacokinetic Profile of Sildenafil Citrate in Healthy Middle Eastern Males: Comparison with Other Ethnicities. <https://doi.org/10.1016/j.jsps.2021.11.011>
- Coyne, D. W., Roger, S. D., Shin, S. K., Kim, S. G., Cadena, A. A., Moustafa, M. A., ... Yu, K. H. P. (2021). Roxadustat for CKD-related Anemia in Non-dialysis Patients. *Kidney International Reports*, 6(3), 624–635. doi: <https://doi.org/10.1016/j.ekir.2020.11.034>
- Dennis Stalker, PhD; Susan Reid, MEd, PMP; Atulkumar Ramaiya, PhD; Wayne A. Wisemandle, MA; and Nancy E. Martin, PharmD, MD (2016). Pharmacokinetic and Pharmacodynamic Equivalence of Epoetin Hospira and Epogen After Single Subcutaneous Doses to Healthy Male Subjects. doi: <https://doi.org/10.1016/j.clinthera.2016.06.010>
- Elisa Piva, MDa, Carlo Brugnara, MDb, Federica Spolaore, MDa, Mario Plebani, MDa,(2015), Clinical Utility of Reticulocyte Parameters, *Clinics in Laboratory Medicine*, doi: <https://doi.org/10.1016/j.cll.2014.10.004>
- George Nasr, Diana Glovac, Sonia Samtani, Jimmy Kwon, Wei Zhou, Pranav Patel, Dawn Lombardo, University of California,Irvine, Health System, Orange, CA, USA9 (2020).Assessing The Necessity Of Non-Invasive Stress Testing For Cardiac Clearance Inckd Patients On Hd Undergoing Renal Transplant Evaluation, *Journal of the American College of Cardiology*, doi: [https://doi.org/10.1016/S0735-1097\(20\)31781-2](https://doi.org/10.1016/S0735-1097(20)31781-2)
- Haine, L., Yegen, C. H., Marchant, D., Richalet, J. P., Boncoeur, E., & Voituron, N. (2021). Cytoprotective effects of erythropoietin: What about the lung? *Biomedicine and Pharmacotherapy*, 139, 111547. doi: <https://doi.org/10.1016/j.biopha.2021.111547>
- Hiddo J.L. Heerspink^{1, 2, 16}, David Cherney^{3, 16}, Douwe Postmus⁴, Bergur V. Stefánsson⁵, Glenn M. Chertow⁶, Jamie P. Dwyer⁷, Tom Greene⁸, Mikhail Kosiborod^{2, 9}, Anna Maria Langkilde⁵, John J.V. McMurray¹⁰, Ricardo Correa-Rotter¹¹, Peter Rossing^{12, 13}, C., 15; on behalf of the DAPA-CKD Trial Committees and Investigators. (2021). A pre-specified analysis of the Dapagliflozin and Prevention of Adverse Outcomes in Chronic Kidney

