

References

- **Abbaspour** N., Hurrell R. and Kelishadi R (2014). Review on iron and its importance for human health. *Journal of Research Medical Science*. 19 (2):164–174.
- **Ali** E. W. and Badreldin N. S. (2013). Effectiveness of Iron Replacement Therapy in Sudanese Haemodialysis Patients Treated with Recombinant Erythropoietin. *Laboratory medicine Journal*. 1(2): 15-2.
- **Al-Mukhtar** S. E., Abd K. H., Salman S. (2006). Iron status in patients with chronic renal failure on haemodialysis. *The Iraqi postgraduate medical journal*. 5 (3): 318-324.
- **Auerbach** M. and Macdougall I. C. (2014). Safety of intravenous iron formulations facts and folklore. *Blood Transfusion*. 12 (3): 296–300.
- **Babitt** J. L. and Lin H. Y. (2012). Mechanisms of Anemia in CKD. *Journal of American society of nephrology*. 23 (10): 1631-1634.
- **Baillie** G. R., Larkina M., Goodkin D. A., Li Y., Pisoni R. L., Bieber B., Mason N., Tong L., Locatelli F., Marshall M.R., Inaba M. and Robinson B. M. (2015). Data from the Dialysis Outcomes and Practice Patterns Study validate an association between high intravenous iron doses and mortality. *Kidney international*. 87(1): 162–168.
- **Bain** B. J., Bates I., Laffan M. A. and Lewis S. M. (2011). Dacie and Lewis. 11th edition. Elsevier limited. China.
- **Banaga** A. S. I., Mohammed E. B., Siddig R. M., Salama D. E., Elbashir S. B., Khojali M. O., Babiker R. A., Elmusharaf

- K. and Homeida M. M. (2015). Causes of end stage renal failure among haemodialysis patients in Khartoum State/Sudan. *Bio med central*. 8: 502.
- **Beck** N. (2009). Diagnostic hematology. First edition. Springer-Verlag. London.
 - **Bentley** M. L. and Tolwani A. J. (2012). comprehensive Critical Care Adult. Second edition. Society of critical care medicine. USA.
 - **Bogdan** M. J. and Zon L. I. (2013) Hematopoiesis. *Development*. 140 (12): 2463-2467.
 - **Camaschella** C. and Poggiali E. (2009). Towards explaining unexplained hyperferritinemia. *Haematological*. 94(3): 307–309.
 - **Corr** C. (2007). A new normal life on dialysis the first 90 days. First eddition. National Kidney Foundation. New York.
 - **Fishbane** S., Mathew A., Vaziri N. D. (2013). Iron toxicity Relevance for dialysis patients. *Nephrology Dialysis Transplantation*. 129 (2): 255-264.
 - **Francesco** L. D., Lucia D. V., Hörl W., London G., Vanholder R. and Biesen W. V. (2013). Kidney Disease Improving Global Outcomes guidelines on anaemia management in chronic kidney disease a European Renal Best Practice position statement. *Nephrology Dialysis Transplantation*. 28 (6): 1346-1359.
 - **Fuller** D. S., Pisoni R. L., Bieber B. A., Port F. K. and Robinson B. M. (2013). The DOPPS Practice Monitor for US Dialysis Care: Update on trends in anemia management 2 years into the bundle. *American journal of kidney disease*. 62 (6): 1213–1216.
 - **Gangat** N. and Wolanskyj A. P. (2013). Anemia of Chronic Disease. *Seminars in Haematology*. 50 (3):232-238.

- **Ganz T.** (2013). Systemic Iron Homeostasis. *Physiological Review* . 93 (4): 1721-1741.
- **Goldberg I.** and Krause I. (2016). The Role of gender in chronic kidney disease. *Emergency medicine journal*. 1 (2): 58-64.
- **Hakim Y. A. H., Abbas A. A., Khalil A., Ibrahim H. and Mustafa A.** (2016). The effect of hemodialysis on hemoglobin concentration, platelets count and white blood cells count in end stage renal failure. *International Journal of Medical Research & Health Sciences*. 5: 22 -35.
- **Hasegawa M., Kawamura N., Koide S., Murase M., Asano S., Toba T., Kushimoto H., Murakami K., Tomita M., Hasegawa H., Shikano M., Mizuno M., Funahashi N., Kawashima S., Sugiyama S.**(2002). Evaluation of reticulocyte hemoglobin content, percentage of hypochromic red blood cells, and ratio of serum transferrin receptor level/serum iron level as markers of iron deficiency erythropoiesis in patients undergoing hemodialysis. *Nihon Jinzo Gakkai Shi*. 44 (5):453-63.
- **Hattangadi S. M., Wong P., Zhang L., Flygare J. and Lodish H. F.** (2011). From Stem cells to red cells. *Blood journal*. 118 (24): 6258–6268.
- **Hayat A., Haria D., and Salifu M. O.** (2008). Erythropoietin stimulating agents in the management of anemia of chronic kidney disease. *Patient preference and adherence*. 2: 195–200.
- **Higgs D. R. and Wood W. G.** (2011). Erythropoiesis in Post graduate hematology. 6th edition. Blackwell Publishing John Wiley & Sons Ltd. UK.
- **Hoffbrand A. V., Moss, P. A. H and Pettit I. E.** (2006). essential hematology. 5th edition. Black well Publishing Ltd. UK.