- Disease (DAPA-CKD) randomized controlled trial on the incidence of abrupt declines in kidney function. *Kidney International*, 2. doi: <https://doi.org/10.1016/j.kint.2021.09.005>
- Ines Silva, Carolina Alípio, Rui Pinto, Vanessa Mateus (2021), Potential anti-inflammatory effect of erythropoietin in non-clinical studies in vivo: A systematic review, *Biomedicine & Pharmacotherapy*, doi: <https://doi.org/10.1016/j.biopha.2021.111558>
- International Reports*, 4(11), 1523–1537. doi: <https://doi.org/10.1016/j.ekir.2019.09.007>
- Jay B. Wish, Stefan D. Anker, Javed Butler, Aleix Cases, A. G. S. and, & Macdougall, I. C. (2021). Iron Deficiency in CKD Without Concomitant Anemia. *Kidney International Reports*, 6(11), 2752–2762. <https://doi.org/10.1016/j.ekir.2021.07.032>
- Lanpeng Ji, Peng Liu, Stephan Robert (2019). Tail asymptotic behavior of the supremum of a class of chi-square processes. *Statistics and Probability Letters*. <https://doi.org/10.1016/j.spl.2019.07.001>
- Laura Arellano Sánchez-Carrillo MD, Juan Manuel Rodríguez-López MD, Dionisio Ángel Galarza-Delgado MD, Laura Baena-Trejo MD, Magaly Padilla-Orozco MD, Lidia Mendoza-Flores MD, Adrián Camacho-Ortiz MD (2016). Enhancement of hand hygiene compliance among health care workers from a hemodialysis unit using video-monitoring feedback. *American Journal of Infection Control*. doi: <http://dx.doi.org/10.1016/j.ajic.2016.01.04>
- M. Basora, M.J. Colomina, M. Tio, L. Mora, G. Sánchez-Etayo, F. Salazar, E. Ciercoles, M. Panos, E. Guerrero y, R. Berge (2015), Optimización de la hemoglobina preoperatoria en cirugía ortopédica mayor utilizando hierro intravenoso con o sin eritropoyetina. Estudio epidemiológico, *Revista Española de Anestesiología y Reanimación*, doi: <https://doi.org/10.1016/j.redar.2014.07.011>
- Manisha Jain, Prantar Chakrabarti, Tuphan Kanti Dolai, Pramit Ghosh, Prakas Kumar Mandal, Shuvra Neel Baul, Rajib De (2021), Comparison of efficacy and safety of thalidomide vs hydroxyurea in patients with Hb E- β thalassemia - a pilot study from a tertiary care Centre of India, *Blood Cells, Molecules and Diseases*, doi: <https://doi.org/10.1016/j.bcmed.2021.102544>
- Mengyao Tang, Jonathan A. Batty, Chiayu Lin, Xiaohong Fan, Kevin E. Chan, Sahir Kalim. Pulmonary Hypertension, Mortality, and Cardiovascular Disease in CKD and ESRD Patients: A Systematic Review and Meta-analysis. *American Journal of Kidney Diseases*. doi: <https://doi.org/10.1053/j.ajkd.2017.11.018>
- P. Fenaux, V. Santini, M. Aloe Spiriti³, Giagounidis, R. Schlag, Radinoff⁶, L. Gercheva-Kyuchukova, Anagnostopoulos, Oliva, Symeonidis, M. Hunault Berger, K. Götze, Potamianou, H. Haralampiev, R. Wapenaar, I. Milionis, U. Platzbecker (2017). Challenging Iwg2006 Response Criteria: Results Of A Randomized Study Of Epoetin Alfa versus Placebo In Anemic Lower Risk Mds Patients. *Leukemia Research*. doi: [https://doi.org/10.1016/S0145-2126\(17\)30149-2](https://doi.org/10.1016/S0145-2126(17)30149-2)

- Qiyang Zheng, Huisheng Yang, Luying Sun, Ruojun Wei, Xinwen Fu, Y., & Wang, Yishan Huang, Yu Ning Liu, W. J. L. (2020). Efficacy and safety of HIF prolyl-hydroxylase inhibitor vs epoetin and darbepoetin for anemia in chronic kidney disease patients not undergoing dialysis: A network meta-analysis. *Pharmacological Research*, 159, 105020. doi: <https://doi.org/10.1016/j.phrs.2020.105020>
- Rafael Bejar and David P. Steensma (2014). Recent developments in myelodysplastic syndromes. *The American Society of Hematology*. doi: <https://doi.org/10.1182/blood-2014-04-522136>
- Robert Provenzano, MD, Anatole Besarab, MD, Steven Wright, MD, Lynda Szczech, MD, MSCE, K.H. Peony Yu, MD, Thomas B. Neff, MD (hc) (2016). Roxadustat (FG-4592) Versus Epoetin Alfa for Anemia in Patients Receiving Maintenance Hemodialysis: A Phase 2, Randomized, 6- to 19-Week, Open-Label, Active-Comparator, Dose-Ranging, Safety and Exploratory Efficacy Study. *Original Investigation Dialysis*. doi: <https://doi.org/10.1053/j.ajkd.2015.12.020>
- Steven Fishbane, Bruce S. Spinowitz, Wayne A. Wisemandle, Nancy E. Martin (2019). Randomized Controlled Trial of Subcutaneous Epoetin Alfa-epbx Versus Epoetin Alfa in End-Stage Kidney Disease. *Kidney International Reports*. <https://doi.org/10.1016/j.ekir.2019.05.010>
- Sydney C.W.Tang, Chapter 16 - ESRD in South-East Asia, *Chronic Kidney Disease in Disadvantaged Populations*, doi: <https://doi.org/10.1016/B978-0-12-804311-0.00016-9>
- Sandra Ribeiro, Luís Belo, Flávio Reis, A. S.-S. (2016). Iron therapy in chronic kidney disease: Recent changes, benefits and risks. *Blood Reviews*, 30(1), 65–72. doi: <https://doi.org/10.1016/j.blre.2015.07.006>
- Zaki Morad, MBBS, FRCP (E), 1 Hui Lin Choong, MBBS, MMed (IntMed), FAMS, 2 Kriang Tungsanga, MD, 3 and Suhardjono, MD, P., & WKF. (2015). Funding Renal Replacement Therapy in Southeast Asia: Building Public-Private Partnerships in Singapore, Malaysia, Thailand, and Indonesia. *American Journal of Kidney Diseases*, 65(5), 799–805. doi: <https://doi.org/10.1053/j.ajkd.2014.09.031>



Comparison Of The Effectiveness And Safety Of Anemia Epoetin Alfa With Epoetin Beta Inhemodialysis Routine Patients At Haji Rsu Surabaya

Gunawan

Anita

Hesti

Burhan

DOI: <https://doi.org/10.22219/sm.Vol17.SMUMM2.18228>

Abstract

Chronic Kidney Disease (CKD) is a disorder of the structure / function of kidney > 3 months marked by pathology and renal damage marker and impairment Glomerular filtration rate (GFR). Erythropoietin is a growth factor hematopoietic that plays a role in the formation of red blood cells. Research conducted by Henry et al, on the pharmacokinetics of epoetin alfa showed the results that epoetin alfa has the effectiveness of increasing Hb concentration within 2-6 weeks with a half-life of 4-5 hours. Epoetin therapy was given with indications of Hb < 10 g/dL, no absolute iron deficiency anemia Transferrin Saturation > 20%, Serum Ferritin and no severe infection. At RSU HAJI, the insurance company bears the cost of administering epoetin alfa at a dose of 3000 IU and epoetin beta at a dose of 2000 IU to anemic patients undergoing HD, with several written conditions, namely the administration of epoetin alfa/beta given twice a week, Hb < 10 g/dL, TSAT > 20%, FS > 200 ng/L, and no severe infection. The research subjects were divided into 2 groups, namely a group of patients receiving treatment for epoetin alpha 3000 IU/2x a week and a group of patients receiving epoetin beta anemia therapy 2000 IU/2x a week, with the direction of data collection being a combination of retrospective methods. Based on the results of research that has been conducted on the comparison of the effectiveness and safety of anemia therapy with epoetin alfa and epoetin beta in routine hemodialysis patients at RSU HAJI Surabaya.

Downloads



Author Biography

Gunawan

Rsu Haji Surabaya jl Manyar Kertoadi

References

Angela Yee-Moon Wang, Tadao Akizawa, Sunita Bavanandan, Takayuki Hamano, Adrian Liew, Kuo-Cheng Lu, Dusit

Lumlertgul, Kook-Hwan Oh, Ming-Hui Zhao, Samuel Ka-Shun Fung, Yoshitsugu Obi, Keiichi Sumida, Lina Hui Lin Choong, Bak Leong Goh, Chuan-Ming Hao, You, Y. T. and M. F. (2019). 2017 Kidney Disease: Improving Global Outcomes (KDIGO) Chronic Kidney Disease–Mineral and Bone Disorder (CKD-MBD) Guideline Update Implementation: Asia Summit Conference Report. *Kidney* <https://doi.org/10.1016/j.ekir.2019.09.007>

Ali Reza Khoshbin, Fahimeh Mohamadabadi , Fatemeh Vafaeian , Adel Babania , Saeideh Akbarian , Reza Khandozi ,Mohamad Ali Sadrebazaz , Ehsan Hatami , Hamid Reza Joshaghani. The effect of radiotherapy and chemotherapy on osmotic fragility of red blood cells and plasma levels of malondialdehyde in patients with breast cancer. *Reports of Practical Oncology & Radiotherapy*. <http://dx.doi.org/10.1016/j.rpor.2014.11.002>

A.M. Thompson, K. Farmer, E.K. Rowe, S.P. Hayley (2020), Erythropoietin modulates striatal antioxidant signalling to reduce neurodegeneration in a toxicant model of Parkinson's disease, *Molecular and Cellular Neuroscience*, doi: <https://doi.org/10.1016/j.mcn.2020.103554>

Abdulrahman Alwhaibi, Sary Alsanea, Ziyad Alrabiah, Fars K. Alanazi, Badraddin M. Al-Hadiya, Hisham S. Abou-Auda (2021). Pharmacokinetic Profile of Sildenafil Citrate in Healthy Middle Eastern Males: Comparison with Other Ethnicities. <https://doi.org/10.1016/j.jsps.2021.11.011>

Coyne, D. W., Roger, S. D., Shin, S. K., Kim, S. G., Cadena, A. A., Moustafa, M. A., ... Yu, K. H. P. (2021). Roxadustat for CKD-related Anemia in Non-dialysis Patients. *Kidney International Reports*, 6(3), 624–635. doi: <https://doi.org/10.1016/j.ekir.2020.11.034>

Dennis Stalker, PhD; Susan Reid, MEd, PMP; Atulkumar Ramaiya, PhD; Wayne A. Wisemandle, MA; and Nancy E. Martin, PharmD, MD (2016). Pharmacokinetic and Pharmacodynamic Equivalence of Epoetin Hospira and Epogen After Single Subcutaneous Doses to Healthy Male Subjects. doi:

<https://doi.org/10.1016/j.clinthera.2016.06.010>

Elisa Piva, MDa, Carlo Brugnara, MDb, Federica Spolaore, MDa, Mario Plebani, MDa,(2015), Clinical Utility of Reticulocyte Parameters, Clinics in Laboratory Medicine, doi: <https://doi.org/10.1016/j.cll.2014.10.004>

George Nasr, Diana Glovaci, Sonia Samtani, Jimmy Kwon, Wei Zhou, Pranav Patel, Dawn Lombardo, University of California,Irvine, Health System, Orange, CA, USA9 (2020).Assessing The Necessity Of Non-Invasive Stress Testing For Cardiac Clearance Inckd Patients On Hd Undergoing Renal Transplant Evaluation, Journal of the American College of Cardiology, doi: [https://doi.org/10.1016/S0735-1097\(20\)31781-2](https://doi.org/10.1016/S0735-1097(20)31781-2)

Haine, L., Yegen, C. H., Marchant, D., Richalet, J. P., Boncoeur, E., & Voituron, N. (2021). Cytoprotective effects of erythropoietin: What about the lung? Biomedicine and Pharmacotherapy, 139, 111547. doi: <https://doi.org/10.1016/j.biopha.2021.111547>

Hiddo J.L. Heerspink^{1, 2, 16}, David Cherney^{3, 16}, Douwe Postmus⁴, Bergur V. Stefa´nsson⁵, Glenn M. Chertow⁶, Jamie P. Dwyer⁷, Tom Greene⁸, Mikhail Kosiborod^{2, 9}, Anna Maria Langkilde⁵, John J.V. McMurray¹⁰, Ricardo Correa-Rotter¹¹, Peter Rossing^{12, 13, C., 15}; on behalf of the DAPA-CKD Trial Committees and Investigators. (2021). A pre-specified analysis of the Dapagliflozin and Prevention of Adverse Outcomes in Chronic Kidney Disease (DAPA-CKD) randomized controlled trial on the incidence of abrupt declines in kidney function. Kidney International, 2. doi: <https://doi.org/10.1016/j.kint.2021.09.005>

Ines Silva, Carolina Alípio , Rui Pinto, Vanessa Mateus (2021), Potential anti-inflammatory effect of erythropoietin in non-clinical studies in vivo: A systematic review, Biomedicine & Pharmacotherapy, doi: <https://doi.org/10.1016/j.biopha.2021.111558>

International Reports, 4(11), 1523–1537. doi: <https://doi.org/10.1016/j.ekir.2019.09.007>

Jay B. Wish, Stefan D. Anker, Javed Butler, Aleix Cases, A. G. S. and, & Macdougall, I. C. (2021). Iron Deficiency in CKD Without Concomitant Anemia. Kidney International Reports, 6(11), 2752–2762. <https://doi.org/10.1016/j.ekir.2021.07.032>

Lanpeng Ji , Peng Liu , Stephan Robert (2019). Tail asymptotic behavior of the supremum of a class of chi-square processes. Statistics and Probability Letters. <https://doi.org/10.1016/j.spl.2019.07.001>

Laura Arely Sánchez-Carrillo MD , Juan Manuel Rodríguez-López MD , Dionisio Ángel Galarza-Delgado MD , Laura Baena-Trejo MD , Magaly Padilla-Orozco MD , Lidia Mendoza-Flores MD , Adrián Camacho-Ortiz MD (2016). Enhancement of hand hygiene compliance among health care workers from a hemodialysis unit using video-monitoring feedback. American Journal of Infection Control. doi: <http://dx.doi.org/10.1016/j.ajic.2016.01.04>

M. Basora, M.J. Colomina , M. Tio , L. Mora , G. Sánchez-Etayo , F. Salazar ,E. Ciércoles , M. Panos, E. Guerrero y, R. Berge (2015) , Optimización de la hemoglobina preoperatoria en cirugía ortopédica mayor utilizando hierro intravenoso con o sin eritropoyetina. Estudio epidemiológico, Revista Española de Anestesiología y Reanimación, doi: <https://doi.org/10.1016/j.redar.2014.07.011>

Manisha Jain , Prantar Chakrabarti , Tuphan Kanti Dolai , Pramit Ghosh , Prakas Kumar Mandal , Shuvra Neel Baul , Rajib De (2021), Comparison of efficacy and safety of thalidomide vs hydroxyurea in patients with Hb E- β thalassemia - a pilot study from a tertiary care Centre of India, Blood Cells, Molecules and Diseases, doi: <https://doi.org/10.1016/j.bcmed.2021.102544>

Mengyao Tang, Jonathan A. Batty, Chiayu Lin, Xiaohong Fan, Kevin E. Chan, Sahir Kalim. Pulmonary Hypertension, Mortality, and Cardiovascular Disease in CKD and ESRD Patients: A Systematic Review and Meta-analysis. American Journal of Kidney Diseases. doi: <https://doi.org/10.1053/j.ajkd.2017.11.018>