- **Hörl W. H.** (2007). Clinical Aspects of Iron Use in the Anemia of Kidney Disease. *Journal of American Society of Nephrology*. 18 (2): 382-393.
- **Jha V., Garcia G., Iseki K., Naicker S., Plattner B., Saran R., Wang A. Y., Yang C.** (2013). Chronic kidney disease global dimension and perspectives. *The lancet journal*. 382 (9888): 260–272.
- **Jing Z. Weijie Y., Nan Z., Yi Z. and Ling W.** (2012). Hemoglobin Targets for Chronic Kidney Disease Patients with Anemia a systematic review and meta-analysis. *Peer reviewed open access scientific journal*. 7 (8): 436-455.
- **Jonathan J. and Taliercio D. O.** (2010). Anemia and chronic kidney disease what's the connection. *The journal of Family Practice*. 59(1):14-18.
- **Kaufmann K. R. and Venkat , K.** (2006). The End-Stage Renal Disease Patient on Dialysis. *American Journal of Emergency Medicine*. 24 (7): 847 – 858.
- **Kidney Disease Initiative Global Outcomes KDIGO** (2012). Clinical Practice Guideline for Anemia in Chronic Kidney Disease. 2 (4): 283–287.
- **Kim C. H.** (2010). Homeostatic and pathogenic extramedullary hematopoiesis. *Journal of blood medicine*. 1: 13–19.
- **Kliger A. S., Foley R. N., Goldfarb D. S., Goldstein S. L., Johansen K., Singh A. and Szczech L.** (2013). KDOQI US commentary on the 2012 KDIGO clinical practice guideline for anemia in CKD. *American Journal of Kidney Diseases*. 62 (5): 849–859.

- **Levey A. S., Coresh J., Balk E., Kausz A. T., Levin A., Steffes M. W. Hogg R. J. and Perrone R. D. (2003).** National kidney foundation practice guidelines for chronic kidney disease: evaluation, classification, and stratification. *Annals of internal Medicine*. 139 (2): 137-147.
- **Locatelli F., Bárány P., Covic A., Francisco A. D., Vecchio L. D., Goldsmith D., Hörl W., London G., Vanholder R. and Biesen W. V. (2013).** Kidney Disease improving global outcomes guidelines on anaemia management in chronic kidney disease. *Nephrology dialysis transplantation*. 28 (6): 1346-1359.
- **Macdougall I. C., Bircher A. J., Eckardt K., Gregorio T. O., Carol A., Stenvinkel P., Swinkels D. W., Christopher W. , Weiss G. and Chertow G. M. (2016).** Iron management in chronic kidney disease conclusions from a kidney disease improving global outcomes. *Kidney International*. 89: 28–39.
- **Macdougall I. C. And Geisser P. (2013).** Use of intravenous iron supplementation in chronic kidney disease: an update. *Iran journal of kidney disease*. 7 (1): 9-22.
- **Marengo A. J. (2006).** Structure-function relations of human hemoglobins. *Baylor univercity Medical Center journal*. 19 (3):239–245.
- **Metzgeroth G. and Hastka J. (2015).** Iron deficiency anemia and anemia of chronic disorders. *Internist berl journal*. 56 (9): 978-88.
- **Moini J. (2016).** Anatomy and Physiology for Health Professionals. Second edition. Jones & Bartlett Publishers. USA.

- **National Kidney Foundation** (2006). Clinical Practice Guidelines and Clinical Practice recommendations. Amgen. New York.
- **National collaborating center for chronic condition** (2006). Anemia management in chronic kidney disease. 1st edition. Royal collage of physicians. London.
- **Neild G. H.** (2016). Life expectancy with chronic kidney disease. *Pediatric nephrology*. 32 (2): 243–248.
- **Nowrousian M. R.** (2008). Recombinant Human Erythropoietin (rhuEPO) in Clinical Oncology. 1st edition. Springer publishing. New York.
- **Philpott D.** (2015). Critical Government Documents on Health Care. 1st edition. Published by Bernan press. London.
- **Rafi A., Karkar A. and Abdelrahman M.** (2007). Monitoring Iron status in End-Stage Renal Disease Patients on Hemodialysis. *Saudi journal of kidney disease and transplantation*. 18 (1): 73-78.
- **Reddy G. C., Devaki R., and Rao P.** (2013). Iron Indices in Patients with Functional Anemia in Chronic Kidney Disease. The journal of the international federation of clinical chemistry and laboratory medicine.. 24(3): 129–136.
- **Remacha A., Sanz C., Contreras E., Heredia C. D., Grifols J. R., Lozano M., Nuñez G. M., Salinas R., Corral M. and Villegas A.** (2013). Guidelines on haemovigilance of post-transfusional iron overload. *Blood Transfusion journal*. 1 (1): 128–139.
- **Rostoker G., Griuncelli M., Lorida C., Magna T., Jankiewicz P., Drahi G., Dahan H., and Cohen Y.** (2014). Maximal Standard Dose of Parenteral Iron for Hemodialysis Patients: An MRI-based decision tree learning analysis. *PLOS one journal*. 9 (12): e115096.

- **Schmidt R. J.** and Dalton C. L. (2007). Treating anemia of chronic kidney disease in the primary care setting: cardiovascular outcomes and management recommendations. *Osteopathic medical primary care*. 1: 14.
- **Shephard M.** (2016). A practical guide to global point-of-care testing. Csir publishing. Japan-Kopa.
- **Solomon E. P.** (2016). Introduction to Human Anatomy and Physiology. 4th edition. Saunders Elsevier. Philadelphia. USA.
- **Stam L. E.** (2010). 100 Questions & Answers About Kidney Dialysis. 1st edition. Jones and Bartlett publisher. New York.
- **Stauffer M. E.** and Fan T. (2014). Prevalence of anemia in chronic kidney disease in the United States. *PLOS one journal*. 9 (1): e84943.
- **Stein J.,** Connor S., Virgin G., Huiong D. E. and Pereyra L. (2016). Anemia and iron deficiency in gastrointestinal and liver conditions. *World journal of gastroenterology*. 22(35): 7908–7925.
- **Stevens L. A.,** Coresh J., Greene T. and Levey A. S.(2006). Assessing Kidney Function Measured and Estimated Glomerular Filtration Rate. *New england journal of medicine*. 354:2473-2483
- **Strasinger S. K.,** Di Lorenzo M. S. (2008). Urine analysis and body fluid. 5th ed. F. A. Davis Company. Philadelphia.
- **Taliercio J. J.** (2010). Anemia and chronic kidney disease What's the connection. *journal of Family Practice*. 59 (1): 14-18.
- **Tandara L.** and Salamunic,I. (2012). Iron metabolism current facts and future directions. *Biochemical medicine journal*. 22 (3): 311–328.

- **Triolo G.** (2003). Guidelines for the treatment of anemia in chronic renal failure. *Journal Italiano nephrology*. 24: 61-82.
- **Turgeon M. L.** (2012). Clinical Hematology. 5TH edition. Lippincott Williams & Wilkins, a Wolters Kluwer business. Philadelphia.
- **Vecchio L. D., Songhi L. and Locatelli F.** (2016). Safety concerns about intravenous iron therapy in patients with chronic kidney disease. *Clinical kidney journal*. 9 (2): 260–267.
- **Wang J. and Pantopoulos K.** (2011). Regulation of cellular iron metabolism. *Bio chemical journal*. 434 (Pt 3): 365–381.
- **Weiss G. and Goodnough, L.T.** (2005), Anemia of Chronic Disease. *New England Journal of Medicine*. 352:1011-1023.
- **Weiner D.E.** (2007). Causes and Consequences of Chronic Kidney Disease implications for Managed Health Care. *Journal of Managed Care Pharmacy*. 13 (3): 1-9.
- **World Health Organisation** (2014). World health rankings live longer live better. [<http://www.worldlifeexpectancy.com/sudan-kidney-disease>].
- **World Health Organization** (2011). Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Vitamin and Mineral Nutrition Information System. Fact sheet [<http://www.who.int/vmnis/indicators/haemoglobin/en/>].

Appendix I

Materials and equipments:

Disposable syringes

Cotton.

70% ethanol.

Di-Potassium Ethylene Diamine-Tetracetate (EDTA) containers.

Sterile plain containers.

Sterile Eppendorf containers.

Sterile blue tips.

Sterile yellow tips.

D.W.

Automated pipette.

Centrifuge.

Bio system 350 semi automated spectrophotometer.

.

Appendix II

بسم من رفع السماء

Sudan university of science and technology

Collage of graduate studies and health research

Faculty of medical laboratory science

Questionnaire

Patient No ()

General information:

Age:.....

Gender: Male__ Female__

Duration of hemodialysis:.....

Frequency of hemodialysis:.....session | week

Other medical illness:.....

Medication:

Type of iron supplement:..... Dose:.....mg | week

Route: IV_____ Oral_____

Duration.....

Erythropoietin therapy:..... Dose:.....Unit | week.

Duration.....

أقر أنا..... بالموافقة على اخذ عينة من
الدم لإجراء فحص الحديد , علما بأنه تم اطلاعي على جميع أهداف البحث.

التوقيع..... رقم الهاتف.....

Result:

CBC:

RBCS:..... Hb:..... PCV:..... WBCS.....
Platelets..... MCV:..... MCH:..... MCHC:.....

Iron profile:

Ferritin:..... S.iron:..... TIBC:.....
Transferrin saturation:.....

Appendix III



Semi automatic biochemistry analyzer, biosystem BTS 350

Available online from: http://img.medicaexpo.com/images_me/photo-g/75772-6350351.jpg.

Appendix IV



Hemodialysis machine.

Available online from:

<https://i.ytimg.com/vi/wjI0z9yUrmM/hqdefault.jpg>