P. Fenaux, V. Santini, M. Aloe Spiriti³, Giagounidis, R. Schlag, Radinoff⁶, L. Gercheva-Kyuchukova, Anagnostopoulos, . Oliva, Symeonidis, M. Hunault Berger, K. Götze. Potamianou, H. Haralampiev, R. Wapenaar, I. Milionis, U. Platzbecker (2017). Challenging Iwg 2006 Response Criteria: Results Of A Randomized Study Of Epoetin Alfa versus Placebo In Anemic Lower Risk Mds Patients. Leukemia Research. doi: [https://doi.org/10.1016/S0145-2126\(17\)30149-2](https://doi.org/10.1016/S0145-2126(17)30149-2)

Qiyang Zheng, Huisheng Yang, Luying Sun, Ruojun Wei, Xinwen Fu, Y., & Wang, Yishan Huang, Yu Ning Liu, W. J. L. (2020).

Efficacy and safety of HIF prolyl-hydroxylase inhibitor vs epoetin and darbepoetin for anemia in chronic kidney disease patients not undergoing dialysis: A network meta-analysis. Pharmacological Research, 159, 105020. doi: <https://doi.org/10.1016/j.phrs.2020.105020>

Rafael Bejar and David P. Steensma (2014). Recent developments in myelodysplastic syndromes. The American Society of Hematology. doi: <https://doi.org/10.1182/blood-2014-04-522136>

Robert Provenzano, MD, Anatole Besarab, MD, Steven Wright, MD, Lynda Szczech, MD, MSCE, K.H. Peony Yu, MD, Thomas B. Neff, MD (hc) (2016). Roxadustat (FG-4592) Versus Epoetin Alfa for Anemia in Patients Receiving Maintenance Hemodialysis: A Phase 2, Randomized, 6- to 19-Week, Open-Label, Active-Comparator, Dose-Ranging, Safety and Exploratory Efficacy Study. Original Investigation Dialysis. doi: <https://doi.org/10.1053/j.ajkd.2015.12.020>

Steven Fishbane, Bruce S. Spinowitz, Wayne A. Wisemandle, Nancy E. Martin (2019). Randomized Controlled Trial of Subcutaneous Epoetin Alfa-epbx Versus Epoetin Alfa in End-Stage Kidney Disease. Kidney International Reports. <https://doi.org/10.1016/j.ekir.2019.05.010>

Sydney C.W.Tang, Chapter 16 - ESRD in South-East Asia, Chronic Kidney Disease in Disadvantaged Populations, doi: <https://doi.org/10.1016/B978-0-12-804311-0.00016-9>

Sandra Ribeiro, Luís Belo, Flávio Reis, A. S.-S. (2016). Iron therapy in chronic kidney disease: Recent changes, benefits and risks. *Blood Reviews*, 30(1), 65–72. doi: <https://doi.org/10.1016/j.blre.2015.07.006>

Zaki Morad, MBBS, FRCP (E), 1 Hui Lin Choong, MBBS, MMed (IntMed), FAMS, 2 Kriang Tungsanga, MD, 3 and Suhardjono, MD, P., & WKF. (2015). Funding Renal Replacement Therapy in Southeast Asia: Building Public-Private Partnerships in Singapore, Malaysia, Thailand, and Indonesia. *American Journal of Kidney Diseases*, 65(5), 799–805. doi: <https://doi.org/10.1053/j.ajkd.2014.09.031>

p-ISSN : 0216 - 759X

saintika medika

JURNAL ILMU KESEHATAN DAN KEDOKTERAN KELUARGA

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| Prevention Of Type 2 Diabetes Mellitus Among Adolescents In Ternate City, Indonesia | Ramli <i>et al.</i> |
| Efficacy of Osteoporosis Drugs Anabolic and Antiresorptive Classes in Post Menopause Women | Ribka Carolin <i>et al.</i> |
| Patient Satisfaction Of Inpatient Social Security Administrator For Health In Hospital | Ida Nurmawati Bunga Adina P. |
| The Effect Of Family Support On Stress Level In Muhammadiyah High School 1 Malang Students With Acne Vulgaris | Dwi Nurwulan P. <i>et al.</i> |
| Correlation Between Knowledge Level On Anxiety Level Post-Coronavac Vaccine at The Clinic of dr. Irma | Marintik Ilahi Yusrin Aulia |
| Body Figure Perception And Relation With Eating Habits In Turkish Adults | Aysun M. U. <i>et al.</i> |
| Synergistic Potential Of Bioactive Compounds Of Nut Grass Tuber Extract (Cyperus rotundus) As Anti-Leukemia Herbal Medicine | Agustini, S. M. <i>et al.</i> |
| Comparison Of The Effectiveness And Safety Of Anemia Epoetin Alfa With Epoetin Beta Inhemodialysis Routine Patients At Haji Rsu Surabaya | Gunawan <i>et al.</i> |
| The Effect Of Papaya Leaf Extract (Carica Papaya L) On Methemoglobin Percentage And The Number Of Erythrocyte Cells In Wistar Strain White Male Rats Induced With Sodium Nitrite | Diah Hermayanti <i>et al.</i> |
| Pregnant Women's Factor toward Mother-to-Child Transmission of HIV practice | Gita Sekar P. <i>et al.</i> |

Faculty of Medicine
University of Muhammadiyah Malang

 PDF 22

Published

2021-12-21

Issue

[Vol. 17 No. 2 \(2021\): December 2021](#)

Section

Article

License

Copyright (c) 2021 Gunawan , Anita, Hesti, Burhan

This work is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](#).

Authors who publish with this journal agree to the following terms:

1. Authors retain copyright and grant the journal right of first publication with the work simultaneously licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](#) that allows others to share the work with an acknowledgment of the work's authorship and initial publication in this journal.
2. Authors are able to enter into separate, additional contractual arrangements for the non-exclusive distribution of the journal's published version of the work (e.g., post it to an institutional repository or publish it in a book), with an acknowledgment of its initial publication in this journal.
3. Authors are permitted and encouraged to post their work online (e.g., in institutional repositories or on their website) prior to and during the submission process, as it can lead to productive exchanges, as well as earlier and greater citation of published work (See [The Effect of Open Access](#)).



This work is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-sa/4.0/).

Template

Focus and Scope

Editorial Team

Reviewers

Author Guidelines

Ethics

Peer Review Process

Plagiarism Policy

Author Fee

Contact

Accredited

Hard Copy

- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| Prevention Of Type 2 Diabetes Mellitus Among Adolescents In Ternate City, Indonesia | Ramli <i>et al.</i> |
| Efficacy of Osteoporosis Drugs Anabolic and Antiresorptive Classes in Post Menopause Women | Ribka Carolin <i>et al.</i> |
| Patient Satisfaction Of Inpatient Social Security Administrator For Health In Hospital | Ida Nurmawati Bunga Adina P. |
| The Effect Of Family Support On Stress Level In Muhammadiyah High School 1 Malang Students With Acne Vulgaris | Dwi Nurwulan P. <i>et al.</i> |
| Correlation Between Knowledge Level On Anxiety Level Post-Coronavac Vaccine at The Clinic of dr. Irma | Marintik Ilahi Yusrin Aulia |
| Body Figure Perception And Relation With Eating Habits In Turkish Adults | Aysun M. U. <i>et al.</i> |
| Synergistic Potential Of Bioactive Compounds Of Nut Grass Tuber Extract (Cyperus rotundus) As Anti-Leukemia Herbal Medicine | Agustini, S. M. <i>et al.</i> |
| Comparison Of The Effectiveness And Safety Of Anemia Epoetin Alfa With Epoetin Beta Inhemodialysis Routine Patients At Haji Rsu Surabaya | Gunawan <i>et al.</i> |
| The Effect Of Papaya Leaf Extract (Carica Papaya L) On Methemoglobin Percentage And The Number Of Erythrocyte Cells In Wistar Strain White Male Rats Induced With Sodium Nitrite | Diah Hermayanti <i>et al.</i> |
| Pregnant Women's Factor toward Mother-to-Child Transmission of HIV practice | Gita Sekar P. <i>et al.</i> |

[Home](#) / [Editorial Team](#)

Editorial Team

Editor in Chief

DR. dr. Kusuma Adriana, Sp.OG

- Sinta ID : [6652363](#)
- Scolar : [https://scholar.google.com/citations?user=zciKTsEAAAAJ&hl=en](#)
- scopus ID : [https://scopus.com/authorid/15087342100](#)
- University of Muhammadiyah Malang

Managing Editor



dr. Dwi Nurwulan Pravitasari, Sp.KK

- Sinta ID : [6652363](#)
- Scolar : <https://scholar.google.co.id/citations?user=zciKTsEAAAAJ&hl=en>
- University of Muhammadiyah Malang

Editorial Board



dr. Yuliono Trika Nur Hasan, Sp.M

- Sinta ID : [6650522](#)
- Scolar : <https://scholar.google.co.id/citations?user=naxsXsUAAAAJ&hl=id>
- UIN Maulana Malik Ibrahim Malang



dr. Rubayat Indradi, MOH.

- Sinta ID : [6731637](#)
- Scolar : <https://scholar.google.com/citations?user=xpsTft0AAAAJ&hl=en>
- University of Muhammadiyah Malang



dr. M. Fadhol Romdhoni, M.Si

- Sinta ID : [5999086](#)
- Scolar : <https://scholar.google.co.id/citations?user=tl2J19gAAAAJ&hl=id>
- University of Muhammadiyah Purwokerto



dr. Ayu Lidia Paramitha

- Scolar : <https://scholar.google.co.id/citations?user=kem5FIEAAAAJ&hl=id>
- University of Muhammadiyah Surabaya



dr. Dian Yuliarta Lestari, Sp.PA

- Sinta ID : [6057020](#)
- Scolar : <https://scholar.google.co.id/citations?user=LcCsJ6wAAAAJ&hl=en>
- Scopus ID : [57197821204](#)
- University of Muhammadiyah Malang



dr. Kanti Ratnaningrum, M.Sc.

- Sinta ID : [6197914](#)
- Scolar : <https://scholar.google.co.id/citations?user=i-c8ai0AAAAJ&hl=en>
- University of Muhammadiyah Semarang



dr. Anung Putri Ilahika, M.Si.

- Sinta ID : [6675872](#)
- Scolar : <https://scholar.google.co.id/citations?user=s8P0HVQAAAAJ&hl=id> Sc
- University of Muhammadiyah Malang



dr. Risma Karlina Prabawati, Sp.S

- Sinta ID : [6732415](#)
- Scolar : <https://scholar.google.com/citations?user=8AzSjAEAAAAJ&hl=en>
- University of Muhammadiyah Malang



dr. Nimim Putri Zahara, Sp.THT-KL

- University of Muhammadiyah Malang



dr. Hanna Cakrawati, M.Biomed

- University of Muhammadiyah Malang

Template

Focus and Scope

Editorial Team

Reviewers

Author Guidelines

Ethics

Peer Review Proses

Plagiarism Policy

Author Fee

Contact

Accredited

Hard Copy

Home / Archives / Vol. 17 No. 2 (2021): December 2021

Vol. 17 No. 2 (2021): December 2021



Published: 2021-12-18

Article

Prevention Of Type 2 Diabetes Mellitus Among Adolescents In Ternate City, Indonesia

Ramli Ramli, Didik Kurniawan, Hamidah Rahman Rahman

100-111



361

375



Efficacy of Osteoporosis Drugs Anabolic and Antiresorptive Classes in Post Menopause Women

Ribka Carolin, Basuki Supartono, Yanto Sandy Tjang

112-123



195

171



Patient Satisfaction Of Inpatient Social Security Administrator For Health In Hospital

Ida Nurmawati, Bunga Adina Pramesti

124-133



188

202



The Effect Of Family Support On Stress Level In Muhammadiyah High School 1 Malang Students With Acne Vulgaris

Dwi Nurwulan Pravitasari; Anung Putri Illahika, Dian Yuliartha Iestari, Febriana Nur Layli, Siska Fitriana

134-143

[PDF](#)[144](#)[128](#)[DOI](#)

Correlation Between Knowledge Level On Anxiety Level Post-Coronavac Vaccine at The Clinic of dr. Irma

Marintik Ilahi, Yusrin Aulia

144-151

[PDF](#)[187](#)[151](#)[DOI](#)

Body Figure Perception And Relation With Eating Habits In Turkish Adults

Aysun Mara Uysal, Can Öner, Huseyin Cetin, Engin Ersin Simsek

152-160

[PDF](#)[131](#)[129](#)[DOI](#)

Synergistic Potential Of Bioactive Compounds Of Nut Grass Tuber Extract (Cyperusrotundus) As Anti-Leukemia Herbal Medicine

Agustini, S. M., Tri Aini Fadjrjn Juliani, Nimim, Patmawati

161-167

[PDF](#)[128](#)[102](#)[DOI](#)

Comparison Of The Effectiveness And Safety Of Anemia Epoetin Alfa With Epoetin Beta Inhemodialysis Routine Patients At Haji Rsu Surabaya

Gunawan , Anita, Hesti, Burhan

168-179

[PDF](#)[268](#)[151](#)[DOI](#)

The Effect Of Papaya Leaf Extract (Carica Papaya L) On Methemoglobin Percentage And The Number Of Erythrocyte Cells In Wistar Strain White Male Rats Induced With Sodium Nitrite

Diah Hermayanti, Hawin Nurdiana, Jessica Alda

180-190

[PDF](#)[335](#)[148](#)[DOI](#)

Pregnant Women's Factor toward Mother-to-Child Transmission of HIV practice

Prihanti Gita Sekar , Irma Nur Sukmawati, Firman Arief, Qonita Prasta A, Enggar Ayu S, Jeanny Dwi Adriyanti, Iqbal Margi S

191-203

[PDF](#)[78](#)[115](#)[DOI](#)

Template



Focus and Scope

Editorial Team



SAINTIKA MEDIKA : JURNAL ILMU KESEHATAN DAN KEDOKTERAN KELUARGA

 [UNIVERSITAS MUHAMMADIYAH MALANG](#)

 [P-ISSN : 0216759X](#) <> [E-ISSN : 2614476X](#)  [Subject Area : Health, Science](#)



0

Impact Factor



759

Google Citations



Sinta 4

Current Accreditation

 [Google Scholar](#)

 [Garuda](#)

 [Website](#)

 [Editor URL](#)

History Accreditation

2016

2017

2018

2019

2020

2021

2022

2023

2024

2025

Garuda

[Google Scholar](#)

[Antimicrobial potential of Kaffir Lime \(Citrus hystrix D.C\) peel extract against Staphylococcus aureus](#)

Universitas Muhammadiyah Malang  [Saintika Medika Vol. 18 No. 1 \(2022\): June 2022](#)

 2022  [DOI: 10.22219/sm.Vol18.SMUMM1.21112](#)  [Accred : Sinta 4](#)

[The Effect of Brain Training Game activities on Improvement of Cognitive Function measured by Montreal Cognitive Assesment Indonesia version \(MoCA-Ina\)](#)

Universitas Muhammadiyah Malang  [Saintika Medika Vol. 18 No. 1 \(2022\): June 2022](#)

 2022  [DOI: 10.22219/sm.Vol18.SMUMM1.21569](#)  [Accred : Sinta 4](#)

[Overview of Ear, Nose, and Throat Complaints of Covid 19 Inpatients at the University of Muhammadiyah Malang Hospital for the Period April 2021 to June 2021](#)




Universitas Muhammadiyah Malang  [Saintika Medika Vol. 18 No. 1 \(2022\): June 2022](#)

 2022  [DOI: 10.22219/sm.Vol18.SMUMM1.21604](#)  [Accred : Sinta 4](#)

[Pesticide Exposure to Liver Function of Farmers in Rural and Remote Areas in Indonesia: A Correlational Study](#)

Universitas Muhammadiyah Malang  [Saintika Medika Vol. 18 No. 1 \(2022\): June 2022](#)

 2022  [DOI: 10.22219/sm.Vol18.SMUMM1.17931](#)  [Accred : Sinta 4](#)

[Depression Among University Students During Covid-19 Pandemic: An Online-Based Cross-Sectional Study](#)Universitas Muhammadiyah Malang  [Saintika Medika Vol. 18 No. 1 \(2022\): June 2022](#) 2022  DOI: [10.22219/sm.Vol18.SMUMM1.18472](#)  Accred : [Sinta 4](#)[Relationship Between Disease Stadium And Quality Of Life In Parkinson's Disease Patients In The Neural Polyclinic Of Muhammadiyah University Hospital Malang](#)Universitas Muhammadiyah Malang  [Saintika Medika Vol. 18 No. 1 \(2022\): June 2022 66-71](#) 2022  DOI: [10.22219/sm.Vol18.SMUMM1.21198](#)  Accred : [Sinta 4](#)[Effect Of Gadget Usage With Digital Eye Strain \(Des\) In Students Of The Medical Faculty Muhammadiyah University Of Malang](#)Universitas Muhammadiyah Malang  [Saintika Medika Vol. 18 No. 1 \(2022\): June 2022](#) 2022  DOI: [10.22219/sm.Vol18.SMUMM1.21493](#)  Accred : [Sinta 4](#)[Comparison Between Physical Exercise and Alendronate Against Bone Calcium Levels and Body Weight In Wistar Rats Model Glucocorticoid-Induce Osteoporosis](#)Universitas Muhammadiyah Malang  [Saintika Medika Vol. 18 No. 1 \(2022\): June 2022 72-79](#) 2022  DOI: [10.22219/sm.Vol18.SMUMM1.21570](#)  Accred : [Sinta 4](#)[Relationship Of Community's Perceptions And Attitude To People With Mental Disorders Case Study In Paringan Jenangan Village, Ponorogo](#)Universitas Muhammadiyah Malang  [Saintika Medika Vol. 18 No. 1 \(2022\): June 2022 51-59](#) 2022  DOI: [10.22219/sm.Vol18.SMUMM1.21995](#)  Accred : [Sinta 4](#)[The Influence Of Sleep Patterns Based On The Sleep Disturbance Scale For Children \(Sdsc\) On The Height Of Children Aged 8-11 Years](#)Universitas Muhammadiyah Malang  [Saintika Medika Vol. 18 No. 1 \(2022\): June 2022 60-65](#) 2022  DOI: [10.22219/sm.Vol18.SMUMM1.22153](#)  Accred : [Sinta 4](#)[View more ...](#)